COMPUTER SCIENCE

11th STANDARD

1-MARKS, SHORT Q&A, DETAILS Q&A

STUDY MATERIAL

NAME : _____

SCHOOL: _____

_____

Prepared By

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UNIT I - FUNDAMENTALS OF COMPUTER AND WORKING WITH A TYPICAL OPERATING SYSTEMS (WINDOWS & LINUX)

CHAPTER – 1 INTRODUCTION TO COMPUTER

Choose the correct answer:

1. First generation computer _____ component is used
   a. Vacuum tubes b. Transistors
   c. Integrated circuits d. Microprocessors
2. Name the volatile memory
   a. ROM b. PROM **c. RAM** d. EPROM
3. Identify the output device
   a. Keyboard b. Memory **c. Monitor** d. Mouse
4. Identify the input device
   a. Printer **b. Mouse** c. Plotter d. Projector
5. _____ Output device is used for printing building plan, flex board, etc.
   a. Thermal printer **b. Plotter** c. Dot matrix d. inkjet printer
6. In ATM machines, which one of the following is used to _____.
   a. Touch Screen b. speaker c. Monitor d. Printer
7. When a system restart _____ which type of booting is used.
   a. Warm booting b. Cold booting c. Touch boot d. Real boot.
8. Expand POST
   a. Post on self Test b. Power on Software Test
   c. Power on Self Test d. Power on Self Text
9. Which one of the following is the main memory?
   a. ROM **b. RAM** c. Flash drive d. Hard disk
10. Which generation of computer used IC's?
    a. First b. Second **c. Third** d. Fourth
11. _____ Example of First Generation Computer.
    a. IBM 1401 b. VLSI c. IBM 360 Series **d. ENIAC**
12. Which of the following led us today to extremely high speed calculating device?
    a. Laptop b. Tabulating machine c. Abacus **d. ENIAC**
13. _____ Languages used in Third generation Computer.
    a. Machine Level b. Object Code
    c. High Level d. Assembly Level
14. _____ Example is not in First Generation Computer.
    a. IBM 1401 b. EDVAC c. UNVAC1 d. ENIAC
15. In second generation _____ component is used.
    a. IC's b. Microprocessor **c. Transistor** d. Vacuum tubes
16. _____ Example of Second Generation Computer.
    a. IBM 1401 b. EDVAC c. UNVAC d. ENIAC
17. _____ is defined as an unprocessed collection.
    a. Datum **b. Data** c. Process d. Project
18. _____ Example is not in Second Generation Computer.
    a. IBM 1401 b. UNVAC1108 c. IBM 360 Series **d. UNIVA1**
19. The CPU has _____ components in Computer.
    a. 2 b. 4 **c. 3** d. 5
20. _____ Device is used to insert the Alpha-Numeric data into Computer.
    a. Mouse b. Printer c. Monitor **d. Keyboard**
21. Which of the following is a Third generation of computer?
    a. IBM1620 b. ENIAC
    c. UNIVAC1 d**. Honeywell 6000 series**
22. _____ memory is a Volatile.
    a. Primary b. PROM c. Secondary d. ROM

23. The _____ converts any type of printed or written information including photographs into a digital format.
a. Monitor **b. Scanner**
c. Printer d. Digital Camera

24. A _____ is a device for signaling by hand, by way of pressing one or more switches.
a. Keyboard b. Printer **c. Keyer** d. Touch Screen

25. Pictures on a monitor are formed with picture elements called _____.
a. Points b. Dots c. inches **d. Pixels**

26. A _____ printer that prints using a fixed number of pins or wires.
a. Laser b. Ink Jet c. Plotter **d. Dot-matrix**

27. _____ are used to produce computer output on a big screen.
a. Monitors b. Touch Screen
c. Plotter **d. Multimedia Projector**

28. An _____ is a basic software that makes the computer to work.
a. Ms-Office b. Ms-Paint **c. Operation System** d. Note Pad

29. Booting process has _____ Types.
a. 3 **b. 2** c. 5 d. 1

30. _____ is the physical component of a computer.
a. Software b. Application **c. Hardware** d. Power

31. "An act of Calculating" means _____.
a. Computing b. Arithmetic c. numbers d. calculations

32. _____ is the first known calculating machine counting.
a. Analytical Engine b. Abacus
c. Calculator d. Computer

33. Super Conductors are used in _____ generation.
a. Fourth b. Second **c. Fifth** d. Third

34. Which software used in fifth generation computer?
a. Artificial Neural Network **b. Artificial Intelligence**
c. Robotics d. Machine language

35. The first generation computers were used between _____.
a.1940 – 1955 b. 1941 – 1956 **c. 1942 – 1955** d. 1941- 1955

36. The first generation computers used _____ for memory.
a. Magnetic circuitry **b. Magnetic drums**
c. Magnetic tubes d. Magnetic buses

37. Transistors were made smaller in size and placed on _____ chips.
a. Integrated **b. Silicon** c. Magnetic d. Circuit

38. The primary memory is _____ in nature.
a. Peripheral **b. Volatile** c. Non- Volatile d. Main memory

39. The second generation computers were used between _____.
a. 1954 – 1964 b. 1951 – 1966 c. 1950 – 1956 d. 1961- 1965

40. The third generation computers were used between _____.
a. 1964 – 1975 b. 1961 – 1971 c. 1960 – 1975 **d. 1964- 1975**

41. The fourth generation computers were used between _____.
a.1975 – 1980 b. 1971 – 1981 c. 1970 – 1975 d. 1974- 1985

42. ____ is the major component which interprets and executes software instructions.
a. Input unit b. Output unit c. Memory **d. CPU**

43. In _____ Mouse uses Laser Light.
a. Optical b. Mechanical **c. Laser** d. Air

44. _____ types of Printer in the categories.
a. 3 **b. 2** c. 4 d.1

45. Laser printer print _____ pages per minutes.
a. 100 b.150 c. 80 d. 120

46. Line printers are capable of printing much more than _____ Lines Per Minute.
a. 1500 **b. 1000** c. 500 d. 800

47. _____is the physical component of a computer.
a. Hardware b. Software c. Application d. Picture
48. The speed of Inkjet printers generally range from _____ Page Per Minute.
a. 1-10 b. 1-15 c. 15-20 **d.1-20**
49. _____ serves as a voice Input device.
a. Speakers b. Scanner c. Printer **d. Microphone**
50. _____ is the set of programs or instructions.
a. Hardware **b. Software** c. Application d. Picture
51. The computer mouse as we know it today was invented and developed by _____.
a. Douglas Engelbart b. Douglas Lee c. Charles Babbage d. Napier
52. Third generation computers, used_____
a. Vacuum Tube b. Transistor
c. Integrated Circuit d. Micro Processor
53. When the system starts from initial state _____
a. Computing **b. Cold Booting** c. Warm Booting d. BIOS
54. When the system restarts or when reset button is pressed, we call it _____.
a. Computing b. Cold Booting **c. Warm Booting** d. BIOS
55. The _____ is the combination of hardware and software.
a. Calculator **b. Computer** c. ALU d. CPU
56. CPU interprets and executes software instructions.
a. CPU b. ALU c. monitor d. mouse
57. The processing is performed by the_____
a. software b. information c. data d. hardware
58. Which of the following is not a input device?
a. Keyboard b. Mouse c. Scanners **d. Printers**
59. _____ Printers use color cartridges.
a. Laser b. Dot Matrix c. Thermal **d. Inkjet**
60. _____ is used to feed any form of data to the computer.
a. Output Unit b. Processing c. Memory Unit **d. Input Unit**
61. _____unit is used to Display the data.
a. Output Unit b. Processing c. Memory Unit d. Input Unit
62. _____ is used to Store the data into to the computer.
a. Output Unit b. Processing **c. Memory Unit** d. Input Unit
63. Main Memory is also called _____.
a. Secondary memory b. Main memory
c. CPU d. Cache memory.
64. Optical Mouse invented in the year _____.
a. 1968 b. 1973 **c. 1988** d. 1981
65. Laser mouse has as many as ____ buttons. a. 4 **b. 3** c. 1 d. 2
66. Who invented the computer mouse?
a. Douglas Engelbart b. Bill English c. Apple Lisa d. Henry Babbage
67. Which device works like a Xerox machine?
a. Retinal scanner b. OCR c. OMR **d. Scanner**
68. Which device is very safe and convenient for security instead of password?
a. Scanner **b. Finger scanner** c. Track Ball d. Retinal scanner
69. Which device similar to the upside – down design of the mouse?
a. Mouse b. Optical Mouse c. Laser Mouse **d. Retinal Scanner**
70. _____ detect alpha numeric characters printed or written on a paper.
a. Scanner b. Mouse
c. Trace Ball **d. Optical Character Reader**
71. Which of the following device uses CCD Electronic Chip?
a. Digital Camera b. OCR c. MICR d. Voice Input System
72. Input → _____ → Output
a. Data b. Information **c. Process** d. Computer
73. Printers are basically classified into _____ types.

a. 3 **b. 2** c. 4 d. 5

74. How many classification of memories in memory unit?
a. 2 b. 4 c.5 d. more than 2

75. How many types of keyboards used to input the data? a. 2 b. 4 **c. 3** d. 5

76. Which of the following Mouse type used Green LED?
a. Mechanical **b. Optical** c. Laser d. None of those

77. Which of the following Mouse type used Infrared LED?
a. Mechanical b. Optical **c. Laser** d. None of those

78. Which mouse has as many as 12 buttons?
a. Laser b. Optical c. Mechanical **d. Both a & b**

79. The mechanical mouse introduced in the year.
a. 1978 b.1988 **c. 1968** d. 1958

80. The first computer Monitor was released in the year _____
a. 1974 b. 1972 c. 1971 **d. 1973**

81. Which of the following is an impact printer?
a. Inkjet b. Fax **c. Dot Matrix** d. Laser

82. How many buses available inside the CPU? a. 4 **b. 3** c. 2 d. many

83. In which bus the data can travel in single direction?
a. Address bus b. Data Bus c. Control Bus d. Universal Bus

ABBREVIATION:

- ALU – Arithmetic Logic Unit
- CPU – Central Processing Unit
- CU – Control Unit
- IC – Integrated Circuits
- GUI - Graphical User Interface
- VLSI - Very Large Scale Integrated Circuits.
- ULSI – Ultra Large Scale Integration
- ENIAC- Electronic Numerical Integrator And Calculator
- NLP - Natural Language Processing
- AI - Artificial Intelligence
- RAM – Random Access Memory
- ROM – Read Only Memory
- QR – Quick Response
- OCR – Optical Character Reader
- CCD - Charge Coupled Device
- CRT - Cathode Ray Tube
- LCD - Liquid Crystal Display
- LED - Light Emitting Diode
- VGA - Video Graphics Array
- CPS - Character Per Second
- PIXEL – Picture Element
- CPS - Character Per Second
- DPI - Dots Per Inch
- PPM - Page Per Minute
- POST - Power on Self Test
- BIOS - Basic Input Output System
- OS - Operating system

Question and Answer:

1. What is a Computer?

A **computer** is an electronic device that manipulates information, or data. It has the ability to store, retrieve, and process data.
Computer works faster than human being and given the values more accuracy and reliable.

2. Write about Charles Babbage.

- Is considered to be the **father of computer**.
- His invention and the concept of **Analytical Engine in 1837**.
- The Analytical Engine contained an Arithmetic Logic Unit (ALU), basic flow control, and integrated memory; which led to the development of first general - purpose computer concept.

3. What are the Characteristics of Computer?

Computer is the powerful machine. It can perform large number of tasks. The main capacities of computer are work length, speed accuracy, diligence, versatility memory and automation and lots of more tasks.

4. Write the Generation of Computer.

First Generation	1942-1955	**Vacuum tubes**
Second Generation	1955-1964	**Transistors**
Third Generation	1964-1975	**Integrated Circuits (IC)**
Fourth Generation	1975-1980	**Microprocessor** Very Large Scale Integrated Circuits (VLSI)
Fifth Generation	1980 – till date	Ultra Large Scale Integration (ULSI)
Sixth Generation	In future	

5. The first digital computer

The ENIAC (Electronic Numerical Integrator And Calculator) was invented by J. Presper Eckert and John Mauchly.
It occupied about 1,800 square feet and used about 18,000 vacuum tubes, weighing almost 50 tons. ENIAC was the first digital computer because it was fully functional.

6. Write the Applications of computer.

A computer has high speed of calculation, diligence, accuracy, reliability, or versatility which made it an integrated part of our life as well as business organisations. Computers are being used almost every walk of life.

7. Write the functions of Arithmetic and Logic Unit

The ALU is a part of the CPU where various computing functions are performed on data. The ALU performs arithmetic operations such as addition, subtraction, multiplication, division and logical operations. The result of an operation is stored in internal memory of CPU. The logical operations of ALU promote the decision-making ability of a computer.

8. Write the significant features of Monitor.

Monitor is the most commonly used output device to display the information. It looks like a TV. Pictures on a monitor are formed with picture elements called PIXELS. Monitors may either be Monochrome which display text or images in Black and White or can be color, which display results in multiple colors.

There are many types of monitors available such as CRT (Cathode Ray Tube), LCD (Liquid Crystal Display) and LED (Light Emitting Diodes). The monitor works with the VGA (Video Graphics Array) card.

The video graphics card helps the keyboard to communicate with the screen. It acts as an interface between the computer and display monitor. Usually the recent motherboards incorporate built-in video card.

9. Distinguish between Data and Information.

Data:

Data is defined as an unprocessed collection of raw facts, suitable for communication, interpretation or processing.

For example: 134, 16, 'Kavitha', 'C' is data. This will **not give any meaningful message.**

Information:

Information is a collection of facts from which conclusions may be drawn. In simple words we can say that data is the raw facts that are processed to give meaningful, ordered or structured information.

For Example: Kavitha is 16 years old. This information is about Kavitha **and conveys some meaning**. This conversion of data into information is called data processing.

10. Write the Components of a Computer.

1. Input Unit 2.Central Processing Unit (Control Unit, Arithmetic Logic Unit, Memory Unit) 3.Output Unit

11. Write about Input Unit and Output Unit.

Input Unit

Input unit is used to feed any form of data to the computer, which can be stored in the memory unit for further processing. **Example: Keyboard, mouse, etc.**

Output Unit

An Output Unit is any hardware component that conveys information to users in an understandable form. **Example: Monitor, Printer etc.**

12. Write about the Central Processing Unit.

CPU is the major component which interprets and executes software instructions. It also controls the operation of all other components such as memory, input and output units. It accepts binary data as input process the data according to the instructions and provides the result as output.

The CPU has three components which are Control unit, Arithmetic and logic unit (ALU) and Memory unit.

13. Write about Arithmetic and Logic Unit.

The ALU is a part of the CPU where various computing functions are performed on data. The ALU performs arithmetic operations such as addition, subtraction, multiplication, division and logical operations. The result of an operation is stored in internal memory of CPU.

The logical operations of ALU promote the decision-making ability of a computer**.**

14. Write about Control Unit.

The control unit controls the flow of data between the CPU, memory and I/O devices. It also controls the entire operation of a computer.

15. Write about Memory Unit / Storage Unit.

The Memory Unit is of two types which are primary memory and secondary memory. The primary memory is used to temporarily store the programs and data when the instructions are ready to execute. The secondary memory is used to store the data permanently.

16. Distinguish between Primary memory and Secondary Memory.

- The **Primary Memory** is volatile, that is, the content is lost when the power supply is switched off.
- The Random Access Memory (RAM) is an example of a main memory.
- The **Secondary memory** is non volatile, that is, the content is available even after the power supply is switched off.
- Hard disk, CD-ROM and DVD ROM are examples of secondary memory.

17. List out the Types of Input Devices.

Keyboard, Mouse, Scanners, Track Ball, Optical Character Reader, Input Voice System, Light Pen, Bar Code / QR Code Reader, Digital Camera, Touch Screen, Keyer are the Input Devices.

18. List out the Types of Output Devices.

Monitors, Printers, Speakers, Plotter, Multimedia Projectors are the Output Devices.

19. Difference between Optical and Laser Mouse

Optical Mouse	Laser Mouse
• Measures the motion and acceleration of pointer. • It uses light source instead of ball to judge the motion of the pointer. • Optical mouse has three buttons. • Optical mouse is less sensitive towards surface.	• Measures the motion and acceleration of pointer. • Laser Mouse uses Laser Light. • Laser Mouse is highly sensitive and able to work on any hard surface.

20. Write about Sixth Generation Computer.

In the Sixth Generation, computers could be defined as the era of intelligent computers, based on Artificial Neural Networks. One of the most dramatic changes in the sixth generation will be the explosive growth of Wide Area Networking. Natural Language Processing (NLP) is a component of Artificial Intelligence (AI). It provides the ability to develop the computer program to understand human language.

Answer the Detail Question:

1. Explain the Generation of Computer

Generation	Period	Main Component used	Merits/Demerits
First Generation	1942-1955	**Vacuum tubes**	• Big in size • Consumed more power • Malfunction due to overheat • Machine Language was used
First Generation Computers - ENIAC , EDVAC , UNIVAC 1 ENIAC weighed about 27 tons, size 8 feet × 100 feet × 3 feet and consumed around 150 watts of power			
Second Generation	1955-1964	**Transistors**	• Smaller compared to First Generation • Generated Less Heat • Consumed less power compared to first generation • Punched cards were used • First operating system was developed - Batch Processing and Multiprogramming Operating System

			• Machine language as well as Assembly language was used.
Second Generation Computers **IBM 1401, IBM 1620, UNIVAC 1108**			
Third Generation	1964 -1975	**Integrated Circuits (IC)**	• Computers were smaller, faster and more reliable • Consumed less power • High Level Languages were used
Third Generation Computers **IBM 360 series, Honeywell 6000 series**			
Fourth Generation	1975-1980	**Microprocessor** Very Large Scale Integrated Circuits (VLSI)	• Smaller and Faster • Microcomputer series such as IBM and APPLE were developed • Portable Computers were introduced.
Fifth Generation	1980 - till date	**Ultra Large Scale Integration (ULSI)**	• Parallel Processing • Super conductors • Computers size was drastically reduced. • Can recognize Images and Graphics • Introduction of Artificial Intelligence and Expert Systems • Able to solve high complex problems including decision making and logical reasoning
Sixth Generation	In future		• Parallel and Distributed computing • Computers have become smarter, faster and smaller • Development of robotics • Natural Language Processing • Development of Voice Recognition Software

2. Explain the Input and Output Devices.

Input Devices:

(1) Keyboard:

Keyboard (wired / wireless, virtual) is the most common input device used today. The individual keys for letters, numbers and special characters are collectively known as character keys. This keyboard layout is derived from the keyboard of original typewriter. The data and instructions are given as input to the computer by typing on the keyboard. Apart from alphabet and numeric keys, it also has Function keys for performing different functions. There are different set of keys available in the keyboard such as character keys, modifier keys, system and GUI keys, enter and editing keys, function keys, navigation keys, numeric keypad and lock-keys.

(2) Mouse:

Mouse (wired/wireless) is a pointing device used to control the movement of the cursor on the display screen. It can be used to select icons, menus, command buttons or activate something on a computer. Some mouse actions are move, click, double click, right click, drag and drop.

(3) Scanner:

Scanners are used to enter the information directly into the computer's memory. This device works like a Xerox machine. The scanner converts any type of printed or written information including photographs into a digital format, which can be manipulated by the computer.

(4)Fingerprint Scanner:

Finger print Scanner is a fingerprint recognition device used for computer security, equipped with the fingerprint recognition feature that uses biometric technology. Fingerprint Reader / Scanner is a very safe and convenient device for security instead of using passwords, which is vulnerable to fraud and is hard to remember.

(5) Track Ball:

Track ball is similar to the upside- down design of the mouse. The user moves the ball directly, while the device itself remains stationary. The user spins the ball in various directions to navigate the screen movements.

(6) Retinal Scanner:

This performs a retinal scan which is a biometric technique that uses unique patterns on a person's retinal blood vessels.

(7) Light Pen:

A light pen is a pointing device shaped like a pen and is connected to a monitor. Te tip of the light pen contains a light-sensitive element which detects the light from the screen enabling the computer to identify the location of the pen on the screen. Light pens have the advantage of 'drawing' directly onto the screen, but this becomes hard to use, and is also not accurate.

(8) Optical Character Reader:

It is a device which detects characters printed or written on a paper with OCR, a user can scan a page from a book. The Computer will recognize the characters in the page as letters and punctuation marks and stores. The Scanned document can be edited using a word processor.

(9) Bar Code / QR Code Reader:

A Bar code is a pattern printed in lines of different thickness. Te Bar code reader scans the information on the bar codes transmits to the Computer for further processing. Te system gives fast and error free entry of information into the computer. QR (Quick response) Code: The QR code is the two dimension bar code which can be read by a camera and processed to interpreter the image

(10) Voice Input Systems:

Microphone serves as a voice Input device. It captures the voice data and sends it to the Computer. Using the microphone along with speech recognition software can offer a completely new approach to input information into the Computer.

(11) Digital Camera:

It captures images / videos directly in the digital form. It uses a CCD (Charge Coupled Device) electronic chip. When light falls on the chip through the lens, it converts light rays into digital format.

(12) Touch Screen:

A touch screen is a display device that allows the user to interact with a computer by using the finger. It can be quite useful as an alternative to a mouse or keyboard for navigating a Graphical User Interface (GUI). Touch screens are used on a wide variety of devices such as computers, laptops, monitors, smart phones, tablets, cash registers and information kiosks. Some touch screens use a grid of infrared beams to sense the presence of a finger instead of utilizing touch-sensitive input.

(13) Keyer:

A Keyer is a device for signaling by hand, by way of pressing one or more switches. Modern keyers have a large number of switches but not as many as a full size keyboard. Typically, this number is between 4 and 50. A keyer differs from a keyboard, which has "no board", but the keys are arranged in a cluster.

Output Devices:

(1) Monitor:

Monitor is the most commonly used output device to display the information. It looks like a TV. Pictures on a monitor are formed with picture elements called PIXELS. Monitors may either be Monochrome which display text or images in Black and White or can be color, which display results in multiple colors. There are many types of monitors available such as CRT (Cathode Ray Tube), LCD (Liquid Crystal Display) and LED (Light Emitting Diodes). The monitor works with the VGA (Video Graphics Array) card. The video graphics card helps the keyboard to communicate with the screen. It acts as an interface between the computer and display monitor. Usually the recent motherboards incorporate built-in video card.

The first computer monitor was part of the Xerox Alto computer system, which was released on March 1, 1973.

(2) Plotter:

Plotter is an output device that is used to produce graphical output on papers. It uses single color or multi color pens to draw pictures.

(3) Printers:

Printers are used to print the information on papers. Printers are divided into two main categories:

- Impact Printers
- Non Impact printers

Impact Printers

These printers print with striking of hammers or pins on ribbon. These printers can print on multi-part (using carbon papers) by using mechanical pressure. For example, Dot Matrix printers and Line matrix printers are impact printers. A Dot matrix printer that prints using a fixed number of pins or wires. Each dot is produced by a tiny metal rod, also called a "wire" or "pin", which works by the power of a tiny electromagnet or solenoid, either directly or through a set of small levers. It generally prints one line of text at a time. Te printing speed of these printers varies from 30 to 1550 CPS (Character Per Second).

Line matrix printers use a fixed print head for printing. Basically, it prints a page-wide line of dots. But it builds up a line of text by printing lines of dots. Line printers are capable of printing much more than 1000 Lines Per Minute, resulting in thousands of pages per hour. These printers also uses mechanical pressure to print on multi-part (using carbon papers).

Non-Impact Printers

These printers do not use striking mechanism for printing. They use electrostatic or laser technology. Quality and speed of these printers are better than Impact printers. For example, Laser printers and Inkjet printers are non-impact printers.

Laser Printers

Laser printers mostly work with similar technology used by photocopiers. It makes a laser beam scan back and forth across a drum inside the printer, building up a pattern. It can produce very good quality of graphic images. One of the chief characteristics of laser printer is their resolution – how many Dots per inch(DPI). The available resolution range around 1200 dpi. Approximately it can print 100 pages per minute(PPM).

Inkjet Printers:

Inkjet Printers use colour cartridges which combined Magenta, Yellow and Cyan inks to create color tones. A black cartridge is also used for monochrome output. Inkjet printers work by spraying ionized ink at a sheet of paper. Te speed of Inkjet printers generally range from 1-20 PPM (Page Per Minute).

They use the technology of firing ink by heating it so that it explodes towards the paper in bubbles or by using piezoelectricity in which tiny electric currents controlled by electronic circuits are used inside the printer to spread ink in jet speed. An Inkjet printer can spread millions of dots of ink at the paper every single second.

Speakers:

Speakers produce voice output (audio) . Using speaker along with speech synthesize software, the computer can provide voice output. This has become very common in places like airlines, schools, banks, railway stations, etc..

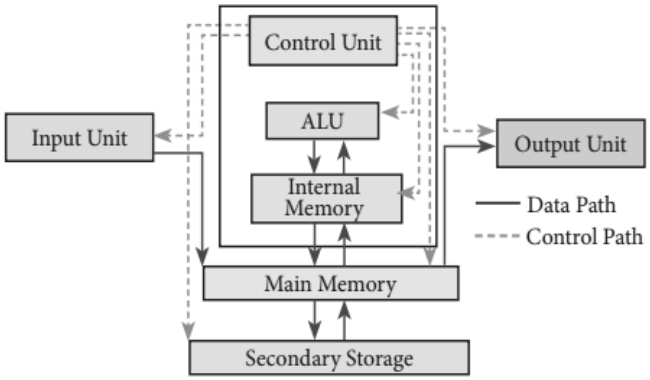
Multimedia Projectors:

Multimedia projectors are used to produce computer output on a big screen. These are used to display presentations in meeting halls or in classrooms.

3. Explain the Components of a Computer

The computer is the combination of hardware and software. Hardware is the physical component of a computer like motherboard, memory devices, monitor, keyboard etc., while software is the set of programs or instructions. Both hardware and software together make the computer system to function.

Let us first have a look at the functional components of a computer. Every task given to a computer follows an Input- Process- Output Cycle (IPO cycle). It needs certain input, processes that input and produces the desired output. The input unit takes the input, the central processing unit does the processing of data and the output unit produces the output. The memory unit holds the data and instructions during the processing.



Components of a Computer (Block Diagram)

Input Unit

Input unit is used to feed any form of data to the computer, which can be stored in the memory unit for further processing. Example: Keyboard, mouse, etc.

Central Processing Unit

CPU is the major component which interprets and executes software instructions. It also controls the operation of all other components such as memory, input and output units. It accepts binary data as input, process the data according to the instructions and provide the result as output. The CPU has three components which are Control unit, Arithmetic and logic unit (ALU) and Memory unit.

Arithmetic and Logic Unit

The ALU is a part of the CPU where various computing functions are performed on data. The ALU performs arithmetic operations such as addition, subtraction, multiplication, division and logical operations. The result of an operation is stored in internal memory of CPU. The logical operations of ALU promote the decision-making ability of a computer.

Control Unit

The control unit controls the flow of data between the CPU, memory and I/O devices. It also controls the entire operation of a computer.

Output Unit

An Output Unit is any hardware component that conveys information to users in an understandable form. Example: Monitor, Printer etc.

Memory Unit

The Memory Unit is of two types which are primary memory and secondary memory. The primary memory is used to temporarily store the programs and data when the instructions are ready to execute. The secondary memory is used to store the data permanently. The Primary Memory is volatile, that is, the content is lost when the power supply is switched off. The Random Access Memory (RAM) is an example of a main memory. The Secondary memory is non volatile, that is, the content is available even after the power supply is switched off. Hard disk, CD-ROM and DVD ROM are examples of secondary memory.

CHAPTER -2 NUMBER SYSTEM

PART - I

Choose the Correct Answer:

1. Which refers to the number of bits processed by a computer's CPU?
   A) Byte B) Nibble C) Word length **D) Bit**
2. How many bytes does 1 Kilo Byte contain?
   A) 1000 B) 8 C) 4 **D) 1024**
3. Expansion for ASCII
   A) American School Code for Information Interchange
   B) American Standard Code for Information Interchange
   C) All Standard Code for Information Interchange
   D) American Society Code for Information Interchange
4. 2^50 is referred as
   A) Kilo B) Tera **C) Peta** D) Zeta
5. How many characters can be handled in Binary Coded Decimal System?
   A) 64 B) 255 C) 256 D) 128
6. For 11012 what is the Hexadecimal equivalent?
   A) F B) E **C) D** D) B
7. What is the 1's complement of 00100110?
   A) 00100110 **B) 11011001** C) 11010001 D) 00101001
8. Which amongst this is not an octal number?
   A) 645 B) 234 **C) 876** D) 123
9. The term data comes from the word _____
   A) Datum B) Digit C) Datam D) Dateum
10. A _____ is a collection of 4 bits.
    A) Byte B) Boolean C) MB **D) Nibble**
11. The most commonly used numbering system is the _____ system.
    A) Binary **B) Decimal** C) Octal D) Hexadecimal
12. A _____ is small piece of data that is derived from the words "BInary DigiT".
    A) Byte **B) BIT** C) Kilo Byte D) Mega Byte
13. A collection of 8 bits is called as a _____.
    A) Byte B) KB C) Bit D) MB
14. ____ have only two possible values, 0 and 1.
    A) Byte B) KB **C) BIT** D) MB
15. The most commonly used coding scheme _____.
    A) BCD **B) ASCII** C) EBCID D) ISCII
16. The left most bit in the binary number is called as _____.
    A) LSB B) SLB **C) MSB** D) LMB
17. The right most bit in the binary number is called as _____.
    A) LSB B) SLB C) MSB D) LMB
18. The ASCII value for a Blank character is _____.
    A) 8 B) 16 **C) 32** D) 64
19. The ASCII value range for the upper case alphabets is _____.
    A) 0 – 48 B) 97 to 122 C) 0 – 127 **D) 65 to 90**
20. The radix of an Binary number is _____.
    A) 2 B) 8 C) 4 D) 16
21. The radix of an octal number is _____.
    A) 2 **B) 8** C) 4 D) 16
22. The radix of an Decimal number is _____.
    A) 2 B) 8 **C) 10** D) 16
23. The radix of an Hexadecimal number is _____.
    A) 2 B) 8 C) 4 **D) 16**

24. How the information entered into computer?
A) knowledge **B) Data** C) ASCII value D) BCD

25. Data means a _____.
A) Set of Information B) Set of Record **C) Set of Values** D) Set of Files

26. Singular form of Data _____.
A) Record B) File C) Values **D) Datum**

27. How the messages represented in computers?
A) Information B) Data C) Knowledge **D) All of these**

28. In a computer, a data is converted into _____.
A) ASCII form B) BCD form **C) Binary form** D) Octal form

29. 4 Bits = _____.
A) Bit B) Byte C) Word **D) Nibble**

30. Which is used to measure the number of bits in each word?
A) Word Length B) Length C) Size D) Word Size

31. A word can have a length of _____.
A) 2,5,10 bits B) 15,25,50 bits **C) 16,32,64 bits** D) 12,24,48 bits

32. Who coined the term byte?
A) Charles Babbage B) John Von Newmann
C) Werner Buchholz D) Herman Helirith

33. A number system can be derived from a _____.
A) bit B) byte **C) base or radix** D)nibble or word

34. How many standard number system are there to use?
A) 2 **B) 4** C) 8 D) 16

35. Which of the following is not a standard number system?
A) Pentagon B) Hexadecimal C) Decimal D) Binary

36. The Radix of Hexadecimal is _____.
A) 6 B) 10 **C) 16** D) 8

37. Which digit is not allowed in Hexadecimal number system?
A) G B) B C) E D) D

38. The decimal value of 1010.01_2 is _____.
A) 10.5 **B) 10.25** C) 10.05 D) 10.025

39. In binary numbers, the signed positive number has a prefix?
A) + **B) 0** C) 1 D) –

40. In binary numbers, the signed negative number has a prefix?
A) + B) 0 **C) 1** D) –

41. The 4 bit binary equivalent of -5 is _____.
A) 1101 B) 0101 C) 1100 D) -101

42. A Latin prefix Deci means _____.
A) 2 B) 8 C) 16 **D) 10**

43. How many procedures are there to convert from decimal to binary?
A) 2 B) 4 C) 8 D) 3

44. The most commonly used number system is _____.
A) Binary B) Hexadecimal **C) Decimal** D) Octal

45. BCD is ____ bit code.
A) 16 B) 8 **C) 4** D) 2

46. Which coding scheme is used to LCD?
A) Unicode B) ASCII C) EBCDIC **D) BCD**

47. Enhanced BCD is _____ bit code.
A) 2 B) 4 **C) 6** D) 8

48. EBCDIC primarily used in ____ Computers.
A) IBM B) APPLE C) PENTUM D) LAPTOP

49. EBCDIC uses ____ bit coding scheme.
A) 16 B) 8 C) 4 D) 2

50. The Total number of characters coded using EBCDIC is _____.
A) 32 B) 64 C) 128 **D) 256**

51. Which of the following the newest concept in digital coding?
A) ASCII **B) Unicode** C) EBCDIC D) Byte Code

52. Unicode is a _____ bit code.
A) 8 B) 4 **C) 16** D) 32

53. Which coding schemes have 65000 representations?
A) Byte code B) Binary code C) EBCDIC **D) Unicode**

54. Which coding schemes used by Asian Languages?
A) Unicode B) ASCII C) EBCDIC D) BCD

55. Which of the program used Unicode?
A) C B) C++ **C) Java** D) None of these

56. The decimal equivalent of 0.011_2 is _____.
A) 0.6875 **B) 0.1875** C) 0.1785 D) 0.5

57. 1's complement of 1001_2 is _____.
A) 1001_2 **B) 0111_2** C) 0110_2 D) 1010_2

58. The most popular way of representing negative numbers in computer system is _____.
A) 1's Complement B) Signed Bit **C) 2's Complement** D) All of these

59. Which complement performs the logical negation on each individual bit?
A) Signed **B) Unsigned** C) 2's D) 1's

60. The 2's complement of 1101_2 is _____.
A) 1100_2 B) 1010_2 C) 0101_2 **D) 0011_2**

61. The 2's complement of 1100_2 is _____.
A) 1110_2 **B) 0100_2** C) 0101_2 D) 0011_2

62. $10_2 + 10_2$ = _____.
A) 100_2 B) 20_2 C) 110_2 D) 10_2

63. The ASCII value of put Zero (0) is _____.
A) 48 B) 58 C) 65 D) 30

63. ISCII has been used by _____.
A) IBM B) Apple C) Microsoft **D) A & B**

64. TSCII is Proposed by _____.
A) IWG – TSC B) Apple C) IBM D) Microsoft

65. Entire Tamil alphabets handled by the coding Schemes _____.
A) EBCDIC B) ASCII C) ISCII **D) TSCII**

66. The Tamil alphabets have _____.
A) Soup B) Grantha C) Numerals **D) All of those**

67. The number of Tamil glyphs is about _____.
A) 255 B) 128 **C) 170** D) 256

68. Which indicates whether the given value is positive or negative ?
A) Signed bit B) Unsigned bit
C) 1's Complement D) 2's Complement

69. 16^0 is equivalent to ____ value.
A) 0 **B) 1** C) 16 D) A & B

70. In Hexadecimal number system B represents the digit.
A) 11 B) 12 C) 14 D) 13

71. The Binary equivalent of Hexadecimal value C is repressed by _____.
A) 1010 B) 1011 C) 1101 **D) 1100**

72. The Hexadecimal equivalent of 1011 is _____.
A) 14 B) 13 **C) 11** D) 15

73. Which of the following is not a parameter to find the magnitude of a number?
A) Absolute Value B) Positional Value
C) Base Value **D) Number System**

74. How many parameters are considered to find the magnitude of a number?
A) 3 B) 4 C) 2 D) 5

75. Which of the following idea behind positional numbering system?
A) Absolute Value B) Place volume **C) Radix** D) All of these

ABBREVIATION :

- BCD – Binary Coded Decimal.
- EBCDIC – Extended Binary Coded Decimal Interchange Code.
- ASCII – American Standard Code for Information Interchange.
- ISCII - Indian Standard Code for Information Interchange.
- TSCII – Tamil Standard Code for Information Interchange.
- MSB- Most Significant Bit.
- LSB- Least Significant Bit.
- IBM - International Business Machine.

Question and Answer:

1. What is Data?

The term data comes from the word **datum**, which means a raw fact. The data is a fact about people, places or some objects.

2. Write the 1's complement procedure.

The steps to be followed to find 1's complement of a number:
Step 1: Convert given Decimal number into Binary
Step 2: Check if the binary number contains 8 bits, if less add 0 at the left most bit, to make it as 8 bits.
Step 3: Invert all bits (i.e. Change 1 as 0 and 0 as 1)

3. We cannot find 1's complement for $(28)_{10}$. State reason.

It's a positive number. 1's complements apply only with negative number.

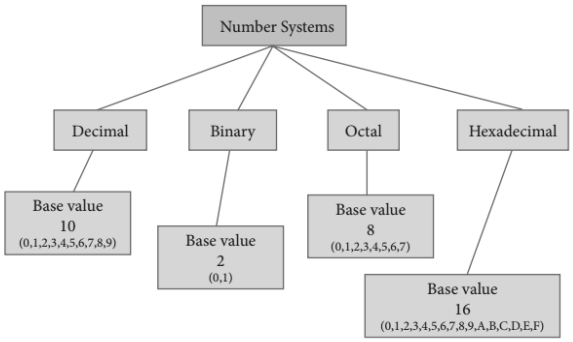
4. Convert $(46)_{10}$ into Binary number.

46 / 2 = 23 =0 → MSB
23 / 2 = 11= 1
11 / 2 = 5 = 1
5 / 2 = 2 = 1
2 / 2 = 1 = 0
↓
LSB

$(46)_{10} = (101110)_2$

5. What is radix of a number system? Give example.

The number systems are Decimal, Binary, Octal, Hexadecimal. Each number system is uniquely identified by its **base value** or **radix**. Radix or base is the count of number of digits in each number system. Radix or base is the general idea behind positional numbering system.



Example of Number System as Flow-diagram

6. Write note on binary number system.

There are only two digits in the Binary system, namely, 0 and 1. The numbers in the binary system are represented to the base 2 and the positional multipliers are the powers of 2.

Example The binary sequence (1101)2 has the decimal equivalent:

$$(1101)_2 = 1 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0$$
$$= 8 + 4 + 0 + 1$$
$$= (13)_{10}$$

7. Convert $(150)_{10}$ into Binary, then convert that Binary number to Octal.

$(150)_{10} = (?)_2$

150 / 2 = 75	= 0	→ MSB
75 / 2 = 37	= 1	
37 / 2 = 18	= 1	
18 / 2 = 9	= 0	
9 / 2 = 4	= 1	
4 / 2 = 2	= 0	
2 / 2 = 1	= 0	

LSB

$(150)_{10} = (10010110)_2$

$(10010110)_2 = (?)_8$

$= 010\ 010\ 110$

$= 2\ \ 2\ \ 6$

$(10010110)_2 = (226)_8$

8. Write a short note on ISCII.

ISCII is the system of handling the character of Indian local languages. This as a 8-bit coding system. Therefore it can handle 256 (2^8) characters. This system is formulated by the department of Electronics in India in the year 1986 - 88 and recognized by Bureau of Indian Standards (BIS). Now this coding system is integrated with Unicode.

9. Add : a) $-22_{10}+15_{10}$ b) $20_{10}+25_{10}$

a) $-22_{10}+15_{10}$

+15's binary value = 1111 as 8 bit format is **0000 1111 → ans of (+15)**

22's binary value = 10110

8 bit format = 0001 0110

1's complement = 1110 1001

2's complement -22 = + 1

= **1110 1010 →ans of (-22)**

1110 1010

+ 0000 1111

= **1111 1001→ final answer**

b) $20_{10}+25_{10}$

20's binary value = 0001 0100

25's binary value = 0001 1001

$(20 + 25)_{10} = (45)_{10}$ = **00101101**

10. Write the procedure to convert fractional Decimal to Binary

Conversion of fractional Decimal to Binary

The method of **repeated multiplication by 2** has to be used to convert such kind of decimal fractions.

The steps involved in the method of **repeated multiplication by 2**:

Step 1: Multiply the decimal fraction by 2 and note the integer part. The integer part is either 0 or 1.

Step 2: Discard the integer part of the previous product. Multiply the fractional part of the previous product by 2. Repeat Step 1 until the same fraction repeats or terminates (0).

Step 3: The resulting integer part forms a sequence of 0s and 1s that become the binary equivalent of decimal fraction.

Step 4: The final answer is to be written from first integer part obtained till the last integer part obtained.

11. Convert (98.46)10 to Binary

$(98)_{10}$= (?)$_2$

98 / 2 = 49 = 0 ↑ → MSB
49 / 2 = 24 = 1 |
24 / 2 = 12 = 0 |
12 / 2 = 6 = 0 |
06 / 2 = 3 = 0 |
03 / 2 = 1 = 1 |
01 / 2 = 0 = 1 → LSB

= $(1100010)_2$

$(0.46)_{10}$ = (?)$_2$

.46x2=.92 = 0 → LSB ↓
.92x2=.84 = 1 |
.84x2= .6 = 1 |
.64x2=.36 = 1 |
.36x2=.72 = 0 |
.72x2=.44 = 1 |
.44x2=.88 = 0 |
.88x2=.76 = 1 |
.76x2=.52 = 1 |
.52x2=.04 = 1 |
.04x2=.08 = 0 → MSB

= $(01110101110)_2$

Final Answer is
= $(1100010 + 0.01110101110)_2$
$(98.46)_{10}$ =$(1100010.0111010101110)_2$

12. Find 1's Complement and 2's Complement for the following Decimal number
a) -98 b) -135

a) -98	**b) -135**
98's Binary value is 1100010 [find the value through divide by 2]	135's Binary value is 10000111 [find the value through divide by 2]
8 bit format is 0110 0010	8 bit format is 1000 0111
1's Complement 10011101	1's Complement 0111 1000
2's Complement + 1	2's Complement + 1
1001 1110 (-98)	**0111 1001 (-135)**

13. Add 1101010_2+101101_2

1101010
(+) 0101101
10010111 **= $(10010111)_2$**

14. Subtract 1101011_2 - 111010_2

1101011
(-) 0111010
0110001 **= $(0110001)_2$**

PART - II
BOOLEAN ALGEBRA

Choose the correct answer :

1. Which is a basic electronic circuit which operates on one or more signals?
   a) Boolean algebra b) Gate c) Fundamental gates d) Derived gates
2. Which gate is called as the logical inverter?
   a) AND b) OR **c) NOT** d)XNOR
3. A + A =_____.
   a) A b) 0 c) 1 d) A'
4. NOR is a combination of ?
   a) NOT (OR) b) NOT(AND) c) NOT(NOT) d)NOT(NOR)
5. NAND is called as _____ Gate.
   a) Fundamental Gate **b) Derived Gate** c) Logical Gate d) Electronic Gate
6. The _____ sign is used to indicate the OR operator.
   a) (+) Plus b) (-) minus c) (/) Slash d) (.) Dot
7. The ____ sign is used to indicate the AND operator
   a) (+) Plus b) (-) minus c) (/) Slash **d) (.) Dot**
8. NAND is a combination of ?
   a) NOT (OR) **b) NOT(AND)** c) NOT(NOT) d)NOT(NOR)

Answer the Following :

1. What is Boolean Algebra?

Boolean algebra is a mathematical discipline that is used for designing digital circuits in a digital computer. It describes the relation between inputs and outputs of a digital circuit. The name Boolean algebra has been given in honor of an English mathematician George Boole who proposed the basic principles of this algebra.

2. Write a short note on NAND gate.

The NAND gate operates an AND gate followed by a NOT gate. It acts in the manner of the logical operation "AND" followed by inversion. The output is "false" if both inputs are "true", otherwise, the output is "true". In other words the output of the NAND gate is 0 if and only if both the inputs are 1, otherwise the output is 1.

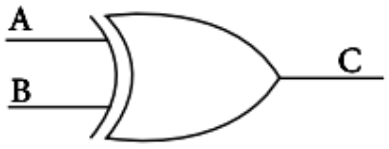
3. Draw the Truth Table for XOR gate.

In Boolean algebra (Exclusive - OR) operator $\oplus$ or "encircled plus". Hence C = **A $\oplus$B**.

The **Truth Table** for XOR gate is

Input		Output
A	B	C
0	0	0
0	1	1
1	0	1
1	1	0

The logical symbol of XOR gate is



4. Write the Associative Laws?

Associative Law

A+(B+C) = (A+B)+C

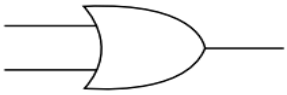
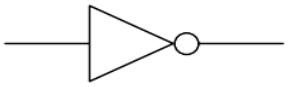
A.(B.C) = (A.B).C

5. What are derived gates?

The logic gates like NAND, NOR, XOR and XNOR are derived gates which are derived from the fundamental gates.

6. Write the truth table of fundamental gates.

The AND, OR & NOT are fundamental gates.

Logical Gates	Symbol	Truth Table
AND		A B AB 0 0 0 0 1 0 1 0 0 1 1 1
OR		A B A + B 0 0 0 0 1 1 1 0 1 1 1 1
NOT		A $\overline{A}$ 0 1 1 0

7. Write a short note on XNOR gate.

The XNOR (exclusive - NOR) gate is a combination XOR gate followed by an inverter. Its output is "true" if the inputs are the same, and "false" if the inputs are different.. In simple words, the output is 1 if the input are the same, otherwise the output is 0.

The truth table for AND Gate is

Input		Output
A	B	C
0	0	0
0	1	0
1	0	0
1	1	1

8. Reason out why the NAND an NOR are called universal gates?

NAND and NOR gates are called Universal gates, because the fundamental logical gates can be realized through them.

9. Write the De Morgan's law.

De Morgan's

$$\overline{A + B} = \overline{A} \cdot \overline{B}$$

$$\overline{(A \cdot B)} = \overline{A} + \overline{B}$$

Explain in Detail:

1. Explain the fundamental gates with expression and truth table.

AND Gate

The AND gate can have two or more input signals and produce an output signal. The output is "true" only when both inputs are "true", otherwise, the output is "false". In other words the output will be 1 if and only if both inputs are 1; otherwise the output is 0. The output of the AND gate is represented by available say C, where A and B are two and if input Boolean variables. In Boolean algebra, a variable can take either of the values '0' or '1'.

The logical symbol of the AND gate is

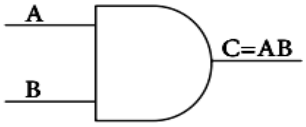
One way to symbolize the action of an AND gate is by writing the Boolean function.

C = A AND B

In Boolean algebra the multiplication sign stands for the AND operation. Therefore, the output of the AND gate is
C = A . B or simply C = AB
Read this as "C equals A AND B".

Since there are two input variables here, the truth table has four entries, because there are four possible inputs : 00, 01, 10 and 11.

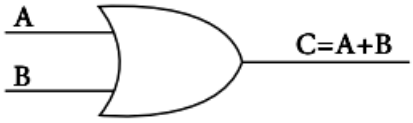
For instance if both inputs are 0,
C = A . B
= 0 . 0
= 0



OR Gate

The OR gate gets its name from its behavior like the logical inclusive "OR". The output is "true" if either or both of the inputs are "true". If both inputs are "false" then the output is "false". In other words the output will be 1 if and only if one or both inputs are 1; otherwise, the output is 0.

The Logical symbol of the OR gate is



The Truth Table for OR gate is

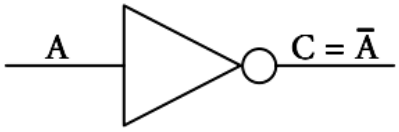
Input		Output
A	B	C
0	0	0
0	1	1
1	0	1
1	1	1

The OR gate output is
C = A OR B
We use the + sign to denote the OR function.
Therefore, C = A + B Read this as "C equals A OR B".
For instance,
If both the inputs are 1
C = A + B = 1 + 1 = 1

NOT Gate

The NOT gate, called a logical inverter, has only one input. It reverses the logical state. In other words the output C is always the complement of the input.

The Logical Symbol of the NOT gate is



The Truth Table of NOT gate is

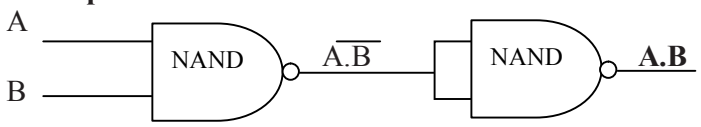
Input	Output
A	C
1	0
0	1

The Boolean function of NOT gate is
C = NOT A
In Boolean Algebra, the Over bar stands for NOT operation. Therefore,
C = A
Read this as "C equals NOT A" or "C equals The complement of A".
If A is 0,
C = 0 = 1
On the other hand, if A is 1,
C = 1 = 0

2. How AND and OR can be realized using NAND and NOR gates.

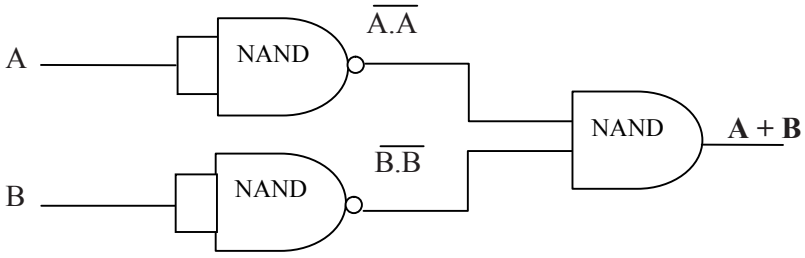
AND and OR operation from NAND gates are shown below:

AND operation



A.B = (A NAND B) NAND (A NAND B)

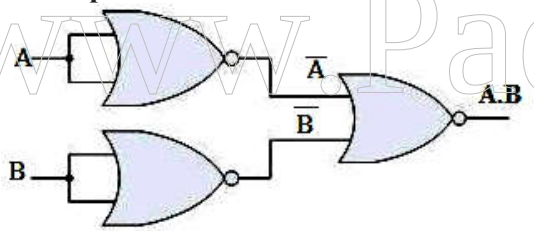
OR operation



A+B = (A NAND A) NAND (B NAND B)

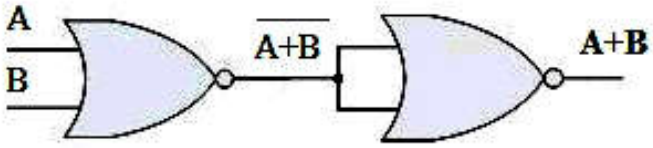
AND and OR operation from NOR gates are shown below:

AND operation



A.B = (A NOR A) NOR (B NOR B)

OR operation

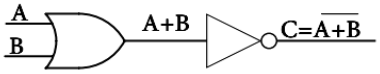


A+B = (A NOR B) NOR (A NOR B)

3. Explain the Derived gates with expression and truth table.

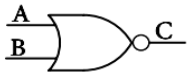
NOR Gate

The NOR gate circuit is an OR gate followed by an an inverter. Its output is "true" if both inputs are "false" Otherwise, the output is "false". In other words, the only way to get '1' as output is to have both inputs '0'. Otherwise the output is 0. The logic circuit of the NOR gate is



Logic Circuit of NOR Gate

The Logic Symbol of NOR Gate



Logic symbol of NOR Gate

The output of NOR gate is
$C = (\overline{A + B})$

Read this as "C equals NOT of A OR B" or "C equals the complement of A OR B".
For example,
if both the inputs are 0,

$C = (\overline{0 + 0}) = 0 = 1.$

The Truth Table of NOR Gate

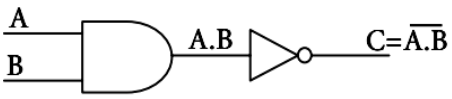
Input		Output
A	B	C
0	0	1
0	1	0
1	0	0
1	1	0

Truth Table for NOR Gate

NAND Gate

The NAND gate operates an AND gate followed by a NOT gate. It acts in the manner of the logical operation "AND" followed by inversion. The output is "false" if both inputs are "true", otherwise, the output is "true". In other words the output of the NAND gate is 0 if and only if both the inputs are 1, otherwise the output is 1.

The logical circuit of NAND gate is



Logic Circuit of NAND Gate

Logic Symbol of NAND Gate

Logic Symbol of NAND Gate

The output of the NAND gate is
$C = (\overline{A \cdot B})$
Read this as "C" equals NOT of A AND B" or
"C" equals the complement of A AND B".
For example if both the inputs are 1
$C = (1 \cdot 1) = 1 = 0$

The truth table for NAND gate is

Input		Output
A	B	C
0	0	1
0	1	1
1	0	1
1	1	0

Truth Table for NAND Gate

4. Write the Theorems of Boolean Algebra.

Theorems of Boolean Algebra

Identity
$A + 0 = A$
$A \cdot 1 = A$

Complement
$A + \overline{A} = 1$
$A \cdot \overline{A} = 0$

Commutative
$A + B = B + A$
$A \cdot B = B \cdot A$

Associative
$A + (B + C) = (A + B) + C$
$A \cdot (B \cdot C) = (A \cdot B) \cdot C$

Distributive
$A \cdot (B + C) = A \cdot B + A \cdot C$
$A + (B \cdot C) = (A + B) \cdot (A + C)$

Null Element
$A + 1 = 1$
$A \cdot 0 = 0$

Involution
$\overline{(\overline{A})} = A$

Indempotence
$A + A = A$
$A \cdot A = A$

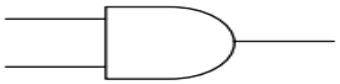
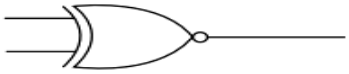
Absorption
$A + (A \cdot B) = A$
$A \cdot (A + B) = A$

3rd Distributive
$A + \overline{A} \cdot B = A + B$

De Morgan's
$\overline{A + B} = \overline{A} \cdot \overline{B}$
$\overline{(A \cdot B)} = \overline{A} + \overline{B}$

5. Draw the Logic Gates with Corresponding Truth Tables.

Logic Gates and their corresponding Truth Tables

Logical Gates	Symbol	Truth Table
AND		A B AB 0 0 0 0 1 0 1 0 0 1 1 1
OR		A B A + B 0 0 0 0 1 1 1 0 1 1 1 1
NOT		A $\overline{A}$ 0 1 1 0
NAND		A B $\overline{A\,B}$ 0 0 1 0 1 1 1 0 1 1 1 0
NOR		A B $\overline{A+B}$ 0 0 1 0 1 0 1 0 0 1 1 0
XOR		A B A⊕B 0 0 0 0 1 1 1 0 1 1 1 0
XNOR		A B $\overline{A\oplus B}$ 0 0 1 0 1 0 1 0 0 1 1 1

Extra Question and Answers:

1. **List the types of Information stored in a computer.**
   Numbers, Text, Graphics, Animation, Audio, Video etc…

2. **Name the Number System is used in General.**
   Decimal Number is the Number System is used in General.

3. **Write the Types of Number System and its radix (basic value).**
   There are Four types of Number System.

Types	Radix (basic value)
Binary Number	2
Octal Numbers	8
Decimal Numbers	10
Hexadecimal Numbers	16

   The above number systems are also called as **Positional value System**.

4. **How the given messages are represented in computer?**
   The given messages are represented in computer as Information → Data → Knowledge.

5. **What is Information?**
   The Information is a set of processed data.

6. **What is Knowledge? Give example.**
   Knowledge is identified for the information. Ex: 50% of work done in Computer by CPU.

7. **How the data classified based on their size?**
   Bits, Nibbles, Bytes and Word.

8. **What is Bit?**
   The most basic unit of information in a digital computer is called as a Bit. A bit is Binary digit which can be 0 or 1.

9. **What is Byte?**
   Byte is a group of 8 bits which is used to represent a character. A byte is considered as the basic unit of measuring the memory size in the computer.

10. **What is Nibble?**
    A Nibble is half byte. Which is usually a grouping of 4 bits. Word is the number of bits a processor can bundle (read / write) a time.

11. **What is Word Length?**
    The term word length is used as the measure of the number of bits in each word.
    For example: A word can have a length of 16 bits, 32 bits and 64 bits.

12. **Which parameters are used to determine the magnitude of a number or the value of each digit in a number?**
    - Absolute value
    - Place Value or positional value
    - Base value

13. **How many procedures for converting from decimal to binary? What are they?**
    There are two procedures for converting from decimal to binary.
    They are: a) Expansion Method b) Repeated division by 2.

14. **What is double dabble method?**
    The conversion of decimal number into the binary using Repeated-division method is called double dabble method.

15. **Convert 101101_2 to its decimal equivalents using double dabble method.**

    The Left Most Bit (LMB):1

Multiply by 2,	add next bit	(2x1)+0	= 2.	
Multiply by 2,	add next bit	(2x0)+1	= 5.	
Multiply by 2,	add next bit	(2x5)+ 1	= 11.	
Multiply by 2,	add next bit	(2x11)+0	= 22.	
Multiply by 2,	add next bit	(2x22)+1	= 45.	**$(101101)_2 = 45_{10}$**

16. **How the binary number represented by signed and unsigned bit?**
    In Binary, a negative number may be represented by prefixing a digit 1 to the number while number while a positive number may be represented by prefixing a digit 0.

17. **What does the complement of a number refer?**
    The term complement refers to part which together with another makes up a whole. The 1's complement performs the logical negation on each individual bit.

18. Write the 1's complement of 1010_2 and 100101_2?

1's Complement of 1010_2 is 0101_2 (replace 1 by 0 and 0 by 1)
1's Complement of 100101_2 is 011010_2.

19. What is use of coding scheme?

The coding scheme is used to represent a character in the bit.

20. If a user types 256 (in Decimal) using BCD coding. What is the number stored in memory of the computer?

The number stored as 0010010110.

21. Convert 1010100.011_2 to decimal number.

1010100.011_2
$= 1 \times 2^6 + 0 \times 2^5 + 1 \times 2^4 + 0 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 0 \times 2^0 + 0 \times 2^{-1} + 1 \times 2^{-2} + 1 \times 2^{-3}$
$= 64 + 0 + 16 + 0 + 4 + 0 + 0 + 0 + 0.25 + 0`125$
$= 84.325_{10}$.

22. Convert 22.25_{10} to binary.

Integer part	**Fractional part**	
22 / 2 = 11 = 0	0.25 x 2 = 0.50	0
11 / 2 = 05 = 1	0.50 x 2 = 1.00	1
05 / 2 = 02 = 1		
02 / 2 = 01 = 0		

$= 10110.01_2$

23. Convert 11011110101110_2 to Hexadecimal number.

11011110101110_2

Group in fours	0011	0111	1010	1110
Convert each number	3	7	A	E

$= 37AE_{16}$.

24. Convert $4A8C_{16}$ to binary.

	4	A	8	C
Convert each Digit	0100	1010	1000	1100

$= 0100101010001100_2$.

25. Convert $(128)_8 \rightarrow (\ ?\ )_{10}$

$(128)_8$
$(128)_8 = 1x8^2+2x8^1+8x8^0$
$= 64+16+8$
$= 88_{10}$

Explain in Detail:

1. **What is number system? Describe different number system in detail.**

A numbering system is a way of representing numbers. Each number system is uniquely identified by its **base value** or **radix**.

Decimal Number System

- The term Decimal is derived from a Latin prefix Deci, which means ten.
- It consists of 0,1,2,3,4,5,6,7,8,9(10 digits).
- It is the oldest and most popular number system used in our day to day life.
- In the positional number system, each decimal digit is weighted relative to its position in the number.
- This means that each digit in the number is multiplied by 10 raised to a power corresponding to that digit's position.

Binary Number System

- There are only two digits in the Binary system, namely, 0 and 1.
- The numbers in the binary system are represented to the base 2 and the positional multipliers are the powers of 2.
- The left most bit in the binary number is called as the **M**ost **S**ignificant **B**it (MSB) and it has the largest positional weight.
- The right most bit is the **L**east **S**ignificant **B**it (LSB) and has the smallest positional weight.

Octal Number System

- The octal number system is playing a vital role in digital computer work.
- Octal number system has base of 8.
- Octal number system uses digits 0,1,2,3,4,5,6 and 7 (8 digits).
- The places to left of the octal point are positive powers of 8 and places to right are negative powers of 8.

Hexadecimal Number System

- A hexadecimal number is represented using base 16.
- Hexadecimal or Hex numbers are used as a shorthand form of binary sequence.
- This system is used to represent data in a more compact manner.
- It has 16 symbols are used, 0 to F, the notation is called hexadecimal.
- The first 10 symbols are the same as in the decimal system, 0 to 9 and the remaining 6 symbols are taken from the first 6 letters of the alphabet sequence, A to F, where A represents 10, B is 11, C is 12, D is 13, E is 14 and F is 15.

2. **Explain the following terms**

i) BCD ii) EBCDIC iii) ASCII iv) ISCII v) Unicode

BCD – Binary Coded Decimal
EBCDIC – Extended Binary Coded Decimal Interchange Code
ASCII – American Standard Code for Information Interchange
Unicode
ISCII - Indian Standard Code for Information Interchange.

i) Binary Coded Decimal (BCD)

This encoding system is not in the practice right now. This is 2_6 bit encoding system. This can handle $2_6 = 64$ characters only.

ii) American Standard Code for Information Interchange (ASCII)

This is the most popular encoding system recognized by United States. Most of the computers use this system. Remember this encoding system can handle English characters only. This can handle 2_7 bit which means 128 characters. In this system, each

character has individual number (Refer **Appendix**). The new edition (version) ASCII -8, has 2^8 bits and can handle 256 characters are represented from 0 to 255 unique numbers. The ASCII code equivalent to the uppercase letter 'A' is 65. The binary representation of ASCII (7 bit) value is 1000001. Also 01000001 in ASCII-8 bit.

iii) Extended Binary Coded Decimal Interchange Code (EBCDIC)

This is similar to ASCII Code with 8 bit representation. This coding system is formulated by International Business Machine (IBM). The coding system can handle 256 characters. The input code in ASCII can be converted to EBCDIC system and vice - versa.

iv) Indian Standard Code for Information Interchange (ISCII)

ISCII is the system of handling the character of Indian local languages. This as a 8-bit coding system. Therefore it can handle 256 (2^8) characters. This system is formulated by the department of Electronics in India in the year 1986- 88 and recognized by Bureau of Indian Standards (BIS). Now this coding system is integrated with Unicode.

v) Unicode

This coding system is used in most of the modern computers. The popular coding scheme after ASCII is Unicode. ASCII can represent only 256 characters. Therefore English and European Languages alone can be handled by ASCII. Particularly there was a situation, when the languages like Tamil, Malayalam, Kannada and Telugu could not be represented by ASCII. Hence, the Unicode was generated to handle all the coding system of Universal languages. This is 16 bit code and can handle 65536 characters. Unicode scheme is denoted by hexadecimal numbers.

CHAPTER – 3 COMPUTER ORGANIZATIONS

Choose the correct Answer:

1. Which of the following is said to be the brain of a computer?
   a) Input devices b) Output devices c) Memory device **d) Microprocessor**
2. Which of the following is not the part of the microprocessor unit?
   a) ALU b) Control unit **c) Cache memory** d) Register
3. How many bits constitute a word?
   a) 8 b) 16
   c) 32 **d) determined by the processor used**
4. Which of the following device identifies the location when address is placed in the memory address register?
   a) Locator b) encoder **c) decoder** d) multiplexer
5. Which of the following is a CISC processor?
   a) Intel P6 b) AMD K6 **c) Pentium III** d) Pentium IV
6. Which is the faster memory?
   a) Hard disk b) Main memory **c) Cache memory** d) Blue Ray disc
7. How many memory locations are identified by a processor with 8 bits address bus at a time?
   a) 28 b) 1024 **c) 256** d) 8000
8. What is the capacity of 12cm diameter DVD with single sided and single layer?
   a) 4.7GB b) 5.5GB c) 7.8GB d) 7.2GB
9. What is the smallest size of data represented in a CD?
   a) blocks b) sectors **c) pits** d) tracks
10. Display devices are connected to the computer through _____.
    a) USB port b) PS / 2 port c) SCSI port **d) VGA connector**
11. Which of the is not included in computer organization?
    a) I / O devices **b) Software** c) CPU d) Main memory
12. Which of the following deals with the hardware components of a computer system?
    a) Application software b) Computer architecture
    c) Computer Organization d) System software
13. Which of the following involved in designing a computer?
    a) Computer Architecture b) Computer Organization
    c) Computer Software d) Memory
14. Which of the following performs all tasks in the computer?
    a) Chips b) Bus **c) CPU** d) I / O devices
15. Microprocessors were first introduced in the early?
    a) 1956 b) 1958 c) 1960 **d) 1970**
16. The first general purpose Microprocessor developed by _____.
    a) IBM **b) Intel** c) Apple d) Microsoft
17. Microprocessor is driven by _____.
    a) Clock pulses b) ALU c) Control unit d) Register
18. The first general purpose Microprocessor was _____.
    a) 5005 **b) 4004** c) 8085 d) 8086
19. Which of the following is an integrated circuit?
    a) Personal computer **b) Microprocessor**
    c) INTEL d) Transistor
20. Which of the following is a programmable multipurpose silicon chip that is based on a register?
    a) Microprocessor b) Clock c) Address Bus d) Data bus
21. How many units the Microprocessor is made?
    a) 1 b) 2 **c) 3** d) 4
22. Which of the following process computer instructions?
    a) ALU b) Control Unit c) Register d) Microprocessor
23. Which of the following control the operations through signals?
    a) Register **b) Control Unit** c) Intel d) ALU

24. Which holds the instruction and data for the execution of the processor?
a) ALU b) Control Unit **c) Register** d) System Bus
25. System Bus is the collection of _____ buses.
a) 2 **b) 3** c) 4 d) 6
26. System Bus is the collection of _____.
a) Address Bus b) Data Bus c) Control Bus **d) All of these**
27. Which of the following act as a communication channels between the microprocessor and devices?
a) ALU b) Control Unit c) Register **d) System Bus**
28. How many characteristics the microprocessor depends on?
a) 2 **b) 3** c) 4 d) 8
29. Which of the following is not the characteristics of Microprocessor?
a) Clock Speed b) Instruction set c) Word size **d) System Bus**
30. Which of the following is not the unit of Microprocessor?
a) ALU **b) Clock speed** c) Control unit d) Register
31. The speed at which the microprocessor executes instructions is called?
a) Clock speed b) Clock rate c) Clock bus d) Clock size
32. Clock speed is measured in _____.
a) MHz b) GHz **c) a & b** d) BPS
33. Which of the following regulates the speed of the microprocessor?
a) Program counter b) Instruction set c) ALU **d) Clock**
34. One Hertz = _____ cycle per second.
a) 0 **b) 1** c) 2 d) 3
35. Which of the following used to measure the speed of computer processors?
a) Clock rate b) Clock speed c) Word size **d) Hertz**
36. Expansion of MHz is _____.
a) Memory Hertz **b) Mega Hertz** c) Micro Hertz d) Main Hertz
37. How many types of operations carried out of instruction set?
a) 5 b) 4 c) 3 d) 2
38. Which of the following in turn determines architecture of the microprocessor?
a) I / O pins b) Control flow c) Data transfer d) Operations
39. Which of the following determines the amount of RAM accessed at the time?
a) Clock speed **b) Word size** c) Hertz d) Data bus
40. Which of the following accessed the total number of pins on the microprocessor?
a) Hertz b) Clock speed c) System Bus **d) Word Size**
41. The first commercial microprocessor is a _____ bit.
a) 8 b) 16 **c) 3** d) 2
42. In Microprocessor, the total output pins is always _____ to the total input pins.
a) equal b) greater than **c) less than** d) not equal
43. The present microprocessor use ____ bit architecture.
a) 8 or 16 b) 4 or 8 **c) 32 or 64** d) 64 or 128
44. How many types of Register the CPU has?
a) 4 **b) 2** c) 8 d) 16
45. Expansion of MDR is ____.
a) Mega Data Register b) Micro Data Register
c) Memory Data Register d) Machine Data Register
46. Expansion of MAR is _____.
a) Memory Address Register b) Micro Address Register
c) Memory Add Register d) Microprocessor Address Recognition
47. Which of the following bus is used to point a memory location?
a) System Bus b) Data Bus **c) Address Bus** d) Control Bus
48. Which of the following bus is used to transfer information between CPU and the memory?
a) System Bus **b) Data Bus** c) Control Bus d) Address Bus
49. Which bus in unidirectional?
a) System Bus b) Data Bus c) Control Bus **d) Address Bus**

50. Which has controls read or write operations?
a) System Bus b) Data Bus **c) Control Bus** d) Address Bus
51. The read operation transfer data from memory to _____.
a) MAR **b) MDR** c) PC d) Instruction set
52. Which operation transfers data from the MDR to memory?
a) Read b) Copy c) Move **d) Write**
53. In 8 bit processor, its MDR and the word in the memory have _____ bit.
a) 16 **b) 8** c) 256 d) 64
54. How many types of Microprocessor are there?
a) 2 b) 4 c) 3 d) 8
55. How many classification of Microprocessor are there based on the Data Width?
a) 4 b) 8 c) 16 d) 64
56. Which of the following microprocessor is not the classification based on data size?
a) 8 b) 16 c) 32 **d) 128**
57. How many types of Microprocessor are there based on Instruction set?
a) 8 b) 16 c) 4 **d) 2**
58. Expansion of RISC is _____.
a) Reduced Information Set Computers **b) Reduced Instruction Set Computers**
c) Reading Information Set Computers d) Reader Inclusion System Computers
59. Expansion of CISC is _____.
a) Communication information Set Computers
b) Complex Information Set Computers
c) Classified Instruction Set Computers
d) Complex Instruction Set Computers
60. Which of the following is not an example of RISC processor?
a) Intel P6 b) Pentium IV **c) Pentium II** d) AMD K6
61. Which of the following is not an example of CISC processor?
a) Intel P6 **b) Pentium IV** c) Pentium II d) AMD K6
62. Expansion of DVD is _____.
a) Digital Versatile Disc b) Digital Video Display
c) Digital Versatile Digital d) Digital Versatile Display
63. The color of double-layered DVD is _____.
a) Silver b) Bronze c) Blue **d) Gold**
64. The color of Single-layered DVD is _____.
a) Silver b) Bronze c) Blue d) Gold
65. Expansion of HDMI is _____.
a) Higher Display Multimedia Information
b) High Definition Memory Information
c) High Definition Multimedia Interface
d) High Definition Media Interface
66. Expansion of USB is _____.
a) Uniform Source Bus b) Universal Source Bus
c) Universal System Bus **d) Universal Serial Bus**
67. Which of the following transfer data up to 5 Gigabyte / second?
a) USB 1.0 b) USB 2.0 **c) USB 3.0** d) USB 1.2
68. Which of the following is the today &x0027's basic component of electronics?
a) IC's b) Transistor **c) Silicon** d) Vacuum Tube
69. Which of the following is the behind a computer?
a) IC's **b) Microprocessor** c) CPU d) Memory Unit
70. A CD or CD-ROM is made from _____ thickness.
a) 10mm b) 15mm c) 1.4mm **d) 1.2mm**
71. How the CD data is represented?
a) Pits b) Tracks c) Lands d) Rings
72. DVD can hold the data more than ____ times of CD.
a) Five **b) Six** c) Four d) Three

73. USB Port consumes power _____ DC.
a) 3V b) 2V **c) 5V** d) More than 5v
74. The capacity of Blue ray disc is more than five times of _____.
a) CD **b) DVD** c) Flash Drive d) HDD
75. Which of the following is an importance consideration while categorizing microprocessors?
a) Register b) Pins **c) Instruction Set** d) Program Counter
76. How many control line is enough to have read or write operation?
a) Only One b) Only Two c) Only Four d) More than One
77. Which of the following company manufacturing especially mother board and processor?
a) IBM **b) Intel** c) Motorola d) Samsung
78. The color of double-layered DVD is _____
a) Silver b) Bronze c) Blue **d) Gold**
79. Which is a state non volatile storage medium?
a) Blu-Ray **b) Flash memory** c) Cache memory d) DVD
80. Which memory offers a fast read and write access time?
a) Flash b) Cache c) Hard disk d) Main
81. In which memory contents can be erased using UV rays?
a) PROM b) EEPROM c) ROM **d) EPROM**
82. Which of the following is to write HD videos?
a) Blu-Ray b) DVD c) CD d) SVCD
83. A CD or CD-ROM is made from _____ thickness.
a) 10mm b) 15mm c) 1.4mm **d) 1.2mm**

Answer the following:

1. **What are the parameters which influence the characteristics of microprocessor?**
A microprocessor's performance depends on the following characteristics:
   a. Clock speed
   b. Instruction set
   c. Word size

2. **What is an instruction?**
A command which is given to a computer to perform an operation on data is called an instruction.

3. **What is a program counter?**
The program counter (PC) is a special register in the CPU which always keeps the address of the next instruction to be executed.

4. **What is HDMI?**
High-Definition Multimedia Interface is an audio/video interface which transfers the compressed video and audio data from video controller, to a compatible computer monitor, LCD projector, digital television etc..

5. **Which source is used to erase the content of a EPROM?**
Ultra-violet-rays is used erase the content of a EPROM.

6. **Differentiate Computer Organization from Computer Architecture.**
Computer architecture deals with the engineering considerations involved in designing a computer. Computer Organization deals with hardware components that are transparent to the programmer.

7. Classify the microprocessor based on the size of the data.

Microprocessors can process instructions. The microprocessor can be classified as follows based on the size of the data.

i. 8-bit microprocessor.
ii. 16-bit microprocessor.
iii. 32-bit microprocessor.
iv. 64-bit microprocessor.

8. Write down the classifications of microprocessors based on the instruction set.

The two types of microprocessors which are based on their instruction sets.

i. Reduced Instruction Set Computers (RISC)
ii. Complex Instruction Set Computers (CISC)

9. Differentiate PROM and EPROM.

PROM can be written only and cannot be erased. EPROMS are used widely in personal computers because they enable the manufacturer to change the contents of the PROM to replace with updated versions or erase the contents before the computer is delivered.

10. Write down the interface and ports available in a computer.

The various types of ports are given below:

- **Serial Port:** To connect the external devices, found in old computer.
- **Parallel Port:** To connect the printers found in old computer.
- **USB Port:** To connect external devices like camera, scanners, mobile phones external hard disks and printers to the computer.

11. Differentiate CD and DVD.

CD	DVD
▪ Expansion is Compact-Disc. ▪ A standard CD can store about 700 MB of Data. ▪ CD players cannot play DVDs. ▪ It stores up to 80 min of audio.	▪ Expansion is Digital Versatile Disc. ▪ A standard DVD can hold 4.7 GB of Data. ▪ DVD players can play CDs. ▪ It can range from 4.7 GB to 17.08 GB.

12. How will you differentiate a flash memory and an EEPROM?

Flash Memory	EEPROM
▪ Faster in performance. ▪ Flash uses the slower NAND gate. ▪ |Using flash, access and erase data in block-wise. ▪ Storage capacity can range from a GB to hundred of GB.	▪ Slower in performance. ▪ EEPROM uses the faster NOR gate. ▪ Using EEPROM, access and erase data only byte-wise or byte at a time. ▪ Storage capacity can range from a kilobytes to couple of megabytes.

Answer the Details Question:

1. Explain the characteristics of a microprocessor.

A Microprocessor's performance depends on the following characteristics:

a) Clock speed
b) Instruction set
c) Word size

a) Clock Speed

Every microprocessor has an **internal clock** that regulates the speed at which it executes instructions. The speed at which the microprocessor executes instructions is called the **clock speed**. Clock speed is measured in MHz (Mega Hertz) or in GHz (Giga Hertz).

b) Instruction Set

A command which is given to a computer to perform an operation on data is called an **instruction**. Basic set of machine level instructions that a microprocessor is designed to execute is called as an **instruction set**. This instruction set carries out the following types of operations:

- Data transfer
- Arithmetic operations
- Logical operations
- Control flow
- Input/output

c) Word Size

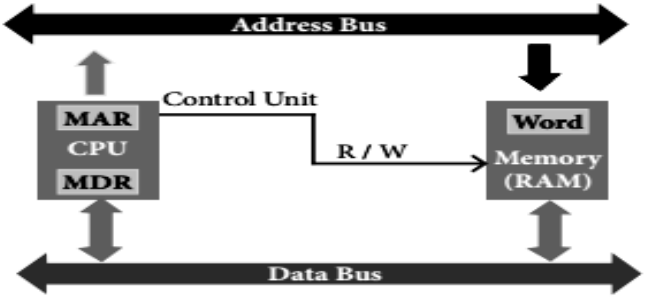
The number of bits that can be processed by a processor in a single instruction is called its word size.

Word size determines the amount of RAM that can be accessed by a microprocessor at one time and the total number of pins on the microprocessor.

Total number of input and output pins in turn determines the architecture of the microprocessor.

2. How the read and write operations are performed by a processor? Explain.

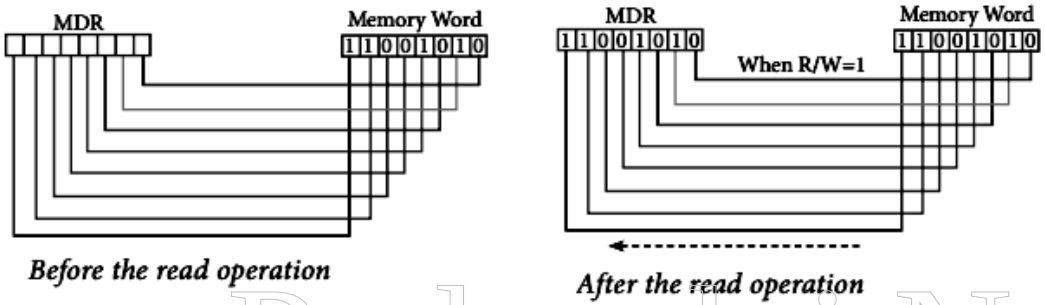
i. The Central Processing Unit (CPU) has a Memory Data Register (MDR) and a Memory Address Register (MAR).
ii. The Memory Data Register (MDR) keeps the data which is transferred between the Memory and the CPU. The Program Counter (PC) is a special register in the CPU which always keeps the address of the next instruction to be executed.
iii. The Arithmetic and Logic unit of CPU places the address of the memory to be fetched,
into the Memory Address Register.
iv. A bus is a collection of wires used for communication between the internal components of a computer.
v. The address bus is used to point a memory location. A decoder, a digital circuit is used to point to the specific memory location where the **word** can be located.
vi. The address register is connected with the address bus, which provides the address of the instruction. A data bus is used to transfer data between the memory and the CPU.
vii. The data bus is bidirectional and the address bus is unidirectional. The control bus controls both read and write operations.
viii. The read operation fetches data from memory and transfers to MDR. A single control line performs two operations like Read/Write using 1or 0.
ix. Also, the write operation transfers data from the MDR to memory. This organization is shown in Figure



Bus connectivity between CPU and Memory

i. The word in the RAM has the same size (no. of bits) as the Memory Data Register (MDR). If the processor is an 8-bit processor like Intel 8085, its MDR and the word in the RAM both have 8 bits.

ii. If the size of the MDR is eight bits, which can be connected with a word in the memory which is also eight bits size. The data bus has eight parallel wires to transfer data either from MDR to word or word to MDR based on the control(Read or write).



Before the read operation *After the read operation*

iii. This control line is labeled as R/W, which becomes 1 means READ operation and 0 means WRITE operation. Figure shows the content of MDR and the word before the READ operation. Also, Figure shows the content of MDR and the word after the READ operation.

iv. The read operation transfers the data (bits) from word to Memory Data Register. The write operation transfers the data (bits) from Memory Data Register to word.

3. Arrange the memory devices in ascending order based on the access time. – Explain (or) Explain the types of Secondary Storage devices.

a) CD / DVD Blu-Ray
b) Hard disk (Main memory)
c) Flash Drives
d) Cache Memory

Compact Disc (CD)

A CD or CD-ROM is made from 1.2 millimeters thick, polycarbonate plastic material. A thin layer of aluminum or gold is applied to the surface. CD data is represented as tiny indentations known as "pits", encoded in a spiral track molded into the top of the polycarbonate layer. The areas between pits are known as "lands". A motor within the CD player rotates the disk. The capacity of an ordinary CDROM is 700MB.

DVD (Digital Versatile Disc or Digital Video Disc)

A DVD is an optical disc capable of storing up to 4.7 GB of data, more than six times what a CD can hold. DVDs are often used to store movies at a better quality. Like CDs, DVDs are read with a laser.

The disc can have one or two sides, and one or two layers of data per side; the number of sides and layers determines how much it can hold. A 12 cm diameter disc with single sided,

single layer has 4.7 GB capacity, whereas the single sided, double layer has 8.5 GB capacity. The 8 cm DVD has 1.5 GB capacity. The capacity of a DVD-ROM can be visually determined by noting the number of data sides of the disc. Double-layered sides are usually gold-colored, while single-layered sides are usually silver-colored, like a CD.

Blu-Ray Disc

Blu-Ray Disc is a high-density optical disc similar to DVD. Blu-ray is the type of disc used for PlayStation games and for playing High-Definition (HD) movies. A double layer Blu-Ray disc can store up to 50GB (gigabytes) of data. This is more than 5 times the capacity of a DVD, and above 70 times of a CD. The format was developed to enable recording, rewriting and playback of high-definition video, as well as storing large amount of data. DVD uses a red laser to read and write data. But, Blu-ray uses a blue-violet laser to write. Hence, it is called as Blu-Ray.

Hard Disk

Hard disk is a magnetic disk on which you can store data. The hard disk has the stacked arrangement of disks accessed by a pair of heads for each of the disks. The hard disks come with a single or double sided disk.

Flash Memory

Flash memory is an electronic (solid-state) non-volatile computer storage medium that can be electrically erased and reprogrammed. They are either EEPROM or EPROM. Examples for Flash memories are pen-drives, memory cards etc. Flash memories can be used in personal computers, Personal Digital Assistants (PDA), digital audio players, digital cameras and mobile phones.

Flash memory offers fast access times. The time taken to read or write a character in memory is called access time. The capacity of the flash memories vary from 1 Gigabytes (GB) to 2 Terabytes (TB).

Cache Memory

The cache memory is a very high speed and expensive memory, which is used to speed up the memory retrieval process. Due to its higher cost, the CPU comes with a smaller size of cache memory compared with the size of the main memory. Without cache memory, every time the CPU requests the data, it has to be fetched from the main memory which will consume more time. The idea of introducing a cache is that, this extremely fast memory would store data that is frequently accessed and if possible, the data that is closer to it. This helps to achieve the fast response time. Where response Time, (Access Time) refers to how quickly the memory can respond to a read / write request.

4. Explain the Types ROMs.

- Read-only Memory (ROM)
- Programmable Read-only Memory (PROM)
- Erasable Programmable Read-only Memory (EPROM)
- Electrically Erasable Read-only Memory (EEPROM)

Read-only Memory (ROM)

- ✓ Read Only Memory refers to special memory in a computer with pre-recorded data at manufacturing time which cannot be modified. The stored programs that start the computer and perform diagnostics are available in ROMs.
- ✓ ROM stores critical programs such as the program that boots the computer. Once the data has been written onto a ROM chip, it cannot be modified or removed and can only be read.
- ✓ ROM retains its contents even when the computer is turned off. So, ROM is called as a non-volatile memory.

Programmable Read-only Memory (PROM)

- ✓ Programmable read only memory is also a non-volatile memory on which data can be written only once. Once a program has been written onto a PROM, it remains there forever.
- ✓ Unlike the main memory, PROMs retain their contents even when the computer is turned off.
- ✓ The PROM differs from ROM. PROM is manufactured as a blank memory, whereas a ROM is programmed during the manufacturing process itself.
- ✓ PROM programmer or a PROM burner is used to write data to a PROM chip. The process of programming a PROM is called burning the PROM.

Erasable Programmable Read Only Memory (EPROM)

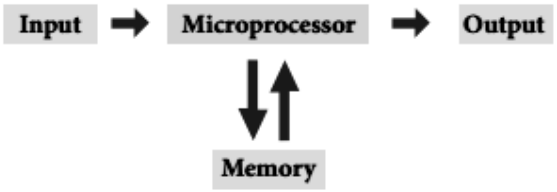
- ✓ Erasable Programmable Read Only Memory is a special type of memory which serves as a PROM, but the content can be erased using ultraviolet rays. EPROM retains its contents until it is exposed to ultraviolet light. The ultraviolet light clears its contents, making it possible to reprogram the memory.
- ✓ An EPROM differs from a PROM, PROM can be written only once and cannot be erased. EPROMs are used widely in personal computers because they enable the manufacturer to change the contents of the PROM to replace with updated versions or erase the contents before the computer is delivered.

Electrically Erasable Programmable Read Only Memory (EEPROM)

- ✓ Electrically Erasable Programmable Read Only Memory is a special type of PROM that can be erased by exposing it to an electrical charge.
- ✓ Like other types of PROM, EEPROM retains its contents even when the power is turned off. Comparing with all other types of ROM, EEPROM is slower in performance.

Extra Question and Answer:

1. **Name the communication channels between the microprocessor and other devices in the computer. (OR) What are the collections of System Bus?**
   Address Bus
   Control Bus
   Data Bus
2. **Name the measurement of clock speed of the computer.**
   MHz (Mega Hertz)
   GHz (Giga Hertz)
3. **Draw the block diagram of a microprocessor based system.**



A Microprocessor - Based System

4. **What is instruction set?**
   Basic set of machine level instructions that a microprocessor is designed to execute is called as an instruction set.

5. **What is word size?**
   The number of bits that can be processed by a processor in a single instruction is called its word size.

6. **Name the different types of CPU Register.**
   - MAR (Memory Address Register)
   - MDR (Memory Data Register)

7. **What is Bus?**

   A bus is a collection of wires used for communication between the internal components of a computer.

8. **Define - Data bus**
   - Data bus is collection of wires to carry data in bits.
   - A data bus is used to transfer data between the memory and the CPU.
   - The data bus is bidirectional.

9. **Define – Address bus.**
   - Address bus is collection of wires to carry data bits.
   - The address bus is used to point a memory location.
   - The address bus is unidirectional.

10. **Define – Control bus.**
    - Control bus is a control line / collection of wires to control the operation / functions.
    - The control bus controls both read and write operations.

11. **What is the use of MDR?**

    MDR keeps the data which is transfered between the memory and the CPU.

12. **Define Decoder.**

    A decoder, a digital circuit is used to point to the specific memory location where the word can be located.

13. **What is the use of Address Bus and Data Bus?**

    Address Bus is used to point the memory location.
    Data Bus is used to transfer data between the memory and the CPU.

1. **Explain the Classification of Microprocessors based on Instruction Set.**

   - The size of the instruction set is another important consideration while categorizing microprocessors. Initially, microprocessors had very small instruction sets because complex hardware was expensive as well as difficult to build.
   - As technology had developed to overcome these issues, more and more complex instructions were added to increase the functionality of microprocessors.
   - Let us learn more about the two types of microprocessors based on their instruction sets.
   - RISC stands for **Reduced Instruction Set Computers**. They have a small set of highly optimized instructions.
   - Complex instructions are also implemented using simple instructions, thus reducing the size of the instruction set.
   - Examples of RISC processors are Pentium IV, Intel P6, AMD K6 and K7.
   - CISC stands for **Complex Instruction Set Computers**. They support hundreds of instructions. Computers supporting CISC can accomplish a wide variety of tasks, making them ideal for personal computers.
   - Examples of CISC processors are Intel 386 & 486, Pentium, Pentium II and III, and Motorola 68000.

2. Explain about Random-Access Memory (RAM).

- The main memory is otherwise called as **Random Access Memory**. This is available in computers in the form of Integrated Circuits (ICs). It is the place in a computer where the Operating System, Application Programs and the data in current use are kept temporarily so that they can be accessed by the computer's processor.
- The smallest unit of information that can be stored in the memory is called as a bit. The memory can be accessed by a collection of 8 bits which is called as a byte.
- The bytes are referred by 'B'. If a computer has 1 megabyte of memory, then it can store 10,48,576 bytes (or characters) of information. [Hence 1MB is 1024KB and 1 KB is 1024 Bytes, So 1024X1024 =10,48,576 Bytes]

- RAM is a volatile memory, which means that the information stored in it is not permanent. As soon as the power is turned off, whatever data that resides in RAM is lost. It allows both read and write operations.
- There are two basic types of RAM
  - Dynamic RAM (DRAM)
  - Static RAM (SRAM)
- These two types differ in the technology they use to hold data. Dynamic RAM being a common type needs to be refreshed frequently. Static RAM needs to be refreshed less often, which makes it faster.
- Hence, Static RAM is more expensive than Dynamic RAM.

3. Explain the ports and Interface.

The Motherboard of a computer has many I/O sockets that are connected to the ports and interfaces found on the rear side of a computer (Figure 3.13). The external devices can be connected to the ports and interfaces. The various types of ports are given below:

Serial Port: To connect the external devices, found in old computers.

Parallel Port: To connect the printers, found in old computers.

USB Ports: To connect external devices like cameras, scanners, mobile phones, external hard disks and printers to the computer.

USB 3.0 is the third major version of the Universal Serial Bus (USB) standard to connect computers with other electronic gadgets. USB 3.0 can transfer data up to 5 Giga byte/second. USB3.1 and USB 3.2 are also released.

VGA Connector: To connect a monitor or any display device like LCD projector.

Audio Plugs: To connect sound speakers, microphone and headphones.

PS/2 Port: To connect mouse and keyboard to PC.

SCSI Port: To connect the hard disk drives and network connectors.

Computer hardware	The physical parts or components of a computer, such as the CPU, mother board, monitor, keyboard, etc.
Intel	Intel Corporation is an American multinational corporation and technology company involving in hardware manufacturing, especially mother board and processors
Silicon chip	Silicon chip is an integrated , set of electronic circuits on one small flat piece of semiconductor material, silicon.
Multipurpose	Multipurposeis several purpose
Address bus	Address bus is a collection of wires that carry the address as bits
Data bus	Data bus is a collection of wires to carry data in bits
Control bus	Control bus is a control line/collection of wires to control the operations/functions
Arithmetic operations	Arithmetic operations are the mathematical operations on data like add, subtract etc
Data Transfer	Data Transfer means moving data from one component to another
Logical operations	Logical operations are the operations on binary/Boolean data like AND, OR , NOT
Bidirectional	Bidirectional means both the directions/ways
Unidirectional	Unidirectional means only one direction
Access time	Access time is the time delay or latency between a request to an electronic system, and the access being completed or the requested data returned

4. THEORETICAL CONCEPT OF OPERATING SYSTEM

Choose the Correct Answer:

1. Operating System is a _____.
   a. Application Software b. Hardware
   c. System Software d. Component
2. Identify the usage of Operating System.
   a. Easy interaction between the human and computer
   b. Controlling input & output
   c. Managing use of main memory
   d. All the above
3. Which of the following is not a function of an Operating function?
   a. Process Management b. Memory Management
   c. Security Management d. Compiler Environment
4. Which of the following OS is a commercially licensed Operating System?
   a. **Windows** b. UBINTU c. FEDORA d. REDHAT
5. Which if the following Operating systems are support Mobile Devices?
   a. Windows 7 b. Linux c. BOSS **d. iOS**
6. File Management manages _____.
   a. Files b. Folders c. Directory **d. All the Above**
7. Interactive Operating System provides _____.
   a. **Graphics User Interface (GUI)** b. Data Distribution
   c. Security Management d. Real Time Management
8. Android is a _____.
   a. **Mobile Operating System** b. Open Source
   c. Development by Google d. All the above
9. Which of the following refers to Android operating System's version?
   a. **JELLY BEAN** b. UBUNTU c. OS/2 d. MITTIKA
10. Which of the following acts as an interface between a user and computer?
    a. Input device b. Output device **c. Operating system** d. Bus
11. Which of the following is used that the user cannot communicate directly with the hardware?
    a. Application b. Utility programs
    c. Device Management **d. Operating System**
12. Which of the following operating systems not used in laptops and computers?
    a. Windows b. Linux **c. iOS** d. Unix
13. Which of the following operating systems not used in mobiles?
    a. Windows **b. Linux** c. iOS d. Google Android
14. Which is not a type of Operating system?
    a. Multi user b. Single user **c. Application** d. both a & b
15. Which of the following is the single user operating system?
    a. Windows **b. Ms-DOS** c. Linux d. Unix
16. Multiprocessor operating system is also called _____ processing.
    a. Multiuser b. Real time **c. Parallel** d. Time sharing
17. Which scheduling technique employed by time sharing OS?
    a. Spooling b. LIFO c. FIFO **d. Round robin**
18. The term 'Time Sharing' has been replaced by _____.
    a. Multi processing b. Distributed **c. Multitasking** d. Multiuser
19. Time sharing is can be _____
    a. Single user b. Multiuser c. Multiprocessing **d. Both a & b**
20. Which of the following technique used in Time sharing OS?
    a. **Virtual memory** b. Primary memory c. Vector memory d. Flash memory
21. In which OS the processor time is divided among different tasks?
    a. Multi user b. Multiprocessor c. Real time **d. Time sharing**
22. Real time OS are mostly used for
    a. Robotics b. Weather
    c. Airline Communication d. Bank

23. Which Operating System provides GUI?
a. Distributed b. Real time **c. Interactive** d. Multi-User

24. Interactive Operating System is a _____.
a. GUI b. CUI c. UI d. OS

25. Which of the following stored by FAT?
a. File name b. Access mode c. File type **d. All of these**

26. Which of the following are not stored by FAT?
a. address b. access mode **c. NTFS** d. file size

27. Linux is a project of _____ .
a. Ken Thomson b. Dennis Ritchie
c. Linus Torvalds d. William Shockley

28. Which OS created by Apple Inc?
a. Android b. Windows c. Uniux **d. iOS**

29. Which OS developed by Google?
a. Android b. iOS c. Windows d. Unix

30. Which of the following is not a mobile devices?
a. Phone b. Tablet c. MP3 player **d. Apple iOS**

31. Which OS is the most popular Linux based open source software?
a. Apple iOS **b. Google Android** c. Windows d. Blackberry

32. Which of the following is not Android OS?
a. Cupcake b. Éclair **c. Five Star** d. Kitkat

33. Which of the OS not takes their roots from Unix?
a. iOS b. Linux c. Mac OS X **d. Windows**

34. Which OS is a windows-alternative open source?
a. Android b. iOS **c. React OS** d. Mac OS X

35. How many techniques are there to optimize the CPU time?
a. 4 **b. 2** c. 3 d. 5

ABBREVIATION :

- FAT - File Allocated Table.
- NTFS - Next Generation File System.
- BOSS - Bharat Operating System Solution.
- MS-DOS - Micro Soft Disk Operating System.
- GUI - Graphical User Interface.
- CUI - Command User Interface.
- FIFO - First In First Out.
- SJF - Shortest Job First.
- NRCFOSS - National Resource Center for Free / Open Source Software.

Answer the following :

1. What are the advantages of memory management?

- Keeping track of which portion of memory are currently being used and who is using them.
- Determining which processes (or parts of processes) and data to move in and out of memory.
- Allocation and de-allocation of memory blocks as needed by the program in main memory. (Garbage Collection)

2. What is the multi-user Operating system?

It is used in computers and laptops that allow same data and applications to be accessed by multiple users at the same time.

The users can also communicate with each other. Windows, Linux and UNIX are examples for multi-user Operating System.

3. What is GUI?

The GUI is a window based system with a pointing device to direct I/O, choose from menus, make selections and a keyboard to enter text. Its vibrant colors attract the user very easily.

4. List out different distributions of Linux Operating System.

Ubuntu, Mint, Fedora, RedHat, Debian, Google's Android, Chrome OS, and Chromium OS.

5. What are the security management features available in Operating System?

The Operating System provides three levels of securities to the user end. They are

(1) File access level
(2) System level
(3) Network level

6. What is multi-purpose?

This is a one of the features of Operating System. It has two or more processors for a single running process (job).

7. What are the different Operating Systems used in computer?

The different Operating Systems used in computer:

(i) Single user or Single Task Operating System
(ii) Multi-user Operating System
(iii) Multi Processing Operating System
(iv) Distributing Operating System
(v) Prominent Operating System

8. What are the advantages and Disadvantages of Time -sharing features?

Time -sharing Operating System	
Advantages	**Disadvantages**
Provides the advantage of quick response.	Problem of reliability.
Avoids duplication of software.	Questions of security and integrity of uses programs and data.
Reduces CPU idle time.	Problem of data communication.

9. Explain and List out examples of mobiles operating system.

A mobile operating system controls a mobile device and its design supports wireless communication and different types of mobile applications. It operates on smart phones, Tablets and Digital mobile devices.

Ex: Google Android, Apple iOS, Blackberry, Symbian.

10. What are the differences between Windows and Linux Operating System?

Windows OS	Linux OS
It is a commercial licensed OS.	It is a open source OS.
Only one distributor.	Many distributors.
It uses GUI.	It uses Kernal
It boot only from primary partition.	It boot either from a primary or from a logical partition.
Secure.	Insecure.

11. Explain the process management algorithms is Operating System.

- This algorithm is based on queuing technique.
- This is the basic logic of the FIFO algorithm.

- Technically, the process that enters the queue first is executed first by the CPU, followed by the next and so on.
- The processes are executed in the order of the queue.

12. What is Operating System?

An Operating System (OS) is a system software which serves as an interface between a user and a computer.

13. What is Open source Software?

Open source based software refers to those categories of software/ programs whose licenses do not impose much condition.

14. What is freeware and shareware?

- Freeware is the software which are available for use at no cost or for an optional fee.
- Shareware is the software which is made available with a right to redistribute copies.

15. What are key features of Operating System?

The key features of Operating Systems are User interface, File management, Memory management, Fault Tolerance, Process management, Security management.

16. Write the Needs of Operating System.

Operating System has become essential to enable the users to design applications without the knowledge of the computer's internal structure of hardware.
Operating System manages all the Software and Hardware. Most of the time there are many different computer programs running at the same time, they all need to access the Computers, CPU, Memory and Storage. The need of Operating System is basically - an interface between the user and hardware.

17. Write the uses of OS.

The main use of Operating System is

- To ensure that a computer can be used to extract what the user wants it do.
- Easy interaction between the users and computers.
- Starting computer operation automatically when power is turned on (Booting).
- Controlling Input and Output Devices
- Manage the utilization of main memory.
- Providing security to user programs.

18. What do you meant by Single user OS? Give example.

An operating system allows only a single user to perform a task at a time. It is called as a Single user and single Task operating system. For a user, a task is a function such as printing a document, writing a file to disk, editing a file or downloading a file etc. MS-DOS is an example for a single user and single task Operating System.

19. Write about Multi-user OS with Examples.

It is used in computers and laptops that allow same data and applications to be accessed by multiple users at the same time. The users can also communicate with each other. Windows, Linux and UNIX are examples for multi-user Operating System

20. What do you meant by Time Sharing OS?

It allows execution of multiple tasks or processes concurrently. For each task a fixed time is allocated. This division of time is called Time- sharing.

21. Name the types of Digital Network.

- Internet
- Intranet

22. What is Intranet and Internet?

- Intranet is a network of computers designed for a specific group of users.
- Internet is wide network of computers and is open to all.

23. What is interactive Operating System?

It is a Graphical User Interface (GUI) through which the user can easily navigate and interact with the system. It is more user friendly OS.

24. Write any two advantages of using Linux.

- It is Open source OS.
- It can be modified and distributed by anyone.
- It is easy to customize.
- There are many distributors.

25. Name the distributors of Linux.

The distributors are BOSS, Ubuntu, Mint, Fedora, Redhat, Debian, Google's Android, Chome OS and Chromium OS.

26. Write about note on Android.

Android is a mobile operating system developed by Google, based on Linux and designed primarily for touch screen mobile devices such as smart phones and tablets.

27. Write the applications of Android.

Android TV for televisions, Android Auto for cars and Android Wear for wrist watches, each with a specialized user interface.

Variants of Android are also used on game consoles, digital cameras, PCs and other electronic gadgets.

28. Define Robotics.

The branch of technology that deals with the design, construction, operation and application of robots.

29. Define Network.

A computer network, or data network, is a digital telecommunications network which allows nodes to share resources.

30. What is meant by Algorithm?

A process or set of rules to be followed in calculation or other problem-solving operations, especially by a computer.

31. What is file?

A file is an object on a computer that stores data, information, settings, or commands used with a computer program.

32. Define Data.

Computer data is information processed or stored by a computer.
This information may be in the form of text documents, images, audio clips, software programs, or other types of data.

33. What is meant by distributed computing?

- Distributed computing is a field of computer science that studies distributed systems.
- A distributed system is a model in which components located on networked computers communicate and coordinate their actions by passing messages.
- The components interact with each other in order to achieve common goal.

34. Differentiate Internet and Intranet.

Internet	Intranet
The Internet is the global system of interconnected computer networks that use the internet protocol suite (TCP/ IP) to link devices worldwide.	A local or restricted communications network, especially a private created using World Wide Web software.

35. Write a note on FAT.

Any type of data in a computer is stored in the form of files and directories/ folders through File Allocation Table (FAT).

The FAT stores general information about files like filename, type(text or binary), size, starting address and access mode (sequential/ indexed sequential/ direct/ relative).

36. Why we need OS?

Operating System has become essential to enable the users to design applications without the knowledge of the computer's internal structure of hardware.

Operating System manages all the Software and Hardware. Most of the time there are many different computer programs running at the same time, they all need to access the Computers, CPU, Memory and Storage.

The need of Operating System is basically - an interface between the user and hardware.

37. Why modern OS use a GUI.

Modern operating systems use a Graphical User Interface(GUI). A GUI lets you use your mouse to click icons, buttons, menus and everything is clearly displayed on the screen using a combination of graphics and text elements.

38. How the Linux OS was created?

The Linux operating system was originated in 1991, as a project of "Linus Torvalds" from a university student of Finland.

He posted information about his project on a news group for computer students and programmers. He received support and assistance from a large pool of volunteers who succeeded in creating a complete and functional Operating System.

Linux is similar to the UNIX operating system.

Answer the following Details:

1. Explain the concept of a Distributed Operating System.

The Distributed Operating System is used to access shared data and files that reside in any machine around the world. The user can handle the data from different locations. The users can access as if it is available on their own computer.

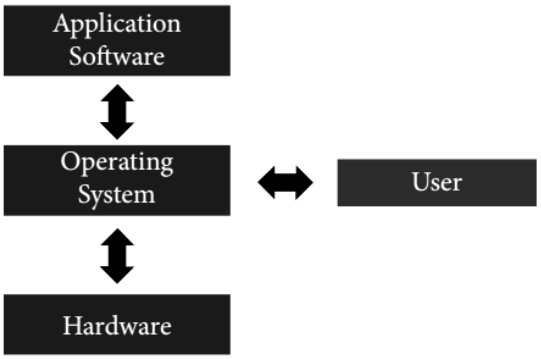
The advantages of distributed Operating System are as follows:

- A user at one location can make use of all the resources available at another location over the network.
- Many computer resources can be added easily in the network.
- Improves the interaction with the customers and clients.
- Reduces the load on the host computer.

2. Explain the main purpose of the Operating System.

Operating System has become essential to enable the users to design applications without the knowledge of the computer's internal structure of hardware. Operating System manages all the Software and Hardware. Most of the time there are many different computer programs running at the same time, they all need to

access the Computers, CPU, Memory and Storage. The need of Operating System is basically - an interface between the user and hardware.



Interaction of Operating system and user

Operating System works as translator, while it translates the user request into machine language (Binary language), processes it and then sends it back to Operating System.

The main use of Operating System is to ensure that a computer can be used to extract what the user wants it do.

- ✓ Easy interaction between the users and computers.
- ✓ Starting computer operation automatically when power is turned on (Booting).
- ✓ Controlling Input and Output Devices.
- ✓ Manage the utilization of main memory.
- ✓ Providing security to user programs.

3. Explain advantages and disadvantages of open source operation system.

Advantages:

- ✓ It's cheaper.
- ✓ It is generally free.
- ✓ It is high quality.
- ✓ Open source operating system is very reliable.
- ✓ Help s become more flexible.
- ✓ Creativity.

Disadvantages:

- Vulnerable to malicious users.
- It is not always user-friendly.
- Personalized support is rarely available.
- Institutional and organizational procurement process affecting the decision making process.

4. Explain memory management techniques.

Memory Management

Memory Management is the process of controlling and coordinating computer's main memory and assigning memory block (space) to various running programs to optimize overall computer performance. \

The Memory management involves the allocation of specific memory blocks to individual programs based on user demands. At the application level, memory management ensures the availability of adequate memory for each running program at all times.

The objective of Memory management process is to improve both the utilization of the CPU and the speed of the computer's response to its users via main memory. For these reasons the computers must keep several programs in main memory that associates with many different Memory Management schemes.

The Operating System is responsible for the following activities in connection with memory management:

• Keeping track of which portion of memory are currently being used and who is using them.

• Determining which processes (or parts of processes) and data to move in and out of memory.

• Allocation and de-allocation of memory blocks as needed by the program in main memory. (Garbage Collection).

5. Explain the Processing management Algorithms / Techniques in Operating System.

- Process management is function that includes creating and deleting processes.
- Providing mechanisms for processes to communicate and synchronize with each other.

The Operating System is responsible for the following activities associated with the process management:

- Scheduling processes and threads on the CPUs.
- Creating and deleting both user and system processes.
- Providing mechanisms for process synchronization.
- Providing mechanisms for process communication.

The Processing Management Algorithms/ Techniques are:

1. FIFO 2. SJF 3. Round Robin 4. Based on Priority

FIFO (First In First Out) Scheduling:

- This algorithm is based on queuing technique. Assume that a student is standing in a queue to get grade sheet from his/her teacher.
- The other student who stands first in the queue gets his/ her grade sheet first and leaves from the queue. Followed by the next student in the queue gets it collected and so on. This is the basic logic of the FIFO algorithm.
- Technically, the process that enters the queue first is executed first by the CPU, followed by the next and so on. The processes are executed in the order of the queue.

SJF (Shortest Job First) Scheduling:

- This algorithm works based on the size of the job being executed by the CPU.
- Consider two jobs A and B.
- A = 6 kilo bytes
- B = 9 kilo bytes.
- First the job "A" will be assigned and then job "B" gets its turn.

Round Robin Scheduling:

- The Round Robin (RR) scheduling algorithm is designed especially for time sharing systems.
- Jobs (processes) are assigned and processor time in a circular method. For example take three jobs A, B, C.
- First the job A is assigned to CPU then job B and job C and then again A, B and C and so on.

Based On Priority:

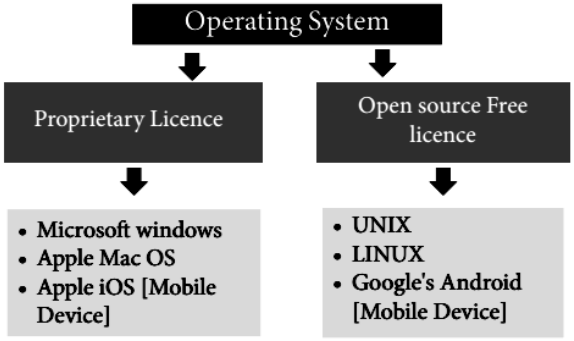
- The given job (process) is assigned based on a Priority.
- The job which has higher priority is more important than other jobs.
- Take two jobs A and B.
- Let the priority of A be 5 and priority B be 7.

- Job B is assigned to the processor before job A.

6. Explain Prominent Operating Systems.

Prominent OS are as follows:

- UNIX
- Microsoft Windows
- Linux
- iOS
- Android



Classification of Operating Systems according to availability

Modern operating systems use a Graphical User Interface(GUI). A GUI lets you use your mouse to click icons, buttons, menus and everything is clearly displayed on the screen using a combination of graphics and text elements. OS can be either proprietary with a commercial license or can be open source. Each Operating System's GUI has a different look and feel, so if you switch to a different Operating System, it may seem unfamiliar at first. However, modern Operating Systems are designed to be ease of use and most of the basic principles are the same.

Open source Free Licence:

UNIX

UNIX is a family of multitasking, multi-user operating systems that derive originally from AT&T Bell Labs, where the development began in the 1970s by Ken Thompson and Dennis Ritchie.

Linux

Linux is a family of open-source operating systems. It can be modified and distributed by anyone around the world. This is different from proprietary software like Windows, which can only be modified by the company that owns it. The main advantage of Linux operating system is that it is open source. There are many versions and their updates. Most of the servers run on Linux because it is easy to customize.

There are a few different distributions of Linux, like Ubuntu, Mint, Fedora, RedHat, Debian, Google's Android, Chrome OS, and Chromium OS which are popular among users.

The Linux operating system was originated in 1991, as a project of "Linus Torvalds" from a university student of Finland. He posted information about his project on a news group for computer students and programmers. He received support and assistance from a large pool of volunteers who succeeded in creating a complete and functional Operating System. Linux is similar to the UNIX operating system.

Android

Android is a mobile operating system developed by Google, based on Linux and designed primarily for touch screen mobile devices such as smart phones and tablets.

Google has further developed Android TV for televisions, Android Auto for cars and Android Wear for wrist watches, each with a specialized user interface. Variants of Android are also used on game consoles, digital cameras, PCs and other electronic gadgets.

Proprietary Licence

Microsoft Windows

Microsoft Windows is a family of proprietary operating systems designed by Microsoft Corporation and primarily targeted to Intel and AMD architecture based computers.

iOS - iPhone OS

iOS (formerly iPhone OS) is a mobile Operating System created and developed by Apple Inc., exclusively for its hardware. It is the Operating System that presently powers many of the company's mobile devices, including the iPhone, iPad and iPod Touch. It is the second most popular mobile Operating System globally after Android.

7. Explain the Types of Software.

Software is set of instructions that perform specific task. It interacts basically with the hardware to generate the desired output.

Types of Software

Software is classified into two types:

1) Application Software
2) System Software

Application Software:

Application software is a set of programs to perform specific task. For example MS-word is application software to create text document and VLC player is familiar application software to play audio, video files and many more.

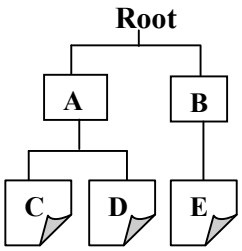
System Software:

System software is a type of computer program that is designed to run the computer's hardware and application programs. For example Operating System and Language Processor.

5.WORKING WITH TYPICAL OPERATING SYSTEM (WINDOWS & LINUX)

1. From the options given below, choose the operations managed by the operating system.
   a. Memory b. Processes
   c. Disks and I/O devices **d. All of these**
2. Which is the default folder for many Windows Application to save your file?
   a. **My Document** b. My Picture
   c. Documents and Settings d. My Computer
3. Under which of the following OS the option Shift+Delete – permanently deletes a file or folder?
   a. Windows 7 b. Windows 8 c. Windows 10 d. **All of the OS**
4. What the meaning of "Hibernate" in Windows XP/ Windows7?
   a. Restart the Computer in safe mode
   b. Restart the Computer in Hibernate mode
   c. Shutdown the Computer terminating all the running applications.
   d. Shutdown the Computer without closing the running application.
5. Which of the following OS is not based on Linux?
   a. Ubuntu **b. BSD** c. CentOS d. Redhat
6. Which of the following in Ubuntu OS is used to view the options for the devices installed?
   a. **Settings** b. Files c. Dash d. VBox_Gas_5.2.2
7. Identify the default email client in Ubuntu?
   a. **Thunderbird** b. Firefox c. Internet Explorer d. Chrome
8. Which is the default application for spreadsheets in Ubuntu? This is available in the software launcher?
   a. LibreOffice Writer b. **LibreOffice Calc**
   c. LibreOffice Impress d. LibreOffice Spreasheet
9. Which is default browser for Ubuntu?
   a. Firefox b. Internet Explorer c. Chrome d. Thunderbird
10. Where will you select the option to log out, suspend, restart, or shut down from the desktop of Ubuntu OS?
    a. **Session Indicator** b. Launcher c. Files d. Search
11. Which OS used on web servers and super computers?
    a. Unix b. Windows c. **Linux** d. iOS
12. Multiple applications execute simultaneous in windows is known as.
    a. Multiprocessing b. **Multitasking** c. Multiprogramming d. None of these
13. Which of the following input devices used in Windows OS?
    a. **Keyboard, Mouse** b. Keyboard, Microphone
    c. Mouse, Joystick d. Keyboard, Scanner
14. Which of the following is not an access applications?
    a. Word processing b. Games c. Spreadsheets d. **C++**
15. In which version of windows the mouse was introduced?
    a. **1** b. 2 c. 3 d. 95
16. Which windows version focused on multitasking?
    a. **95** b. 98 c. XP d. windows 7
17. In which version of windows, DOS gaming disappear?
    a. 95 b. ME c. **98** d. W2K
18. How many versions of Windows 2000 were released?
    a. 3 b. 1 c. **4** d. 2
19. Which was the last windows based MS-DOS? (or) Which version removed the option "Boot in DOS"?
    a. Windows 98 b. **Windows ME** c. W2K d. Windows XP
20. Which of the following is not a version of windows 2000?
    a. Data center server b. Professional c. **DOS** d. Server

21. Which Windows operating system introduced IE8?
    a. XP b. W2K c. Vista d. **7**
22. Which version of Windows takes better advantage of multi-core processing?
    a. **8** b. 7 c. 10 d. 3
23. Which windows versions introduced multiple desktop?
    a. 8 b. 7 c. **10** d. XP
24. How many mouse actions are there while using Windows OS?
    a. 5 b. **6** c. 7 d. 8
25. The basic working platform of Windows is called _____.
    a. OS b. Version c. Icons d. **Desktop**
26. The opening screen of Windows is called _____.
    a. Windows b. Workspace c. taskbar d. **Desktop**
27. The desktop consists of _____.
    a. Icons b. Start Button c. Documents d. **All of these**
28. Which key display the windows desktop?
    a. Winkey + E b. **Winkey + D** c. Winkey + C d. Winkey + T
29. Which button is used to get the Windows desktop?
    a. Aerotop b. Aeroseek c. **Aeropeck** d. Aerodesk
30. The graphical representation of Windows elements are called _____.
    a. Desktop b. **Icons** c. Task box d. Folders
31. Which plays vital role in GUI?
    a. **Icons** b. Windows c. Desktop d. Task bar
32. How many disk drive options are there in Windows?
    a. 4 b. 3 c. **5** d. 6
33. A rectangular area in an application is called _____.
    a. Desktop b. Start Menu c. Icons d. Window
34. Window is typical rectangular area in ____.
    a. Application b. Documents c. Dialog d. **All of these**
35. How many windows active when multiple windows open at a time?
    a. Only one b. Only two c. 3 d. 0
36. Which window display the contents of a document?
    a. Application b. Document c. **Explorer** d. None of these
37. Which is used for formatting the text and graphics?
    a. Icons b. Desktop c. **Window** d. Notepad
38. Which of the following element will display the name of the currently opened document?
    a. **Title Bar** b. Tool Bar c. Workspace d. Menu Bar
39. How many control buttons are there in title bar of the windows?
    a. 2 b. **3** c. 4 d. 1
40. Which key brings the focus on the first menu of the menu bar?
    a. **Alt + F10** b. Alt + F9 c. Ctrl + F10 d. Ctrl + F9
41. How many direction the document can be scrolled?
    a. 3 b. 2 c. 1 d. **4**
42. Which of the following window element help to resize the window?
    a. Corners b. Borders c. **a and b** d. scroll bar
43. A directory contains information about the _____.
    a. Data b. Records c. Icons d. F**iles**
44. The alternate name of the directory called _____
    a. Files b. **Folders** c. Information d. Data
45. The organized file structure is referred to _____
    a. Multilevel directory system b. **Hierarchical directory system**
    c. Multitasking directory system d. a and b
46. The first level in a hierarchical directory system is _____.
    a. **Root directory** b. Sub directory c. Directory d. Folder
47. Which level in the Multi-level directory system is root directory?
    a. Fourth b. Third c. Second d. **First**

48. 

from the above C,D,E are called _____.

a. **Files** b. Directory c. Sub directory d. Folder

49. Which of the following gives the hierarchy to access a particular directory?

a. **File** b. path c. folder d. root

50. Which of the following are wild card characters?

a. @, ~ b. /, + c. ***, ?** d. +, -

51. Which wild card character used as substitute for zero or more characters in a file name?

a. ***** b. ? c. @ d. +

52. Which wild card character used as substitute for single characters in a file name?

a. * b. **?** c. @ d. +

53. What is the name of the bar which appear at the bottom of the screen?

a. Scroll bar b. Title bar c. **Task bar** d. Menu bar

54. Which icon on the desktop allows to explore and manage the content of the computer drive?

a. My Computer b. **Computer** c. This PC d. All of these

55. Which of the following windows version display 'This PC' icon?

a. Windows 95 b. Windows XP c. Windows 7 d. **None of these**

56. Which of the following is another way of open a program?

a. **Start → Run** b. Start → Program c. Start →Apps d. Start →

57. How many ways are there to create a new folder?

a. 4 b. 3 c. **2** d. many

58. The default name of folder created is _____.

a. New b. Folder c. Folder New d. **New Folder**

59. Which key is used to change the folder name?

a. ESC key b. **Enter key** c. Alt key d. Ctrl + Shift

60. Which command on the start menu used to search the entire computer quickly?

a. **Find** b. Search c. Locate d. Layout

61. Which of the following not searched by Start → Find command?

a. File b. Folder c. Drive d. **None of these**

62. The most common way of opening of file or a folder using mouse is _____.

a. Click b. Drag c. **Double Click** d. Drag and Drop

63. How many ways to rename file and Folders in Windows?

a. 1 b. 2 c. 4 d. **3**

64. Which facility provides you to move or copy the file or folders in Windows?

a. **Windows Explorer** b. My Computer c. This PC d. Recycle Bin

65. Which command is used to cut file or folder?

a. **File → Cut** b. Edit → Cut c. Edit → Move d. Format → Cut

66. The shortcut key is used to cut file or folder

a. Ctl + Alt + C b. Clt + C c. Clt + Alt + X d. **Clt + X**

67. The command to paste the cutted files into new location is _____.

a. **Edit → Paste** b. File → Paste c. File → Copy d. Format → Paste

68. The shortcut key is used to paste the cutted files or folder is _____

a. **Ctl + V** b. Clt + P c. Alt + P d. Shift + V

69. Which are the symbols seen while collapsing and expanding the folder list in Windows Explorer?

a. *, ? b. @, ? c. **+, -** d. *, -

70. Which menu is used to select the copy option?

a. File b. **Edit** c. Format d. Tools

71. The shortcut key is used to copy files or folders
    a. **Ctl + C** b. Clt +X c. Alt+ C d. Shift + C
72. Which key used while drag and drop the files or folders to be copied?
    a. Shift b. Alt c. Tab d. **Ctrl**
73. How many methods are there of transferring files or folder to or from Removable disk?
    a. 2 b. **4** c. 3 d. 5
74. Which icon on the desktop is used to recover the deleted files and folders?
    a. My Computer b. This PC c. **Recycle Bin** d. Computer Bin
75. Which menu is delete file or folder in Windows?
    a. **File** b. Edit c. Tools d. Format
76. Which key combination is used to delete the file or folder permanently?
    a. Ctrl + Delete b. Shift + Delete c. Alt + Delete d. Ctrl+Alt + Del
77. Which must be created on files and folders and placed on Desktop to help automate your work?
    a. Icons b. Task bar c. **Shortcuts** d. Program
78. Which program or software is available free of charge?
    a. **Open source** b. Closed source c. Share source d. None of these
79. Which one is popular open source version of UNIX?
    a. Windows b. **Linux** c. Minux d. C++
80. Which OS is designed for computer, smart phones and network servers?
    a. Android b. **Ubuntu** c. iOS7 d. None of these
81. Which of the following linux sever distribution is freeware?
    a. Red Hat b. SUSE c. **UBUNTU** d. All of these
82. Which of the linux sever distribution is shareware?
    a. Cent OS b. **Red Hat** c. SUSE d. All of these
83. Which of the following is located at the top of the screen in Linux OS?
    a. Task bar b. Scroll bar c. Tool bar d. **Menu bar**
84. Which of the following is not the icon in the Ubuntu OS?
    a. Amazon b. **FlipKart** c. Files d. Trash
85. How many common indicators are there in Ubuntu OS menubar?
    a. 3 b. 4 c. **6** d. 5
86. The default Ubuntu 16.04 theme known as _____.
    a. **Ambiance** b. Trend c. Dzire d. 3D tube
87. Which provides in Ubuntu OS for easy access to applications, mounted devices and Trash?
    a. Icons b. Desktop c. **Launcher** d. My Computer
88. Which Ubuntu OS icon is equivalent to My Computer icon?
    a. This PC b. Computer c. **Files** d. Explorer
89. Which Ubuntu OS icon is used to browse the internet?
    a. Internet Explorer b. Google Chrome c. Google Android d. **Fire Fox**
90. Which icon in Ubuntu OS open an application like MS-Word?
    a. Star Office Writer b. Open Office Writer c. **Libre Office Writer** d. Libre Office Editor
91. Which icon in Ubuntu OS open an application like MS-Excel?
    a. **Libre Office Calc** b. Open Office Calc c. Office Calc d. Star Office Calc
92. Expansion of VBox is _____.
    a. Video Box b. Visual Box c. Vector Box d. **Virtual Box**
93. Trash icon is equivalent to _____ icon in Windows.
    a. Spam b. **Recycle Bin** c. Garbage Bin d. Dustbin
94. Match the following.

(i)	Tablet OS	-	(1) Linux
(ii)	Desktop OS	-	(2) Andriod
(iii)	Smart phone OS	-	(3) iOS
(iv)	OS used in Super Computer	-	(4) Windows 7

    a. 1,4,3,2 b. 1,2,4,3 c. 4,3,1,2 d. **3,4,2,1**
95. How many different types of icons in Windows?
    a. 5 b. 6 c. **4** d. 3

96. Which of the following statement is true?
    (i) Introduction of GUI is in Windows 1.
    (ii) Introduction of 32 bit environment in Windows 95.
    (iii) Four versions of Windows 2000 were released.
    (iv) Windows vista introduced in the year 2006.
    (v) Introduction of multiple desktop in Windows 10.
    a. Only (i),(iii),(v) b. Only (ii),(iv),(v) c. Only (i),(ii),(v) d. **All of these**
97. Which of the following statement is true?
    (i) The basic working platform of windows is not a desktop.
    (ii) The opening screen of windows is called desktop.
    (iii) The appearance of the desktop cannot be charged.
    (iv) The desktop consists of icons and task bar.
    a. Only (i),(iv) b. **Only (i),(iii)** c. Only(iii) d. Only (ii), (iv)
98. Match the following.
    (i) These icons are representing software package is logo.
    (ii) These icons point to particular file.
    (iii) These icons used to identify application.
    (iv) These icons shows the removable storage and permanent storage medium.
    (1) Document Icon (2) Application Icon 3) Disk Drive Icon 4) Shortcut Icon
    a. **2,4,1,3** b. 4,1,3,2 c. 3,1,2,4 d. 1,2,4,3
99. How many types of windows you can work with?
    a. 3 b. **2** c. 1 d. many
100. Which of the following is not a element of application window?
    a. Tool bar b. Work area c. Status bar d. **Word**
101. How the files are displayed in windows OS?
    a. **Tree Structure** b. Data Structure c. File Structure d. All of these
102. Which contains the information about the files?
    a. Icons b. Windows c. **Directory** d. Document
103. Which directory is created automatically at the time of disk formatting?
    a. **Root** b. Sub directory c. Bin d. Drive Directories
104. How many parent directory is allowed for the child directory?
    a. 2 b. **Only One** c. More than 2 d. Less than 6
105. The sequence of directory names which leads to access a particular file name is called
    a. Sub directory b. Root directory c. Tree d. **Path**

Answer the following:

1. **Differentiate Cut and Copy option.**

Cut	Copy
It is the process of moving a block from one place to another.	It is the process of making duplicate copies of the block of a worksheet.

2. **What is the use of a file extension?**
   File extension is used to know that in which the file is associated with.

3. **Differentiate Files and Folders.**

Files	Folders
File is the collection of records.	Folder is a collections of files

4. **Differentiate Save and Save As option.**
   "Save" option save a document with a name "Save As" option save an already saved the document with a new name and also create a copy of already saved document with new name obviously.

5. What is Open Source?

Open Source refers to a program or software in which the source code is available in the web to the general public free of cost.

6. What is the advantage of Open Source?

- The Open software is free to use, distribute and modify.
- It has lower cost in most cases in only the fraction of the cost of their propriety counter parts.
- It is most secured as the accessible to everyone.

7. Mention the Different server distribution in Linux OS.

The most popular Linux server distributors are:

Free server & most popular:
Ubuntu Linux
CentOS
Distributions associated with price:
Red Hat
Linux Mint
Arch Linux
Deepin
Fedora
Debian

8. How will you log off from Ubuntu OS?

When we has finished working on our computer, we can choose to Log Out through the Session Indicator on the far right side of the top panel.

9. Name any four icons in Ubuntu OS desktop

Amazon, Trash, Files, System Settings..

10. What is Ambiance in Ubuntu OS?

The default desktop background, or wallpaper, belonging to the default Ubuntu16.04 theme known as Ambiance.

11. What is Launcher?

- The vertical bar of icons on the left side of the desktop is called the Launcher.
- The launcher provides easy access to applications, mounted devices, and the Trash.

12. Name the icons which is equivalent to MS- office applications.

- Libre Office Writer - MS-Word
- Libre Office Calc - MS-Excel
- Libre Office Impress – MS-Powerpoint

13. What is the use of VBox in Ubuntu OS?

The expansion for VBox is VirtualBox. The reason to use Oracle VirtualBox is Ubuntu Linux can be run as a guest OS within the Virtual machine.

14. What is Trash in Ubuntu OS?

Trash is the equivalent of Recycle bin. All the deleted Files or Folders are moved here.

15. What is Multi-Tasking?

Multiple applications which can execute simultaneously in windows is known as " Multi-Tasking.

16. Write the prominent feature of Windows 95 OS.

- Introduced Start button and Start menu.
- Introduced a 32 bit environment, the task bar and forced on multitasking.

17. Write the prominent feature of Windows 98 OS.

- Integration of the Web browser (Internet Explorer) with the Operating System.
- DOS gaming began to disappear as Windows gaming improved.

18. Write the prominent feature of Windows 7 OS.

- Faster boot times, introduced new user interfaces and Internet Explorer 8.
- Most used operating system on the internet and also the most used for PC gaming.

19. What is desktop?

The basic working platform of windows is called desktop or the opening screen of windows is called desktop.

20. Name the parts of Task bar.

The Task bar is at the bottom of the Desktop and contains the Start button. Windows Notification Area time and date.

21. What is the use of Aero peek?

Aero Peek is used to get the desktop at any time.

22. What is Shutdown?

Shut down is the team used to describe the process of closing all software programs in preparation to turn off a computer's power.

23. What is Log off?

Referred to as logoff, logout, disconnecting, and sign out, sign off process of disconnecting from network or what occur

24. What is Recycle Bin?

It is a folder which contains all deleted files and folders have an opportunity to recover from it.

25. Name the four versions of Windows 2000.

The four versions of Windows 2000 were released:

- Professional (for business desktop and laptop),
- Server (for both Web Server and an Office Server),
- Advanced Server (for line of business application) and
- Data Center Server (for high-traffic computer networks).

26. Name the commonly used icons in the desktop.

Commonly used icons are: My Computer, Documents, Recycle bin, application icons, Shortcut icons, Document icons and Disk-drive icon.

27. What is meant by Document icon?

Active document window which is a window within an application window is called as document icon.

28. What is meant by Window?

Window is a typical rectangular area in an application or a document. It is an area on the screen that displays information for a specific program.

29. What is meant by Application Window?

It is an area on a computer screen with defined boundaries, and within which information is displayed. Such windows can be resized, maximized, minimized, placed side by side, overlap.

30. What is Document Window?

A document window is a section of the screen used to display the contents of a document.

31. Name the elements of Application Window.

Title bar, Menu bar, Tool bar, Scroll bars, Status bar, Work Space (area) and Control buttons.

32. **Name the elements of Windows.**

Title bar, Menu bar, Tool bar, Scroll bars, Status bar, Borders , Work Space (area) and Corners.

33. Name the Control Buttons.

Minimize, Maximize/ Restore and Close buttons.

34. What is meant by Title Bar? (Or) What will displayed on the Windows title bar?

The title bar will display the name of the application and the name of the document opened. It will also contain minimize, maximize and close button.

35. What is meant by Work Space in Document Window?

- The workspace is the area in the document window to enter or type the text of your document.
- It is the point of insertion for typing within the document.

36. What is Scroll Bar?

The scroll bars are used to scroll the workspace horizontally or vertically.

37. What is the use of Corners and Borders?

The corners and borders of the windows help to drag and resize the windows. The mouse pointer changes to a double headed arrow when positioned over a border or a corner. Drag the border or corner in the direction indicated by the double headed arrow to the desired size. The window can be resized by dragging the corners diagonally across the screen.

38. Where will the Start menu is available?

In the lower left-hand corner of the windows screen is the Start button. When you click on the button, the Start menu will appear. Using the start menu, you can start any application.

39. What the use of Task bar? Or what are all available on Taskbar?

At the bottom of the screen is a horizontal bar called as Taskbar. This bar contains (from left to right) the Start button, shortcuts to various programs, minimized programs and in the extreme right corner you can see the system tray which consist of volume control, network, date and time etc. Next to the Start button is the quick Launch Toolbar which contains task for frequently used applications.

40. What is root directory?

The first level in a multilevel or hierarchical directory system is root directory, which is created automatically at the time of disk formatting.

41. What is the use wildcard character (*) Asterisk?

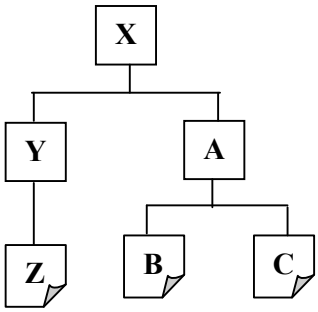
The use of asterisk as a substitute of zero or more characters.

42. What is the use of wild card character (?) Question mark?

The use of question mark as a substitute for a single character in a name.

43. Observe the following and answer the following.

a) Name of the Root directory.
b) Name of the Sub-directory.
c) Name of the Files.



Ans:
(a) X
(b) Y, A
(c) Z, B, C

44. What is Ubuntu?

- A quality that includes the essential human virtues, comparison and humanity is called ubuntu.
- Ubuntu is an open source OS for computer.
- It is a Linux distribution based on the debian architecture.

45. What is the different between UNIX and LINUX?

S.No	UNIX	LINUX
1	Unix is a proprietary operation system.	Linux is a open source Operating system.
2	Unix OS primarily uses a command line Interface.	Linux OS primarily uses GUI Interface.

46. List down the differences in security for Windows7 , Windows8 and Windows10 Operating system.

Windows 7 - Ordinary password security while logging.
Windows 8 - Ordinary password security while logging.
Windows 10 - Windows Hello, one of the security which lets you log-in using a fingerprint, face or iris scan instead of a password.

47. What is OS (Operating System)?

- An Operating System is a software program that enables the computer hardware to communicate and operate with the computer software.
- It also acts as an interface between the user and the computer hardware and controls the execution of all kinds of programs.

48. Differentiate Windows 7 and Windows 8.

Windows 7	Windows 8
Faster boot times, introduced new user interface and Internet Explorer 8.	It was faster than previous versions of Windows.
Most used operating system on the internet and also the most used for PC gaming.	Windows 8 takes better advantage of multi-core processing, solid state drives (SSD), touch screens and other alternative input methods.

49. Write a note on Windows Scroll bars.

A scrollbar is an interaction technique in which continuous text, pictures, or any other content can be scrolled in a predetermined direction (up, down, left or right) on a computer display so that all contents can be viewed, even if only fraction of the content cab be seen on a device's screen at a time.

50. How will you delete files and folders using file menu?

- Select the file or folder you wish to delete.
- Click on the File menu and select Delete.
- The file will be moved to recycle bin.

51. Write a note on Ubuntu OS.

- Ubuntu is a Linux - based operating system. It is designed for computers, smart phones, and network servers.
- The system is developed by a UK based company called Canonical Ltd.
- All the principles used to develop the Ubuntu software are based on the principles of Open Source software development.

52. What is the purpose of windows store design?

Windows store is designed to unify all windows platforms across multiple devices, including Windows Phone and tablets, with universal apps that can be downloaded from the Windows Store and run on all Windows devices.

53. Analyse: Why the drives are segregated?

The drives are segregated because

- Save space and increase performance.
- To include other Operating systems, isolate programs and keep files tidy.
- It might help to isolate operating systems or programs from other user.

54. If you are working on multiple files at a time, sometimes the system may hang. What is the reason behind it? How can you reduce it?

- Due to low capacity of main memory (RAM) the system many hang while working with multiple files.
- To reduce it increase the size of main memory and other reasons for hanging is overheating, driver corruption or errors, software errors and computer virus.

55. Are drives such as hard drive and floppy drives represented with drive letters?

Yes, hard drives and floppy drives represented with drive letters.

56. Write the specific use of Cortana.

Use of Cortana

- Gives reminders based on time, places or people.
- Track packages, teams, interests and flights.
- Send emails and texts.
- Find facts, files, places and information.
- Open any application on your system.

57. List out the major differences between Windows and Ubuntu OS.

S.No	UBUNTU OS	WINDOWS OS
1	Open source (Licensing Freedom)	Closed source (Licensing Restriction)
2	Online peer support	Paid - help desk support
3	Full hardware support	Partial hardware support
4	Support CUI	No CUI Support
5	Flexibility	Rigidity

58. Are there any difficulties you face while using Ubuntu? If so, mention it with reasons.

- Different desktop manages lead to a fragmented experience.
- Too many package Managers makes Ubuntu hard to learn and master.
- Lack of software.
- Hardware compatibility.

59. Differentiate Thunderbird and Firefox in Ubuntu OS.

Firefox is a browser. Thunderbird is email client which can be used to view emails received.

60. Differentiate Save, Save As and Save a Copy in Ubuntu OS.

Save : This will save the document without asking for a new name or locations. It will overwrite the original.

Save As : This will prompt you to save the document using a dialog box. This allows to change the file name or location.

Detail Question and Answer:

61. Explain the versions Windows Operating System.

Versions	Logo	Year	Specific features
Windows 1.x	MICROSOFT WINDOWS	1985	• Introduction of GUI in 16-bit processor • Mouse was introduced as an input device.
Windows 2.x	MICROSOFT WINDOWS	1987	• Supports to minimize or maximize windows. • Control panel feature was introduced with various system settings and customising options.
Windows 3.x	MICROSOFT WINDOWS	1992	• Introduced the concept of multitasking. • Supported 256 colours which brought a more modern, colourful look to the interface.

Windows 95		1995	• Introduced Start button, the taskbar, Windows Explorer and Start menu. • Introduced 32 - bit processor and focused more on multitasking.
Windows 98		1998	• Integration of the Web browser (Internet Explorer) with the Operating System. • DOS gaming began to disappear as Windows based games improved. • Plug and play feature was introduced.
Windows NT			• Designed to act as servers in network.
Windows Me		2000	• It introduced automated system diagnostics and recovery tools.
Windows 2000		2000	• Served as an Operating System for business desktop and laptop systems. • Four versions of Windows 2000 were released: Professional (for business desktop and laptop systems), Server (both a Web server and an office server), Advanced Server (for line-of-business applications) and Data Centre Server (for high-traffic computer networks).
Windows XP		2001	• Introduced 64-bit Processor. • Improved Windows appearance with themes and offered a stable version.
Windows Vista		2006	• Updated the look and feel of Windows.

Windows 7	Windows 7	2009	• Booting time was improved, introduced new user interfaces like Aero Peek, pinning programs to taskbar, handwriting recognition etc. and Internet Explorer 8.
Windows 8	Windows 8	2012	• Windows 8 is faster than previous versions of Windows. • Start button was removed. • Windows 8 takes better advantage of multi-core processing, solid state drives (SSD), touch screens and other alternate input methods. • Served as common platform for mobile and computer.
Windows 10	Windows 10	2015	• Start Button was added again. • Multiple desktop. • Central Notification Center for App notification and quick actions. • Cortana voice activated personal assistant.

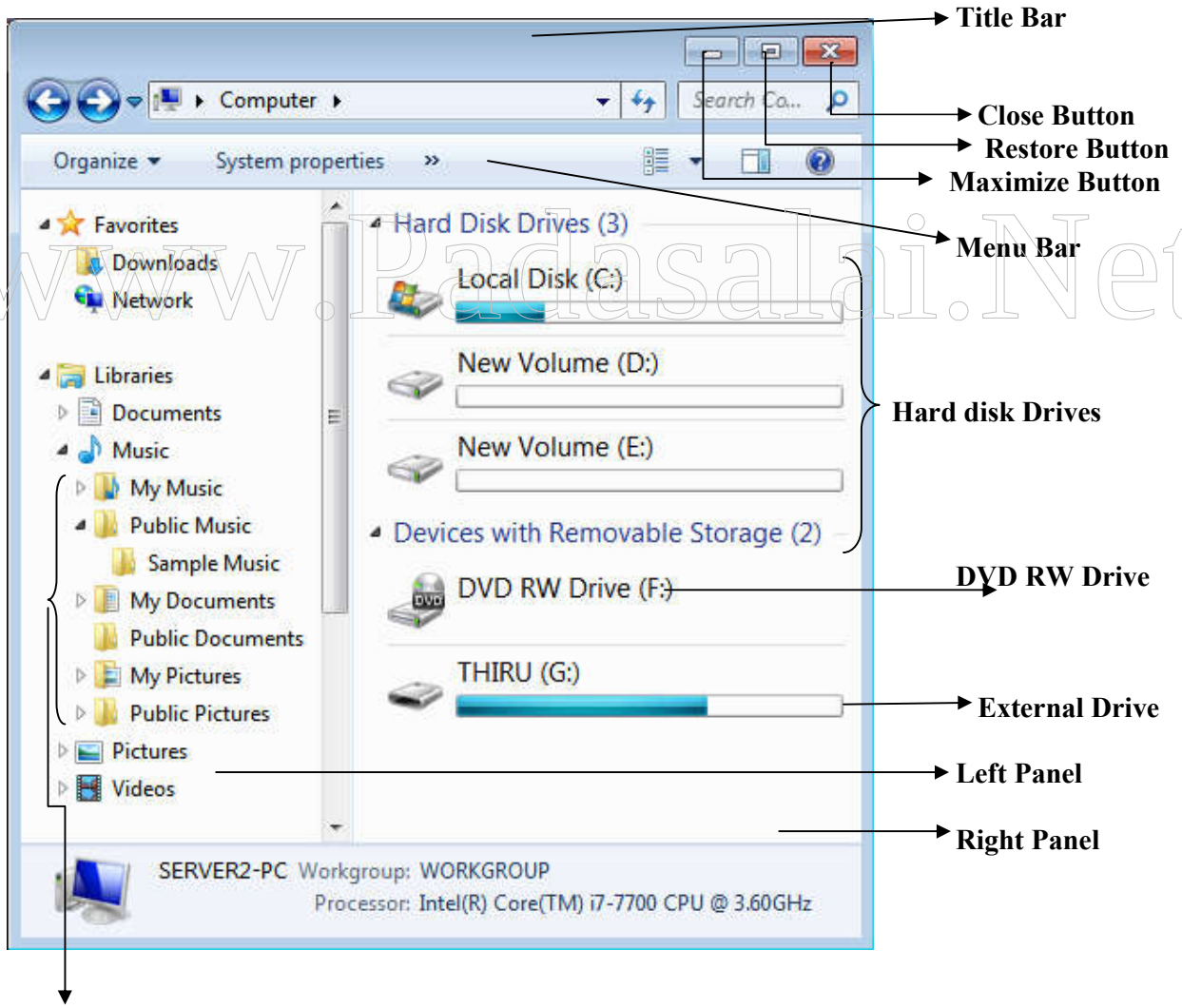
62. Draw and compare the icon equivalence in Windows and Ubuntu.

S.No	Windows	Ubuntu
1	Recycle Bin	Trash
2	My Computer	Files
3	Ms- Word	Libre Office Writer

63. Complete the following matrix

Navigational method	Located on	Ideally suited for
Start button	Taskbar	**Quick access common apps and settings**
My Computer	Desktop	Exploring your disk drives and using system tools.
Windows Explorer	**Taskbar**	Seeing hierarchy of all computer contents and resources in one window.
Quick Launch	**Taskbar**	**To open the Programs quickly**

64. Observe the figure and mark all the window elements, Identify the versions of the Windows OS.



65. Write the procedure to create, rename, delete and save a file in Ubuntu OS. Compare it with Windows OS.

In Ubuntu OS :
Create a file : By right clicking in the desktop and also files be created by using file menu.
Delete a file : By using right click and choosing move to trash or by using menu.
Rename a file : By using right click and choosing rename option.
Save a file : Press Ctrl + X or F2 to exit. You will then be asked if you want to save. (or) Press Ctrl + O or F3 and Ctrl + X or f2 for save the file and exit.

InWindows OS :
Create a file : Open an application and created by using file menu.
Delete a file : By right click on the file and choose rename option to rename a file.
Save a file : Press Ctrl + S or File →Save to save the file.

66. Write the important functions of an operating system?
The important functions of an operating system.

- Memory management
- Processor management
- Device management
- File management
- Security management
- Control over system performance
- Job accounting
- Error accounting
- Coordination between other software and users.

67. Write the functions of Windows OS.

- The functions of Windows operating system which allows you to do are:
- Access application (programs) on computer (Word processing, games, Spreadsheets, Calculators and so on).
- Load any were new programs on to the computer.
- Manage hardware such as printers, scanners, mouse, digital cameras etc.
- Manage how files are stores on your computer.
- Change computer settings such as color schemes, screen savers and the resolution of monitor.

68. Write the actions and reactions of using mouse.

Action	Reaction
Point to an item	Move the mouse pointer over the item.
Click	Point to the item on the screen, press and release the left mouse button.
Right click	Point to the item on the screen, press and release the right mouse button. Clicking the right mouse button displays a pop up menu with various options.
Double-click	Point to the item on the screen, quickly press twice the left mouse button.
Drag and drop	Point to an item then hold the left mouse button as you move the pointer press and you have reached the desired position, release the mouse button.

69. Explain the different types of icons in Windows desktop.

Icons:

Icon is a graphic symbol representing the window elements like files, folders, shortcuts etc., Icons play a vital role in GUI based applications.

Application Icons:

These icons are representing software package's logo. Double click over this icon, the related application gets invoked.

Standard Icons:

The icons which are available on desktop by default while installing Windows OS are called standard icons. The standard icons available in all Windows OS are My Computer, Documents and Recycle Bin.

Shortcut Icons:

Shortcut icons can be created for any application or file or folder. By double clicking the icon, the related application or file or folder will open. This represents the shortcut to open a particular application.

70. Explain the elements of Windows.

Title Bar – The title bar will display the name of the application and the name of the document opened. It will also contain minimize, maximize and close button.

Menu Bar - The menu bar is seen under the title bar. Menus in the menu bar can be accessed by pressing Alt key and the letter that appears underlined in the menu title. Additionally, pressing Alt or F10 brings the focus on the first menu of the menu bar. In Windows 7, in the absence of the menu bar, click **Organize** and from the drop down menu, click the **Layout** option and select the desired item from that list.

The Workspace - The workspace is the area in the document window to enter or type the text of your document. The workspace area in the document window.

Scroll bars - The scroll bars are used to scroll the workspace horizontally or vertically moving bar.

Corners and borders - The corners and borders of the window helps to drag and resize the windows. The mouse pointer changes to a double headed arrow when positioned over a border or a corner. Drag the border or corner in the direction indicated by the double headed arrow to the desired size . The window can be resized by dragging the corners diagonally across the screen.

71. Explain different ways of creating a new folder. (Ans : Book Page No : 90 – 92)
72. Explain how will you find a file or folder in Windows. (Ans : Book Page No : 93 – 95)
73. Explain the different methods of renaming files and folders in Windows. (Ans : Book Page No : 95 – 97)
74. Explain the different methods of moving files and folders in Windows. (Ans : Book Page No : 98)
75. Explain how will you copy files and folders in Windows. (Ans : Book Page No : 98 - 99)
76. Explain the methods followed while copying files and folders to removable disk in Windows. (Ans : Book Page No : 99 - 100)
77. Explain the procedure of shutting down or log off computer.(Ans: Book Page No:102 –103)
78. Write the significant features of Ubuntu OS. (Ans: Book Page No:105)
79. Explain the most common indicators in Ubuntu OS menu bar. (Ans: Book Page No:106)
80. Explain the Element of Ubuntu OS. (Ans: Book Page No:107 - 110)

UNIT - II ALGORITHMIC PROBLEM SOLVING

6. SPECIFICATION AND ABSTRACTION

1. Which of the following activities is algorithmic in nature?
   a. **Assemble a bicycle** b. Describe a bicycle
   c. Label the parts of a bicycle d. Explain how a bicycle works
2. Which of the following activities is not algorithmic in nature?
   a. Multiply two numbers b. Draw a kolam
   c. Walk in the park d. **Braid the hair**
3. Omitting details inessential to the task and representing only the essential features of the task is known as
   a. Specification b. **Abstraction** c. Composition d. Decomposition
4. Starting the input property and the as : - output relation a problem is known as
   a. **Specification** b. Abstraction c. Algorithm d. Definition
5. Ensuring the input-output relation is
   a. the responsibility of the algorithm and the right of the user.
   b. the responsibility of the user and the right of the algorithm.
   c. the responsibility of the algorithm but not the right of the user.
   d. **the responsibility of both the user and the algorithm.**
6. If i=5 before the assignment i:=i-1 after the assignment, the value of I is
   a. 5 b. **4** c. 3 d. 2
7. If i < 0 before the assignment i:=i-1 after the assignment, we can conclude that
   a. 0 < i b. **0 ≤ i** c. i = 0 d. 0 ≥ i
8. Which of the following are an examples of process?
   a. adding two numbers b. Draw a kolam
   c. Walk in the park d. **All of these**
9. Instructions are also known as?
   a. Programs b. Input c. **Statement** d. Process
10. Which must be expressed using statement of a programming language?
    a. Process b. Instruction c. **Algorithm** d. Specification
11. Which is intended to solve a problem?
    a. Program b. Statement c. Process d. **Algorithm**
12. How many basic building blocks are there to construct algorithms?
    a. 1 b. 2 c. **4** d. 3
13. Which of the following not used to construct algorithm?
    a. Data b. **Process** c. Control flow d. Functions
14. In computers, operations on data performed by
    a. **Instruction** b. Program c. Process d. All of these
15. When operations are done on data, the results are stored in
    a. control flow b. functions c. **variables** d. instructions
16. Which are named boxes for storing data?
    a. Data b. process c. functions d. **variables**
17. The data stored in a variable is also called _____.
    a. **value** b. process c. function d. control flow
18. Computational processes in the real world have
    a. Statements b. Procedure c. Behaviour d. **State**
19. Which changes when a process evolves?
    a. Process b. **State** c. Behaviour d. program
20. How the state of the process represented in an algorithm?
    a. Data b. **Variables** c. Statements d. Programs
21. The order of execution of program statement is known as
    a. Variable b. **Control flow** c. Functions d. Association
22. Which of the following statement is not used to alter the normal flow of control?
    a. Sequential control flow b. Alternative control flow
    c. **Assignmentcontrol flow** d. Iterative control flow

23. Which of the following statement is used to alter the normal flow of control?
a. Sequential control flow b. Alternative control flow
c. Iterative control flow d. **All of these**

24. Each part of an algorithm are known as
a. Variables b. **Functions** c. Control flow d. data

25. Which of the following is not an algorithm design technique?
a. Specification b. Abstraction c. **Control flow** d. Composition

26. Which of the following design technique state the relation between the input and the output?
a. **Specification** b. Abstraction c. Composition d. Decomposition

27. Which of the following design technique used to hide the unnecessary details while solving the problem?
a. Specification b. **Abstraction** c. Composition d. Decomposition

28. The input and output are passed between an algorithm and the user through
a. data b. control flow c. variables d. functions

29. The symbol indicates the comment statement while specifying an algorithm is
a. **--** b. || c. ~~ d. none of these

30. An Algorithm is composed of the statement
a. assignment b. control flow c. **a and b** d. arithmetic

31. Which statement are used to notate a program for the human readers?
a. Assignment b. Control flow c. **Comments** d. Arithmetic

32. How many standard specification formats are there to design the algorithm?
a. **2** b. 3 c. 4 d. 1

33. Which serves as a contract between the designer and users of the algorithm?
a. Abstraction b. **Specification** c. Composition d. Decomposition

34. Which defines the rights and responsibilities of the algorithm?
a. Abstraction b. Composition c. **Specification** d. Decomposition

35. Which is the most effective tool used for managing program complexity?
a. Specification b. Control flow c. Composition d. **none of these**

36. Which of the following is a basic and important abstraction?
a. **State** b. Variable c. Control flow d. Functions

37. The right side of assignment can be?
a. A value b. A variable c. An expression d. **Any one of these**

Answer the following:

1. Define an Algorithm.

An Algorithm is a step by step sequence statements intended to solve a problem.

2. Distinguish between an algorithm and a process.

An algorithm is a sequence of instructions to accomplish a task or solve a problem. An instruction describes an action. When the instructions are executed, a process evolves which accomplishes the intended task or solves the given problem. We can compare an algorithm to a recipe, and the resulting process to cooking.

3. Initially,
Farmer, goat, grass, wolf = L,L,L,L and the framer crosses the river with goat. Model the action with an assignment statement.

1. -- farmer, goat, grass, wolf = L, L, L, L
2. farmer, goat := R, R
3. -- farmer , goat , grass , wolf = R, R, L, L
4. farmer := L
5. farmer, goat, grass, wolf = L, R, L, L
6. farmer, grass := R, R
7. -- farmer , goat , grass , wolf = R, R, R, L

8. farmer, goat := L, L
9. -- farmer, goat, grass, wolf = L, L, R, L
10. farmer, wolf := R, R
11. -- farmer , goat , grass , wolf = R, L, R, R
12. farmer : = L
13. -- farmer , goat , grass , wolf = L, L, R, R
14. farmer , goat : = R, R
15. -- farmer , goat , grass , wolf = R, R, R, R

4. Specify a function to find the minimum of two numbers.

1. Minimum (A,B)
2. -- inputs : A and B are integers or real numbers.
3. – outputs: A minimum, A< B
   B minimum, B< A

5. If $\sqrt{2}$ = 1.414, and the square_root( ) function returns -1.414, does it violate the following specification?
-- square_root( )
-- inputs : x is a real number, n>0
-- outputs: y is a real number such that y^2=x.

Yes, if violate the specification.

6. When do you say that a problem is algorithmic in nature?

We usually say that a problem is algorithmic in nature when its solution involves the construction of an algorithm. Some types of problems can be immediately recognized as algorithmic.

7. What is the format of the specification of an algorithm?

Let P be the required property of the inputs and Q the property of the desired outputs. Then the algorithm S is specifed as
1. algorithm_name (inputs)
2. -- inputs : P
3. -- outputs: Q

8. What is abstraction?

A problem can involve a lot of details. Several of these details are unnecessary for solving the problem. Only a few details are essential. Ignoring or hiding unnecessary details and modeling an entity only by its essential properties is known as abstraction.

9. How is state represented in algorithm?

The state of process can be represented by set of variables in an algorithm. The state at any point of execution is simply the values of the variables at the point.

10. What is the form and meaning of assignment statement?

Assignment statement is used to store a value in a variable. It is written with the variable on the left side of the assignment operator and a value on the right side.

variable := value

When this assignment is executed, the value on the right side is stored in the variable on the left side.

11. What is the difference between Assignment operator and equality operator?

Assignment operator is used to assign the right hand side value to left hand side variable.

Equality operator is used to compare the values of both right hand side variable and left hand side variable and results in either true or false.

12. How will you construct an algorithm?

- Data
- Variables
- Control Flow
- Functions

13. How do you know whether the state changes in an algorithm?

As the value of the variables are changed, the state changes.

14. What is control flow?

The order in which the statements are executed may differ from the order in which they are written in the algorithm. This order of execution of statements is known as the control flow.

15. Name the Control flow statements used in an algorithm.

- Sequential Control flow.
- Alternative Control flow
- Iterative Control flow

16. Name the basic principles and techniques for designing algorithms.

- Specifications
- Abstractions
- Composition
- Decomposition.

17. Write the goal of the algorithm.

The goal of the Algorithm is to establish the relation between the input and the desired output.

18. Write the specification of an algorithm to compute the quotient and remainder after dividing two integers.

1. divide(A, B)
2. -- inputs : A is an integer and $B \neq 0$
3. -- outputs : $A = q \times B + r$ and $0 < r < B$

19. Differentiate initial and final state of an algorithm.

The inputs and outputs are passed between an algorithm and the user through variables. Te values of the variables when the algorithm starts is known as the initial state, and the values of the variables when the algorithm finishes is known as the final state.

20. Write a note on the parts of specification of an algorithm.

We can write the specification in a standard three part format:

• The name of the algorithm and the inputs.

• Input: the property of the inputs.

• Output: the desired input-output relation.

The first part is the name of the algorithm and the inputs. Te second part is the property of the inputs. It is written as a comment which starts with — inputs: The third part is the desired input-output relation. It is written as a comment which starts with — outputs:. The input and output can be written using English and mathematical notation.

21. Write the specification of an algorithm for computing the square root of a number.

1. Let us name the algorithm square_root.
2. It takes the number as the input. Let us name the input n. n should not be negative.
3. It produces the square root of n as the output. Let us name the output y. Then n should be the square of y.

Now the specification of the algorithm is

square_root(n)

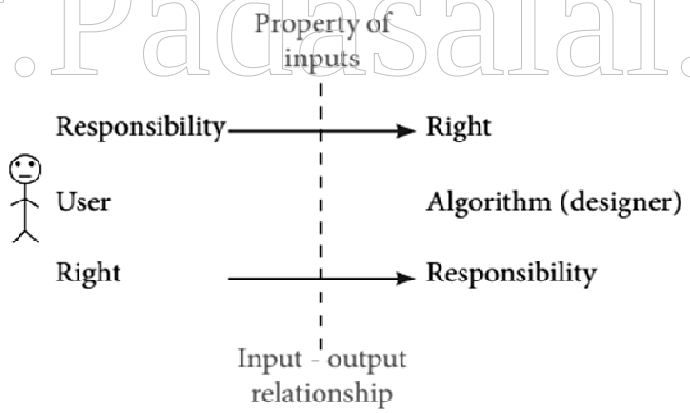
-- inputs: n is a real number, n ≥ 0.

-- outputs: y is a real number such that $y^2 = n$.

22. Which defines the rights and responsibilities of the designer and user of the algorithm.

Specification of an algorithm serves as a contract between the designer of the algorithm and the users of the algorithm, because it defines the rights and responsibilities of the designer and the user.

23. Define the input – output relationship between the designer and user of the algorithm.



24. What is the use of abstraction?

The abstraction used in a variety of ways while constructing algorithms — in the specification of problems, representing state by variables, and decomposing an algorithm to functions.

25. What does the specification abstracts in an algorithm?

Specification abstracts a problem by the properties of the inputs and the desired input-output relation.

26. Define state of an algorithm.

State is a basic and important abstraction. Computational processes have state. A computational process starts with an initial state. As actions are performed, its state changes. It ends with a final state. State of a process is abstracted by a set of

variables in the algorithm. Te state at any point of execution is simply the values of the variables at that point.

27. Differentiate State and Functions.

State : In algorithms, the state of a computation is abstracted by a set of variables.

Functions: When an algorithm is very complex, we can decompose it into functions and abstract each function by its specification.

28. What does specification of an algorithm consists?

The specification of an algorithm consists of the name of the algorithm (together with its inputs), the input property, and the desired input-output relation.

29. How the assignment statement changes the state of an algorithm?

Assignment statement changes the values of variables, and hence the state.

Detail Question and Answer:

1. Write the specification of an algorithm hypotenuse whose inputs are the lengths of the two shorter sides of a right angled triangle, and the output is the length of the third side.

1. Let us name the algorithm Hypotenuse
2. It takes the number as the input. Let us name the input S1, S2. should not be negative.
3. It produces the Hypotenuse of S1,S2 as the output. Let us name the output *l*. Then S1,S2 should be the square of *l*.

Now the specification of the algorithm is

Hypotenuse (S1, S2)

-- inputs : S1 and S2 are real numbers or integers.

-- outputs : *l* is a real number such that $l^2 = S1^2 + S2^2$.

2. Suppose you want to solve the quadratic equation ax2 + bx + c = 0 by an algorithm.

Quadratic_solve (a, b, c)

-- inputs : ?

-- outputs: ?

You intend to use the formula and you are prepared to handle only real number roots.

Write a suitable specification. $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

1. Let us name the algorithm Quadratic_solve.
2. It takes the number as the input. Let us name the input a, b, c. a should not be zero.
3. It produces the Quadratic_solve of a, b, c as the output. Let us name the output *x*. Then a, b, c should be the Quadratic_solve of *x*.

Now the specification of the algorithm is

Quadratic_solve(a,b,c)

--input : a,b,c are real numbers, $a \neq 0$

--output: x is a real number, the quadratic equation $ax^2+bx+c = 0$ is satisfied by exactly two values *fx*, namely

$$x_1 = \frac{-b+\sqrt{b^2-4ac}}{2a} \quad \text{and} \quad x_2 = \frac{-b-\sqrt{b^2-4ac}}{2a}$$

3. **Exchange the contents: Given two glasses marked A and B. Glass A is full of apple drink and glass B is full of grape drink. For exchanging the contents of glasses A and B, the state by suitable variables, and write the specification of the algorithm.**

1. Let us name the algorithm Exchange.
2. It takes the number as the input. Let us name the input a, b. a, b should not be zero.
3. It produces the Exchange of a, b by using third variable t as the output. Let us name the output. Then a, b, t should be the Exchange of the drinks.

Now the specification of the algorithm is

Exchange(a, b)
-- inputs : a, b are integers. $a \neq 0$, $b \neq 0$.
-- outputs : a, b are the integers

```
t: = a;
a: = b;
b: = t;
```

4. **Explain the detail how will you construct an algorithm. (Or) Explain the Building Blocks of Algorithms.**

We construct algorithms using basic building blocks such as

- Data
- Variables
- Control flow
- Functions

Data

Algorithms take input data, process the data, and produce output data. Computers provide instructions to perform operations on data. For example, there are instructions for doing arithmetic operations on numbers, such as add, subtract, multiply and divide. There are different kinds of data such as numbers and text.

Variables

Variables are named boxes for storing data. When we do operations on data, we need to store the results in variables. The data stored in a variable is also known as the value of the variable. We can store a value in a variable or change the value of variable, using an assignment statement.

Control flow

An algorithm is a sequence of statements. However, after executing a statement, the next statement executed need not be the next statement in the algorithm. The statement to be executed next may depend on the state of the process. Thus, the order in which the statements are executed may differ from the order in which they are written in the algorithm. This order of execution of statements is known as the control flow.

Functions

Algorithms can become very complex. The variables of an algorithm and dependencies among the variables may be too many. Then, it is difficult to build algorithms

correctly. In such situations, we break an algorithm into parts, construct each part separately, and then integrate the parts to the complete algorithm.

The parts of an algorithm are known as functions. A function is like a sub algorithm. It takes an input, and produces an output, satisfying a desired input output relation.

5. Explain the types of Control flow statements.

There are three important control flow statements to alter the control flow depending on the state.

• In **sequential control flow**, a sequence of statements are executed one after another in the same order as they are written.

• In **alternative control flow**, a condition of the state is tested, and if the condition is true, one statement is executed; if the condition is false, an alternative statement is executed.

• In **iterative control flow**, a condition of the state is tested, and if the condition is true, a statement is executed. The two steps of testing the condition and executing the statement are repeated until the condition becomes false.

6. Explain the Algorithm design Techniques.

There are a few basic principles and techniques for designing algorithms.

Specification:

The first step in problem solving is to state the problem precisely. A problem is specified in terms of the input given and the output desired. Te specification must also state the properties of the given input, and the relation between the input and the output.

Abstraction:

A problem can involve a lot of details. Several of these details are unnecessary for solving the problem. Only a few details are essential. Ignoring or hiding unnecessary details and modeling an entity only by its essential properties is known as abstraction.

Composition:

An algorithm is composed of assignment and control flow statements. A control flow statement tests a condition of the state and, depending on the value of the condition, decides the next statement to be executed.

Decomposition:

We divide the main algorithm into functions. We construct each function independently of the main algorithm and other functions. Finally, we construct the main algorithm using the functions. When we use the functions, it is enough to know the specification of the function. It is not necessary to know how the function is implemented.

7. COMPOSITION AND DECOMPOSITION

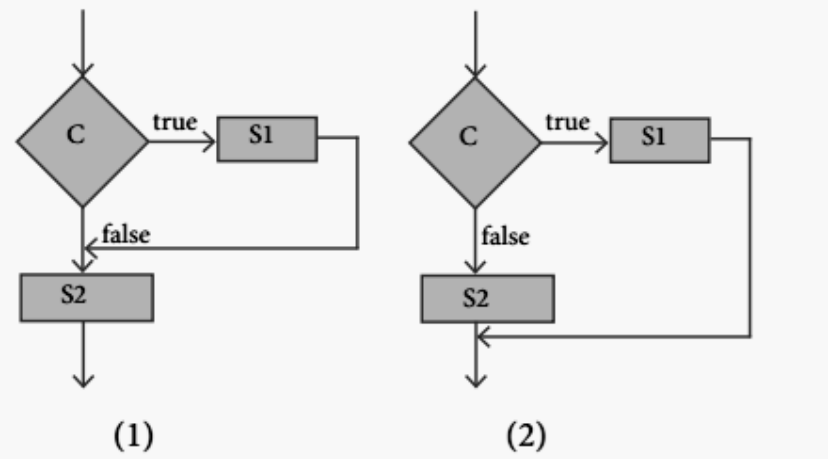
1. Suppose u, v = 10 ,5 before the assignment. What are the values of u and v after the sequence of assignments?
   1 u := v
   2 v := u
   a. u, v = 5, 5 b. u, v = 5, 10 c. u, v = 10, 5 d. u, v = 10, 10

2. Which of the following properties is true afer the assignment (at line 3?
   1 -- i+j = 0
   2 i, j := i+1, j-1
   3 -- ?
   a. i+j >0 b. i+j < 0 **c. i+j =0** d. i = j

3. If C1 is false and C2 is true, the compound statement
   1 if C1
   2 S1
   3 else
   4 if C2
   5 S2
   6 else
   7 S3 executes
   a. S1 **b. S2** c. S3 d. none

4. If C is false just before the loop, the control flows through
   1 S1
   2 while C
   3 S2
   4 S3
   a. S1;S3 b. S1; S2; S3
   c. S1; S2; S2; S3 d. S1; S2; S2; S2; S3

5. If C is true, S1 is executed in both the flow charts, but S2 is executed in



   a. (1) only b. (2) only
   c. both (1) and (2) **d. neither (1) nor (2)**

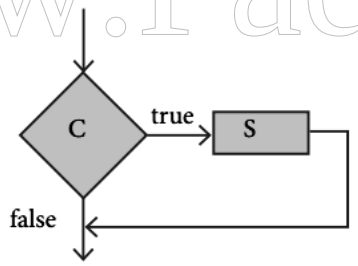
6. How many times the loop is iterated?
   i := 0
   while i ≠ 5
   i := i + 1
   a. 4 **b. 5** c. 6 d. 0

7. Which of the following is one of the elementary problem solving Techniques?
a. Decomposition b. Control flow c. Functions d. State
8. How many notations are there for representing algorithms?
a. 1 b. 2 **c. 3** d. many
9. Which of the following is not a notation for representing algorithm?
a. Programming language **b. Composition**
c. Pseudo code d. Flowchart
10. The notation for representing algorithms _____.
a. Pseudo code **b. Programming language** c. Composition d. Flow chart
11. Which notation is similar to programming languages?
a. Pseudo code b. Flowchart
c. Statements d. Decomposition
12. Which of the following is a diagrammatic notation for representing algorithms?
a. Pseudo code b. Programming language c. Source Code **d. Flow chart**
13. An algorithm expressed in programming language is called
a. Statement **b. program** c. information d. function
14. Which of the following is not a programming language?
a. C b. C++ **c. Ms-Office** d. Python
15. Which translates the program into executable instruction?
a. Complier b. Interpreter c. Linker **d. None of these**

Answer the following:

1. **Distinguish between a condition and a statement.**
A condition is phrase that describes a test of the state. A statement is a phrase that commands the computer to do an action.

2. **Draw a flowchart for conditional statement.**



3. **Both conditional statement and iterative statement have a condition and statement. How do they differ?**
- Conditional statement is executed only if the condition is true. Otherwise, nothing is done.
- Iterative statement repeatedly evaluates a condition and executes a statement as long as the condition is true.

4. **What is difference between an algorithm and a program?**
An algorithm is a self-contained step-by-step set of operations to be performed to solve a specific problems. A computer pro-foam is sequence of instructions that comply the rules of a specific programming language, written to perform a specified task with a computer.

5. **Why is function an abstraction?**
A function is an abstraction of a subproblem, and specified by its input property, and its input-output relation.

6. How do we refine a statement?

In refinement, starting at a high level, each statement is repeatedly expanded into more detailed statements in the subsequent levels.

7. What are the compound statements?

Compound statements are composed of sequential, alternative and iterative control flow statements.

8. Write a note on Alternative statement.

Alternative statement selects and executes exactly one of the two statements, depending on the value of the condition.

9. Define Iterative statement.

Iterative statement repeatedly evaluates a condition and executes a statement as long as the condition is true.

10. Define Decomposition in defining algorithm.

Decomposition breaks down a problem into smaller sub-problems and combine their solutions to solve the original problem.

11. What function in defining algorithm?

A function is an abstraction of a subproblem, and specified by its input property, and its input output relation.

12. Write a note on Pseudo code.

- Pseudo code is a mix of programming language-like constructs and plain English. This notation is not formal nor exact. It uses the same building blocks as programs, such as variables and control flow.
- But, it allows the use of natural English for statements and conditions. An algorithm expressed as pseudo code is not for computers to execute directly, but for human readers to understand.
- Therefore, there is no need to follow the rules of the grammar of a programming language. However, even pseudo code must be rigorous and correct. Pseudo code is the most widely used notation to represent algorithms.

13. What are the disadvantages of using flowchart?

- Flowcharts are less compact than representation of algorithms in132 programming language or pseudo code.
- They obscure the basic hierarchical structure of the algorithms.
- Alternative statements and loops are disciplined control flow structures. Flowcharts do not restrict us to disciplined control flow structures.

14. Name the three control flow statement.

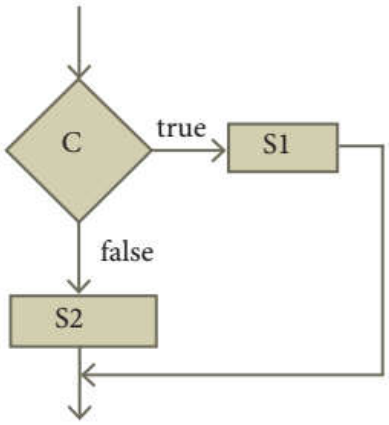
There are three importance control flow statements:

i. Sequential
ii. Alternative
iii. Iterative

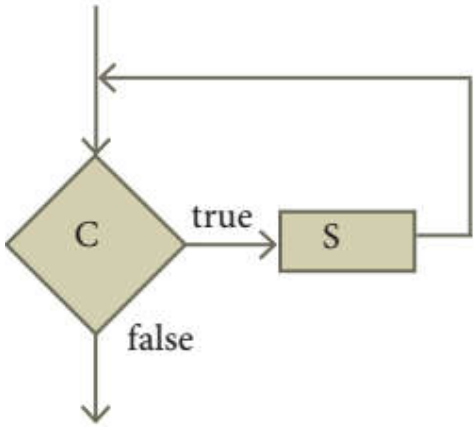
15. Define Iteration.

Testing the loop condition and executing the loop body once is called an iteration.

16. Draw a flowchart for Alternative and Iterative control flow.



Alternative Control flow



Iterative Control flow

17. Describe the types of Control flow statements.

Alternative

1. Test whether C is true or false.
2. If C is true, then do S1; otherwise do S2.

Conditional

1. Test whether C is true or false.
2. If C is true then do S; otherwise do nothing

Iterative

1. Test whether C is true or false.
2. If C is true, then do S and go back to step 1; otherwise do nothing.

18. Write an algorithm to find the minimum of two numbers.

Algorithm minimum can be defined as

1. minimum(a, b)
2. -- a, b
3. if a < b
4. result : = a
5. else
6. result = b
7. -- result = a ↓ b

19. We want an algorithm that compares two numbers and produces the result as

$$\text{compare}(a, b) = \begin{cases} 1- & \text{if } a < b \\ 0 & \text{if } a = b \\ 1 & \text{if } a > b \end{cases}$$

we can define compare() using a case analysis.

1. compare(a, b)
2. case a < b
3. result := -1
4. case a = b
5. result := 0
6. else -- a > b
7. result : = 1

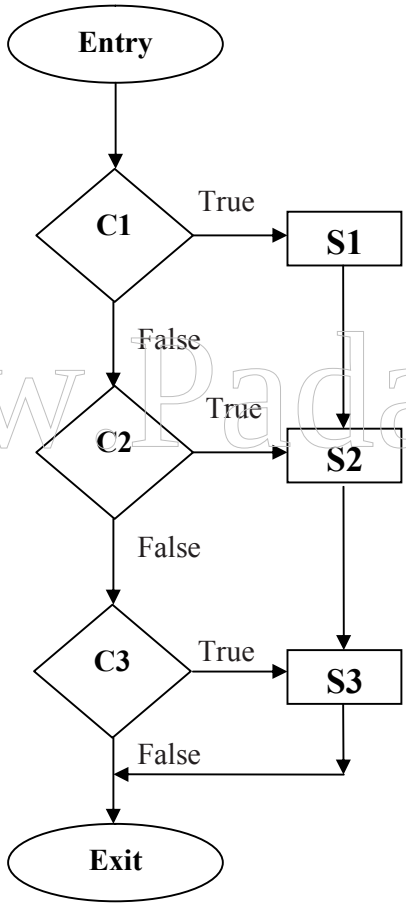
20. If C is false in line 2, trace the control flow in this algorithm.

1 S1
2 -- C is false
3 if C
4 S2
5 else
6 S3
7 S4
S1; S2; S4.

21. What is case analysis?

Case analysis statement generalizes it to multiple cases. Case analysis splits the problem into an exhaustive set of disjoint cases.

22. Draw a flowchart foe 3-Case Analysis using Alternative Statements



23. Define a function to double a number in two different ways:

(1) n + n (or) n x n (2) 2 x n (or) n^2.

(1) double (n)

-- inputs : n is a real number or a integer, n > 0
-- ouputs : y is a real number or an integer such that
y = n + n (or) n x n.

(2) double (n)

-- inputs : n is a real number or a integer, n > 0
-- outputs : y is a real number or an integer such that
y = 2 x n (or) n^2.

Details Question and Answers:

24. Exchange the contents: Given two glasses marked A and B. Glass A is full of apple and glass B is full of grape drink. Write the specification for exchanging the contents of glasses A and B, and write a sequence of assignments to satisfy the specification.

1. Let us name the algorithm Exchange.
2. It takes the number as the input. Let us name the input a, b. a, b should not be zero.
3. It produces the Exchange of a, b by using third variable t as the output. Let us name the output. Then a, b, t should be the Exchange of the drinks.

Now the specification of the algorithm is

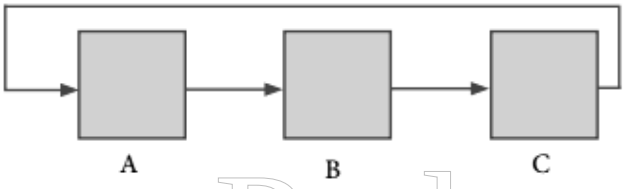
Exchange(a, b)

-- inputs : a, b are integers. $a \neq 0$, $b \neq 0$.

-- outputs : t is the integer such that

t: = a; a: = b; b: = t;

25. Circulate the contents: Write the specification and construct an algorithm to circulate the contents of the variables A, B and C as shown below: The arrows indicate that B gets the value of A, C gets the value of B and A gets the value of C.



1. Let us name the algorithm Circulate.
2. It takes the number as the input. Let us name the input A, B, C. A, B, C should not be zero.
3. It produces the Exchange of a, B, C by using third variable t1, t2 as the output. Let us name the output. Then A, B, C, t1, t2 should be the Circulate of the values.

Now the specification of the algorithm is

Circulate(A, B, C)

-- inputs : A, B, C are integers. $A \neq 0$, $B \neq 0$, $C \neq 0$.

-- outputs : t1, t2 are the integers such that

t1: = B; t2: = C; B: = A; C: = t1; A: = t2;

26. Decanting problem. You are given three bottles of capacities 5, 8, and 3 liters. Te 8L bottle is filled with oil, while the other two are empty. Divide the oil in 8L bottle into two equal quantities. Represent the state of the process by appropriate variables. What are the initial and final states of the process? Model the decanting of oil from one bottle to another by assignment. Write a sequence of assignments to achieve the final state.

1. A: = 8, b: =0, c: = 0	1.	E	F	T
2. E, F, T: =A, B, C	2.	8	0	0
3. F: = E-3	3.	3	5	0
4. T: = F-3	4.	3	2	3
5. E: = E+T	5.	6(3+3)	2	0
6. T: = F F: = F-2	6.	6	0	2
7. F: = E-1	7.	1	5	2

8. F: = F-1 T: = T+1	8.	1	4	3
9. E: = E+T T: = T-3	9.	4	4	0

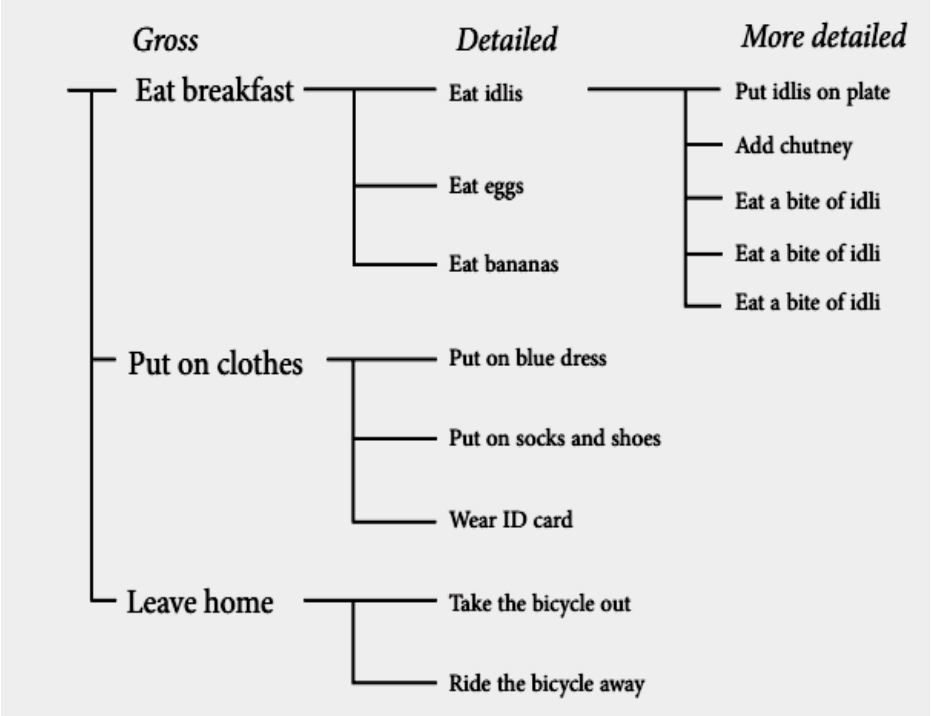
27. Trace the step-by-step execution of the algorithm for factorial(4).

factorial(n)
-- inputs : n is an integer , n ≥ 0
-- outputs : f = n!
f, i := 1 ,1
while i ≤ n
f, i := f × i, i+1

factorial(4)
i=1, f=1;
= f = 1 x 1
= f = 1 x 2
= f = 2 x 3
= f = 6 x 4
= f = 24.

28. Explain the Refinement kin detail with example.

- After decomposing a problem into smaller subproblems, the next step is either to refine the subproblems or to abstract the subproblems.
- Each subproblem can be expanded into more detailed steps. Each step can be further expanded to still finer steps, and so on. Ties are known as refinement
- We can also abstract the subproblems. We specify each subproblem by its input property and the input-output relation. While solving the main problem, we only need to know the specification of the subproblems. We do not need to know how the subproblems are solved.



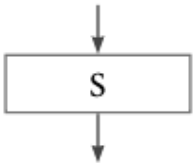
29. Explain the three Notations for representing algorithms.

There are mainly three different notations for representing algorithms.

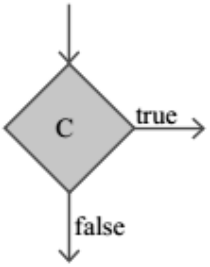
- A programming language is a notation for expressing algorithms to be executed by computers.
- Pseudo code is a notation similar to programming languages. Algorithms expressed in pseudo code are not intended to be executed by computers, but for communication among people.
- Flowchart is a diagrammatic notation for representing algorithms. They give a visual intuition of the flow of control, when the algorithm is executed.

30. Explain the types of symbols used in flowcharts in detail.

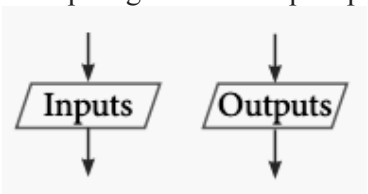
- Flowchart is a diagrammatic notation for representing algorithms. They show the control flow of algorithms using diagrams in a visual manner. In flow charts, rectangular boxes represent simple statements, diamond-shaped boxes represent conditions, and arrows describe how the control flows during the execution of the algorithm. A flow chart is a collection of boxes containing statements and conditions which are connected by arrows showing the order in which the boxes are to be executed.
- A statement is contained in a rectangular box with a single outgoing arrow, which points to the box to be executed next.



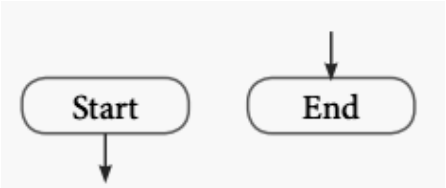
- A condition is contained in a diamond shaped box with two outgoing arrows, labeled true and false. The true arrow points to the box to be executed next if the condition is true, and the false arrow points to the box to be executed next if the condition is false.



- Parallelogram boxes represent inputs given and outputs produced.



- Special boxes marked Start and the End are used to indicate the start and the end of an execution:



31. Write the Disadvantages of Flowcharts.

Flowcharts also have disadvantages.

1) Flowcharts are less compact than representation of algorithms in programming language or pseudo code.
2) They obscure the basic hierarchical structure of the algorithms.
3) Alternative statements and loops are disciplined control flow structures. Flowcharts do not restrict us to disciplined control flow structures.
4)

32. Explain the case Analysis in detail with example.

Alternative statement analyses the problem into two cases. Case analysis statement generalizes it to multiple cases. Case analysis splits the problem into an exhaustive set of disjoint cases. For each case, the problem is solved independently. If C1, C2, and C3 are conditions, and S1, S2, S3 and S4 are statements, a 4-case analysis statement has the form,

1. case C1
2. S1
3. case C2
4. S2
5. case C3
6. S3
7. else
8. S4

The conditions C1, C2, and C3 are evaluated in turn. For the first condition that evaluates to true, the corresponding statement is executed, and the case analysis statement ends. If none of the conditions evaluates to true, then the default case S4 is executed.

i. The cases are exhaustive: at least one of the cases is true. If all conditions are false, the default case is true.
ii. The cases are disjoint: only one of the cases is true. Though it is possible for more than one condition to be true, the case analysis always executes only one case, the first one that is true. If the three conditions are disjoint, then the four cases are (1) C1, (2) C2, (3) C3, (4) (not C1) and (not C2) and (not C3).

❖ Read All Examples of Algorithms in this Chapter

8. ITERATION AND RECURSION

1. A loop invariant need not be true
   (a) at the start of the loop. (b) at the start of each iteration
   (c) at the end of each iteration **(d) at the start of the algorithm**
2. We wish to cover a chessboard with dominoes,  the number of black squares and the number of white squares covered by dominoes, respectively, placing a domino can be modelled by
   (a) b := b + 2 (b) w := w + 2 (c) b, w := b+1, w+1 **(d) b := w**
3. If m x a + n x b is an invariant for the assignment a, b : = a + 8, b + 7, the values of m and n are
   (a) m = 8, n = 7 **(b) m = 7, n = -8** (c) m = 7, n = 8 (d) m = 8, n = -7
4. Which of the following is not an invariant of the assignment?
   m, n := m+2, n+3
   (a) m mod 2 (b) n mod 3 (c) 3 X m - 2X n **(d) 2 X m - 3X n**
5. If Fibonacci number is defined recursively as

$$F(n)=\begin{cases}0 & n=0\\ 1 & n=1\\ F(n-1)+F(n-2) & \text{otherwise}\end{cases}$$

   to evaluate F(4), how many times F() is applied?
   (a) 3 (b) 4 (c) 8 (d) 9
6. Using this recursive definition

$$a^n=\begin{cases}1 & \text{if } n=0\\ a \times a^{n-1} & \text{otherwise}\end{cases}$$

   how many multiplications are needed to calculate a^{10}?
   (a) 11 (b) 10 **(c) 9** (d) 8
7. Which of the following algorithm design techniques to execute the same action repeatedly?
   (a) Assignment (b) Iteration (c) Recursion **(d) Both b and c**
8. Which statements executed repeatedly as long as the loop condition is true?
   (a) Sequential (b) Abstraction **(c) Iteration** (d) Assignment
9. Which of the following is updated when each time the loop body is executed?
   (a) Data **(b) Variables** (c) Function (d) All of these
10. Which of the following is key to construct iteration algorithms?
    (a) Loop invariant (b) Loop updation
    (c) Loop variable (d) Loop condition
11. Which of the following is more powerful algorithms design technique closely related to iteration?
    (a) Sequential (b) Iteration **(c) Recursion** (d) Composition
12. How many cases are there in a recursive solver has?
    (a) 2 (b) 3 (c) 4 (d) many
13. Which of the following is a recursive solver case?
    (a) Base case (b) Recursive case (c) loop case **(d) Both a and b**
14. How many important points the loop variant is true?
    (a) 1 (b) 2 (c) 3 **(d) 4**
15. How many base case atleast must be in recursion?
    (a) 1 (b) 4 (c) 3 (d) 2

Answer the following:

1. What is an invariant?

An expression involving variables, which remains unchanged by an assignment to one of these variables, is called an invariant of the assignment.

2. Define a loop invariant.

An invariant for the loop body is known as a loop invariant.

3. Does testing the loop condition affect the loop invariant? Why?

Yes, it affects.

A loop invariant is true at

- (a) at the start of the loop (just before the loop)
- (b) at the start of each iteration (before loop body)
- (c) at the end of each iteration (after loop body)
- (d) at the end of the loop (just after the loop)

4. What is the relationship between loop invariant, loop condition and the input-output recursively?

- A loop invariant is a condition that is necessarily true immediately before and immediately after each iteration of a loop.
- A loop invariant ia some condition that holds for every iteration of the loop.

5. What is recursive problem solving?

Recursion step breaks the problem into sub-problems of smaller size, assumes solutions for sub-problems are given by recursive calls, and constructs solution to the given problem.

(OR)

Each solver should test the size of the input. If the size is small enough, the solver should output the solution to the problem directly. If the size is not small enough, the solver should reduce the size of the input and call a sub-solver to solve the problem with the reduced input.

6. Define factorial of natural number recursively.

```
factorial (n)
-- inputs: n is an integer , n ≥ 0
-- outputs : factorial of n

if n = 0 -- base case
1
else
n * factorial (n-1)       --recursion step
```

7. What is the use of repeating the same action again and again?

Even though the action is the same, the state in which the action is executed is not the same. Each time we execute the action, the state changes. Therefore, the same action is repeatedly executed, but in different states. The state changes in such a way that the process progresses to achieve the desired input-output relation.

8. How will you solve the problem using recursive?

Recursion is another algorithm design technique, closely related to iteration, but more powerful. Using recursion, we solve a problem with a given input, by solving the same problem with a part of the input, and constructing a solution to the original problem from the solution to the partial input.

9. How will you construct a loop using a loop variant?

- Establish the loop invariant at the start of the loop.
- The loop body should so update the variables as to progress toward the end, and maintain the loop invariant, at the same time.
- When the loop ends, the termination condition and the loop invariant should establish the input-output relation.

Detail Answers:

1. There are 7 tumblers on a table, all standing upside down. You are allowed to turn any 2 tumblers simultaneously in one move. Is it possible to reach a situation when all the tumblers are right side up? (Hint: Te parity of the number of upside down tumblers is invariant.)

u is the number of tumblers upside down 3 cases.
1 turn two tumblers right way up (u:=u+2)
2 turn two tumblers in the wrong way up (u:=u-2)
3 turn one the right way up and the other wrong way up (u:=u+1-1)

The invariant of these assignments.
Parity is a Boolean value (true or false)
True if (0,2,4,6…)
False is (1,3,5,7…)
Notation even u
Invariant of u:=u+2
Invariant of u:=u-2
Even u is an invariant of problem.
No matter how many times we turn over pairs of tumbler, the value is even.
So it is not possible to reach the situation when all the tumblers are right side up.

2. A knockout tournament is a series of games. Two players compete in each game; the loser is knocked out (i.e. does not play any more), the winner carries on. Te winner of the tournament is the player that is left after all other players have been knocked out. Suppose there are 1234 players in a tournament. How many games are played before the tournament winner is decided?

P no.of players
G no.of Games
Initially, P=1234, G=0.
P,G:=P-1, G+1
P+G is invariant
Finally, P=1, G=1233.

3. King Vikramaditya has two magic swords. With one, he can cut off 19 heads of a dragon, but after that the dragon grows 13 heads. With the other sword, he can cut off 7 heads, but 22 new heads grow. If all heads are cut off, the dragon dies. If the dragon has originally 1000 heads, can it ever die? (Hint: The number of heads mod 3 is invariant.)

At first glance this problem is convoluted and intractable.
Once we hit upon the idea of using invariant, however it becomes trivial.
We note (13-19)=(22-7)=0 (mod 3).
The magic swords can never change the number of heads of the dragon mod 3.
Since we start at 1000=1 (mod 3). We can never get to 0. The dragons lives.

4. Assume an 8 × 8 chessboard with the usual coloring. "Re-coloring" operation changes the color of all squares of a row or a column. You can recolor repeatedly. Te goal is to attain just one black square. Show that you cannot achieve the goal. (Hint: If a row or column has b black squares, it changes by (|8 - b) - b|).

i. We start with a normal colored chess board with number of black squares B=32 and number of white squares W=32.
ii. So, W-B = 0 which is divisible by 4 and W+B = 64 W-B = 0 mod 4.
iii. Whenever we change the colors of a row or column, we change the color of 8 squares.
iv. Let this row (or column) have W white squares + B black squares W+B = 8. If this operation B increases by 2n, then W decreases by 2n so that W+B = 64. But B-W will change by 4n and if remain divisible by 4.
v. W-B=0 mod 4.
vi. After every operation "B-W mod 4" can have no other values.
vii. But the required state has 63 white square and 1 black square, so it requires.
viii. W-B = 63-1=62 = 2 mod 4.

5. Power can also be defined recursively as

$$a^n = \begin{cases} 1 & \text{if } n = 0 \\ a \times a^{n-1} & \text{if } n \text{ is odd} \\ a^{n/2} \times a^{n/2} & \text{if } n \text{ is even} \end{cases}$$

Construct a recursive algorithm using this definition. How many multiplications are needed to calculate a^{10}?

power (a, n)
-- inputs: n is an integer , n ≥ 0
-- outputs : a^n
if n = 0 -- base case
1
else
if(n%2!=0)
a × power (a, n-1) --recursion step in case of odd
else
a × power (a, n/2) (or) a × power (a, n%2) --recursion step in case of even.

6. A single-square-covered board is a board of 2n x 2n squares in which one square is covered with a single square tile. Show that it is possible to cover the board with triominoes without overlap.

****** (SEE EXAMPLE NO: 8.13 for the answer)**

7. How will you solve the problem using recursive? Explain.

- To solve a problem recursively, the solver reduces the problem to subproblems, and calls another instance of the solver, known as sub-solver, to solve the sub-problem. The input size to a sub-problem is smaller than the input size to the original problem. When the solver calls a sub-solver, it is known as recursive call.
- The magic of recursion allows the solver to assume that the sub-solver (recursive call) outputs the solution to the sub-problem. Then, from the solution to the sub-problem, the solver constructs the solution to the given problem.
- As the sub-solvers go on reducing the problem into sub-problems of smaller sizes, eventually the sub-problem becomes small enough to be solved directly, without recursion.

Therefore, a recursive solver has two cases:

1. Base case: The problem size is small enough to be solved directly. Output the solution. There must be at least one base case.

2. Recursion step: The problem size is not small enough. Deconstruct the problem into a sub-problem, strictly smaller in size than the given problem. Call a sub-solver to solve the sub-problem. Assume that the sub-solver outputs the solution to the sub-problem.

7. Write algorithm of the outline of recursive problem solving techniques.

This outline of recursive problem solving technique is shown below.

```
Solver (input)
if input is small enough
construct solution
else
find sub_problems of reduced input
solutions to sub_problems =
solver for each sub_problem
construct solution to the problem from
solutions to the sub_problems
```

Whenever we solve a problem using recursion, we have to ensure these two cases: In the recursion step, the size of the input to the recursive call is strictly smaller than the size of the given input, and there is at least one base case.

❖ **Read All Examples of Algorithms in this Chapter**

கல்வி என்பது காற்றின் எல்லை...
படிப்பு என்பது உன் சுவாசத்தின் எல்லை...

கல்வி ஓர் ஆசான். கல்வி தன்னை நாடுபவருக்கு சரியான வழிகாட்டுகிறது. நாடுபவருள் இருக்கும் நுட்பமான ஆன்ம ஒளியை விழிப்புறச் செய்கின்றது. கல்விக்கு இரண்டு பக்கங்கள், ஒன்று கடவுளின் அருளைப் பொழிகின்றது மற்றதோ பொருளால் ஒருவனை செழுமையடையச் செய்கின்றது. கல்வியின் துணையோடு மனிதன் மலர்ச்சியுறும்போது இவ்வுலகம் அவன் அறிவாற்றலின் நறுமணத்தால் பயனடைகின்றது. ஆகவே படியுங்கள், படித்துகொண்டே இருங்கள். அதுவே ஆத்மாவிற்கு, அழிவில்லாத நிரந்தரமான உண்மையை உணர்த்தும்/ நல்வழிக்கு இட்டுச் செல்லும்.

சுவாசி.....! சுவாசத்தை நேசி....!

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