

## XI – COMPUTER SCIENCE

### MINIMUM STUDY IMPORTANT 5 MARKS MATERIAL

#### 1. Discuss the various generations of Computers.

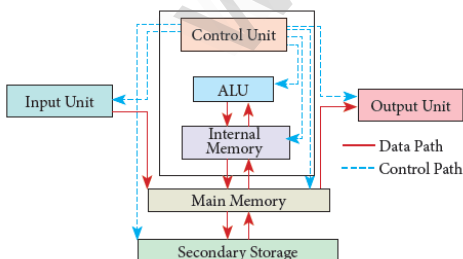
Based on various stages of development, computers can be divided into **six** different generations.

Generation	Period	Main Component used	Merits/Demerits
First Generation	1940- 1956	<i>Vacuum tubes</i>	<ul style="list-style-type: none"> <li>➤ Big in size</li> <li>➤ Consumed more power</li> <li>➤ <b>Machine Language</b> was used</li> </ul>
Second Generation	1956- 1964	<i>Transistors</i>	<ul style="list-style-type: none"> <li>➤ <b>Punched cards</b> were used as <b>input</b>.</li> <li>➤ Generated <b>less heat</b></li> <li>➤ <b>Assembly language</b> was used.</li> </ul>
Third Generation	1964 -1971	<i>Integrated Circuits (IC)</i>	<ul style="list-style-type: none"> <li>➤ Computers were smaller, faster and more reliable</li> <li>➤ Consumed less power</li> <li>➤ <b>High Level Languages</b> were used</li> </ul>
Fourth Generation	1971-1980	<i>Microprocessor ( Very Large Scale Integrated Circuits (VLSI))</i>	<ul style="list-style-type: none"> <li>➤ Smaller and Faster</li> <li>➤ <b>Microcomputer</b> series such as <b>IBM</b> and <b>APPLE</b> were developed</li> <li>➤ <b>Portable Computers</b> were Introduced</li> </ul>
\Fifth Generation	1980 – till date	<i>Ultra Large Scale Integration (ULSI)</i>	<ul style="list-style-type: none"> <li>➤ <b>Parallel Processing</b></li> <li>➤ <b>Super conductors</b></li> <li>➤ Computers size was reduced.</li> <li>➤ Computers can recognize <b>Images</b> and <b>Graphics</b></li> </ul>
Sixth Generation	In future	-	<ul style="list-style-type: none"> <li>➤ <b>Parallel and Distributed</b> computing</li> <li>➤ Development of <b>robotics</b></li> <li>➤ Natural language processing</li> </ul>

#### 2 . Explain the basic components of a computer with a neat diagram.

The computer is the combination of **hardware** and **software**.

- ❖ **Input unit , Central processing unit ,Output unit and Memory unit** are the important components of a computer.
- ❖ **Input → Process → Output cycle (IPO).**



#### ✚ Input Unit :

- It 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 :**

- It controls the **operation** of **all** other components.
- It accepts **data** as **input**, **process** the data according to the **instructions** and provide the **result** as **output**
- **It has three components:**
  1. ALU (Arithmetic and Logic unit)
  2. Control unit
  3. Memory unit

#### **(1)ALU ( Arithmetic and Logic unit):**

- The ALU performs **arithmetic operations**.
- The result of an operation is **stored** in **internal memory** of CPU.
- It gives the **decision(Logical)-making ability** of a computer

#### **(2)Control unit:**

- It controls the **flow of data** between the **CPU, memory** and

#### **(3)Memory unit:**

- It is used to **store data** and **instructions**
- There are two types of memory, they are **primary** memory and **secondary** memory

##### **(i)Primary memory:**

- It is also called **main** memory.
- It is **volatile**.
- **Temporary** memory.
- Example: RAM

##### **(ii)Secondary memory:**

- It is **non volatile**
- **Permanent** memory.
- Example: Hard Disk, CD-ROM

### **✚ Output Unit:**

- It **conveys information** to users in an **understandable form**.
- Example: Monitor, Printer, Speaker, plotter etc.

## **3.Explain the following**

### **a. Inkjet Printer b. Multimedia projector c. Bar code / QR code Reader**

#### **a. Inkjet Printer:**

- ❖ Inkjet printers work by spraying **ionised** ink at a sheet of paper.
- ❖ An Inkjet printer can spread millions of dots of ink at the paper every single second.
- ❖ It has colour cartridges which combined **Magenta, Yellow** and **Cyan** inks.
- ❖ A black cartridge is used for monochrome output.

#### **b. Multimedia projector:**

- ❖ It is used to produce computer output on a **big screen**.
- ❖ Used to display **presentations** in meeting halls or in classrooms.

#### **c. Bar code:**

- ❖ A Bar code is a pattern printed in lines of **different thickness**.
- ❖ The Bar code **reader scans** the information on the bar codes transmits to the Computer for further processing.

#### **QR code Reader:**

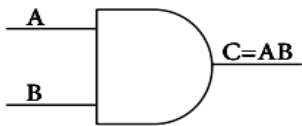
- ❖ **QR (Quick response) Code.**
- ❖ The QR code is the **2D bar code** which can be read by a camera .

#### 4. Explain the fundamental gates with expression and truth table.

- ❖ Gate is a basic **electronic circuit**.
- ❖ It operates on **one or more input** signals to produce **an output** signal.
- ❖ There are three fundamental gates namely **AND, OR** and **NOT**.

##### AND GATE:

- The AND gate has **two or more** input variables and **one** output.
- The output is **TRUE** when **all** the Inputs are **TRUE**.
- Algebraic expression :  $Y=A \cdot B$

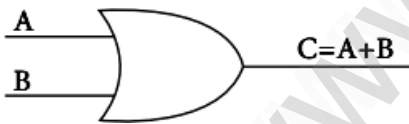


##### Truth Table:

INPUT		OUTPUT
A	B	$C=A \cdot B$
0	0	0
0	1	0
1	0	0
1	1	1

##### OR GATE:

- The OR gate has **two or more** input variables and **one** output .
- The output is **TRUE** if **at least** one input is **TRUE**.
- Algebraic expression :  $Y = A + B$

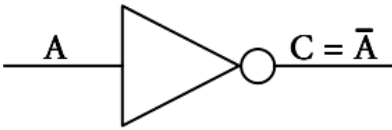


##### Truth Table:

INPUT		OUTPUT
A	B	$C=A+B$
0	0	0
0	1	1
1	0	1
1	1	1

**NOT GATE:**

- The NOT Operator has **one** input and **one** output
- The NOT operator **inverts** the input.
- **Algebraic expression** :  $Y = A$



**Truth Table:**

INPUT	OUTPUT
A	$C = \bar{A}$
0	1
1	0

**5. What are the types of ROM? Explain.**

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

**Read Only Memory (ROM):**

- ❖ It is **non-volatile** memory
- ❖ It can only be **read**.
- ❖ Stores **permanently**
- ❖ It **retains its contents** even when the computer is turned off.

**Programmable Read Only Memory (PROM):**

- ❖ It is a **non-volatile** memory.
- ❖ Data can be written **only once**.
- ❖ Content **cannot be erased**.
- ❖ The process of **programming a PROM** is called **burning the PROM**.

**Erasable Programmable Read Only Memory (EPROM):**

- ❖ It is a **non-volatile** memory.
- ❖ Data can be written **many times**.
- ❖ The content can be erased using **ultraviolet rays**.
- ❖ Used in **personal computers**.

**Electrically Erasable Programmable Read Only Memory (EEPROM):**

- ❖ It is a **non-volatile** memory.
- ❖ It can be erased by an **electrical charge**.
- ❖ It is **slower** in performance.

**6. What are the Characteristics of Microprocessor? Explain.**

There are **three** important Characteristics of Microprocessors. They are,  
 a) Clock speed

- b) Instruction set
- c) Word size

✚ **Clock speed:**

- Every microprocessor has an **internal clock**.
- The speed of **instruction execution** in microprocessor is called the **clock speed**.
- **Clock speed** is measured in **MHz** (Mega Hertz) or in **GHz** (Giga Hertz).

✚ **Instruction set:**

- Instruction is a **command** used to **perform an operation** based on **data**.
- **Basic set of instructions** to execute by **microprocessor** is called an **instruction set**.
- **Types of operations**
  - Data transfer
  - Arithmetic operations
  - Logical operations
  - Control flow
  - Input/output

✚ **Word size:**

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

## 7. Explain the algorithms used in process management.

- Process management includes **creating** and **deleting** processes
- The algorithms used to allocate the job in computer are,
  1. FIFO
  2. SJF
  3. Round Robin
  4. Based on Priority

### **1. FIFO (First In First Out)Scheduling:**

- It is based on **queuing** technique
- **First** is executed **first** by the CPU, followed by the next and so on.

### **2. SJF (Shortest Job First)Scheduling:**

- It works based on the **size** of the job .
- Consider two jobs **A** and **B**.
  - 1) A = **6KB** 2) B = **9KB**First the job “A” will be assigned and then job “B”

### **3.Round Robin Scheduling:**

- It is based on **time sharing** .  
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.

### **4.Based On Priority:**

- It is based on a **Priority**.
- Take two jobs A and B. Let the priority of A be **5** and priority B be **7**.
- Job B is assigned **first**.

## 8.Explain the Various versions of Windows.

Versions	Year	Specific features
Windows .x	1985	<ul style="list-style-type: none"> <li>• Introduction of GUI in <b>16 - bit, processor</b></li> <li>• <b>Mouse</b> was introduced as an input device.</li> </ul>
Windows 2.x	1987	<ul style="list-style-type: none"> <li>• Supports to <b>minimize</b> or <b>maximize</b> windows.</li> </ul>
Windows 3.x	1992	<ul style="list-style-type: none"> <li>• Introduced the concept of <b>multitasking</b>.</li> <li>• Supported 256 colours.</li> </ul>
Windows 95	1995	<ul style="list-style-type: none"> <li>• Introduced <b>32 - bit processor</b>.</li> </ul>
Windows 98	1998	<ul style="list-style-type: none"> <li>• Windows based games improved.</li> <li>• <b>Plug and play</b> feature was introduced.</li> </ul>
Windows Me	2000	<ul style="list-style-type: none"> <li>• It introduced automated system <b>diagnostics</b> and <b>recovery</b> tools.</li> </ul>
Windows 2000	2000	<ul style="list-style-type: none"> <li>• for business desktop, laptop and server..</li> </ul>
Windows XP	2001	<ul style="list-style-type: none"> <li>• Introduced <b>64-bit Processor</b>.</li> </ul>
Windows Vista	2006	<ul style="list-style-type: none"> <li>• Updated the <b>look</b> and <b>feel</b> of Windows.</li> </ul>
Windows 7	2009	<ul style="list-style-type: none"> <li>• Booting <b>time</b> was improved</li> </ul>
Windows 8	2012	<ul style="list-style-type: none"> <li>• Windows 8 is <b>faster</b> than previous versions of Windows.</li> <li>• <b>Start</b> button was <b>removed</b>.</li> </ul>
Windows 10	2015	<ul style="list-style-type: none"> <li>• <b>Start</b> Button was <b>added</b> again.</li> <li>• <b>Multiple desktop</b>.</li> </ul>

## 9. Explain the different ways of finding a File or Folder.

### Method 1 (Using Start menu):

- Click the **Start** button, select **search box**
- Type the **name** of the file or the folder you want to search.
- It will display the list of files or folders starting with the specified name.
- Just **click** and open that file or the folder.

### Method 2 (using computer icon):

- Click **Computer** Icon .
- Select **any disk drive** screen.
- At the **top right corner** of that screen, there is a **search box** option.
- Type the **name** of the file or the folder you want to search.
- It will display the list of files or folders starting with the specified name.
- Just **click** and open that file or the folder.

## 10. What are the types of Errors?

### Syntax error:

- Syntax error occur when **grammatical rules** of C++ are violated.
- Ex. cout<< " welcome to c++ " - it will throw an error because It does not end with a semicolon.

**Semantic error or logical error:**

- It may be happened by **wrong use** of variable / operator /order of execution etc.
- Here program is **grammatically correct** but it contains some **logical error**.

**Run time error:**

- A run time error occurs **during** the **execution** of a program.
- It occurs because of some **illegal operation** that takes place.

**11. Write about Binary operators used in C++.**

**Binary operators:**

Require two operands and one operator.

**C++ Binary Operators are classified as:**

- (1) Arithmetic operator
- (2) Relational operator
- (3) Logical operator
- (4) Assignment operator
- (5) Conditional operator

**Arithmetic operator:**

- Arithmetic operator perform simple arithmetic operations like addition, subtraction, multiplication, division, etc.
- Support both unary and binary operations.

Operator	operation
+	Addition
-	Subtraction
*	Multiplication
/	Division
%	modulus

**Relational operator:**

- Relational operators are used to determine the relationship between its operands.

Operator	operation
>	Greater than
>=	Greater than equal to
<	Less than
<=	Less than equal to
==	Equal
!=	Not equal

**Logical operator:**

- A logical operator is used evaluate logical by combining two relational expression into one.

Operator	operation
&&	AND

	OR
!	NOT

**Assignment operator:**

➤ =(equal to) is the assignment operator is used to assign a value on the right hand side to a variable which is one of the left hand side.

Operator	Name of Operator
+=	Addition Assignment
-=	Subtraction Assignment
*=	Multiplication Assignment
/=	Division Assignment
%=	Modulus Assignment

**i) Conditional Operator:**

- ?: is a conditional Operator which is also known as Ternary Operator.
- This operator is used as an alternate to if ... else control statement.

**12. What is an entry control loop? Explain any one of the entry controlled loop with suitable example.**

- while is an **Entry** controlled loop.
- The **condition (Test –Expression)** placed at the **beginning** of the body of the loop.

**While loop**

**General working for loop:**

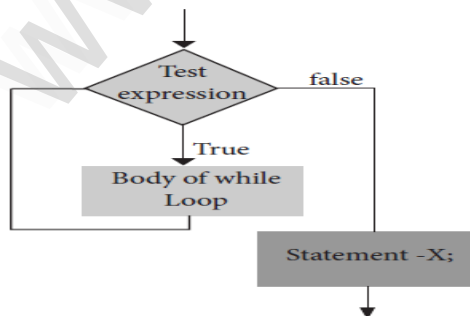
- 1.First the **control variable** is **initialized**
2. If the condition is **false**, the control exit from loop.
4. If the condition is **true**, the **body of the loop** is executed,
5. Next the control is to **update** expression.
- 6.After this, the control is again transferred to the **condition**.

**Syntax:**

```

Initialization;
while ( Test expression )
{
    Body of the loop;
    Update expression;
}
    
```

**Flow chart:**



**Example program:**

```

#include<iostream>
using namespace std;
    
```



```
int main()
{
int n=1;
while(n<5)
{
cout<<n;
n++;
}
}
```

**Output: 1234**

### 13. Explain Call by value method with suitable example.

- The formal parameter **creates new variables** and **stores** the value from **actual parameter**
- This method **copies** the values of actual parameters **into** the formal parameters
- **Any change** in the formal parameter is **not reflected** back to the actual parameter.

#### Example program:

```
#include <iostream >
using namespace std;
void swap (int a)
{
    a=8;
    cout<< "\n"<< a;
}
int main ( )
{
    int m1 = 10;
    cout<<m1 ;
    swap (m1);
    cout<< "\n"<< m1;
}
```

#### Output:

10  
8  
10

#### Note:

**m1** -> Actual parameter      **a** -> Formal Parameter

### 14. Explain call by reference in C++ with an example

- The formal parameters become **aliases** to the actual parameters.
- It is working on the **original data**.
- **Any change** made in the formal parameter is **reflected** back in the actual parameter

#### Example program:

```
#include <iostream >
using namespace std;
```

```
void swap (int &a)
{
    a=8;
    cout<< "\n"<<a;
}
int main ()
{
    int m1 = 10;
    cout<<m1 ;
    swap (m1);
    cout<< "\n"<< m1;

}
```

**Output:**

```
10
8
10
```

**Note:**

**m1** -> Actual parameter    **a** -> Formal Parameter

### 15. What is Recursion? Write a program to find the factorial of the given number using recursion.

- A function that calls itself is known as recursive function.
- **Example program:**

```
#include <iostream>
using namespace std;
int factorial(int); // Function prototype //
int main()
{
    int no;
    cout<<"\nEnter a number to find its factorial: ";
    cin >> no;
    cout << "\nFactorial of Number " << no <<" = " << factorial(no);
    return 0;
}
int factorial(int m)
{
    if (m > 1)
    {
        return m*factorial(m-1);
    }
    else
    {
        return 1;
    }
}
}
```

**Output :**

```
Enter a number to find its factorial: 5
Factorial of Number 5 = 120
```

## 16. Explain scope of variable with example.

✚ Scope refers to the **accessibility of a variable**.

✚ There are four types of scopes in C++.

They are:

1. Local scope,
2. Function scope,
3. Files cope,
4. Class scope

### 1. Local scope

- A local variable is defined **within a local block**.
- A local variable **cannot be accessed** from **outside** the block.
- A block of code begins and ends with **curly braces{ }**.

### 2. Function scope

- The scope of variable is extended to **the function block**, and all **sub blocks**.
- The life time of a function scope variable, is the lifetime of the function block.

### 3. File scope

- It is also called as **global** variable.
- To declared above **main ( )**.
- The life time of a file scope variable is **the life time of a program**.

### Example program:

```
#include <iostream >
using namespace std;
int b=10;
void swap (int a)
{
int c = a+b;
cout<< c;
}
```

```
int main ( )
{
int m1 = 10;
cout<<m1 ;
swap (m1);
cout<< „\n“<< m1;
}
```

Here,

**a** - Function scope variable **b** - File scope variable

**c** - Local variable

### 4. Class scope

- A class is a new way of creating and implementing a user **defined data type**.
- Access specifiers are **Private, protected** and **public**.

**class name**

```
{
Private:
{ declaration; }
Protected:
{ declaration; }
Public:
{ declaration; }
};
```

## 17. What are the rules for operator overloading?

### Rules or Restrictions on Operator Overloading:

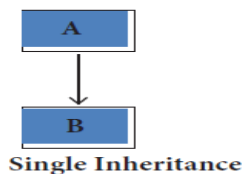
- **Precedence and Associativity** of an operator **cannot** be changed.
- **No new operators** can be created, Only **existing** operators can be overloaded.
- **Cannot redefine** the meaning of an operator's procedure.
- Overloaded operators **cannot have default** arguments.
- When binary operators are overloaded, the **left hand** object must be an **object** of the relevant **class**

## 18. Explain the different types of inheritance.

There are different types of inheritance viz., Single Inheritance, Multiple inheritance, Multilevel inheritance, hybrid inheritance and hierarchical inheritance.

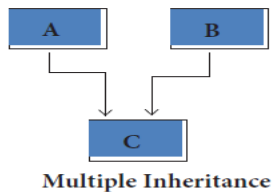
### 1. Single Inheritance:

- When a **derived class** inherits only from **one base class**, it is known as single inheritance.



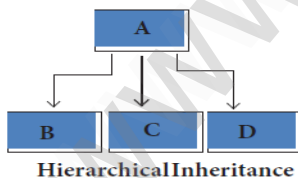
### 2. Multiple Inheritance:

- When a **derived class** inherits from **multiple base classes** it is known as multiple inheritance.



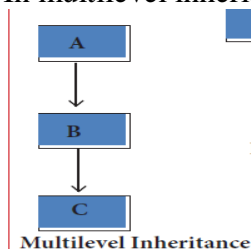
### 3. Hierarchical inheritance:

- When **more than one derived classes** are created from a **single base class**, it is known as Hierarchical inheritance.



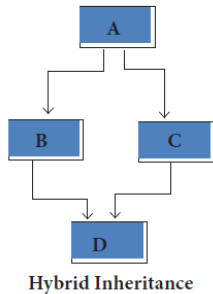
### 4. Multilevel Inheritance:

- The **transitive nature** of inheritance.
- In multilevel inheritance a derived class itself **acts as a base class** to derive another class.



**5. Hybrid inheritance:**

➤ A combination of **more than one type of inheritance** is known as hybrid inheritance.



**19. Explain the types of cyber attacks.**

**1. Virus:**

A virus is a small piece of computer code that can repeat itself and spreads from one computer to another by attaching itself to another computer file.

**2. Worms:**

Worms are self- repeating and do not require a computer program to attach themselves.

**3. Spyware:**

Spyware can be installed on the computer automatically when the attachments are open, by clicking on links or by downloading infected software.

**4.Ransom ware:**

Ransom ware is a type of malicious program that demands payment after launching a cyber-attack on a computer system.

**20. What are the various crimes happening using computer?**

Crime	Function
Malware	<ul style="list-style-type: none"> <li>Malicious programs that can perform a variety of functions including monitoring user’s computer activity without their permission.</li> </ul>
Harvesting	<ul style="list-style-type: none"> <li>A person or program collects login and password information from a legitimate user to illegally gain access to others’ account(s).</li> </ul>
Spam	<ul style="list-style-type: none"> <li>Distribute unwanted e-mail to a large number of internet users.</li> </ul>
Cyber Terrorism	<ul style="list-style-type: none"> <li>Hacking, threats, and blackmailing towards a business or a person.</li> </ul>
Cyber stalking	<ul style="list-style-type: none"> <li>Harassing through online.</li> </ul>