

Class : 11Register
Number**COMMON QUARTERLY EXAMINATION - 2023 - 24**

Time Allowed : 3.00 Hours]

COMPUTER SCIENCE

[Max. Marks : 70

Instructions : (1) Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.

(2) Use Blue or Black ink to write and underline and pencil to draw diagrams.

PART - I

Note : i) Answer All the questions.

15X1 = 15

ii) Choose the most appropriate answer from the given four alternatives and write the corresponding answer.

- When a system restarts which type of booting is used.
(a) Warm booting b) Cold booting c) Touch boot d) Real boot.
- How many characters can be handled in Binary coded Decimal system?
a) 64 b) 255 c) 256 d) 128
- Display devices are connected to the computer through
(a) USB b) PS / 2 c) SCSI d) VGA
- Which of the following operating systems support Mobile devices?
a) Windows 7 b) Linux c) Boss d) ios
- How can you move to the desktop anytime by pressing ----- or Aeropeek.
a) Winkey + A b) Winkey + p c) Winkey + D d) Winkey + O
- The short cut key used to rename a file in windows.
a) F2 b) F4 c) F5 d) F6
- If $o < i$ before the assignment $i := i - 1$ after the assignment, we can conclude that
a) $o < i$ b) $o \leq i$ c) $i = 0$ d) $o \geq i$
- How many times the following loop will be executed?

```

i := 0
while i ≠ 5
  i = i + 1

```


(a) 4 b) 5 c) 6 d) 0
- Which of the following is not an invariant of the assignment? $m, n := m + 2, n + 3$
a) $M \bmod 2$ b) $n \bmod 3$ c) $3x m - 2x n$ d) $2x m - 3x n$
- Null character is a string is -----
a) $\backslash 0$ b) $\backslash 5$ c) $\backslash x$ d) $\backslash n$
- What was the original name given to c++?
a) cpp b) advanced C c) C with classes d) class with C
- Which of the following is extraction operator?
a) $>>$ b) $<<$ c) $<>$ d) $\wedge\wedge$
- How many categories of datatypes are available in c++?
a) 5 b) 4 c) 3 d) 2
- This is used as alternate to end l comma
a) $\backslash t$ b) $\backslash b$ c) $\backslash 0$ d) $\backslash n$
- Which of the following is entry check loop?
a) for b) while c) do... while d) if ...else

PART - II

II. Answer any six questions. Question No. 24 is compulsory.

6x2=12

- Write the function of the memory.
- Write the truth table for XOR gate.
- What is Program Counter?
- What are the security management features available in OS.
- What are called Standard Icons?

KK/11/C.S/1

MOUNT CARMEL MISSION MATRICULATION HIGHER SECONDARY SCHOOL**KALLAKURICHI – 606 202****COMMON QUARTERLY EXAMINATION – 2023 – 2024 – (ANSWER KEY)****CLASS: 11****SUB: COMPUTER SCIENCE****PART – I****I. CHOOSE IT:**

- | | | |
|--------------------|---------------------------------|--------------|
| 1. a) warm booting | 8. b) 5 | 15. b) while |
| 2. a) 64 | 9. d) $2 \times m - 3 \times n$ | |
| 3. d) VGA | 10. a) \o | |
| 4. d) ios | 11. c) C with classes | |
| 5. c) Winkey + D | 12. a) >> | |
| 6. a) F2 | 13. c) 3 | |
| 7. b) $o \leq I$ | 14. d) \n | |

PART – II**16. Write the function of the Memory.**

Ans: The memory stores everything that a computer works with.

The memory unit is of two types namely Primary memory & Secondary memory

i. Primary memory:

- The primary memory is used to temporarily store the programs and data.
- The primary memory is volatile, that is, the content is lost when the power supply is off. The Random Access Memory (RAM) is an example of a main(primary) memory.

ii. Secondary memory:

- The secondary memory is used to permanently store the data.
- The secondary memory is non-volatile, that is, the content is available even after the power supply is off. Hard disk, CD-ROM and DVD ROM(Read Only Memory) are examples of secondary memory.

17. Write the truth table for XOR gate.

Ans: The XOR gate acts in the same way as the logical “either/or”. The output is “true” if either, but not both of the inputs are “true”. The output is “false” if both inputs are “false” or if both inputs are “true”.

Input		Output
A	B	$C = A \oplus B$
0	0	0
0	1	1
1	0	1
1	1	0

18. What is Program Counter?

Ans: The Program Counter (PC) is a special register in the CPU which always keeps the address of the next instruction to be executed.

19. What are the security management features available in OS.

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

- i. File access level ii. System level iii. Network level

20. What are called Standard Icons?

Ans: 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.

21. Define Loop Invariant.

Ans: In iteration, the loop body is repeatedly executed as long as the loop condition is true. Each time the loop body is executed, the variables are updated. However, there is also the variables which remains unchanged by the execution of the loop body. This unchanging property is called the loop invariant. Loop invariant is the key to construct and to reason about iterative algorithms.

22. What is the use of setw() format manipulator?

Ans: setw() manipulator sets the width of the field assigned for the output. The field width determines the minimum number of characters to be written in output.

Syntax:

setw(number of characters)

Example:

```
int marks = 70;
```

```
cout<<setw(10)<<"MARK="<<setw(5)<<marks;
```

OUTPUT:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
					M	A	R	K	=				7	0

23. What will the result of the following

if num = 6 initially

a) `cout<<num;`

b) `cout<<(num == 5);`

Ans: a) 6

Here assigned value is printed on the output screen as 6.

b) false

Here given value with variable name is num=6, num 6 is going to check with the given condition of num == 5, "num 6" is not equal with "num 5". So, it is "false".

24. Debug the following code:

```
if(x = 1)
```

```
P = 100;
```

```
else
```

```
P = 10;
```

Ans:

CORRECT CODE:

```
if(x == 1)
```

```
P = 100;
```

```
Else
```

```
P =10;
```

In this code segment, = is a wrong operator for a condition, as = is an assignment operator. In if case condition we should use == which is an equal to operator. The operator "=" checks whether the two operands are identical or not. If so, it's going to return true. Otherwise, it's going to return false. Replace = with == to make the code segment correct.

PART – III**25. Write short note on Impact printer.**

Ans: - Impact printers print with striking of hammers or pins on ribbon.

- Impact printers can print on multi-part (using carbon papers).

Eg: Dot Matrix printers and Line Matrix printers are impact printers.

26. Add: a) - 22₁₀ + 15₁₀ b) 20₁₀ + 25₁₀

Ans: a) - 22₁₀ + 15₁₀

$$\begin{array}{r} -22 \\ 2 \overline{) 22} \\ 2 \overline{) 11} \quad -0 \\ 2 \overline{) 5} \quad -1 \\ 2 \overline{) 2} \quad -1 \\ 1 \quad -0 \end{array}$$

$$-22_{10} = (10110)_2$$

Binary Equivalent = 10110₂

$$\text{8 bit} = 00010110$$

$$\text{1's complement} = 11101001 (+)$$

$$\text{Add 1} = 1$$

$$\underline{\underline{11101010}}$$

$$(15_{10}) = 1111$$

$$\text{8 bit} = 00001111$$

$$-22_{10} + 15_{10} = 11101010 (+)$$

$$00001111$$

$$\underline{\underline{11111001}}$$

Ans: (11111001)₂

Ans: b) 20₁₀ + 25₁₀

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

$$\begin{array}{r} 2 \overline{) 20} \\ 2 \overline{) 10} \quad -0 \\ 2 \overline{) 5} \quad -0 \\ 2 \overline{) 2} \quad -1 \\ 1 \quad -0 \end{array}$$

$$\begin{array}{r} 2 \overline{) 25} \\ 2 \overline{) 12} \quad -1 \\ 2 \overline{) 6} \quad -0 \\ 2 \overline{) 3} \quad -0 \\ 1 \quad -1 \end{array}$$

$$20_{10} = 10100$$

$$25_{10} = 11001$$

$$\text{8 bit} = 00010100_2$$

$$\text{8 bit} = 00011001_2$$

$$20_{10} + 25_{10} = 00010100 (+)$$

$$00011001$$

$$\underline{\underline{00101101}}$$

Ans: (00101101)₂

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

Flash memory	EEPROM
i) Flash memory is Read/Write memory.	i) EEPROM is read only memory.
ii) Flash memory is faster.	ii) Comparatively slower.
iii) Flash memory is used in PDAs (Personal Digital Assistants), Digital Cameras to store data.	iii) Use to store critical programs.
iv) Flash memory capacity vary from 4 GB to 2 TB.	iv) EEPROM is lesser capacity in general.

28. What are the advantages and disadvantages of Time-sharing features?**Ans:** Advantages:

- i) It allows execution of multiple tasks or processes concurrently.
- ii) All the current processes will have their CPU time.
- iii) Switches between the tasks rapidly thus completing other processes even if a process taken long time to complete.

Disadvantages:

- i) Switching between the tasks becomes sometimes sophisticated.
- ii) May lead to network and security problems.

29. Write a note on Recycle Bin.**Ans:** i) Recycle Bin is a special folder to keep the files or folders deleted by the user.

ii) The user cannot access the files or folders available in the Recycle Bin without restoring it.

30. What is Case analysis?**Ans:** Case analysis statement generalizes the problem in 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,

General Form of case analysis statement:

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

Execution style: 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.**Example:** pseudo code for Signum function

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

31. Why is main function special?**Ans:** The main() function is the starting point where all C++ programs begin their execution. A C++ program is a collection of functions. The main() function is the starting point of program execution. So, every C++ program must have a main function.**Example:**

```
int main() // STARTING POINT OF EXECUTION – comment line
{
    cout<<"This is an main";}
```

32. Write the syntax and purpose of switch statement.

Ans: Purpose: The switch statement is a multi-way branch statement. It provides an easy way to dispatch execution to different parts of code based on the value of the expression. The switch statement replaces multiple if-else sequence.

Syntax:

```
switch (expression)
{
case constant 1:
    statement(s);
    break;
case constant 2:
    statement(s);
    break;
default:
    statement(s);
}
```

Workflow of switch:

- i) The expression is evaluated.
- ii) Matches expression value against constant values specified in case statements.
- iii) If a value matches, executes that respective set of statements. Otherwise, the statements under the default option are executed.

33. Evaluate the following C++ expressions where x, y, z are integers and m, n are floating point numbers.

The value of x = 5, y = 4 and m = 2.5;

i) $n = x + y / x;$

ii) $z = m * x + y;$

iii) $z = (x++) * m + x;$

Ans: i) $n = x + y / x;$

$$= 5 + 4/5 \text{ (both y and x are int type. So only integer part of quotient is considered)}$$

$$= 5 + 0.8$$

$$n = 5.8 \text{ (n is in float type. So the answer we get in floating point)}$$

ii) $z = m * x + y;$

$$= 2.5 * 5 + 4; \text{ (m is float type. So x value is promoted to float [implicit conversion])}$$

$$= 12.5 + 4$$

$$z = 16 \text{ (z is in int type. So only integer part of quotient is considered)}$$

iii) $z = (x++) * m + x;$

$$= 5++ * 2.5 + 5$$

$$= 5 * 2.5 + 6 \text{ (x value is incremented with +1)}$$

$$= 12.5 + 6$$

$$= 18.5$$

$$z = 18 \text{ (z is in int type. So only integer part of quotient is considered)}$$

PART – IV

34.a) Explain the following

i) Inkjet printer

ii) Multimedia projector

iii) Bar code / QR code reader

Ans: i) Inkjet printer: Inkjet Printer use colour cartridges which combine Majenta, Yellow and Cyan inks to create color tones. A black cartridge is also used for monochrome output. Inkjet printers work by spraying Ionised Ink at a sheet of paper. The speed of inkjet printers generally range from 1-20 PPM (Pages Per Minute)

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

iii) 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. The system gives fast and error free entry of information into the computer.

iv) QR code reader: The QR (Quick Response) code is a two dimension bar code which can be read by a camera and processed to interpret the images.

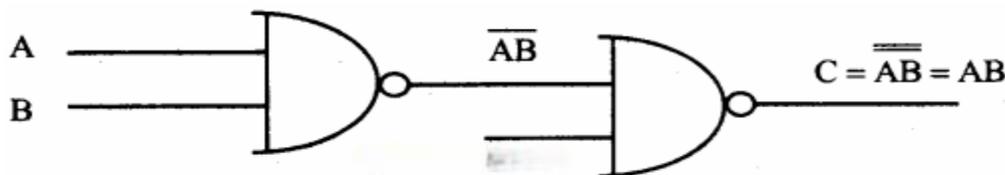
(OR)

b) How AND and OR can be realized using NAND and NOR gates?

Ans: Bubbled AND Gate

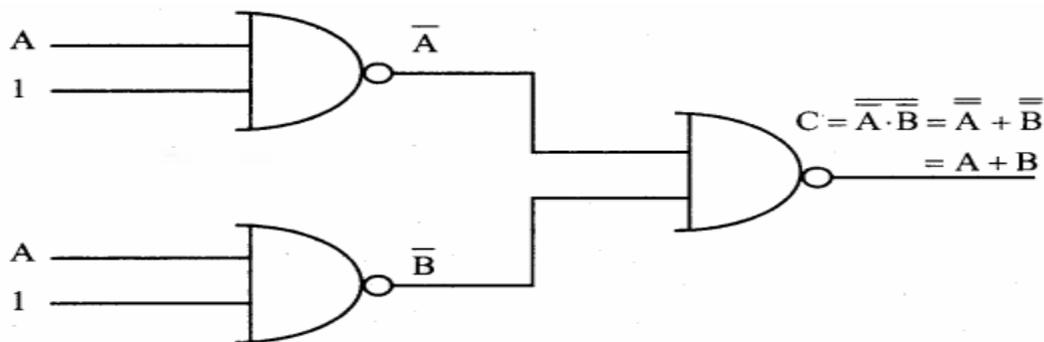
(i) Realized of AND using only NAND:

The Boolean function for AND is $C = AB$. The same can be realized using only NAND gates.



(ii) Realization of or using only NAND's:

The Boolean function of OR is $C = A + B$. The same can be realized using only NAND gates.

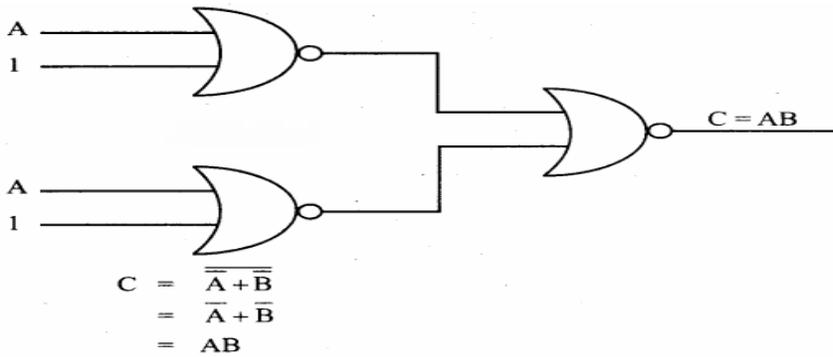


$$\begin{aligned} C &= \overline{\overline{A} \cdot \overline{B}} \\ &= \overline{\overline{A} + \overline{B}} \text{ (By Demorgan's law)} \\ &= A + B \text{ (output of OR gate)} \end{aligned}$$

(iii) Realization of AND using NOR:

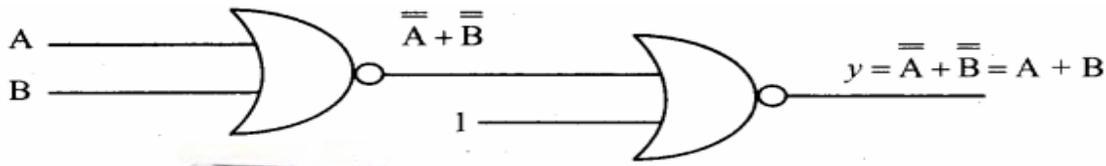
By using only the NOR gates, we can get the output equivalent to the output of AND gate.

$$C = A \cdot B$$



(iv) Realization of OR using NOR's:

By using only NOR gates we are getting the output equivalent to OR gate.



35. (a) Explain the types of ROM.

Ans: i) 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.
- 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 is a non-volatile memory.

ii) Programmable Read Only Memory (PROM):

- Programmable read-only memory is also a non-volatile memory on which data can be written only once.
- PROM is a non-volatile memory.
- PROM is manufactured as a blank memory.
- PROM can be programmed by PROM programmer or a PROM burner.
- The process of programming a PROM is called burning the PROM.

iii) Erasable Programmable Read Only Memory (EPROM):

- Erasable Programmable Read Only Memory is a special type of memory which serves as a PROM.
- EPROM content can be erased using ultraviolet rays.
- EPROM can be reprogrammed.
- EPROMs are used widely in personal computers because they enable the manufacturer to change the contents.

(OR)

(b) Explain the concepts of a distributed operating system along with its advantages.

Ans: 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:

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

36 (a). Explain the different ways of finding a file or folder.

Ans: To find a file or folder:

- i. Click the **start** button, the **search** box appears at the bottom of the start menu.
- ii. Type the name of the file or the folder or part of it to search.
- iii. The files or the folders with the specified names will appear, if you click that file, it will directly open that file or the folder.
- iv. There is another option called “**see more results**” which appears above the **search** box.
- v. If you click it, it will lead you to a **Search Results** dialog box where you can click and open that file or the folder.

Searching Files or Folders using Computer icon:

- i. Click **Computer Icon** from desktop or from **Start menu**.
- ii. The Computer disk drive screen will appear and at the top right corner of that screen, there is a **search box** option.
- iii. Type the name of the file or the folder or part of it to search.
- iv. Just click and open that file or the folder.

(OR)

(b). 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, represent the state by suitable variables, and write the specification of the algorithm.

Ans: Let the variables a, b, c represent the glass A, glass B and Glass C respectively. Variables A, B, C can store values APPLE, GRAPE or EMPTY.

Initial State:	1. -- a, b, c	:=	APPLE, GRAPE, EMPTY
	2. c	:=	b
	3. -- a, b, c	:=	APPLE, EMPTY, GRAPE
	4. b	:=	a
	5. -- a, b, c	:=	EMPTY, APPLE, GRAPE
	6. a	:=	c
Final State:	7. -- a, b, c	:=	GRAPE, APPLE, EMPTY

Specification:

1. Exchange ()
2. -- inputs: a, b, c := APPLE, GRAPE, EMPTY
3. -- outputs: a, b, c := GRAPE, APPLE, EMPTY

37. (a) What are the types of errors.

Ans:

Type of Error	Description
Syntax Error	Syntax errors occur when grammatical rules of C++ are violated. Example: cout "Hello World"; Will throw an error because << is missing in the statement. Correct statement: cout<<"Hello World";
Semantic Error	When a program has not produced the desired results, We call it as logical Error or Semantic error. //Example: Program to find square of 15 #include <iostream.h> using namespace std; int main() { int n=15; cout<<"Square of 15 is:"<<15+15; } OUTPUT: Square of 15 is 30 The above program gets compiled without errors and gives output. But the output is 30 instead of 225 since 15 is added twice instead of multiplication. Such errors are called logical error.
Run – time error	A run time error occurs during the execution of a program. It is occurs because of some illegal operation that takes place. For example: If a program tries to open a file which does not exist, it results in a run-time error.

(OR)

(b) A single – square – covered board is a board of $2^n \times 2^n$ squares in which one square is covered with a single square tile. Show that it is possible to cover this board with triominoes without overlap.

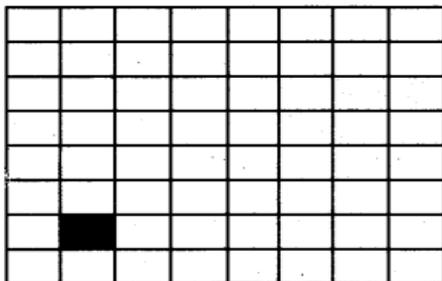
Ans: Size of the board is $2^n \times 2^n$

Number of squares = $2^n \times 2^n = 4^n$

Number of squares covered = 1

Number of squares to be covered = $4^n - 1$

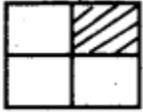
$4^n - 1$ is a multiple of 3.



Case 1: $n = 1$

The size of the board 2×2

one triominoe can cover 3 squares without overlap.



We can cover it with one triominoe and solve the problem.



+



→



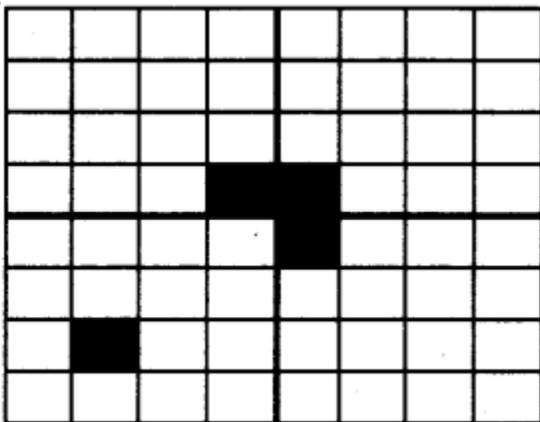
2x2 square

Triominoe

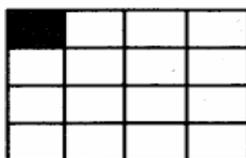
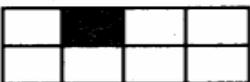
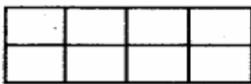
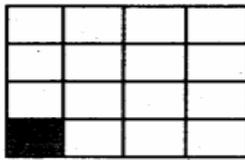
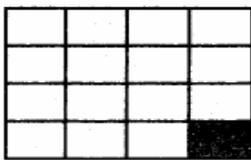
Triominoe covered square

Case 2: $n \geq 2$

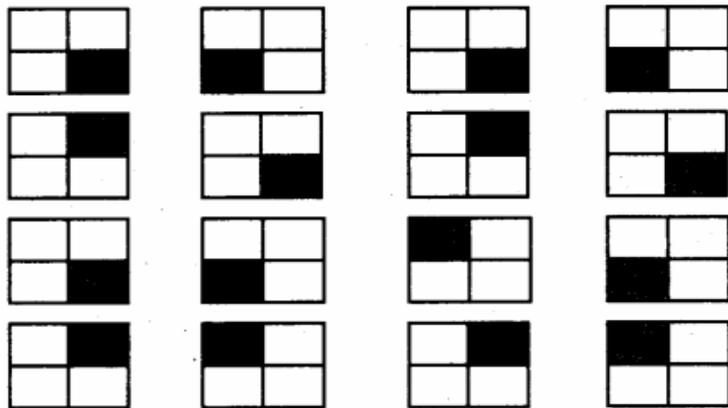
1. place a triominoe at the center of the entire board so as to not cover the covered sub – board.
2. One square in the board is covered by a tile. The board has 4 sub – boards of size $2^{n-1} \times 2^{n-1}$.



Out of 4 sub – boards one sub – board is a single square covered sub – board.



One triominoe can cover remaining three sub – boards into single square covered sub – board. The problem of size n is divided into 4 sub – problems of size $(n - 1)$. Each sub – board has $2^{2n-1} \times 2^{2n-1} - 1 = 2^{2n-2} - 1 = 4^{n-1} - 1$ squares to be covered.



$4^{n-1} - 1$ is also a multiple of 3

In this, the $2^n \times 2^n$ board is reduced to boards of size 2×2 having one square covered. A triominoe can be placed in each of these boards and hence the whole original $2^n \times 2^n$ board is covered with triominoe without overlap.

38. (a) What is entry control loop? Explain any one of the entry control loop with suitable example.

Ans: In an entry control loop, the test-expression is evaluated before the entering into a loop.

Examples: 1. While loop 2. For loop

While loop:

Purpose: A while loop is a control flow statement that allows the statements to be executed as long as the condition is true.

Type: Entry Control loop

Syntax:

```
while(test expression)
```

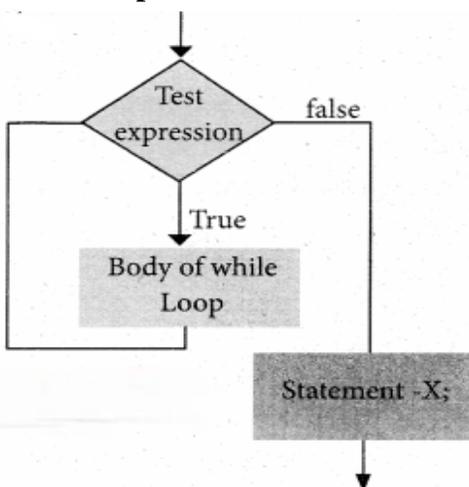
```
{
```

```
  body of the loop;
```

```
}
```

```
Statement-x;
```

Flowchart representation:



Control flow:

Step 1 : Test – expression is evaluated to either True or False;

Step 2 : If test – expression is true;

(a) The body of the loop is executed.

(b) Control is transferred to step 1.

Step 3: If test – expression is false, the control exits the while loop.

Example:

```
int a = 2;
```

```
while (a<=10)
{
cout << a << '\t';
a+=2;
}
```

Output:

2 4 6 8 10

(OR)

(b) Explain control statement with suitable example.

Ans: Control statements are statements that alter the sequence of flow of instructions.

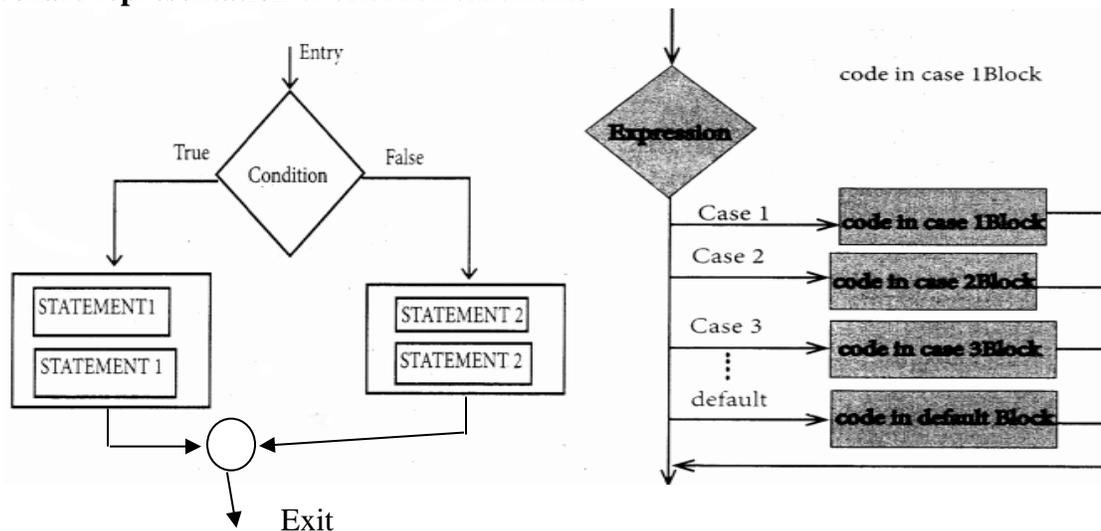
Types of control statements:

- i. Selection statement
- ii. Iteration statement
- iii. Jump statement

i. Selection statements: The selection statement means the statement (s) executed, depends upon a condition. If a condition is true, a true block (a set of statements) is executed otherwise a false block is executed. This statement is also called decision statement or selection statement because it helps in making decision about which set of statements are to be executed.

Examples: 1. If 2. Switch

Flowchart representation of selection statements:

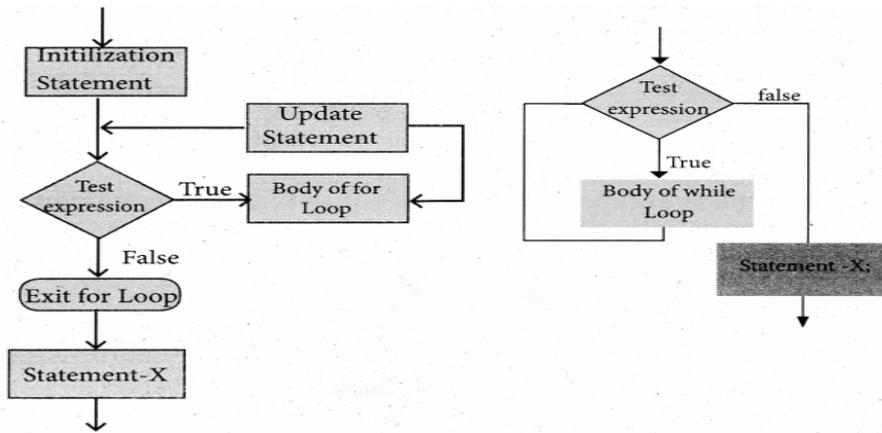


ii. Iteration (or looping) statement: An iteration (or loop) is a sequence of one or more statements that are repeatedly executed until a condition is satisfied. These statements are also called as control flow statements. It is used to reduce the length of code to reduce the time to execute program and takes less memory space.

Example:

1. While
2. do while
3. for

Flowchart representation of iteration statements:



iii. Jump statement: Jump statements are used to interrupt the normal flow of program.

Types of jump statements are

- goto statement
- break statement
- continue statement

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