Computer Science - Plus One

June 2022 - Model

Question Paper with Answer key

Part I

A. Answer any five questions from 1 to 7. Each carries 1 score. (5×1=5)

1. 1.   What is the major technological advancement in the fourth generation computers?
   a) Transistor   b) Integrated circuit
   c) Microprocessor   d) Vacuum Tube

   A: c) Microprocessor

2. ....memory is small and fast memory between the processor and RAM.

   A: Cache memory

3. Choose the correct exit controlled loop from the following looping statements written below:
   a) while   b) for   c) do...while   d) None

   A: c) do...while

4. .... character is used as a string terminator and added at the end of the string.

   A: \0 (Null Character)

5. .... function is used to check whether a character is in the upper case or not.

A: isupper()

6. The ability of a function to call itself is known as.........

   A: Recursion

7. A .... is a device that can interconnect different networks having different protocols.
   a) Router b) Bridge c) Switch d) Gateway

   A: Gateway

Answer any 9 questions from 8 to 19. Each carries 2 scores. (9x2=18)

8. Do the following number conversions
   a)$(31)_{10}$ to binary. b) $(10001)_2$ to decimal.
   A: (a)

2	31	
2	15	1
2	7	1
2	3	1
	1	1

$31_{10} = 11111_2$

(b) $10001_2 = 1 \times 10^4 + 1 \times 10^0 = 1 \times 16 + 1 \times 1 = 16 + 1 = 17_{10}$

9. Define Data processing.
   A: Data processing is the process of converting data into meaningful information.

10. Compare RAM and ROM.

    A:

RAM	ROM
It is faster than ROM	Slower
It stores OS, programs and data	It stores boot programs
It allows reading and writing	Allows reading only
It is volatile	Non-volatile

11. What is an Operating System?

A: Operating sysem is the most important software in a computer. OS is an interface between user and hardware. The OS makes the system convenient to use. OS controls and co-ordinates the operations of a computer.
E.g. Windows 11, Ubuntu, DOS etc.

12. What are the two types of Documentation?

Internal documentation and external documentation are the two types of documentaion. Internal documentations are the comments in the program. External documentations contain instructions about the installation and usage of the program(user guide).

13. How are non-graphic characters represented in C++? Give an example.

Non-graphic symbols are represented in C++ by using escape sequences (\). E.g. \n,\t etc.

14. Write the purpose of default statement in switch statement.

The default is used for performing a task when none of the case is true. Default is similar to else in else-if ladder.

15. Compare 'break' and 'continue' statements in C++.

Break	Continue
Used with switch or loops	Used only with loops
Takes the control outside the loop	Does not take control out of loop
Causes to terminate the loop	Skips one iteration of the loop

16. Define an Array.

Array is a fixed number of elements of the same type stored sequentially in memory with a single name.

17. Compare Linear search and Binary search.

Linear search	Binary search
The elements need not be in any order	The elements should be in sorted order
Slow	Fast
May need to visit all the elements	Never visited all the elements
Suitable for small array	Suitable for large array

18. Explain the merits of modular programming.

A: **Reduces program size**:- Repetition of same expression can be avoided by using modules. E.g. To find $\sqrt{x} + \sqrt{y}$, The module written for finding square root of x can be reused for y.
Reduces chances of error:- Errors can be easily identified as they are localized to a function.
Reduces programming complexity Code for each module is short, simple and easy to understand.
Improves Reusability A function once written can be

reused later, which saves time and energy. E.g. calling and using of predefined functions.
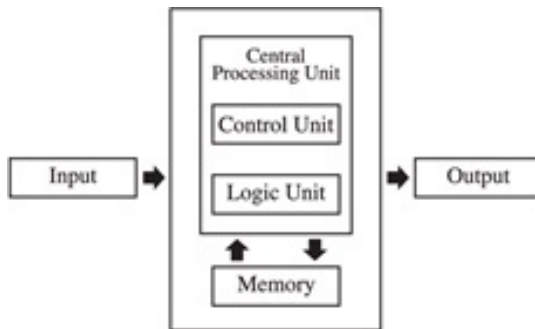
19. Pick the odd one out and give reason:
    a) strlen()   b) itoa()   c) strcpy()   d) strcat()

    A: b) itoa() :- This is a conversion function with header file cstdlib. Others are string functions.

Answer any 9 questions from 20 to 32. Each carries 3 scores.(9 x 3 = 27)

20. Explain Von Neumann architecture of a computer with proper diagram.

The mathematician John Von Neumann proposed a 'stored program computer' architecture which forms the basis of modern computers. His architecture consists of a CPU (Central Processing Unit) with ALU (Arithmetic and Logic Unit) and CU (Control Unit), I/O (Input/Output) unit and Memory unit.

21. Represent -60 in 1's complement form.
    $60 = 111100_2$
    $Using 8 bits, 60 = 00111100$
    $-60 in 1's complement = 11000011$

2	60	
2	30	0
2	15	0
2	7	1
2	3	1
	1	1

22. What is e-waste? Explain different e-waste disposal methods.

E-waste refers to electronic products nearing the end of their 'useful life'.

E-waste disposal methods.

1. Reuse :- It refers to second-hand use or usage after the equipment is modified.

2. Incineration :- In this the waste is burned in specially designed incinerators at a high temperature.

3. Recycling :- It is the process of making new products from old products.

4. Land filling :- In this method soil is excavated and waste material is buried in it.

23. What is meant by debugging? What are different types of errors in computer programs?

Debugging is the process of detecting and correcting errors (bugs). The types of errors are syntax errors, logical errors and runtime errors.

24. What are the rules for naming identifiers in C++?

The rules for making identifiers are

a. Use letters, digits and underscore(_) only.

b. The first character must be a letter or underscore.

c. White spaces and special characters are not allowed.

d. Keywords cannot be used.

e. Identifiers are case sensitive.

25. Define data types in C++? List fundamental data types in C++.

    Data types are used to specify the type of the data. Fundamental data types are int, char, float, double and void.

26. Rewrite the following statement using if...else statement.
    result = mark>30 ? 'p': 'f';

    if(mark > 30)
          result = 'p';
    else
          result = 'f'

27. Write an algorithm for bubble sort.

    Step 1: start
    Step 2: Starting with the first element compare the current element with the next element
    Step 3: If the current element is greater than the next element, then swap the elements.
    Step 4: If the current element is less than the next element, move to the next element.
    Step 5: Repeat steps 2 to 4 until the elements are sorted
    Step 6: Stop.

28. Differentiate between 'get()' and 'getline()' functions in C++.

    get() function can accept a character or a string through keyboard. For accepting string, array needs to be given as argument.
    cin.get (ch); // This accepts a character to the variable ch
    cin.get(str,10) // This accepts a string of maximum 10 characters where str is a character array.

getline() function also accepts a string through keyboard. It can have one, two or three arguments. Third argument is to set any other delimiter character other than enter key.

E.g. cin.getline (str, 10) ; // This accepts a string of maximum 10 characters

cin.getline (str, 10, 'z') ; // This accepts a string of max 10 characters or up to the letter 'z'.

29. Write down the differences between call by value and call by reference function calling techniques in C++.

Call by value	Call by reference
Ordinary variables are used as formal parameters	Reference variables are used as formal parameters
Actual parameters may be constants, variables.	Actual parameters will be variables only.
The changes made in the formal arguments do not reflect in actual arguments.	The changes made in the formal arguments do reflect in actual arguments.
Exclusive memory allocation is required for the formal arguments.	Memory of actual arguments is shared by formal arguments.
Arguments are declared as ordinary variables in the function definition	The ampersand symbol (&) is used before arguments in the function definition

30. What is a computer network? What are the major advantages of a computer network?

Computer Network is a group of computers and other devices connected together through a communication medium. The advantages of computer networks are
1. Resource sharing
2. Price-performance ratio

3. Communication
4. Reliability
5. Scalability

31. Explain the main sections of e-mail with an example.

    A: An e-mail has the following sections
    To - Addresses of the recipients are specified here
    Cc - Carbon copy is to provide address of the secondary recipients
    Bcc - Blind carbon copy is to provide addresses of third recipients and the primary and secondary recipients cannot see the bcc addresses
    Subject - It is to provide a meaningful subject/heading
    Content - Messages are typed here
    E.g. To: dhse.ker@gmail.com
    cc: scertkerala@gmail.com
    bcc: sysmapb@gmail.com
    Subject: Higher secondary syllabus updation
    Sir, please update the syllabus for plus two students.
    yours faithfully,
    Student

32. Write the disadvantages of social media. What are the different ways to avoid the disadvantages of social media?

    Disadvantages of social media are Intrusion to privacy, addiction and spread of rumors. The following measures can be taken to avoid disadvantages of socila media.

    • Avoid unnecessary uploading of personal data like e-mail address, phone number, address, pictures etc.
    • Set time schedule for using different websites.
    • Avoid posting wrong or misleading content on websites.
    • Set privacy levels (private, friends, public) such that you

know exactly who can see your posts.

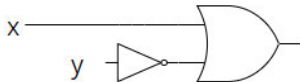**Answer any 2 questions from 33 to 36. Each carries 5 scores. (2 x 5 = 10)**

33. a) State De Morgan's theorems.
    b) Draw logic circuit for the Boolean expression $X + \overline{Y}$.
    c) Draw the logical symbol of universal gates.
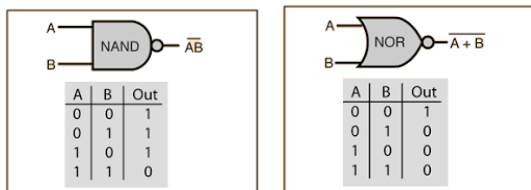
    A: De Morgan's two theorems are

    (i) $\overline{X + Y} = \overline{X} \cdot \overline{Y}$

    (ii) $\overline{(X \cdot Y)} = \overline{X} + \overline{Y}$

    (b)

    (c) NAND and NOR are universal gates.

34. a) What is flowchart ? List any three advantages of flowcharts.
    b) Convert the following algorithm to corresponding flowchart.

    Step 1: START

    Step 2: Input A, B, C
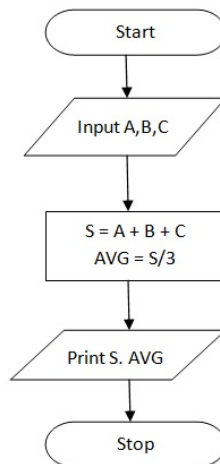
    Step 3: S = A+B+C

    Step 4: Avg = S/3

Step 5: Print S, Avg

Step 6: STOP

A: (a) The pictorial representation of an algorithm is known as flowchart. The advantages of flowchart are
a. Better communication
b. Effective analysis
c. Effective synthesis
d. Efficient coding

(b)

35. a) Write the basic structure of a C++ program.
    b) Explain any one method of type conversion in C++.

A: (a) The basic structure of a C++ program is

```
#include <iostream>
using namespace std;
int main ( )
{
Statements;
```

;
;
return 0;
}
(b) Implicit type conversion:- Implicit type conversion is performed by the compiler. C++ converts lower type to higher type automatically. This is also known as type promotion.
E.g. int n = 1;
char c = 'A';
cout << n + c; //Here c is automatically converted to int for addition. Output is 66 (ASCII value of 'A' is 65)

36. What is Topology? Compare different LAN topologies.

The way in which the nodes are connected to form a network is called a topology. Four types of topologies are
1. Bus
In bus topology, all the nodes are connected to a main cable called bus. A small device called terminator is attached at each end of the bus. Characteristics of a bus are
• Easy to install
• Requires less cable length
• Inexpensive
• Failure of node does not affect the network
• Failure of bus leads to network break down
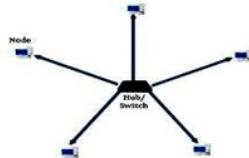• Only one node can transmit data at a time
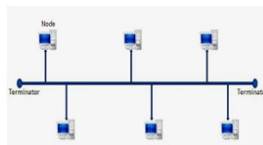
2. Star
In star topology each node is directly connected to a hub or switch.Its features are
• More efficient compared to bus

- Easy to install
- Requires more cable length
- Failure of node does not affect the network
- Failure of hub leads to network break down
- Easy to expand

3. Ring

In ring topology all nodes are connected to a cable ring. Data travels only in one direction. Its characteristics are

- Requires less cable length
- Inexpensive
- Failure of a node leads to network break down
- Addition of nodes is difficult
- No signal amplification is required
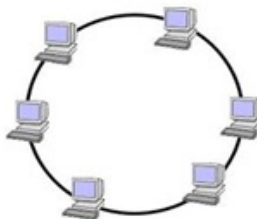
4. Mesh

In mesh topology every node is connected to all other nodes. Its features are

- Most reliable network topology
- Network will not fail, when one path fails
- Requires more cable length
- Expensive and difficult to manage

Note:- Full answers are given for most questions. Requested points will be enough for the exam.