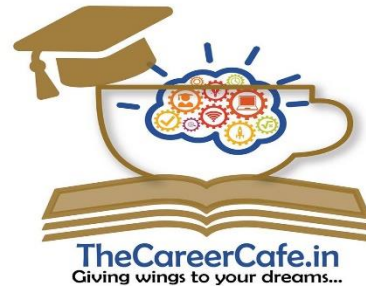


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1) Consider following given code and predict its output:

```
main()
{
    int num[ ] = {1,4,8,12,16};
    int *a, *b;
    int j;
    a=num; b=num+2; i=*a+1;
    printf ("%d, %d, %d\n", i, *a, *b);
}
```

ops: A. 2,1,8      C. 4,4,8  
      B. 4,1,8      D. 2,4,8

2) Upon mixing two independent one-many relationships \_\_\_\_\_ dependency arises.

a. Transitive    b. Multivalued    c. Functional    d. Partial

3) Stack is useful for implementing:

a. Recursion    b. depth first search    c. both (a) & (b)

4) If L is left node, M is middle node, R is right node then an L-M-R traversal can be termed as \_\_\_\_\_

a. Post order    b. in order    c. preorder    d. this is invalid order

5) Srishti writes a program to find an element in the array A[5] with the following elements in order: 8 30 40 45 70. She runs the program to find a number X. X is found in the first iteration of binary search. What is the value of X?

Op 1: 40  
Op 2: 8  
Op 3: 70  
Op 4: 30

6) Periodic collection of all the free memory space to form contiguous block of free space by an operating system is called:

a. garbage collection    b. Dynamic memory allocation    c. collision    d. concatenation

7) A is an empty stack. The following operations are done on it.

PUSH(1)  
PUSH(2)  
POP  
PUSH(5)  
PUSH(6)  
POP



What will the stack contain after these operations. (Top of the stack is underlined)

Op 1: 5 6

Op 2: 1 5

Op 3: 5 6

Op 4: 1 5

8) The output quality of a printer is measured by:

- A. Dots printed per unit time
- B. Dot per centimeter
- C. Dot per sq. inch
- D. Dot per inch

9) The following fragment of c program will print?

```
char c[ ] = "DATA1234";  
char * P = C;  
printf ("%S", P + P[3] - P[1]);
```

- A) DATA1234      B) 234      C) 1234      D) A1234

10) Q is an empty queue. The following operations are done on it:

ADD 5  
ADD 7  
ADD 46  
DELETE  
ADD 13  
DELETE  
DELETE  
ADD 10

What will be the content of Q after these operations. Front is marked by (F) and Rear is marked by (R).

Op 1: 10(R) 13(F)

Op 2: 5(R) 10(F)

Op 3: 13(R) 10(F)

Op 4: 10(R) 5(F)

11) Secret key encryption is also known as -----

12) There is a new data-type which can take as values natural numbers between (and including) 0 and 25. How many minimum bits are required to store this datatype.

- A. 4
- B. 5
- C. 1
- D. 3



- 13) A language has 28 different letters in total. Each word in the language is composed of maximum 7 letters. You want to create a data-type to store a word of this language. You decide to store the word as an array of letters. How many bits will you assign to the data-type to be able to store all kinds of words of the language?
- A. 7  
B. 35  
C. 28  
D. 196
- 14) Parul takes as input two numbers: a and b. a and b can take integer values between 0 and 255. She stores a, b and c as 1-byte data type. She writes the following code statement to process a and b and put the result in c, where  $c = a + 2*b$   
To her surprise her program gives the right output with some input values of a and b, while gives an erroneous answer for others. For which of the following inputs will it give a wrong answer?
- Op 1: a = 10 b = 200  
Op 2: a = 200 b = 10  
Op 3: a = 50 b = 100  
Op 4: a = 100 b = 50
- 15) Stuti is making a questionnaire of True-false questions. She wants to define a data-type which stores the response of the candidate for the question. What is the most-suited data type for this purpose?
- Op 1: integer  
Op 2: boolean  
Op 3: float  
Op 4: character
- 16) What will be the output of the following code statements?  
integer a = 10, b = 35, c = 5  
print a \* b / c - c
- Op 1: 65  
Op 2: 60  
Op 3: Error  
Op 4: 70
- 17) What will be the output of the following pseudo-code statements:  
integer a = 984, b=10  
//float is a data-type to store real numbers.  
float c  
c = a / b





print c

Op 1: 984

Op 2: 98.4

Op 3: 98

Op 4: Error

- 18) Shashi wants to make a program to print the sum of the first 10 multiples of 5.

She writes the following program, where statement 5 is missing:

```
integer i = 0
integer sum = 0
while ( i <= 50 )
{
    sum = sum + i
    -- MISSING STATEMENT 5 --
}
print sum
```

Which of the following will you use for statement 5?

Op 1:  $i = 5$

Op 2:  $i = 5 * i$

Op 3:  $i = i + 1$

Op 4:  $i = i + 5$

- 19) A hash table can store a maximum of 10 records. Currently there are records in locations 1, 3, 4, 7, 8, 9, 10. The probability of a new record going into location 2, with a hash function resolving collisions by linear probing is

Op 1: 0.6

Op 2: 0.1

Op 3: 0.2

Op 4: 0.5

- 20) Sharmili wants to make a program to print the sum of all perfect cubes, where the value of the cubes goes from 0 to 100. She writes the following program:

```
integer i = 0, a // statement 1
integer sum = 0;
a = ( i * i * i )
while ( i < 100 ) // statement 2
{
    sum = sum + a // statement 3
```



```

i = i + 1
a = ( i * i * i ) // statement 4
}
print sum

```

Does this program have an error? If yes, which one statement will you modify to correct the program?

Op 1: Statement 1

Op 2: Statement 2

Op 3: Statement 3

Op 4: Statement 4

Op 5: No error

21) Number of possible ordered trees with 3 nodes A, B, C is

Op 1: 16

Op 2: 12

Op 3: 13

Op 4: 14

22) Vijay wants to print the following pattern on the screen:

```

2
2 4
2 4 6
2 4 6 8

```

He writes the following program:

```

integer i = 1, j=2 // statement 1
while ( i <= 4 ) // statement 2
{
    j = 2;
    while ( j <= ? ) // Statement 3
    {
        print j
        print blank space
        j = j + 2
    }
    print end-of-line \takes the cursor to the next line
    i = i + 1 }

```

What is the value of '?' in statement 3:

Op 1: 8

Op 2: i

Op 3: 2\*i

Op 4: 4



- 23) Rohit writes the following program which inputs a number and prints "Double digit" if the number is composed of two digits and "Not a double digit" if it is not.
- ```
int number;  
if (number>10 AND number < 100)  
    print "Double digit"  
else  
    print "Not a double digit"  
end if
```
- Rohit tries the following inputs: 5 and 66. The program works fine. He asks his brother Ravi to try the program. When Ravi enters a number, the program doesn't work correctly. What did Ravi enter?
- Op 1: 8  
Op 2: 100  
Op 3: 99  
Op 4: 10
- 24) Consider an array on which bubble sort is used. The bubble sort would compare the element  $A[x]$  to which of the following elements in a single iteration.
- Op 1:  $A[x+1]$   
Op 2:  $A[x+2]$   
Op 3:  $A[x+2x]$   
Op 4: All of these.
- 25) Lavanya wants to find the smallest number out of 26 inputted numbers. How many minimum comparisons he has to make?
- Op 1: 25  
Op 2: 13  
Op 3: 26  
Op 4: 52
- 26) I have a problem to solve which takes as input a number  $n$ . The problem has a property that given the solution for  $(n-1)$ , I can easily solve the problem for  $n$ . Which programming technique will I use to solve such a problem?
- Op 1: Iteration  
Op 2: Decision-making  
Op 3: Object Oriented Programming  
Op 4: Recursion



27) Which of the following statements are true about a doubly-linked list?

- Op 1: it may be either linear or circular
- Op 2: it must contain a header node
- Op 3: it will occupy same memory space as that of linear linked list, both having same number of nodes
- Op 4: None of these

28) What is space complexity of a program?

- Op 1: Amount of hard-disk space required to store the program
- Op 2: Amount of hard-disk space required to compile the program
- Op 3: Amount of memory required by the program to run
- Op 4: Amount of memory required for the program to compile

29) Ravi and Rupali are asked to write a program to sum the rows of 2X2 matrices stored in the array A.

Ravi writes the following code (Code A):

```
for n = 0 to 1
sumRow1[n] = A[n][1] + A[n][2]
end
```

Rupali writes the following code (Code B):

```
sumRow1[0] = A[0][1] + A[0][2]
sumRow1[1] = A[1][1] + A[1][2]
```

Comment upon these codes (Assume no loop-unrolling done by compiler):

- Op 1: Code A will execute faster than Code B.
- Op 2: Code B will execute faster than Code A
- Op 3: Code A is logically incorrect.
- Op 4: Code B is logically incorrect.

30) A complete binary tree with 5 levels has how many nodes? (Root is Level 1)...

- Op 1: 15
- Op 2: 25
- Op 3: 63
- Op 4: 31

31) We have two programs. We know that the first has a time complexity  $O(n^2)$ , while the second has a complexity  $\omega(n^2)$ . For sufficiently large  $n$ , which of the following cannot be true?





- Op 1: Both codes have same complexity
- Op 2: The first code has higher time complexity than the second
- Op 3: The second code has lower time complexity than the first code.
- Op 4: Both codes are the same.

**32)** Code A has to execute  $4n^2 + 64$  program statements, while Code B has to execute  $32n$  program statements for a problem of size  $n$ . The time for executing a single program statement is same for all statements. Rajesh was given a problem with a certain size  $k$  and he delivered Code A. What could be the possible value of  $k$ ?

- Op 1: 1000
- Op 2: 5
- Op 3: 10
- Op 4: 3

**33)** Surbhi is given two codes, A and B, to solve a problem, which have complexity  $O(n^3)$  and  $\omega(n^4)$  respectively. Her client wants to solve a problem of size  $k$ , which is sufficiently large. Which code will Surbhi deliver to the client, so that the execution is faster?

- Op 1: Code A
- Op 2: Code B
- Op 3: Surbhi cannot determine
- Op 4: Both codes have the same execution time, so deliver any.

**34)** Which of the following is useful in traversing a given graph by breadth first search?

- Op 1: stack
- Op 2: set
- Op 3: list
- Op 4: queue

**35)** Saloni writes the code for a function that takes as input  $n$ , an even integer and calculates the sum of first  $n$  even natural numbers.

```
function sum( n )  
{  
  if(n equals 2)  
    return 2  
  else  
    return (n + sum(n-2))  
  end  
}
```



She then calls the function by the statement, `sum(30)`. How many times will the function `sum` be called to compute this sum.

- Op 1: 1
- Op 2: 30
- Op 3: 15
- Op 4: 16

36) Farhan writes a code to find the factorial of an inputted number. His code gives correct answer for some inputs and incorrect answers for others. What kind of error does his program have?

- Op 1: Syntactical error
- Op 2: Run-time Error
- Op 3: Logical Error
- Op 4: None of these

37) Gautam writes a program to run on a Motorola processor on his Pentium computer. He wants to see how the program will execute on the Motorola processor using his Pentium machine. What tool will he use?

- Op 1: Compiler
- Op 2: Interpreter
- Op 3: Assembler
- Op 4: Simulator

38) The algorithm design technique used in the quick sort algorithm is

- Op 1: Dynamic programming
- Op 2: Back tracking
- Op 3: Divide and conquer
- Op 4: Greedy Search

39) Consider the following code:

```
function modify(b,a)
{
    return a - b
}
function calculate( )
{
    integer a = 5, b = 12, c
    c = modify(a, b);
    print c
}
```



Assume that a and b were passed by reference. What will be the output of the program on executing function calculate( ) ?

- Op 1: 7
- Op 2: -7
- Op 3: Error
- Op 4: 8

40) Consider the following function:

```
function run( )  
{  
  integer a = 0 // Statement 1  
  while (a < 5)  
  {  
    integer c = 0 // Statement 2  
    c = c + 1 // Statement 3  
    a = a + 1  
  }  
  print c // Statement 4  
}
```

At which statement in this program will the compiler detect an error?

- Op 1: Statement 1
- Op 2: Statement 2
- Op 3: Statement 3
- Op 4: Statement 4

41) Jaswinder has a book of tickets and wants to store ticket numbers in a data structure. New tickets are added to the end of the booklet. Ticket at the top of the stack is issued to the customer. Which data structure should Jaswinder use to represent the ticket booklet?

- Op 1: Queue
- Op 2: Stack
- Op 3: Array
- Op 4: Graph

42) A queue is implemented as a (singly linked) linked-list. Each node has an element and pointer to another node. Rear and Front contain the addresses of the rear and front node respectively. If the condition (rear isequal front) is true and neither is NULL, what do we infer about the linked list?

- Op 1: It has no elements
- Op 2: It has one element
- Op 3: There is an error
- Op 4: None of these



43) If you want to write a function that swaps the values of two variables, you must pass them by:

- Op 1: Value only
- Op 2: Reference only
- Op 3: Either A or B
- Op 4: Neither A nor B

44) What does the following function do?

```
function operation (int a, int b)
{ if (a < b) {
  return operation(b, a) }
  else {
    return a }
}
```

- Op 1: Returns the max of (a,b)
- Op 2: Returns the min of (a,b)
- Op 3: Loops forever
- Op 4: Always returns the second parameter

45) A queue is implemented by a linear array of size 10 (and not as a circularly connected array). Front and Rear are represented as an index in the array. To add an element, the rear index is incremented and the element is added. To delete an element, the front index is incremented. The following operations are done on an empty queue:

ADD 1; DELETE; ADD 2; ADD 3; ADD 4; DELETE, DELETE

After this set of operations, what is the maximum capacity of the queue?

- Op 1: 6
- Op 2: 7
- Op 3: 10
- Op 4: None of these

46) function g(int n)

```
{
  if (n > 0) return 1;
  else return -1;
}
```

function f(int a, int b)

```
{
  if (a > b) return g(a-b);
  if (a < b) return g(-b+a);
  return 0;
}
```



}

If  $f(a,b)$  is called, what is returned?

Op 1: Always +1

Op 2: 1 if  $a > b$ , -1 if  $a < b$ , 0 otherwise

Op 3: -1 if  $a > b$ , 1 if  $a < b$ , 0 otherwise

Op 4: 0 if  $a$  equals  $b$ , -1 otherwise

47) Consider the following code:

```
for i= m to n increment 2{
```

```
print "Hello!" }
```

Assuming  $m < n$  and exactly one of  $(m,n)$  is even, how many times will Hello be printed?

Op 1:  $(n - m + 1)/2$

Op 2:  $1 + (n - m)/2$

Op 3:  $1 + (n - m)/2$  if  $m$  is even,  $(n - m + 1)/2$  if  $m$  is odd

Op 4:  $(n - m + 1)/2$  if  $m$  is even,  $1 + (n - m)/2$  if  $m$  is odd

48) Shashi writes a program in C++ and passes it on to Pankaj. Pankaj does some indentation in some statements of the code. What will this lead to?

Op 1: Faster Execution

Op 2: Lower memory requirement

Op 3: Correction of errors

Op 4: Better readability

49) Consider the statement:

```
while (a < 10.0) { a = a*a }
```

Assuming  $a$  is positive, for what value of  $a$  will this code statement result in an infinite loop?

Op 1:  $a < 1.0$

Op 2:  $a < \sqrt{10}$

Op 3:  $a > \sqrt{10}$

Op 4:  $a = 0$

50) The construct "if (condition) then A else B" is for which of the following purposes?

Op 1: Decision-Making

Op 2: Iteration

Op 3: Recursion

Op 4: Object Oriented Programming

51) There are two loops which are nested. This implies which one of the following?





- Op 1: Two loop, one after the other
- Op 2: Two loops, one inside the others
- Op 3: One loop with two different iteration counts
- Op 4: Two loops with the same iteration count

**52)** Which of the following is true about comments?

- Op 1: They are executed only once.
- Op 2: They are not executed
- Op 3: A good program does not contain them
- Op 4: They increase program execution time.

**53)** Consider the following code:

```
if (condition 1) {  
  if (condition 2)  
  { // Statement A }  
  else  
  if (condition 3)  
  { // Statement B }  
  else  
  { // Statement C }  
  else  
  if (condition 4) { // Statement D }  
  else  
  { // Statement E }  
}
```

Which of the following conditions will allow execution of statement E?

- Op 1: condition1 AND condition3
- Op 2: NOT(condition1) AND condition2 AND NOT(condition4)
- Op 3: NOT(condition2) AND NOT(condition3)
- Op 4: condition1 AND condition4 AND NOT(condition2) AND NOT(condition3)

**54)** To solve a problem, it is broken in to a sequence of smaller sub-problems, till a stage that the sub-problem can be easily solved. What is this design approach called?

- Op 1: Top-down Approach
- Op 2: Bottom-Up Approach
- Op 3: Procedural Programming
- Op 4: None of these

**55)** In the following sorting procedures, which one will be the slowest for any given array?



- Op 1: Quick sort
- Op 2: Heap sort
- Op 3: Merge Sort
- Op 4: Bubble sort

**56)** The average search time of hashing with linear probing will be less if the load factor

- Op 1: is far less than one
- Op 2: equals one
- Op 3: is far greater than one
- Op 4: none of these

**57)** A sorting algorithm traverses through a list, comparing adjacent elements and switching them under certain conditions. What is this sorting algorithm called?

- Op 1: insertion sort
- Op 2: heap sort
- Op 3: quick sort
- Op 4: bubble sort

**58)** The average time required to perform a successful sequential search for an element in an array  $A(1 : n)$  is given by:

- Op 1:  $(n+1) / 2$
- Op 2:  $\log_2 n$
- Op 3:  $n(n+1) / 2$
- Op 4:  $n^2$

**59)** An array of 5 numbers has the following entries in order: 7 4 5 10 8. Prashant uses selection sort to sort this array in descending order. What will the array contain after two iterations of selection sort?

- Op 1: 10 8 7 5 4
- Op 2: 10 8 5 7 4
- Op 3: 8 10 5 7 4
- Op 4: None of these

**60)** An integer X is saved as an unsigned 8-bit number, 00001011. What is X?

- Op 1: 22
- Op 2: 11
- Op 3: 10
- Op 4: None of these

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