

Ques 1 : Choose the correct answer

**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 data-type.**

Option 1 : 4

Option 2 : 5

Option 3 : 1

Option 4 : 3

Ques 2 : Choose the correct answer

**A data type is stored as an 6 bit signed integer. Which of the following cannot be represented by this data type?**

Option 1 : -12

Option 2 : 0

Option 3 : 32

Option 4 : 18

Ques 3 : Choose the correct answer

**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.**

Option 1 : 7

Option 2 : 35

Option 3 : 28

Option 4 : 196

Ques 4 : Choose the correct answer

**A 10-bit unsigned integer has the following range:**

Option 1 : 0 to 1000

Option 2 : 0 to 1024

Option 3 : 1 to 1025

Option 4 : 0 to 1023

Ques 5 : Choose the correct answer

**Rajni wants to create a data-type for the number of books in her book case. Her shelf can accommodate a maximum of 75 books. She allocates 7 bits to the data-type. Later another shelf is added to her book-case. She realizes that she can still use the same data-type for storing the number of books in her book-case. What is the maximum possible capacity of her new added shelf?**

Option 1 : 52

Option 2 : 127

Option 3 : 53

Option 4 : 75

Ques 6 : Choose the correct answer

**A new language has 15 possible letters, 8 different kinds of punctuation marks and a blank character. Rahul wants to create two data types, first one which could store the letters of the language and a second one which could store any character in the language. The number of bits required to store these two data-types will respectively be:**

Option 1 : 3 and 4

Option 2 : 4 and 3

Option 3 : 4 and 5

Option 4 : 3 and 5

Ques 7 : Choose the correct answer

**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.**

$$c = a + 2*b$$

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?

Option 1 : a = 10 b = 200      Option 2 : a = 200 b = 10      Option 3 : a = 50 b = 100      Option 4 : a = 100 b = 50

Ques 8 : Choose the correct answer

Prashant takes as input 2 integer numbers, a and b, whose value can be between 0 and 127. He stores them as 7 bit numbers. He writes the following code to process these numbers to produce a third number c.

$$c = a - b$$

In how many minimum bits should Prashant store c?

Option 1 : 6 bits      Option 2 : 7 bits      Option 3 : 8 bits      Option 4 : 9 bits

Ques 9 : Choose the correct answer

Ankita takes as input 2 integer numbers, a and b, whose value can be between 0 and 31. He stores them as 5 bit numbers. He writes the following code to process these numbers to produce a third number c.

$$c = 2*(a - b)$$

In how many minimum bits should Ankita store c?

Option 1 : 6 bits      Option 2 : 7 bits      Option 3 : 8 bits      Option 4 : 9 bits

Ques 10 : Choose the correct answer

A character in new programming language is stored in 2 bytes. A string is represented as an array of characters. A word is stored as a string. Each byte in the memory has an address. The word "Mahatma Gandhi" is stored in the memory with starting address 456. The letter 'd' will be at which memory address?

Option 1 : 468      Option 2 : 480      Option 3 : 478      Option 4 : 467

Ques 11 : Choose the correct answer

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?

Option 1 : integer      Option 2 : boolean      Option 3 : float      Option 4 : character

Ques 12 : Choose the correct answer:

A pseudo-code is used. Assume that when two data-types are processed through an operator, the answer maintains the same data-type as the input data-types. Assume that all data-types have enough range to

accommodate any number. If two different data-types are operated on, the result assumes the more expressive data-type.

**What will be the output of the following pseudo-code statements:**

**integer a = 456, b, c, d =10**

**b = a/d**

**c = a - b**

**print c**

Option 1 : 410

Option 2 : 410.4

Option 3 : 411.4

Option 4 : 411

Ques 13 : Choose the correct answer:

A pseudo-code is used. Assume that when two data-types are processed through an operator, the answer maintains the same data-type as the input data-types. Assume that all data-types have enough range to accommodate any number. If two different data-types are operated on, the result assumes the more expressive data-type.

// in pseudo code refers to comment

**What will be the output of the following pseudo-code statements:**

**integer a = 984, b, c, d =10**

**print remainder(a,d) // remainder when a is divided by d**

**a = a/d**

**print remainder(a,d) // remainder when a is divided by d**

Option 1 : 48

Option 2 : Error

Option 3 : 84

Option 4 : 44

Ques 14 : Choose the correct answer:

Assume the following precedence (high to low). Operators in the same row have the same precedence:

(.)

\* /

+ -

AND

OR

For operators with equal precedence, the precedence is from left-to-right in expression.

**What will be the output of the following code statements?**

**integer a = 50, b = 25, c = 0**

**print ( a > 45 OR b > 50 AND c > 10 )**

Option 1 : 1

Option 2 : 0

Option 3 : -1

Option 4 : 10

Ques 15 : Choose the correct answer:

Assume the following precedence (high to low). Operators in the same row have the same precedence:

(.)

\* /

+ -

AND

OR

For operators with equal precedence, the precedence is from left-to-right in expression.

**What will be the output of the following code statements?**

**integer a = 50, b = 25, c = 5**

**print a \* b / c + c**

Option 1 : 120

Option 2 : 125

Option 3 : 255

Option 4 : 250

---

Ques 16 : Choose the correct answer:

Assume the following precedence (high to low). Operators in the same row have the same precedence:

(.)

\* /

+ -

AND

OR

For operators with equal precedence, the precedence is from left-to-right in expression.

**What will be the output of the following code statements?**

**integer a = 10, b = 35, c = 5**

**print a \* b / c - c**

Option 1 : 65

Option 2 : 60

Option 3 : Error

Option 4 : 70

---

Ques 17 : Choose the correct answer:

Assume the following precedence (high to low). Operators in the same row have the same precedence:

(.)

\* /

+ -

AND

OR

For operators with equal precedence, the precedence is from left-to-right in expression.

**integer a = 10, b = 35, c = 5**

**Comment about the output of the two statements?**

**print a \* b + c / d**

**print c / d + a \* b**

Option 1 : Differ due

to left-to-right

Option 2 : Differ by 10

Option 3 : Differ by 20

Option 4 : Same

---

precedence

Ques 18 : Choose the correct answer:

Assume the following precedence (high to low). Operators in the same row have the same precedence:

(.)

\* /

+ -

AND

OR

For operators with equal precedence, the precedence is from left-to-right in expression.

**integer a = 40, b = 35, c = 20, d = 10**

**Comment about the output of the following two statements:**

```
print a * b / c - d
print a * b / (c - d)
```

Option 1 : Differ by 80 Option 2 : Same

Option 3 : Differ by 50

Option 4 : Differ  
by 160

Ques 19 : Choose the correct answer:

Assume the following precedence (high to low). Operators in the same row have the same precedence:

```
(.)
* /
+ -
AND
OR
```

For operators with equal precedence, the precedence is from left-to-right in expression.

**integer a = 60, b = 35, c = -30**

**What will be the output of the following two statements:**

```
print ( a > 45 OR b > 50 AND c > 10 )
print ( ( a > 45 OR b > 50 ) AND c > 10 )
```

Option 1 : 0 and 1

Option 2 : 0 and 0

Option 3 : 1 and 1

Option 4 : 1 and 0

Ques 20 : Choose the correct answer:

A pseudo-code is used. Assume that when two data-types are processed through an operator, the answer maintains the same data-type as the input data-types. Assume that all data-types have enough range to accommodate any number. If two different data-types are operated on, the result assumes the more expressive data-type.

// in pseudo code refers to comment

**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
```

Option 1 : 984

Option 2 : 98.4

Option 3 : 98

Option 4 : Error

Ques 21 : Choose the correct answer:

A pseudo-code is used. Assume that when two data-types are processed through an operator, the answer maintains the same data-type as the input data-types. Assume that all data-types have enough range to accommodate any number. If two different data-types are operated on, the result assumes the more expressive data-type.

// in pseudo code refers to comment

**What will be the output of the following pseudo-code statements:**

```
integer a = 984
//float is a data-type to store rational numbers.
float b= 10, c
c = a / b
print c
```

Option 1 : 984

Option 2 : Error

Option 3 : 98.4

Option 4 : 98

---

Ques 22 : Choose the correct answer

**Smriti wants to make a program to print the sum of square of the first 5 whole numbers (0...4). She writes the following program:**

```
integer i = 0 // statement 1
integer sum = 0 // statement 2
while ( i < 5 ) // statement 3
{
    sum = i*i // statement 4
    i = i + 1 // statement 5
}
print sum // statement 6
```

**Is her program correct? If not, which statement will you modify to correct it?**

Option 1 : No error,  
the program is correct.

Option 2 : Statement 1

Option 3 : Statement 4

Option 4 :  
statement 6

---

Ques 23 : Choose the correct answer

**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?**

Option 1 :  $i = 5$

Option 2 :  $i = 5 * i$

Option 3 :  $i = i + 1$

Option 4 :  $i = i + 5$

---

Ques 24 : Choose the correct answer

**Shantanu wants to make a program to print the sum of the first 7 multiples of 6. He writes the following program:**

```
integer i = 0 // statement 1
integer sum // statement 2
while ( i <= 42 ) // statement 3
{
    sum = sum + i // statement 4
    i = i + 6;
}
```

**print sum // statement 6**

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

Option 1 : Statement 1   Option 2 : Statement 2   Option 3 : Statement 3   Option 4 : Statement 4

Ques 25 : Choose the correct answer

**Sharmili wants to make a program to print the sum of all perfect cubes, where the value of the cubes go 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?**

Option 1 : Statement 1   Option 2 : Statement 2   Option 3 : Statement 3   Option 4 : Statement 4   Option 5 : No error

Ques 26 : Choose the correct answer

**Bhavya wants to make a program to print the sum of all perfect squares, where the value of the squares go from 0 to 50. She writes the following program:**

```
integer i = 1, a // statement 1
integer sum = 0
while ( a < 50 ) // statement 2
{
    sum = sum + a // statement 3
    i = i + 1
    a = ( i * i ); // statement 4
}
print sum
```

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

Option 1 : Statement 1   Option 2 : Statement 2   Option 3 : Statement 3   Option 4 : Statement 4   Option 5 : No

---

Ques 27 : Choose the correct answer

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 ::

Option 1 : 8

Option 2 : i

Option 3 : 2\*j

Option 4 : 4

---

Ques 28 : Choose the correct answer

Shravanti writes the following program:

```
integer i = 0, j
while ( i < 2 )
{
    j = 0;
    while ( j <= 3*i )
    {
        print j
        print blank space
        j = j + 3
    }
    print end-of-line \takes the cursor to the next line
    i = i + 1
}
```

What will be the output of the program?

Option 1 : 0

Option 2 : 0 3

Option 3 : 0

Option 4 : 0 3 6



0 3

0 3 6

0 3 6

0 3 6 9

0 3 6 9

0 3 6 9 12

Ques 29 : Choose the correct answer

Vijay wants to print the following pattern on the screen:

```
1
1 2
1 2 3
```

He writes the following program:

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

Will this program function correctly? If not which one statement will you modify to make the program function correctly?

Option 1 : Statement 1   Option 2 : Statement 2   Option 3 : Statement 3

Option 4 :  
Statement 4

Option 5  
:  
Program  
does not  
have  
error.

Ques 30 : Choose the correct answer

Charu writes the following program:

```
integer i = 1, j, a
while ( i <= 4 )
{
  j = 1;
  a = 0;
  while ( a <= 5*i )
  {
    a = 2^j;
    print a
    print blank space
    j = j + 1
  }
}
```

```

}
print end-of-line \takes the cursor to the next line
i = i + 1
}

```

**What will be the output of the program?**

Option 1 : 2	Option 2 : 2 4	<u>Option 3 : 2 4</u>	Option 4 : 2
2 4	2 4 8	<u>2 4 8</u>	2 4
2 4 8	2 4 8 16	<u>2 4 8</u>	2 4
2 4 8 16	2 4 8 16 32	<u>2 4 8 16</u>	2 4 8 16

Ques 31 : Choose the correct answer

**Himanshu wants to write a program to print the larger of the two inputted number. He writes the following code:**

```

int number1, number 2
input number1, number 2
if ("??") // Statement 1
print number1
else
print number2
end if

```

**Fill in the ?? in statement 1.**

<u>Option 1 :</u>	Option 2 :	Option 3 : number2	Option 4 :
<u>number1&gt;number2</u>	number2>number1	equals number1	number1 <=
			number2

Ques 32 : Choose the correct answer

**Shalini wants to program to print the largest number out of three inputted numbers. She writes the following program:**

```

int number1, number 2, number3, temp;
input number1, number2, number3;
if (number1>number2)
temp = number1
else
temp = number2
end if
if (??) // Statement 1
temp = number3
end if
print temp

```

**Fill in the ?? in Statement 1**

Option 1 : number3 >	<u>Option 2 : number3 &gt;</u>	Option 3 : number3 <	Option 4 :
number2	<u>temp</u>	temp	number3 >
			number1

Ques 33 : Choose the correct answer

**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?**

Option 1 : 8

Option 2 : 100

Option 3 : 99

Option 4 : 10

Ques 34 : Choose the correct answer

**Rohan writes the following program which inputs a number and prints "Triple digit" if the number is composed of three digits and "Not triple digit" if it is not.**

```
int number;
if (number>99)
    print "Triple digit"
else
    print "Not triple digit"
end if
```

**Rohan tries the following inputs: 25 and 566. 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?**

Option 1 : 99

Option 2 : 100

Option 3 : 0

Option 4 : 1000

Ques 35 : Choose the correct answer

**Abhinav wants to find the largest number in a given list of 20 numbers. Which of the following is an efficient approach to do this?**

Option 1 : Use bubble sort to sort the list in descending order and then print the first number of the series.

Option 2 : Use selection sort to sort the list in descending order and then print the first number of the series.

Option 3 : Implement one iteration of selection sort for descending order and print the first number in the series.

Option 4 : None of these

Ques 36 : Choose the correct answer

**Lavanya wants to find the smallest number out of 26 inputted numbers. How many minimum comparisons he has to make?**

Option 1 : 25

Option 2 : 13

Option 3 : 26

Option 4 : 52

Ques 37 : Choose the correct answer

**A company offers commission for selling its products to its salesperson. The commission rate is Rs. 5 per product. However if the salesperson sells more than 200 items, he gets a commission of Rs. 10 on all items he sold after the first 200. Kanu writes a program to calculate the commission for the salesperson:**

```
integer numberProducts, commission
input numberProducts
```

```
if ( numberProducts > 200 )
-- MISSING STATEMENT --
else
commission = numberProducts * 5
end if
print commission
```

**Fill in the missing statement.**

Option 1 : commission = (numberProducts - 200) * 10	Option 2 : commission = $\frac{200 * 5 + (numberProducts - 200) * 10}{10}$	Option 3 : commission = numberProducts * 10	Option 4 : None of these
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Ques 38 : Choose the correct answer

**Vikram wants to write a program which checks whether the inputted number is divisible by any of the first 6 natural numbers (excluding 1). He writes the following efficient code for it.**

```
int number, n = 2, isdivisible=0
input number
while ( n <=6) // Statement 1
{
if ( remainder (number, n) == 0)
isdivisible = 1
end
n = n+1 // Statement 2
}
if (isdivisible equals 1)
print "It is divisible"
else
print "It is not divisible"
end
```

**Vikram takes the program to Hari. Hari tells Vikram that though the code is correct, it can be made more efficient. Hari modifies a single statement and makes the code more efficient. Which statement does he modify and how?**

Option 1 : <u>Statement 1 is changed to:</u> <u>while (n &lt;=6 AND</u>	Option 2 : Statement 1 is changed to: while (n <=6 OR	Option 3 : Statement 1 is changed to: while (isdivisible=0)	Option 4 : Statement 2 is changed to:
--	--	--	--

isdivisible=0)

isdivisible=0)

n = n + 2

---

Ques 39 : Choose the correct answer

**Rajiv wants to make a program which inputs two numbers: a and b (a>b) and computes the number of terms between a and b (including a and b). What will be code statement to do this:**

Option 1 : a - b

Option 2 : a - b + 1

Option 3 : a + b

Option 4 : a - b - 1

---

Ques 40 : Choose the correct answer

**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?**

Option 1 : Iteration

Option 2 : Decision-  
makingOption 3 : Object  
Oriented ProgrammingOption 4 :  
Recursion

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Ques 41 : Choose the correct answer:

A pseudo-code is used with the following meaning.

"pointer" is a data-type which contains memory address (or pointers)

Statement "a = \*b" puts the value at the memory address referenced by b into a.

Statement "a = &b" puts the memory address of b into a.

Statement "\*b = a" puts the value a at the memory address referenced by b.

**What is the output of the following code statements? The compiler saves the first integer at the memory location 4062. Integer is one byte long.**

```
integer a
```

```
pointer b
```

```
a = 20
```

```
b = &a
```

```
print *b
```

Option 1 : 4062

Option 2 : 4063

Option 3 : 20

Option 4 : 10

---

Ques 42 : Choose the correct answer:

A pseudo-code is used with the following meaning.

"pointer" is a data-type which contains memory address (or pointers)

Statement "a = \*b" puts the value at the memory address referenced by b into a.

Statement "a = &b" puts the memory address of b into a.

Statement "\*b = a" puts the value a at the memory address referenced by b.

**What is the output of the following code statements? The compiler saves the first integer at the memory location 4165 and the rest at consecutive memory spaces in order of declaration. Integer is one byte long.**

```
integer a, b
```

```
pointer c, d
```

```
a = 30
```

```
c = &a
```

```
b = *c
```

```
a = a + 10
```

```
print b
```

Option 1 : 30

Option 2 : 4165

Option 3 : 40

Option 4 : 4166

Ques 43 : Choose the correct answer:

A pseudo-code is used with the following meaning.

"pointer" is a data-type which contains memory address (or pointers)

Statement "a = \*b" puts the value at the memory address referenced by b into a.

Statement "a = &b" puts the memory address of b into a.

Statement "\*b = a" puts the value a at the memory address referenced by b.

**What is the output of the following code statements? The compiler saves the first integer at the memory location 4165 and the rest at consecutive memory spaces in order of declaration. Integer is one byte long.**

```
integer a
```

```
pointer c, d
```

```
a = 30
```

```
c = &a
```

```
d = c
```

```
a = a + 10
```

```
print *c
```

Option 1 : 30

Option 2 : 4165

Option 3 : 40

Option 4 : 4166

Ques 44 : Choose the correct answer

**What is space complexity of a program?**

Option 1 : Amount of hard-disk space required to store the program

Option 2 : Amount of hard-disk space required to compile the program

Option 3 : Amount of memory required by the program to run

Option 4 : Amount of memory required for the program to compile

Ques 45 : Choose the correct answer

**The memory space needed by an algorithm has a fixed part independent of the problem instance solved and a variable part which changes according to the problem instance solved. In general, which of these two is of prime concern to an algorithm designer?**

Option 1 : Fixed part

Option 2 : Variable Part

Option 3 : Product of fixed part and variable part

Option 4 : None of these

Ques 46 : Choose the correct answer

**While calculating time complexity of an algorithm, the designer concerns himself/herself primarily with the run time and not the compile time. Why?**

Option 1 : Run time is always more than

Option 2 : Compile time is always more

Option 3 : Compile time

Option 4 : A program needs to be compiled once

compile time. than run time. is a function of run time. but can be run several times.

Ques 47 : Choose the correct answer

**Pankaj and Mythili were both asked to write the code to evaluate the following expression:**

$$a - b + c/(a-b) + (a-b)^2$$

**Pankaj writes the following code statements (Code A):**

```
print (a-b) + c/(a-b) + (a-b)*(a-b)
```

**Mythili writes the following code statements (Code B):**

```
d = (a-b)
```

```
print d + c/d + d*d
```

**If the time taken to load a value in a variable, for addition, multiplication or division between two operands is same, which of the following is true?**

Option 1 : Code A uses lesser memory and is slower than Code B    Option 2 : Code A uses lesser memory and is faster than Code B    Option 3 : Code A uses more memory and is faster than Code B    Option 4 : Code A uses more memory and is slower than Code B

Ques 48 : Choose the correct answer

**Vrinda writes an efficient program to sum two square diagonal matrices (matrices with elements only on diagonal). The size of each matrix is nXn. What is the time complexity of Vrinda's algorithm?**

Option 1 :  $\theta(n^2)$     Option 2 :  $\theta(n)$     Option 3 :  $\theta(n*\log(n))$     Option 4 : None of these

Ques 49 : Choose the correct answer

**Tarang writes an efficient program to add two upper triangular 10X10 matrices (elements on diagonal retained). How many total additions will his program make?**

Option 1 : 100    Option 2 : 55    Option 3 : 25    Option 4 : 10

Ques 50 : Choose the correct answer

**Ravi and Rupali are asked to write a program to sum the rows of a 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):**

Option 1 : Code A will Option 2 : Code B will    Option 4 : Code B

execute faster than Code B.

execute faster than Code A

Option 3 : Code A is logically incorrect.

is logically incorrect.

Ques 51 : Choose the correct answer

**There is an array of size  $n$  initialized with 0. Akanksha has to write a code which inserts the value  $3^k$  at position  $3^k$  in the array, where  $k=0,1,\dots$ (till possible). Akanksha writes an efficient code to do so. What is the time complexity of her code?**

Option 1 :  $\theta(n^2)$

Option 2 :  $\theta(n)$

Option 3 :  $\theta(\log_3(n))$

Option 4 :  $\theta(3^n)$

Ques 52 : Choose the correct answer

**There are two matrices A and B of size  $n \times n$ . The data in both these matrices resides only at positions where both the indices are a perfect square. Rest all positions have 0 as the data. Manuj has available a third matrix initialized with 0's at all positions. He writes an efficient code to put the sum of A and B in C. What is the time complexity of Manuj's program?**

Option 1 :  $\theta(n^2)$

Option 2 :  $\theta(n)$

Option 3 :  $\theta(n^{1/2})$

Option 4 :  $\theta(\log(n))$

Ques 53 : Choose the correct answer

**Ravi has to add an strictly upper triangular (no elements at diagonal) and a strictly lower triangular square matrix (no elements at diagonal) and put the result in a third matrix. What is the time complexity of Ravi's algorithm? Assume that storing a value in a memory space takes negligible time, while each addition between values takes the dominating amount of time.**

Option 1 :  $\theta(n^2)$

Option 2 :  $\theta(n)$

Option 3 :  $\theta(1)$

Option 4 : None of these

Ques 54 : Choose the correct answer

**We have two  $100 \times 3$  (rows  $\times$  column) matrices containing mid-term exam marks and end-term exam marks of 100 students. Each row refers to a particular student, while columns refer to marks in English, Social Sciences and Maths. The end-term and mid-term marks of each student in each subject have to be added to get his total score in each subject, to be put in a third matrix ( $100 \times 3$ ). Parinidhi writes a code (Code A), where the outer loop iterates over the rows, while the inner loop iterates over the columns. Shashi writes a code (Code B), where the outer loop iterates over the columns, while the inner loop iterates over rows. Which of the following is true with regard to their code ignoring any caching or memory storage effects?**

Option 1 : Code A is faster than Code B

Option 2 : Code B is faster than Code A

Option 3 : Code A and Code B will run in the same amount of time

Option 4 : The comparison between the speed of the codes cannot be made.

Ques 55 : Choose the correct answer

**A code takes the following code steps (equivalently time unit) to execute:  $5 \cdot n^3 + 6 \cdot n^2 + 1$ . Which of the following is not true about the time complexity of the program?**



Option 1 : It has a time complexity of  $O(n^3)$     Option 2 : It has a time complexity of  $O(n^4)$     Option 3 : It has a time complexity of  $O(n^2)$     Option 4 : It has a time complexity of  $\theta(n^3)$

Ques 56 : Choose the correct answer

**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?**

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

Ques 57 : Choose the correct answer

**The time complexity of code A is  $\theta(n)$ , while for Code B it is  $\theta(\log(n))$ . Which of the following is true for sufficiently large  $n$ ?**

Option 1 : Both code have the same time complexity    Option 2 : Code A has higher time complexity    Option 3 : Code B has higher time complexity    Option 4 : No comparison can be made between the time complexity of the two codes.

Ques 58 : Choose the correct answer

**Rajini is given an efficient code for summing two  $n \times n$  matrices and putting the result in a third matrix. She is asked to find it's time complexity. She realizes that the number of iterations required is more than  $n$ . What can she claim with regard to the complexity of the code?**

Option 1 : It is  $O(n)$     Option 2 : It is  $O(n^2)$     Option 3 : It is  $\theta(n)$     Option 4 : It is  $\omega(n)$

Ques 59 : Choose the correct answer

**Gautam is given two codes, A and B, to solve a problem, which have complexity  $\theta(n)$  and  $\theta(n^2)$  respectively. His client wants to solve a problem of size  $k$ , which Gautam does not know. Which code will Gautam deliver to the client, so that the execution is faster?**

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

Ques 60 : Choose the correct answer

**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?**

Option 4 : Both

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

Ques 61 : Choose the correct answer

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

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

Ques 62 : Choose the correct answer

**Pavithra is given two codes, A and B, to solve a problem, which have complexity  $\theta(n^3)$  and  $\omega(n^3)$  respectively. Her client wants to solve a problem of size  $k$ , which is sufficiently large. Which code should she deliver to the client in the present scenario?**

Option 1 : Code A      Option 2 : Code B      Option 3 : Both codes have the same execution time, so deliver any.      Option 4 : None of these

Ques 63 : Choose the correct answer

**Code A has to execute  $4*n^2 + 64$  program statements, while Code B has to execute  $32*n$  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  $k$ ?**

Option 1 : 1000      Option 2 : 5      Option 3 : 10      Option 4 : 3

Ques 64 : Choose the correct answer

**Saumya writes a code which has a function which calls itself. Which programming concept is Saumya using?**

Option 1 : This is bad programming practice and should not be done.      Option 2 : Recursion      Option 3 : Decision Making      Option 4 : Overloading

Ques 65 : Choose the correct answer

**Shrishti writes the code for a function that computes the factorial of the inputted number  $n$ .**

**function factorial( $n$ )**  
**{**

```
if(n equals 1)
  return 1
else
-- MISSING STATEMENT --
end
}
```

**Fill in the missing statement.**

Option 1 : return factorial(n-1)      Option 2 : return n\*factorial(n)      Option 3 : return n\*(n-1)      Option 4 : return n\*factorial(n-1)

---

Ques 66 : Choose the correct answer

**Tanuj writes the code for a function that takes as input n and calculates the sum of first n natural numbers.**

```
Function sum( n )
{
if(??)
  return 1
else
  return (n + sum(n-1))
end
}
```

**Fill in ?? in the code.**

Option 1 : n equals 1      Option 2 : n equals 2      Option 3 : n >= 1      Option 4 : n > 1

---

Ques 67 : Choose the correct answer

**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.**

Option 1 : 1      Option 2 : 30      Option 3 : 15      Option 4 : 16

---

Ques 68 : Choose the correct answer

**Consider the following function**

```

function calculate( n )
{
  if(n equals 5)
    return 5
  else
    return (n + calculate(n-5))
  end
}

```

**Shishir calls the function by the statement, calculate(20). What value will the function return?**

Option 1 : 50

Option 2 : 200

Option 3 : 35

Option 4 : 20

Ques 69 : Choose the correct answer

**Ravi is writing a program in C++. C++ uses the 'for' keyword for loops. Due to distraction, Ravi writes 'gor' instead of 'for'. What will this result to?**

Option 1 : The code will not compile.

Option 2 : The code will give an error while in execution

Option 3 : The code may work for some inputs and not for others.

Option 4 : It will create no problems.

Ques 70 : Choose the correct answer

**What does a compiler do?**

Option 1 : Converts code from a high level language to a low level language

Option 2 : Necessarily converts the code into assembly language

Option 3 : Converts code from a low level language to a high level language

Option 4 : Necessarily converts the code into machine language

Ques 71 : Choose the correct answer

**A program is compiled by Tarun on his machine. Whether it will run on a different computer will depend upon:**

Option 1 : Operating system on the computer

Option 2 : Hardware configuration of the computer

Option 3 : Both operating system and hardware configuration

Option 4 : The language of the program

Ques 72 : Choose the correct answer

**Sakshi writes a code in a high-level programming language on a Pentium-III machine, which she wants to execute on a Motorola chip. What of the following will she run on the code?**

Option 1 : An interpreter

Option 2 : A compiler

Option 3 : A cross-compiler

Option 4 : Linker

Ques 73 : Choose the correct answer

**Shahaana has a 10,000 line code. She is trying to debug it. She knows there is a logical error in the first 25 lines of the code. Which of the following will be an efficient way of debugging:**

Option 1 : Compile the whole code and step into it line by line  
 Option 2 : Use an interpreter on the first 25 lines.  
 Option 3 : Compile the whole code and run it  
 Option 4 : None of these

---

Ques 74 : Choose the correct answer

**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?**

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

---

Ques 75 : Choose the correct answer

**Reshama is debugging a piece of code which takes several iterations of modifying and executing code, while Mohammad has to deliver a product to the customer, which the customer will run multiple times. Reshama wants her debug cycle to take minimum possible time, while Mohammad wants that his products run time is minimum. What tools should Reshama and Mohammad respectively use on their code?**

Option 1 : Compiler, Interpreter  
 Option 2 : Interpreter, Compiler  
 Option 3 : Compiler, Compiler  
 Option 4 : Interpreter, Interpreter

---

Ques 76 : Choose the correct answer

**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?**

Option 1 : Compiler  
 Option 2 : Interpreter  
 Option 3 : Assembler  
 Option 4 : Simulator

---

Ques 77 : Choose the correct answer

**Consider the following code:**

```
function modify(y,z)
{
  y = y + 1;
  z = z + 1;
  return y - z
}
```

```
function calculate()
{
  integer a = 5, b = 10, c

  c = modify(a, b);
  print a
  print space
  print c
}
```

}

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

Option 1 : 11 -5

Option 2 : 10 -5

Option 3 : 6 -5

Option 4 : 5 -5

---

Ques 78 : Choose the correct answer

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() ?

Option 1 : 7

Option 2 : -7

Option 3 : Error

Option 4 : 8

---

Ques 79 : Choose the correct answer

Consider the following code:

```
function modify(y,z)
```

```
{
```

```
    y = y + 1
```

```
    z = z + 1
```

```
    return y - z
```

```
}
```

```
function calculate()
```

```
{
```

```
    integer a = 12, b = 20, c
```

```
    c = modify(a, b);
```

```
    print a
```

```
    print space
```

```
    print c
```

```
}
```

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

Option 1 : 12 -8

Option 2 : 13 -8

Option 3 : 12 8

Option 4 : 13 8

---

Ques 80 : Choose the correct answer

**Afzal writes a piece of code, where a set of three lines occur around 10 times in different parts of the program. What programming concept can he use to shorten his program code length?**

Option 1 : Use for  
loopsOption 2 : Use  
functions

Option 3 : Use arrays

Option 4 : Use  
classes

---

Ques 81 : Choose the correct answer

**Geetika writes a piece of code, where a set of eight lines occur around 10 times in different parts of the program (Code A). She passes on the code to Deva. Deva puts the set of eight lines in a function definition and calls them at the 10 points in the program (Code B). Which code will run faster using an interpreter?**

Option 1 : Code A

Option 2 : Code B

Option 3 : Code A and  
Code B will run with the  
same speedOption 4 : None of  
these

---

Ques 82 : Choose the correct answer

**Consider the following code:**

```
function modify(a,b)
{
  integer c, d = 2
  c = a*d + b
  return c
}
```

```
function calculate()
{
  integer a = 5, b = 20, c
  integer d = 10
  c = modify(a, b);
  c = c + d
  print c
}
```

**Assume that a and b were passed by value. What will be the output of the function calculate() ?**

Option 1 : 80

Option 2 : 40

Option 3 : 32

Option 4 : 72

---

Ques 83 : Choose the correct answer

**Consider the following code:**

```
function modify(w,u)
{
  w = w + 2
```

```

u = u - 3
return (w - u)
}

```

```

function calculate()
{
integer a = 10, b = 20, c
c = modify(a, b);
print a
print space
print b
}

```

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

Option 1 : 12 17      Option 2 : 10 17      Option 3 : 12 20      Option 4 : 10 20

Ques 84 : Choose the correct answer

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?

Option 1 : Statement 1    Option 2 : Statement 2    Option 3 : Statement 3    Option 4 : Statement 4

Ques 85 : Choose the correct answer

Which one of the following is the lowest level format to which the computer converts a higher language program before execution?

Option 1 : English code      Option 2 : Machine Code      Option 3 : Assembly Language      Option 4 : System Language

Ques 86 : Choose the correct answer

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

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



Ques 87 : Choose the correct answer

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 C?

Option 1 : condition1  
AND condition3

Option 2 : condition1  
AND condition4 AND  
!condition2

Option 3 :  
NOT(condition2) AND  
NOT(condition3)

Option 4 :  
condition1 AND  
NOT(condition2)  
AND  
NOT(condition3)

Ques 88 : Choose the correct answer

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?

Option 1 : condition1  
AND condition3

Option 2 :  
NOT(condition1) AND  
condition2 AND

Option 3 :  
NOT(condition2) AND

Option 4 :  
condition1 AND  
condition4 AND  
NOT(condition2)

NOT(condition4)

NOT(condition3)

AND

NOT(condition3)

Ques 89 : Choose the correct answer

**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 condition will allow execution of statement A?**

Option 1 :	Option 2 : condition1	Option 3 : <u>condition1</u>	Option 4 :
NOT(condition2)	AND condition4 AND	<u>AND condition2 AND</u>	NOT(condition1)
AND	NOT(condition2) AND	<u>condition4</u>	AND condition2
NOT(condition3)	NOT(condition3)		AND
			NOT(condition4)

Ques 90 : Choose the correct answer

**What does the following function do?**

```

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

```

<u>Option 1 : Returns the</u>	Option 2 : Returns the	Option 3 : Loops forever	Option 4 : Always
<u>max of (a,b)</u>	min of (a,b)		returns the second
			parameter

Ques 91 : Choose the correct answer

**What does the following function do?**

**function operation (int a, int b)**

```
{
  if (a > b)
  { return operation(b, a) }
  else
  { return a; }
}
```

Option 1 : Always returns the first parameter

Option 2 : Returns the min of (a,b)

Option 3 : Returns the max of (a,b)

Option 4 : Loops forever

Ques 92 : Choose the correct answer

**function g(int n)**

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

**function f(int a, int b)**

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

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

Option 1 : Always -1

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

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

Option 4 : 0 if a equals b, -1 otherwise

Ques 93 : Choose the correct answer

**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?**

Option 1 : 1 if a > b, -1

Option 2 : Always +1

Option 3 : 0 if a equals b,

Option 4 : -1 if a > b, 1 if a < b, 0

if  $a < b$ , 0 otherwise+1 otherwise

otherwise

Ques 94 : Choose the correct answer

**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?**

Option 1 : Always +1

Option 2 : 1 if  $a > b$ , -1 if  $a < b$ , 0 otherwiseOption 3 : -1 if  $a > b$ , 1 if  $a < b$ , 0 otherwise

Option 4 : 0 if a equals b, -1 otherwise

Ques 95 : Choose the correct answer

**function g(int n)**

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

**function f(int a, int b)**

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

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

Option 1 : Always +1

Option 2 : -1 if  $a > b$ , 1 if  $a < b$ , 0 otherwiseOption 3 : 1 if  $a > b$ , -1 if  $a < b$ , 0 otherwise

Option 4 : 0 if a equals b, -1 otherwise

Ques 96 : Choose the correct answer

**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?

Option 1 :  $(n - m + 1)/2$       Option 2 :  $1 + (n - m)/2$       Option 3 :  $1 + (n - m)/2$  if  $m$  is even,  $(n - m + 1)/2$  if  $m$  is odd      Option 4 :  $(n - m + 1)/2$  if  $m$  is even,  $1 + (n - m)/2$  if  $m$  is odd

Ques 97 : Choose the correct answer

Consider the following code:

```
for i= m to n increment 2
{ print "Hello!" }
```

Assuming  $m < n$  and  $(m,n)$  are either both even or both odd, How many times will Hello be printed?

Option 1 :  $(n - m + 1)/2$       Option 2 :  $1 + (n - m)/2$       Option 3 :  $1 + (n - m)/2$  if  $m$  is even,  $(n - m + 1)/2$  if  $m$  is odd      Option 4 :  $(n - m + 1)/2$  if  $m$  is even,  $1 + (n - m)/2$  if  $m$  is odd

Ques 98 : Choose the correct answer

Assuming  $n > 2$ , What value does the following function compute for odd  $n$ ?

```
function f (int n)
{
if (n equals 1) { return 1 }
if (n equals 2) { return f(n-1) + n/2 }
return f(n-2) + n;
}
```

Option 1 :  $1 + 2 + 3 + 4 + \dots + n$       Option 2 :  $1 + 3 + 5 + 7 + \dots + n$       Option 3 :  $n/2 + (1 + 3 + 5 + 7 + \dots + n)$       Option 4 :  $1 + (1 + 3 + 5 + 7 + \dots + n)$

Ques 99 : Choose the correct answer

Assuming  $n > 2$ , What value does the following function compute for even  $n$ ?

```
int f (int n)
{
if (n equals 1) { return 1 }
if (n equals 2) { return f(n-1) + n/2 }
return f(n-2) + n
}
```

Option 1 :  $1 + 2 + 3 + 4 + \dots + n$       Option 2 :  $1 + (2 + 4 + 6 + 8 + \dots + n)$       Option 3 :  $1 + n/2 + (4 + 6 + 8 + \dots + n)$       Option 4 :  $2 + 4 + 6 + 8 + \dots + n$

Ques 100 : Choose the correct answer

The for loop is equivalent to a while loop when

Option 1 : There is no initialization expression

Option 2 : There is no increment expression

Option 3 : A and B combined are true

Option 4 : It is never equivalent

Ques 101 : Choose the correct answer

**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?**

Option 1 : a < 1.0

Option 2 : a < sqrt(10)

Option 3 : a > sqrt(10)

Option 4 : a = 0

Ques 102 : Choose the correct answer

```
int area(double radius)
```

```
{
return PI*radius*radius;
}
```

**Which of the following is always true about the function area?**

Option 1 : It returns the area of a circle within the limits of double precision.

Option 2 : It returns the area of a circle within the limits of the constant PI.

Option 3 : It returns the area of a circle within the limits of precision of double, or the constant PI, whichever is lower.

Option 4 : None of the above.

Ques 103 : Choose the correct answer

**What does this function compute for positive n?**

```
function f(int n)
```

```
{
if (n equals 1)
{ return 1 }
else
{ return f(n-1)/f(n-1) + n }
}
```

Option 1 : 1 + n

Option 2 : 1 + 2 + 3 + ... + n

Option 3 : 1 + n, if n > 1, 1 otherwise

Option 4 : None of the above

Ques 104 : Choose the correct answer

**Which of these is not a data type?**

Option 1 : integer

Option 2 : character

Option 3 : boolean

Option 4 : array

Ques 105 : Choose the correct answer

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

Option 4 : Object

Option 1 : Decision-Making

Option 2 : Iteration

Option 3 : Recursion

Oriented Programming

---

Ques 106 : Choose the correct answer

**In a sequential programming language, code statements are executed in which order?**

Option 1 : All are executed simultaneously

Option 2 : From top to bottom

Option 3 : From bottom to top

Option 4 : None of these

---

Ques 107 : Choose the correct answer

**A for-loop is used for which of the following purposes?**

Option 1 : Decision-Making

Option 2 : Iteration

Option 3 : Recursion

Option 4 : None of these

---

Ques 108 : Choose the correct answer

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

Option 1 : Two loop, one after the other

Option 2 : Two loops, one inside the others

Option 3 : One loop with two different iteration counts

Option 4 : Two loops with the same iteration count

---

Ques 109 : Choose the correct answer

**How will 47 be stored as an unsigned 8-bit binary number?**

Option 1 : 10111101

Option 2 : 00101111

Option 3 : 10111000

Option 4 : 00101101

---

Ques 110 : Choose the correct answer

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

Option 1 : 22

Option 2 : 11

Option 3 : 10

Option 4 : None of these

---

Ques 111 : Choose the correct answer

**A variable cannot be used...**

Option 1 : Before it is declared

Option 2 : After it is declared

Option 3 : In the function it is declared in

Option 4 : Can always be used

---

Ques 112 : Choose the correct answer

**What is implied by the argument of a function?**

Option 1 : The variables passed to it

Option 2 : The value it

Option 3 : The execution

Option 4 : Its

when it is called returns on execution code inside it return type

---

Ques 113 : Choose the correct answer

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

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

---

Ques 114 : Choose the correct answer

**Neelam wants to share her code with a colleague, who may modify it. Thus she wants to include the date of the program creation, the author and other information with the program. What component should she use?**

Option 1 : Header files    Option 2 : Iteration    Option 3 : Comments    Option 4 : Preprocessor directive

---

Ques 115 : Choose the correct answer

**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?**

Option 1 : Faster Execution    Option 2 : Lower memory requirement    Option 3 : Correction of errors    Option 4 : Better readability

---

Ques 116 : Choose the correct answer

**Zenab and Shashi independently write a program to find the the mass of one mole of water, which includes mass of hydrogen and oxygen. Zenab defines the variables:**

**integer hydrogen, oxygen, water // Code A**

**while Shashi defines the three quantities as:**

**integer a, b, c // Code B**

**Which is a better programming practice and why?**

Option 1 : Code B is better because variable names are shorter    Option 2 : Code A is better because the variable names are understandable and non-confusing    Option 3 : Code A will run correctly, while Code B will give an error.    Option 4 : Code B will run correctly, while Code A will give an error.

---

Ques 117 : Choose the correct answer

**For solving a problem, which of these is the first step in developing a working program for it?**

Option 1 : Writing the program in the programming language    Option 2 : Writing a step-by-step algorithm to solve the problem.    Option 3 : Compiling the libraries required.    Option 4 : Code debugging

---



Ques 118 : Choose the correct answer

**A robust program has which one of the following features?**

Option 1 : It runs correctly on some inputs

Option 2 : It is robust to hardware damage

Option 3 : It can handle incorrect input data or data types.

Option 4 : None of these

---

Ques 119 : Choose the correct answer

**Tarun wants to write a code to divide two numbers. He wants to warn the user and terminate the program if he or she enters 0 as the divisor. Which programming construct can he use to do this?**

Option 1 : Iteration

Option 2 : Decision-making

Option 3 : Recursion

Option 4 : None of these

---

Ques 120 : Choose the correct answer

**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?**

Option 1 : Top-down Approach

Option 2 : Bottom-Up Approach

Option 3 : Procedural Programming

Option 4 : None of these

---

Ques 121 : Choose the correct answer

**The time complexity of linear search algorithm over an array of n elements is**

Option 1 :  $O(\log_2 n)$

Option 2 :  $O(n)$

Option 3 :  $O(n \log_2 n)$

Option 4 :  $O(n^2)$

---

Ques 122 : Choose the correct answer

**Rajesh implements queue as a singly-linked linked list. The queue has n elements. The time complexity to ADD a new element to the queue:**

Option 1 :  $O(1)$

Option 2 :  $O(\log_2 n)$

Option 3 :  $O(n)$

Option 4 :  $O(n \log_2 n)$

---

Ques 123 : Choose the correct answer

**The time required to insert an element in a stack with linked list implementation is**

Option 1 :  $O(1)$

Option 2 :  $O(\log_2 n)$

Option 3 :  $O(n)$

Option 4 :  $O(n \log_2 n)$

---

Ques 124 : Choose the correct answer

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

Option 1 : Quick sort

Option 2 : Heap sort

Option 3 : Merge Sort

Option 4 : Bubble sort

---

Ques 125 : Choose the correct answer

**Pankaj stores n data elements in a hash table. He is able to get the best efficiency achievable by a**

**hash table. What is the time complexity of accessing any element from this hash table?**

Option 1 : O(1)      Option 2 :  $O(n^2)$       Option 3 :  $O(\log n)$       Option 4 :  $O(n)$

Ques 126 : Choose the correct answer

**Every element of a data structure has an address and a key associated with it. A search mechanism deals with two or more values assigned to the same address by using the key. What is this search mechanism?**

Option 1 : Linear Search      Option 2 : Binary search      Option 3 : Hash Coded Search      Option 4 : None of these

Ques 127 : Choose the correct answer

**The order of magnitude of the worst case performance of a hash coded search (over N elements) is**

Option 1 : N      Option 2 :  $N \log_2 N$       Option 3 :  $\log_2 N$       Option 4 : not dependent upon N

Ques 128 : Choose the correct answer

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

Option 1 : insertion sort      Option 2 : heap sort      Option 3 : quick sort      Option 4 : bubble sort

Ques 129 : Choose the correct answer

**A sorting algorithm iteratively traverses through a list to exchange the first element with any element less than it. It then repeats with a new first element. What is this sorting algorithm called?**

Option 1 : insertion sort      Option 2 : selection sort      Option 3 : heap sort      Option 4 : quick sort

Ques 130 : Choose the correct answer

**A sort which uses the binary tree concept such that any number in the tree is larger than all the numbers in the subtree below it is called**

Option 1 : selection sort      Option 2 : insertion sort      Option 3 : heap sort      Option 4 : quick sort

Ques 131 : Choose the correct answer

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

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

Ques 132 : Choose the correct answer

**How many comparisons are needed to sort an array of length 5 if a straight selection sort is used**

**and array is already in the opposite order?**

Option 1 : 1

Option 2 : 10

Option 3 : 50

Option 4 : 20

---

Ques 133 : Choose the correct answer

**Queues serve a major role in**

Option 1 : simulation of recursion

Option 2 : simulation of arbitrary linked list

Option 3 : simulation of limited resource allocation

Option 4 : expression evaluation

---

Ques 134 : Choose the correct answer

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

Option 1 : is far less than one

Option 2 : equals one

Option 3 : is far greater than one

Option 4 : none of these

---

Ques 135 : Choose the correct answer

**Number of vertices of odd degree in a graph is**

Option 1 : is always even

Option 2 : always odd

Option 3 : either even or odd

Option 4 : always zero

---

Ques 136 : Choose the correct answer

**The algorithm design technique used in the quick sort algorithm is**

Option 1 : Dynamic programming

Option 2 : Back tracking

Option 3 : Divide and conquer

Option 4 : Greedy Search

---

Ques 137 : Choose the correct answer

**Linked lists are not suitable for**

Option 1 : Insertion sort

Option 2 : Binary search

Option 3 : Queue implementation

Option 4 : None of these

---

Ques 138 : Choose the correct answer

**A connected graph is the one which**

Option 1 : Cannot be partitioned without removing an edge

Option 2 : Can be partitioned without removing an edge

Option 3 : does not contain a cycle

Option 4 : Has even number of vertices

---

Ques 139 : Choose the correct answer

**Stack is useful for implementing**

Option 1 : radix search

Option 2 : breadth first search

Option 3 : recursion

Option 4 : none of these

---

Ques 140 : Choose the correct answer

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

Option 1 : stack      Option 2 : set      Option 3 : list      Option 4 : queue

---

Ques 141 : Choose the correct answer

**Which of the following is useful in implementing quick sort?**

Option 1 : stack      Option 2 : set      Option 3 : list      Option 4 : queue

---

Ques 142 : Choose the correct answer

**Which of the following abstract data types can be used to represent a many-to-many relation?**

Option 1 : Tree      Option 2 : Stack      Option 3 : Graph      Option 4 : Queue

---

Ques 143 : Choose the correct answer

**Two lists, A and B are implemented as singly linked link-lists. The address of the first and last node are stored in variables *firstA* and *lastA* for list A and *firstB* and *lastB* for list B. Given the address of a node is given in the variable *node*, the element stored in the node can be accessed by the statement *node->data* and the address to the next node can be accessed by *node->next*. Pankaj wants to append list B at end of list A. Which of the following statements should he use?**

Option 1 : lastB -> next = firstA      Option 2 : lastA = firstB      Option 3 : lastA->next = firstB      Option 4 : lastB = firstA

---

Ques 144 : Choose the correct answer

**Which of the following sorting algorithms yield approximately the same worst-case and average-case running time behaviour in  $O(n \log n)$ ?**

Option 1 : Bubble sort and Selection sort      Option 2 : Heap sort and Merge sort      Option 3 : Quick sort and Radix sort      Option 4 : Tree sort and Median-of-3 Quick sort

---

Ques 145 : Choose the correct answer

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

Option 1 : 15      Option 2 : 25      Option 3 : 63      Option 4 : 31

---

Ques 146 : Choose the correct answer

**The maximum number of nodes on level I of a binary tree is which of the following? (Root is Level 1)**

Option 1 :  $2^{I-1}$       Option 2 :  $3^{I-1}$       Option 3 :  $2^I$       Option 4 :  $2^I - 1$

---

Ques 147 : Choose the correct answer

**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.**

Option 1 : A [x+1]

Option 2 : A [x+2]

Option 3 : A [x+2x]

Option 4 : All of these.

Ques 148 : Choose the correct answer

**In an implementation of a linked list, each node contains data and address. Which of the following could the address field possibly contain?**Option 1 : Address of next node in sequence

Option 2 : It's own address

Option 3 : Address of last node

Option 4 : Address of first node

Ques 149 : Choose the correct answer

**Surbhi wants to implement a particular data structure using a static array. She uses the concept of circular list to implement the data structure, because this allows her to efficiently use all fields of the array. Which data structure is Surbhi implementing?**

Option 1 : a stack

Option 2 : a queue

Option 3 : Binary Tree

Option 4 : None of these

Ques 150 : Choose the correct answer

**Which of the following is a bad implementation for a queue?**

Option 1 : Circular List

Option 2 : Doubly linked list

Option 3 : Singly linked List

Option 4 : Linear Static Array

Ques 151 : Choose the correct answer

**Which of the following statements are true about a doubly-linked list?**Option 1 : it may be either linear or circular

Option 2 : it must contain a header node

Option 3 : it will occupy same memory space as that of linear linked list, both having same number of nodes

Option 4 : None of these

Ques 152 : Choose the correct answer

**Which of the following data structure may give overflow error, even though the current number of element in it is less than its size ?**Option 1 : Queue implemented in a linear array

Option 2 : Queue implemented in a circularly connected array

Option 3 : Stack implemented in a linear array

Option 4 : none of these

Ques 153 : Choose the correct answer

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

Option 1 : 16

Option 2 : 12

Option 3 : 13

Option 4 : 14

Ques 154 : Choose the correct answer

**The best sorting methods if number of swapping done is the only measure of efficiency is**

Option 1 : Bubble sort    Option 2 : Selection sort    Option 3 : Insertion sort    Option 4 : Quick sort

Ques 155 : Choose the correct answer

**As part of the maintenance work, you are entrusted with the work of rearranging the library books in a shelf in proper order, at the end of each day. The ideal choice will be**

Option 1 : bubble sort    Option 2 : insertion sort    Option 3 : selection sort    Option 4 : heap sort

Ques 156 : Choose the correct answer

**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**

Option 1 : 0.6    Option 2 : 0.1    Option 3 : 0.2    Option 4 : 0.5

Ques 157 : Choose the correct answer

**A full binary tree with n leaves contains**

Option 1 :  $2n + 1$  nodes    Option 2 :  $\log_2 n$  nodes    Option 3 :  $2n - 1$  nodes    Option 4 :  $2n$  nodes

Ques 158 : Choose the correct answer

**An array contains the following elements in order: 7 6 12 30 18. Insertion sort is used to sort the array in ascending order. How many times will an insertion be made?**

Option 1 : 2    Option 2 : 3    Option 3 : 4    Option 4 : 5

Ques 159 : Choose the correct answer

**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?**

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

Ques 160 : Choose the correct answer

**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?**

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

Ques 161 : Choose the correct answer

The array A has n elements. We want to determine the position of X in the array. We know that X is present in the array A and X can be present at any location in the array with equal probability. How many comparisons will be required on average to find the element X using linear search?

Option 1 : n

Option 2 :  $(n+1)/2$ Option 3 :  $2*n$ Option 4 :  $n^2$ 

Ques 162 : Choose the correct answer

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)

Option 1 : 5 6Option 2 : 1 5Option 3 : 5 6Option 4 : 1 5

Ques 163 : Choose the correct answer

A stack is implemented as a linear array A[0...N-1]. Farhan writes the following functions for pushing an element E in to the stack.

function PUSH( top, E, N )

```
{
  if(X)
  {
    top= top+1
    A[top] = E
  }
  else
  {
    print "Overflow"
  }
  return top
}
```

Fill in the condition X

Option 1 :  $top < N$ Option 2 :  $top$ Option 3 :  $top > 0$ Option 4 :  $top > 1$ 

Ques 164 : Choose the correct answer

A stack is implemented as a linear array A[0...N-1]. Noor writes the following functions for popping an element from the stack.

function POP( top, N )

```
{
  if(X)
  {
    top = top - 1
  }
  else
```

```

{
  print "Underflow"
}
return top
}

```

**Fill in the condition X**

Option 1 :  $top < N-1$     Option 2 :  $top$     Option 3 :  $top > 1$     Option 4 :  $top \geq 0$

Ques 165 : Choose the correct answer

**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).**

Option 1 : 10(R) 13(F)    Option 2 : 5(R) 10(F)    Option 3 : 13(R) 10(F)    Option 4 : 10(R) 5(F)

Ques 166 : Choose the correct answer

**A queue is implemented as a (singly linked) linked-list for easy addition and deletion of elements. Each node has an element and pointer to another node. Which node will point to empty/no location?**

Option 1 : Front    Option 2 : Rear    Option 3 : Both    Option 4 : None of these

Ques 167 : Choose the correct answer

**A stack is implemented as a (singly-linked) linked-list, where each node contains data and address of another node. The top node will contain the address of which node?**

Option 1 : No node. It will be empty    Option 2 : The node containing the first element pushed into the stack.    Option 3 : The node containing the element which was pushed just before the top element.    Option 4 : None of these

Ques 168 : Choose the correct answer

**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?**

Option 1 : 6

Option 2 : 7

Option 3 : 10

Option 4 : None of these

---

Ques 169 : Choose the correct answer

**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?**

Option 1 : It has no elements

Option 2 : It has one element

Option 3 : There is an error

Option 4 : None of these

---

Ques 170 : Choose the correct answer

**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?**

Option 1 : Queue

Option 2 : Stack

Option 3 : Array

Option 4 : Graph

---