

Choose the correct option.

A stack is implemented as a linear array A[0...N-1]. A programmer writes the function given below to pop out an element from the stack.

```
function POP( top, N )
{
    if (X)
    {
        top = top - 1
    }
    else
    {
        print "Underflow"
    }
    return top
}
```

What should substitute the condition "X"?

Options

top<N-1

top<N

top>1

top>= 0

Choose the correct option.

What will be the output of the following pseudocode statements?

(Note: Assume that when two data types are processed through an operator, the answer maintains the same data type as that of the input. Also, all data types have enough range to accommodate any number. If two different data types are operated upon, the result assumes the data type that is more expressive.)

```
integer a = 456, b, c, d =10  
b = a/d  
c = a - b  
print c
```

Options

410

410.4

411.4

411

Choose the correct option.

What is implied by the argument of a function?

Options

The variables passed to the function when it is called

The value that the function returns on execution

The execution code inside the function

Return type of the function

Choose the correct option.

Function main is the starting point of execution of a program. What shall help in making an executable program without the use of main function in the program?

Options

Any function can be made and marked as starting point using a language dependent syntax

Two macros can be used. One to hold the name of a function and its working and the other to call the first macro

Any program without a main function shall not do anything but can only produce a blank screen

It is not possible to run a program without a main function in a program

Choose the correct option.

Which of the given options implies that there are two loops that are nested?

Options

Two loops, one after the other

Two loops, one inside the other

One loop with two different iteration counts

Two loops with the same iteration count

Choose the correct option.

In an implementation of a linked list, each node contains data and address. What can the address field possibly contain?

Options

Address of the next node in sequence

Its own address

Address of the last node

Address of the first node

Choose the correct option.

Which of the given statements is TRUE about a variable?

Options

A variable cannot be used before it is declared.

A variable cannot be used after it is declared.

A variable cannot be used in the function it is declared in.

A variable can always be used.

Choose the correct option.

The program to print the larger of the two numbers entered by a user is given below. What should be used in place of "???" in Statement 1 of the code to get the desired output?

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

Options

number1>number2

number2>number1

number2 equals number1

number1<= number2

Choose the correct option.

Sonal writes a Binary Search program which takes in 3 inputs from the user- Size of list, Elements of the list and Number to be searched for.

Consider the given set of inputs for this program-

Size:7

List: 2 5 8 13 12 17 20

Number to be Searched: 12

After how many comparisons will the item be located in the list?

Options

1

3

7

Item won't be located

Choose the correct option.

In which areas of a class are data and functions directly accessible outside the class?

Options

Public

Private

Protected

None of the above

Choose the correct option.

Which of the given statements refers to data hiding in object-oriented programming?

Options

A class does not have functions as private members.

A class has both data and functions in the data in the class.

Data in the private and protected area of a class is not directly accessible and can only be accessed through member functions in the public area of class.

A single class can have many objects.

Choose the correct option.

In which of the given situations can a constructor be invoked?

Options

When an object is created

When an object is assigned the value 0

Only at the end of the code

When the scope of the object is over

Choose the correct option.

The function given below computes the factorial of the number "n" entered by a user. What should be the "MISSING STATEMENT" in order to make the code work properly?

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

Options

return factorial(n-1)

return n*factorial(n)

return n*(n-1)

return n*factorial(n-1)

PASSAGE

```
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
}
```

Choose the correct option.

Consider the given code. Assume that "a" and "b" are passed by value. What will be the output of the program when the function *calculate()* is executed?

OPTIONS

80

40

32

72

Choose the correct option.

A football seller stores all the footballs in a large container that is closed from the bottom. The footballs are stacked on top of each other in the box. The new supply of balls is put in the box from the top. When a customer buys a football, the one at the top of the stack is given to the customer. Each football has a code. The seller wants to store the codes of all the footballs in a data structure to keep track of the inventory. Which data structure should be used for this purpose?

Options

Queue

Stack

Array

Graph

Choose the correct option.

Ravi uses the given statement in his code.

Result = (num1 + num2)/(num1 - num2)

He ran his code several times but got error occasionally. What type of an error is this?

Options

Logical Error

Syntax Error

Semantic Error

Latent error

Choose the correct option.

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?

Options

Linear search

Binary search

Hash coded search

None of the above

Choose the correct option.

How many nodes does a full binary tree with " n " non-leaf nodes contain?

Options

$\log n$

$n + 1$

$2n + 1$

$2n$

Choose the correct option.

A programmer mistakenly writes "gor" instead of the keyword "for" used in loops, while writing a program in C++. What will this result in?

Options

The code would not compile.

The code would give an error while execution.

The code may work for some inputs and not for the others.

The code would not create any problem.

Choose the correct option.

How many nodes does a complete binary tree with 5 levels have, if the root is considered to be at level 1?

Options

15

25

63

31

Choose the correct option.

Two programmers independently write a program to find the mass of one mole of water, that includes the masses of hydrogen and oxygen.

The first programmer defines the variables as:

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

The second programmer defines three quantities as:

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

Which of the two is a better programming practice and why?

Options

Code B is better because variable names are shorter.

Code A is better because the variable names are understandable and non-confusing.

Code A would run correctly while Code B would give an error.

Code B would run correctly while Code A would give an error.

PASSAGE

```
enum names {AMAR,AKBAR,ANTHONY}
function main()
{
print AMAR
print AKBAR
print ANTHONY
}
```

Choose the correct option:
A pseudo-code is used which is self explanatory.

What will be the output generated when the given code is executed?

OPTIONS

0

12

123

111

Choose the correct option.

What is the first step for developing a working program to solve a problem?

Options

To write the program in the programming language

To write a step-by-step algorithm to solve the problem

To compile the required libraries

To debug the code

Choose the correct option.

In which of the given methods is sorting **NOT** possible?

Options

Insertion

Selection

Exchange

Deletion

Choose the correct option.

Which algorithm design technique is used in the quick sort algorithm?

Options

Dynamic programming

Back tracking

Divide and conquer

Greedy search

Choose the correct option.

A programmer writes a program to find an element in the array A[5] with the elements: 8 30 40 45 70. The program is run to find a number "X", that is found in the first iteration of binary search. What is the value of "X"?

Options

40

8

70

30

Choose the correct option.

Identify the lowest level format to which the computer converts a program in a higher language before execution.

Options

English code

Machine code

Assembly language

System language

Choose the correct option.

Identify the lowest level format to which the computer converts a program in a higher language before execution.

Options

English code

Machine code

Assembly language

System language

PASSAGE

```
class brush
{
private:
    integer size, c
    rcode
    function getdata( ) { ... } // Statement 1
public:
    integer name // Statement 2
    function putdata( ) { ... }
}

function main
{
    brush b1, b2
    print b1.name // Statement 3
    b2.getdata() // Statement 4
}
```

Choose the correct option.

Refer to the given pseudocode. The code is similar to that in C++ and is self-explanatory. An accessible member function and a data member for an object are accessed by the statements *objectname.functionname* and *objectname.datamembername*, respectively. Which statement should be deleted from the code to rectify the error in it?

OPTIONS

Statement 1

Statement 2

Statement 3

Statement 4

Choose the correct option.

What is the term given to the variable whose scope is beyond all the scopes i.e., it can be accessed by all the scopes?

Options

Universal Variable

Global Variable

External Variable

Auto Variable

Both 2 and 3

Choose the correct option.

The function given below takes a number "n" as the input and calculates the sum of first "n" natural numbers. Which statement should be inserted in place of "???" to get the required output?

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

Options

n equals 1

n equals 2

n>= 1

n>1

Choose the correct option.

What is implied by the argument of a function?

Options

The variables passed to the function when it is called

The value that the function returns on execution

The execution code inside the function

Return type of the function

Choose the correct option.

Which of the given options implies that there are two loops that are nested?

Options

Two loops, one after the other

Two loops, one inside the other

One loop with two different iteration counts

Two loops with the same iteration count

Choose the correct option.

In an implementation of a linked list, each node contains data and address. What can the address field possibly contain?

Options

Address of the next node in sequence

Its own address

Address of the last node

Address of the first node

Choose the correct option.

Aina wants to write a program to traverse trees but she does not know how to implement Stacks. Which of the following methods can she use to bring out the same?

1. Adding another level of dummy leaf nodes.
2. Adding parent node for each node of the tree.
3. Representing the given Binary tree as Threaded Binary tree.

Options

Only 1

Only 2

Only 3

Both 1 and 2

Both 2 and 3

PASSAGE

```
class rocket
{
private:
    integer height, weight
public: // Statement 1
function input( int a, int b )
{
    height = a;
    weight = b;
}

function main()
{
    rocket rocket1, rocket2
}
```

Choose the correct option.

Refer to the given pseudocode. The code is similar to that in C++ and is self-explanatory. An accessible member function and a data member for an object are accessed by the statements *objectname.functionname* and *objectname.datamembername*, respectively. What can be inferred from this code?

OPTIONS

"rocket" is a class with "rocket1" and "rocket2" as its objects, with "height" and "weight" as its attributes.

"rocket" is a class with "rocket1" and "rocket2" as its objects, with "height" and "weight" as its objects.

"rocket" is a class with "rocket1", "rocket2", "height" and "weight" as its attributes.

"rocket" is a class with "rocket1", "rocket2", "height" and "weight" as its objects.

Choose the correct option.

Which of the given statements is TRUE about a variable?

Options

A variable cannot be used before it is declared.

A variable cannot be used after it is declared.

A variable cannot be used in the function it is declared in.

A variable can always be used.

Choose the correct option.

The program to print the larger of the two numbers entered by a user is given below. What should be used in place of "???" in Statement 1 of the code to get the desired output?

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

Options

number1>number2

number2>number1

number2 equals number1

number1<= number2

Choose the correct option.

In which areas of a class are data and functions directly accessible outside the class?

Options

Public

Private

Protected

None of the above

Choose the correct option.

The function given below computes the factorial of the number "n" entered by a user. What should be the "MISSING STATEMENT" in order to make the code work properly?

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

Options

return factorial(n-1)

return n*factorial(n)

return n*(n-1)

return n*factorial(n-1)

Choose the correct option.

Preeti writes a program in a low level language, now she wants to translate it into a higher language without rewriting the program. What another program she must use for this purpose?

Options

Compiler

Decompiler

Interpreter

Executer

Cross Compiler

Choose the correct option.

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

(.)
* /
+ -
AND
OR

The precedence is from left to right for the operators with equal precedence.

What will be the output of the following code statements?

```
integer a = 50, b = 25, c = 5  
print a * b / c + c
```

Options

120

125

255

250

Choose the correct option.

A football seller stores all the footballs in a large container that is closed from the bottom. The footballs are stacked on top of each other in the box. The new supply of balls is put in the box from the top. When a customer buys a football, the one at the top of the stack is given to the customer. Each football has a code. The seller wants to store the codes of all the footballs in a data structure to keep track of the inventory. Which data structure should be used for this purpose?

Options

Queue

Stack

Array

Graph

Choose the correct option.

In a linear list of elements, a deletion can be made from one end (front) and an insertion can be made at the other end (rear). What is this linear list known as?

Options

Queue

Stack

Tree

Branch

Choose the correct option.

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?

Options

Linear search

Binary search

Hash coded search

None of the above

Choose the correct option.

How many nodes does a complete binary tree with 5 levels have, if the root is considered to be at level 1?

Options

15

25

63

31

PASSAGE

```
union MyUnion
{
    structure MyStructure
    {
        integer m
        float n
        character o
    }MyStr
    integer p
}MyUn
```

Choose the correct option:
A pseudo-code is used which is self explanatory.

Given that the size of integer is 2 units, float is 4 units and character is 1 unit, what will be the amount of memory occupied by the *MyUn* object?

OPTIONS

2 units

6 units

7 units

9 units

Choose the correct option.

What is the first step for developing a working program to solve a problem?

Options

To write the program in the programming language

To write a step-by-step algorithm to solve the problem

To compile the required libraries

To debug the code

Choose the correct option.

Two programmers independently write a program to find the mass of one mole of water, that includes the masses of hydrogen and oxygen.

The first programmer defines the variables as:

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

The second programmer defines three quantities as:

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

Which of the two is a better programming practice and why?

Options

Code B is better because variable names are shorter.

Code A is better because the variable names are understandable and non-confusing.

Code A would run correctly while Code B would give an error.

Code B would run correctly while Code A would give an error.

Choose the correct option.

In which of the given methods is sorting **NOT** possible?

Options

Insertion

Selection

Exchange

Deletion

Choose the correct option.

Which algorithm design technique is used in the quick sort algorithm?

Options

Dynamic programming

Back tracking

Divide and conquer

Greedy search

Choose the correct option.

A stack is implemented as a linear array A[0...N-1]. A programmer writes the function given below to pop out an element from the stack.

```
function POP( top, N )
{
    if (X)
    {
        top = top - 1
    }
    else
    {
        print "Underflow"
    }
    return top
}
```

What should substitute the condition "X"?

Options

top<N-1

top<N

top>1

top>= 0

Choose the correct option.

A programmer is making a database of animals in a zoo along with their properties. The possible animals are dog, lion and zebra. Each one has attributes as herbivorous, color and nocturnal. The programmer uses the object-oriented programming paradigm for this. How will the system be conceptualized?

Options

class: Animal; objects: dog, lion and zebra; data members: herbivorous, color and nocturnal

class: Animal; objects: herbivorous, color and nocturnal; data members: dog, lion and zebra

classes: dog, lion and zebra; objects: Animal; data members: herbivorous, color and nocturnal

None of the above

Choose the correct option.

Which of the given options implies that there are two loops that are nested?

Options

Two loops, one after the other

Two loops, one inside the other

One loop with two different iteration counts

Two loops with the same iteration count

Choose the correct option.

What will be the output of the following pseudocode statements?

(**Note:** Assume that when two data types are processed through an operator, the answer maintains the same data type as that of the input. Also, all data types have enough range to accommodate any number. If two different data types are operated upon, the result assumes the data type that is more expressive.)

```
integer a = 456, b, c, d =10  
b = a/d  
c = a - b  
print c
```

Options

410

410.4

411.4

411

PASSAGE

```
function MyBinarySearch(array arr, integer low, integer high, integer item)
{
    if ( low > high )
    {
        return -1
    }

    integer mid = (low + high)/2

    if ( arr[mid] equals item )
    {
        return mid
    }
    else if ( arr[mid] > item )
    {
        return //missing statement 1
    }
    else
    {
        return //missing statement 2
    }
}
```

Choose the correct option:

A pseudo-code is used which is self explanatory.
// in pseudo code refers to comment

Harshul uses the given code to implement Binary Search recursively. Find the statement that will replace missing statement 1 in the given code such that it works efficiently.

OPTIONS

MyBinarySearch(arr, low+1, mid-1, item)

MyBinarySearch(arr, mid+1, high-1, item)

MyBinarySearch(arr, mid+1, high, item)

MyBinarySearch(arr, low, mid-1, item)

Choose the correct option.

A programmer writes a code snippet in which a set of three lines occurs ten times in different parts of the program. What programming concept should be used to shorten the code length?

Options

For loops

Functions

Arrays

Classes

PASSAGE

```
class brush
{
private:
integer size, c
rcode
function getdata( ) { ... } // Statement 1
public:
integer name // Statement 2
function putdata( ) { ... }
}

function main
{
brush b1, b2
print b1.name // Statement 3
b2.getdata() // Statement 4
}
```

Choose the correct option.

Refer to the given pseudocode. The code is similar to that in C++ and is self-explanatory. An accessible member function and a data member for an object are accessed by the statements *objectname.functionname* and *objectname.datamembername*, respectively. Which statement should be deleted from the code to rectify the error in it?

OPTIONS

Statement 1

Statement 2

Statement 3

Statement 4

Choose the correct option.

Sonal writes a Binary Search program which takes in 3 inputs from the user- Size of list, Elements of the list and Number to be searched for.

Consider the given set of inputs for this program-

Size:7

List: 2 5 8 13 12 17 20

Number to be Searched: 12

After how many comparisons will the item be located in the list?

Options

1

3

7

Item won't be located

Choose the correct option.

What will happen if some indentations are made in some statements of a code written in C++?

Options

Faster execution of the code

Lower memory requirement for the code

Correction of errors in the code

Better readability of the code

Choose the correct option.

In an implementation of a linked list, each node contains data and address. What can the address field possibly contain?

Options

Address of the next node in sequence

Its own address

Address of the last node

Address of the first node

Choose the correct option.

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

(.)
* /
+ -
AND
OR

The precedence is from left to right in the expression for the operators with equal precedence.

Which statement is true about the output of the code statements given below?

```
integer a = 40, b = 35, c = 20, d = 10
print a * b / c - d
print a * b / (c - d)
```

Options

The outputs differ by 80.

The outputs are the same.

The outputs differ by 50.

The outputs differ by 160.

Choose the correct option.

A programmer wants the program given below to print the largest number out of three numbers entered by the user.

```
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
```

What should be used in place of "???" in Statement 1 in the code?

Options

number3>number2

number3>temp

number3<temp

number3>number1

PASSAGE

```
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
}
```

Choose the correct option.

Consider the given code. Assume that "a" and "b" are passed by value. What will be the output of the program when the function *calculate()* is executed?

OPTIONS

11 -5

10 -5

6 -5

5 -5

Choose the correct option.

What will be returned if $f(a,b)$ is called in the following functions?

```
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;
}
```

Options

Always +1

1 if $a > b$, -1 if $a < b$, 0 otherwise

-1 if $a > b$, 1 if $a < b$, 0 otherwise

0 if a equals b , -1 otherwise

Choose the correct option.

When a byte code is interpreted, how does it get affected in contrast with the compiled machine code?

Options

It has the same running time as of the machine code

It runs faster than the compiled machine code

It runs slower than the compiled machine code

Interpretation does not make any difference in the byte code running time

Choose the correct option.

A queue is implemented as a singly linked linked-list. Each node has an element and a pointer to another node. The *Rear* and the *Front* contain the addresses of the rear and the front nodes, respectively. What can be inferred about the linked list if the condition (*rear* *is equal* *front*) is true?

Options

It has no elements

It has one element

There is an error

None of the above

Choose the correct option.

The following operations are performed on an empty stack "A":

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

What will the stack contain after these operations?

(**Note:** The top of the stack is underlined in the options.)

Options

5 6

1 5

5 6

1 5

Choose the correct option.

What is a function contained within a class called?

Options

A member function

An operator

A class function

A method

Choose the correct option.

How many nodes does a full binary tree with "n" non-leaf nodes contain?

Options

$\log n$

$n + 1$

$2n + 1$

$2n$

Choose the correct option.

A programmer mistakenly writes "gor" instead of the keyword "for" used in loops, while writing a program in C++. What will this result in?

Options

The code would not compile.

The code would give an error while execution.

The code may work for some inputs and not for the others.

The code would not create any problem.

Choose the correct option.

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?

Options

Linear search

Binary search

Hash coded search

None of the above

Choose the correct option.

Why is an algorithm designer concerned primarily about the run time and not the compile time while calculating time complexity of an algorithm?

Options

Run time is always more than the compile time.

Compile time is always more than the run time.

Compile time is a function of run time.

A program needs to be compiled once but can be run several times.

Choose the correct option.

Aina wants to use a sorting technique to sort a list of numbers such that the running time of the sorting technique that she uses won't be affected by the pre-order of the elements. Which sorting technique should she use?

Options

Merge Sort

Bubble Sort

Insertion Sort

Selection Sort

Choose the correct option.

A librarian has to rearrange the library books on a shelf in a proper order at the end of each day. Which sorting technique should be the librarian's ideal choice?

Options

Bubble sort

Insertion sort

Selection sort

Heap sort

Choose the correct option.

A programmer writes a sorting algorithm that takes different amount of time to sort two different lists of equal size. What is the possible difference between the two lists?

Options

All numbers in one list are more than 100 while in the other are less than 100.

The ordering of numbers with respect to the magnitude in the two lists has different properties.

One list has all negative numbers while the other has all positive numbers.

One list contains 0 as an element while the other does not.

Choose the correct option.

A function in the base class is redefined in the inherited class. What is the term used to describe this situation?

Options

Inheritance

Overriding

Overloading

Encapsulation

Choose the correct option.

Which of the given statements is TRUE about a breadth first search?

Options

Beginning from a node, all the adjacent nodes are traversed first

Beginning from a node, each adjacent node is fully explored before traversing the next adjacent node

Beginning from a node, the nodes are traversed in cyclic order

None of the above

Choose the correct option.

What will be the output of the following pseudocode statements?

(**Note:** Assume that when two data types are processed through an operator, the answer maintains the same data type as that of the input. Also, all data types have enough range to accommodate any number. If two different data types are operated upon, the result assumes the data type that is more expressive.)

```
integer a = 456, b, c, d = 10  
b = a/d  
c = a - b  
print c
```

Options

410

410.4

411.4

411

Choose the correct option.

Triksha wants to write a function that has 3 parameters - length, breadth and height. But she wants this function to be such that providing the value of height will become optional i.e., user may/may not pass the value of height to the function but still the function should work. Which of the following concepts should she use?

Options

Global Variable

Extern Variable

Default Argument

Argument Passing

Choose the correct option.

The function given below takes a number "n" as the input and calculates the sum of first "n" natural numbers. Which statement should be inserted in place of "???" to get the required output?

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

Options

n equals 1

n equals 2

$n \geq 1$

$n > 1$

Choose the correct option.

Which of the given options implies that there are two loops that are nested?

Options

Two loops, one after the other

Two loops, one inside the other

One loop with two different iteration counts

Two loops with the same iteration count

Choose the correct option.

A programmer writes a code snippet in which a set of three lines occurs ten times in different parts of the program. What programming concept should be used to shorten the code length?

Options

For loops

Functions

Arrays

Classes

Choose the correct option.

Binary Search algorithm **CANNOT** be directly applied to which of the given Data Structures?

Options

Sorted Linear Array

Sorted Plain Linked List

Binary Tree

Sorted Pointer Array

PASSAGE

```
function preordertraverse(node)
{
    print node→value
    if (Condition X)
        {preordertraverse(node→left)}
    if (Condition Y)
        {preordertraverse(node→right)}
    return
}
```

Choose the correct option.

Consider a binary tree implementation. The root address is stored in the variable *root*. The address of a node is given in the variable *node*. The value of the node and its right and left child nodes can be accessed using the given statements.

node→value,
node→right,
node→left.

A programmer writes the given function to do a preorder traversal of the tree.

What are Condition X and Condition Y?

OPTIONS

Condition X: *node→left* isnotequal
Condition Y: *node→right* isnotequal

Condition X: *node→right* isnotequal
Condition Y: *node→left* isnotequal

Condition X: *node→left* isequal
Condition Y: *node→right* isequal

Condition X: *node→right* isequal
Condition Y: *node→left* isequal

Choose the correct option.

What is the output of the program given below?

```
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
}
```

Options

0
0 3

0 3
0 3 6

0
0 3 6
0 3 6 9

0 3 6
0 3 6 9
0 3 6 9 12

Choose the correct option:

What will happen if some indentations are made in some statements of a code written in C++?

Options

Faster execution of the code

Lower memory requirement for the code

Correction of errors in the code

Better readability of the code

Choose the correct option.

In an implementation of a linked list, each node contains data and address. What can the address field possibly contain?

Options

Address of the next node in sequence

Its own address

Address of the last node

Address of the first node

Choose the correct option.

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

(.)

* /

+ -

AND

OR

The precedence is from left to right in the expression for the operators with equal precedence.

Which statement is true about the output of the code statements given below?

```
integer a = 40, b = 35, c = 20, d = 10
print a * b / c - d
print a * b / (c - d)
```

Options

The outputs differ by 80.

The outputs are the same.

The outputs differ by 50.

The outputs differ by 160.

Choose the correct option.

What can be inherited by a derived class from a base class?

Options

Data members

Member functions

Constructors and destructors

Data members and member functions

Fill in the blanks

_____ is the compile time binding whereas _____ is run time binding of functions.

Options

Function overriding, Function overloading

Abstraction, Encapsulation

Function overloading, Function overriding

Varies from program to program

Choose the correct option.

A programmer wants the program given below to print the largest number out of three numbers entered by the user.

```
int number1, number2, 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
```

What should be used in place of "???" in Statement 1 in the code?

Options

number3>number2

number3>temp

number3<temp

number3>number1

PASSAGE

```
class entity
{
private:
integer a, b
public:
integer c
function entity( ) { a = 0; b=0}
function compare ( )
{ if (a>b) return 1;
return 0
}
}

function main ( )
{
entity black
int value, value2 = 5
value = black.compare() // Statement 1
black.c = value2 //Statement 2
print black.a //Statement 3
}
```

Choose the correct option.

Refer to the given pseudocode. The code is similar to that in C++ and is self-explanatory. An accessible member function and a data member for an object are accessed by the statements *objectname.functionname* and *objectname.datamembername*, respectively. Identify the statement with an error.

OPTIONS

Statement 1

Statement 2

Statement 3

None of the above

Choose the correct option.

The following operations are performed on an empty stack "A":

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

What will the stack contain after these operations?

(**Note:** The top of the stack is underlined in the options.)

Options

5 6

1 5

5 6

1 5

Choose the correct option:

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?

Options

Linear search

Binary search

Hash coded search

None of the above

Choose the correct option.

Which abstract data type can be used to represent a many-to-many relation?

Options

Tree

Stack

Graph

Queue

Choose the correct option.

X and Y are asked to write a program to sum the rows of a 2X2 matrix stored in an array A.

X writes the code (Code A) as follows:

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

Y writes the code (Code B) as follows:

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

Which of the following statements is correct about these codes if no loop unrolling is done by the compiler?

Options

Code A would execute faster than Code B.

Code B would execute faster than Code A.

Code A is logically incorrect.

Code B is logically incorrect.

Choose the correct option.

Two programmers independently write a program to find the mass of one mole of water, that includes the masses of hydrogen and oxygen.

The first programmer defines the variables as:

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

The second programmer defines three quantities as:

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

Which of the two is a better programming practice and why?

Options

Code B is better because variable names are shorter.

Code A is better because the variable names are understandable and non-confusing.

Code A would run correctly while Code B would give an error.

Code B would run correctly while Code A would give an error.

Choose the correct option.

Raj has a list of n numbers each of a fixed size k . He sorts them using radix sort technique. What is the complexity of this operation?

Options

$O(n \cdot k)$

$O(nk)$

$O(k \log n)$

$k O(\log n)$

Choose the correct option.

A programmer writes a sorting algorithm that takes different amount of time to sort two different lists of equal size. What is the possible difference between the two lists?

Options

All numbers in one list are more than 100 while in the other are less than 100.

The ordering of numbers with respect to the magnitude in the two lists has different properties.

One list has all negative numbers while the other has all positive numbers.

One list contains 0 as an element while the other does not.

Choose the correct option.

In which of the given methods is sorting **NOT** possible?

Options

Insertion

Selection

Exchange

Deletion

Choose the correct option.

How can a call to an overloaded function be ambiguous?

Options

The name of the function might have been misspelled

There might be two or more functions with the same name

There might be two or more functions with equally appropriate signatures

None of the above

Choose the correct option.

A programmer is making a database of animals in a zoo along with their properties. The possible animals are dog, lion and zebra. Each one has attributes as herbivorous, color and nocturnal. The programmer uses the object-oriented programming paradigm for this. How will the system be conceptualized?

Options

class: Animal; objects: dog, lion and zebra; data members: herbivorous, color and nocturnal

class: Animal; objects: herbivorous, color and nocturnal; data members: dog, lion and zebra

classes: dog, lion and zebra; objects: Animal; data members: herbivorous, color and nocturnal

None of the above

Choose the correct option.

Aparajita wants to make a function that is not bound to any identifier. Which of the given functions should she incorporate in her program?

Options

Anonymous Function

Friend Function

Null Function

Global Function

Choose the correct option.

What is implied by the argument of a function?

Options

The variables passed to the function when it is called

The value that the function returns on execution

The execution code inside the function

Return type of the function

Choose the correct option.

Which of the given options implies that there are two loops that are nested?

Options

Two loops, one after the other

Two loops, one inside the other

One loop with two different iteration counts

Two loops with the same iteration count

Choose the correct option.

In an implementation of a linked list, each node contains data and address. What can the address field possibly contain?

Options

Address of the next node in sequence

Its own address

Address of the last node

Address of the first node

Choose the correct option.

Which of the given statements is TRUE about a variable?

Options

A variable cannot be used before it is declared.

A variable cannot be used after it is declared.

A variable cannot be used in the function it is declared in.

A variable can always be used.

Choose the correct option.

The program to print the larger of the two numbers entered by a user is given below. What should be used in place of "???" in Statement 1 of the code to get the desired output?

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

Options

number1>number2

number2>number1

number2 equals number1

number1<= number2

Choose the correct option.

Consider the given queue structure -

—, —, —, —, A, B

FRONT = 5, REAR = 6.

What will be the values of FRONT and REAR respectively after the following operations?

REMOVE A

ADD C,D

Options

6,8

5,8

5,7

6,6. Items will not be inserted.

Choose the correct option.

In which areas of a class are data and functions directly accessible outside the class?

Options

Public

Private

Protected

None of the above

Choose the correct option.

The function given below computes the factorial of the number "n" entered by a user. What should be the "MISSING STATEMENT" in order to make the code work properly?

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

Options

return factorial(n-1)

return n*factorial(n)

return n*(n-1)

return n*factorial(n-1)

PASSAGE

```
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  
}
```

Choose the correct option.

Consider the given code. Assume that "a" and "b" are passed by value. What will be the output of the program when the function *calculate()* is executed?

OPTIONS

80

40

32

72

Choose the correct option.

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

Options

22

11

10

None of the above

Choose the correct option.

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?

Options

Linear search

Binary search

Hash coded search

None of the above

Choose the correct option.

Which of the given options is true regarding Inheritance in Object Oriented Programming?

Options

There is reduced interaction with the hardware

A class may or may not have any object

Two or more functions can have the same name and same number and type of arguments in a program

Class-object relation can be changed at run time

Choose the correct option.

A football seller stores all the footballs in a large container that is closed from the bottom. The footballs are stacked on top of each other in the box. The new supply of balls is put in the box from the top. When a customer buys a football, the one at the top of the stack is given to the customer. Each football has a code. The seller wants to store the codes of all the footballs in a data structure to keep track of the inventory. Which data structure should be used for this purpose?

Options

Queue

Stack

Array

Graph

Choose the correct option.

The following operations are performed on an empty stack "A":

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

What will the stack contain after these operations?

(**Note:** The top of the stack is underlined in the options.)

Options

5 6

1 5

5 6

1 5

Choose the correct option.

How many nodes does a full binary tree with "n" non-leaf nodes contain?

Options

$\log n$

$n + 1$

$2n + 1$

$2n$

Choose the correct option.

How many nodes does a complete binary tree with 5 levels have, if the root is considered to be at level 1?

Options

15

25

63

31

Choose the correct option.

Why is an algorithm designer concerned primarily about the run time and not the compile time while calculating time complexity of an algorithm?

Options

Run time is always more than the compile time.

Compile time is always more than the run time.

Compile time is a function of run time.

A program needs to be compiled once but can be run several times.

PASSAGE

```
function main()
{
    automatic variable var
    print var
}
```

Choose the correct option:
A pseudo-code is used which is self explanatory.

What will be the output generated when the given code is executed?

OPTIONS

0

1

Garbage Value

This code will generate a compile time error

Choose the correct option.

Two programmers independently write a program to find the mass of one mole of water, that includes the masses of hydrogen and oxygen.

The first programmer defines the variables as:

integer hydrogen, oxygen, water // Code A

The second programmer defines three quantities as:

integer a, b, c // Code B

Which of the two is a better programming practice and why?

Options

Code B is better because variable names are shorter.

Code A is better because the variable names are understandable and non-confusing.

Code A would run correctly while Code B would give an error.

Code B would run correctly while Code A would give an error.

Choose the correct option.

What is the first step for developing a working program to solve a problem?

Options

To write the program in the programming language

To write a step-by-step algorithm to solve the problem

To compile the required libraries

To debug the code

Choose the correct option.

In which of the given methods is sorting **NOT** possible?

Options

Insertion

Selection

Exchange

Deletion

Choose the correct option.

A programmer writes a sorting algorithm that takes different amount of time to sort two different lists of equal size. What is the possible difference between the two lists?

Options

All numbers in one list are more than 100 while in the other are less than 100.

The ordering of numbers with respect to the magnitude in the two lists has different properties.

One list has all negative numbers while the other has all positive numbers.

One list contains 0 as an element while the other does not.

Choose the correct option.

A programmer writes a program to find an element in the array A[5] with the elements: 8 30 40 45 70. The program is run to find a number "X", that is found in the first iteration of binary search. What is the value of "X"?

Options

40

8

70

30

Choose the correct option.

A programmer is making a database of animals in a zoo along with their properties. The possible animals are dog, lion and zebra. Each one has attributes as herbivorous, color and nocturnal. The programmer uses the object-oriented programming paradigm for this. How will the system be conceptualized?

Options

class: Animal; objects: dog, lion and zebra; data members: herbivorous, color and nocturnal

class: Animal; objects: herbivorous, color and nocturnal; data members: dog, lion and zebra

classes: dog, lion and zebra; objects: Animal; data members: herbivorous, color and nocturnal

None of the above

Choose the correct option.

What is implied by the argument of a function?

Options

The variables passed to the function when it is called

The value that the function returns on execution

The execution code inside the function

Return type of the function

Choose the correct option.

Which of the given factors does **NOT** matter when dealing with a function call?

Options

Number of formal parameters and informal parameters

Return type of the function

Respective data type of formal parameters and informal parameters

Operation brought out in the function's body

Choose the correct option.

Which of the given options implies that there are two loops that are nested?

Options

Two loops, one after the other

Two loops, one inside the other

One loop with two different iteration counts

Two loops with the same iteration count

Choose the correct option.

In an implementation of a linked list, each node contains data and address. What can the address field possibly contain?

Options

Address of the next node in sequence

Its own address

Address of the last node

Address of the first node

PASSAGE

```
class rocket
{
private:
integer height, weight
public: // Statement 1
function input( int a, int b)
{
height = a;
weight = b;
}
}

function main()
{
rocket rocket1, rocket2
}
```

Choose the correct option.

Refer to the given pseudocode. The code is similar to that in C++ and is self-explanatory. An accessible member function and a data member for an object are accessed by the statements *objectname.functionname* and *objectname.datamembername*, respectively. What can be inferred from this code?

OPTIONS

"rocket" is a class with "rocket1" and "rocket2" as its objects, with "height" and "weight" as its attributes.

"rocket" is a class with "rocket1" and "rocket2" as its objects, with "height" and "weight" as its objects.

"rocket" is a class with "rocket1", "rocket2", "height" and "weight" as its attributes.

"rocket" is a class with "rocket1", "rocket2", "height" and "weight" as its objects.

Choose the correct option.

Trisha wants to use a data structure in which the cost of deleting, adding and traversing its elements is the same and constant. Which of the given data structures should she use?

Options

B-Tree

AVL Tree

Queue

Stack

Choose the correct option.

The program to print the larger of the two numbers entered by a user is given below. What should be used in place of "???" in Statement 1 of the code to get the desired output?

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

Options

number1>number2

number2>number1

number2 equals number1

number1<= number2

Choose the correct option.

Which of the given statements is TRUE about a variable?

Options

A variable cannot be used before it is declared.

A variable cannot be used after it is declared.

A variable cannot be used in the function it is declared in.

A variable can always be used.

Choose the correct option.

In which areas of a class are data and functions directly accessible outside the class?

Options

Public

Private

Protected

None of the above

Choose the correct option.

The function given below computes the factorial of the number "n" entered by a user. What should be the "MISSING STATEMENT" in order to make the code work properly?

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

Options

return factorial(n-1)

return n*factorial(n)

return n*(n-1)

return n*factorial(n-1)

Choose the correct option.

What will happen if some indentations are made in some statements of a code written in C++?

Options

Faster execution of the code

Lower memory requirement for the code

Correction of errors in the code

Better readability of the code

Choose the correct option.

For which of the following purposes is the construct given below used?

if(condition) then A else B

Options

Decision-making

Iteration

Recursion

Object-oriented programming

Choose the correct option.

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

(.)

* /

+ -

AND

OR

The precedence is from left to right for the operators with equal precedence.

What will be the output of the following code statements?

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

```
print a * b / c + c
```

Options

120

125

255

250

Choose the correct option.

Which of the given function prototypes can be considered to be overloaded(no ambiguity)?

- A. function myFunc(integer Num, float me) // does not return anything
- B. function myFunc(integer Num, double me) // does not return anything
- C. function myFunc(character Num, float me) // does not return anything
- D. function myFunc(integer Num, float me) // returns an integer

Options

A and B

A, B and C

A, C and D

B, C and D

Both 2 and 4

Choose the correct option.

A football seller stores all the footballs in a large container that is closed from the bottom. The footballs are stacked on top of each other in the box. The new supply of balls is put in the box from the top. When a customer buys a football, the one at the top of the stack is given to the customer. Each football has a code. The seller wants to store the codes of all the footballs in a data structure to keep track of the inventory. Which data structure should be used for this purpose?

Options

Queue

Stack

Array

Graph

Choose the correct option:

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?

Options

Linear search

Binary search

Hash coded search

None of the above

Choose the correct option.

In a linear list of elements, a deletion can be made from one end (front) and an insertion can be made at the other end (rear). What is this linear list known as?

Options

Queue

Stack

Tree

Branch

Choose the correct option.

How many nodes does a complete binary tree with 5 levels have, if the root is considered to be at level 1?

Options

15

25

63

31

Choose the correct option.

What is the first step for developing a working program to solve a problem?

Options

To write the program in the programming language

To write a step-by-step algorithm to solve the problem

To compile the required libraries

To debug the code

Choose the correct option.

Two programmers independently write a program to find the mass of one mole of water, that includes the masses of hydrogen and oxygen.

The first programmer defines the variables as:

integer hydrogen, oxygen, water // Code A

The second programmer defines three quantities as:

integer a, b, c // Code B

Which of the two is a better programming practice and why?

Options

Code B is better because variable names are shorter.

Code A is better because the variable names are understandable and non-confusing.

Code A would run correctly while Code B would give an error.

Code B would run correctly while Code A would give an error.

Choose the correct option.

Which of the given data types does **NOT** belong to the category of abstract data types?

Options

Hashtable

Set

Object

Stack

Choose the correct option.

In which of the given methods is sorting **NOT** possible?

Options

Insertion

Selection

Exchange

Deletion

Choose the correct option.

Which algorithm design technique is used in the quick sort algorithm?

Options

Dynamic programming

Back tracking

Divide and conquer

Greedy search

Choose the correct option.

Which of the given statements is TRUE about a breadth first search?

Options

Beginning from a node, all the adjacent nodes are traversed first

Beginning from a node, each adjacent node is fully explored before traversing the next adjacent node

Beginning from a node, the nodes are traversed in cyclic order

None of the above

Choose the correct option.

What is the output of the pseudocode statements given below?

(**Note:** Assume that when two data types are processed through an operator, the answer maintains the same data type as that of the input. Also, all data types have enough range to accommodate any number. If two different data types are operated upon, the result assumes the data type that is more expressive.)

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

Options

984

98.4

98

Error

Choose the correct option.

Ashima wants to print a pattern which includes checking and changing a variable's value iteratively. She decides to use a loop/condition. Which of the following options should she use such that the body of the loop/condition is executed atleast once whether the variable satisfies the entering condition or not?

Options

For Loop

While Loop

Do While Loop

Switch Case

Choose the correct option.

A developer writes the program given below to print the sum of the squares of the first five whole numbers (0...4). Is the program correct? If not, which statement should be modified to correct the 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
```

Options

No error, the program is correct

Statement 1

Statement 4

Statement 6

PASSAGE

```
function preordertraverse(node)
{
    print node→value
    if (Condition X)
        {preordertraverse(node→left)}
    if (Condition Y)
        {preordertraverse(node→right)}
    return
}
```

Choose the correct option.

Consider a binary tree implementation. The root address is stored in the variable *root*. The address of a node is given in the variable *node*. The value of the node and its right and left child nodes can be accessed using the given statements.

node→value,
node→right,
node→left.

A programmer writes the given function to do a preorder traversal of the tree.

What are Condition X and Condition Y?

OPTIONS

Condition X: *node→left* isnotequal
Condition Y: *node→right* isnotequal

Condition X: *node→right* isnotequal
Condition Y: *node→left* isnotequal

Condition X: *node→left* isequal
Condition Y: *node→right* isequal

Condition X: *node→right* isequal

Choose the correct option.

What is implied by the argument of a function?

Options

The variables passed to the function when it is called

The value that the function returns on execution

The execution code inside the function

Return type of the function

Choose the correct option.

Which of the given options implies that there are two loops that are nested?

Options

Two loops, one after the other

Two loops, one inside the other

One loop with two different iteration counts

Two loops with the same iteration count

Choose the correct option.

Which of the given statements is true regarding the sorting and searching algorithms?

Options

Linear Searching is faster than the most efficient sorting algorithm

Linear Searching is slower than the most efficient sorting algorithm

Linear Searching and the most efficient sorting algorithm take up almost same time

Their complexities can not be compared

Choose the correct option.

A programmer writes a code snippet in which a set of three lines occurs ten times in different parts of the program. What programming concept should be used to shorten the code length?

Options

For loops

Functions

Arrays

Classes

PASSAGE

```
class rocket
{
private:
integer height, weight
public: // Statement 1
function input( int a, int b )
{
    height = a;
    weight = b;
}

function main()
{
    rocket rocket1, rocket2
}
```

Choose the correct option.

Refer to the given pseudocode. The code is similar to that in C++ and is self-explanatory. An accessible member function and a data member for an object are accessed by the statements *objectname.functionname* and *objectname.datamembername*, respectively. What can be inferred from this code?

OPTIONS

"rocket" is a class with "rocket1" and "rocket2" as its objects, with "height" and "weight" as its attributes.

"rocket" is a class with "rocket1" and "rocket2" as its objects, with "height" and "weight" as its objects.

"rocket" is a class with "rocket1", "rocket2", "height" and "weight" as its attributes.

"rocket" is a class with "rocket1", "rocket2", "height" and "weight" as its objects.

PASSAGE

```
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
}
```

Choose the correct option.

A programmer writes the given program to print the following pattern on the screen:

1
1 2
1 2 3

Will this program function properly? If not, which statement should be modified?

OPTIONS

Statement 1

Statement 2

Statement 3

Statement 4

Choose the correct option.

Which of the given options describes a tree?

Options

An unconnected graph

A connected graph

A connected acyclic graph

A complete graph

Choose the correct option.

Which of the given options is **NOT** a data type?

Options

Integer

Character

Boolean

Array

Choose the correct option.

If $x_1(n)$ is $O(y_1(n))$ and $x_2(n)$ is $O(y_2(n))$, then which of the given options is true in context of asymptotic complexity notations?

Options

$x_1(n) + x_2(n)$ is $O(\min(y_1(n), y_2(n)))$

$x_1(n) + x_2(n)$ is $O(\max(y_1(n), y_2(n)))$

$x_1(n) + x_2(n)$ is $O(y_1(n) * y_2(n))$

$x_1(n) + x_2(n)$ is $O(y_1(n) - y_2(n))$

Choose the correct option.

What can be inherited by a derived class from a base class?

Options

Data members

Member functions

Constructors and destructors

Data members and member functions

Choose the correct option.

Which members of a class cannot be inherited?

Options

Public

Private

Private and Protected

Protected

Choose the correct option.

What is the maximum number of edges in an undirected graph with "n" vertices?

Options

$n*(n-1)/2$

$n*(n+1)/2$

$n*n$

$2*n$

Choose the correct option.

X and Y are asked to write a program to sum the rows of a 2X2 matrix stored in an array A.

X writes the code (Code A) as follows:

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

Y writes the code (Code B) as follows:

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

Which of the following statements is correct about these codes if no loop unrolling is done by the compiler?

Options

Code A would execute faster than Code B.

Code B would execute faster than Code A.

Code A is logically incorrect.

Code B is logically incorrect.

Choose the correct option.

In an implementation of a linked list, each node contains data and address. What can the address field possibly contain?

Options

Address of the next node in sequence

Its own address

Address of the last node

Address of the first node

Choose the correct option.

Why is an algorithm designer concerned primarily about the run time and not the compile time while calculating time complexity of an algorithm?

Options

Run time is always more than the compile time.

Compile time is always more than the run time.

Compile time is a function of run time.

A program needs to be compiled once but can be run several times.

PASSAGE

```
function main()
{
    automatic variable var
    print var
}
```

Choose the correct option:**A pseudo-code is used which is self explanatory.**

What will be the output generated when the given code is executed?

OPTIONS

0

1

Garbage Value

This code will generate a compile time error

Choose the correct option.

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?

Options

Linear search

Binary search

Hash coded search

None of the above

Choose the correct option.

A librarian has to rearrange the library books on a shelf in a proper order at the end of each day. Which sorting technique should be the librarian's ideal choice?

Options

Bubble sort

Insertion sort

Selection sort

Heap sort

Choose the correct option.

Two programmers independently write a program to find the mass of one mole of water, that includes the masses of hydrogen and oxygen.

The first programmer defines the variables as:

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

The second programmer defines three quantities as:

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

Which of the two is a better programming practice and why?

Options

Code B is better because variable names are shorter.

Code A is better because the variable names are understandable and non-confusing.

Code A would run correctly while Code B would give an error.

Code B would run correctly while Code A would give an error.

Choose the correct option.

A programmer writes a sorting algorithm that takes different amount of time to sort two different lists of equal size. What is the possible difference between the two lists?

Options

All numbers in one list are more than 100 while in the other are less than 100.

The ordering of numbers with respect to the magnitude in the two lists has different properties.

One list has all negative numbers while the other has all positive numbers.

One list contains 0 as an element while the other does not.

Choose the correct option.

A programmer is making a database of animals in a zoo along with their properties. The possible animals are dog, lion and zebra. Each one has attributes as herbivorous, color and nocturnal. The programmer uses the object-oriented programming paradigm for this. How will the system be conceptualized?

Options

class: Animal; objects: dog, lion and zebra; data members: herbivorous, color and nocturnal

class: Animal; objects: herbivorous, color and nocturnal; data members: dog, lion and zebra

classes: dog, lion and zebra; objects: Animal; data members: herbivorous, color and nocturnal

None of the above

Choose the correct option.

A programmer writes a program to find an element in the array A[5] with the elements: 8 30 40 45 70. The program is run to find a number "X", that is found in the first iteration of binary search. What is the value of "X"?

Options

40

8

70

30

PASSAGE

```
function print_me(integer n) //Statement 1
{
    if ( n < 1 ) return //Statement 2
    print n //Statement 3
    print_me(n-1) //Statement 4
}
```

Choose the correct option:
A pseudo-code is used which is self explanatory.
// in pseudo code refers to comment

Pooja has written the given code to print numbers from 0 to n in reverse order using the recursive approach. Find if there exists any error in this code.

OPTIONS

Statement 1

Statement 2

Statement 3

There is no error

Choose the correct option.

A stack is implemented as a linear array A[0...N-1]. A programmer writes the function given below to pop out an element from the stack.

```
function POP( top, N )
{
    if (X)
    {
        top = top - 1
    }
    else
    {
        print "Underflow"
    }
    return top
}
```

What should substitute the condition "X"?

Options

top<N-1

top<N

top>1

top>= 0

Choose the correct option.

Identify the lowest level format to which the computer converts a program in a higher language before execution.

Options

English code

Machine code

Assembly language

System language

Choose the correct option.

The function given below takes a number "n" as the input and calculates the sum of first "n" natural numbers. Which statement should be inserted in place of "???" to get the required output?

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

Options

n equals 1

n equals 2

n>= 1

n>1

Choose the correct option.

Which of the given options implies that there are two loops that are nested?

Options

Two loops, one after the other

Two loops, one inside the other

One loop with two different iteration counts

Two loops with the same iteration count

Choose the correct option.

Consider the structure of a queue as given below -

FRONT = 2, REAR = 4

Queue: _, L , M , N , _

What will be the values of FRONT and REAR respectively after the insertion of an element 'Q' in the given queue?

Options

1.4

2.5

1.5

2.4

Choose the correct option.

A programmer writes a code snippet in which a set of three lines occurs ten times in different parts of the program. What programming concept should be used to shorten the code length?

Options

For loops

Functions

Arrays

Classes

PASSAGE

```
class brush
{
private:
integer size, c
rcode
function getdata( ) { ... } // Statement 1
public:
integer name // Statement 2
function putdata( ) { ... }
}

function main
{
brush b1, b2
print b1.name // Statement 3
b2.getdata() //Statement 4
}
```

Choose the correct option.

Refer to the given pseudocode. The code is similar to that in C++ and is self-explanatory. An accessible member function and a data member for an object are accessed by the statements *objectname.functionname* and *objectname.datamembername*, respectively. Which statement should be deleted from the code to rectify the error in it?

OPTIONS

Statement 1

Statement 2

Statement 3

Statement 4

Choose the correct option.

What is the output of the program given below?

```
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
}
```

Options

0
0 3

0 3
0 3 6

0
0 3 6
0 3 6 9

0 3 6
0 3 6 9
0 3 6 9 12

PASSAGE

```
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
}
```

Choose the correct option.

A programmer writes the given program to print the following pattern on the screen:

1
1 2
1 2 3

Will this program function properly? If not, which statement should be modified?

OPTIONS

Statement 1

Statement 2

Statement 3

Statement 4

This program will function properly

Choose the correct option.

In which of the given situations can a constructor be invoked?

Options

When an object is created

When an object is assigned the value 0

Only at the end of the code

When the scope of the object is over

Choose the correct option.

Yukta created an interface to use it in different parts of the program by implementing it. But she forgot to specify the access specifier for each contained method. What will be the access specifier of the methods that will be inherited/implemented?

Options

Public

Private

Protected

An error will be generated

Choose the correct option.

A programmer prepares a questionnaire with "true or false" type of questions. He wants to define a data type that stores the responses of the candidates for the questions. Which is the most suited data type for this purpose?

Options

Integer

Boolean

Float

Character

Choose the correct option.

In an implementation of a linked list, each node contains data and address. What can the address field possibly contain?

Options

Address of the next node in sequence

Its own address

Address of the last node

Address of the first node

Choose the correct option.

A sorting mechanism uses the binary tree concept such that any number in the tree is larger than all the numbers in the sub-tree below it. What is this method called?

Options

Selection sort

Insertion sort

Heap sort

Quick sort

Choose the correct option.

Which of the given options is **NOT** a data type?

Options

Integer

Character

Boolean

Array

Choose the correct option.

A queue is implemented as a singly linked linked-list. Each node has an element and a pointer to another node. The *Rear* and the *Front* contain the addresses of the rear and the front nodes, respectively. What can be inferred about the linked list if the condition (*rear* *is equal* *front*) is true?

Options

It has no elements

It has one element

There is an error

None of the above

Choose the correct option.

Which of the given options describes a tree?

Options

An unconnected graph

A connected graph

A connected acyclic graph

A complete graph

Choose the correct option.

Why is an algorithm designer concerned primarily about the run time and not the compile time while calculating time complexity of an algorithm?

Options

Run time is always more than the compile time.

Compile time is always more than the run time.

Compile time is a function of run time.

A program needs to be compiled once but can be run several times.

Choose the correct option.

Which of the given data types does **NOT** belong to the category of abstract data types?

Options

Hashtable

Set

Object

Stack

Choose the correct option.

A programmer tries to debug a code of 10,000 lines. It is known that there is a logical error in the first 25 lines of the code. What is an efficient way to debug the code?

Options

Compile the entire code and check it line by line.

Use an interpreter on the first 25 lines of code.

Compile the entire code and run it.

None of the above can be used to debug the code.

Choose the correct option.

In which of the given methods is sorting **NOT** possible?

Options

Insertion

Selection

Exchange

Deletion

Choose the correct option.

Which algorithm design technique is used in the quick sort algorithm?

Options

Dynamic programming

Back tracking

Divide and conquer

Greedy search

Choose the correct option.

A programmer writes a program to find an element in the array A[5] with the elements: 8 30 40 45 70. The program is run to find a number "X", that is found in the first iteration of binary search. What is the value of "X"?

Options

40

8

70

30

Choose the correct option.

A programmer is making a database of animals in a zoo along with their properties. The possible animals are dog, lion and zebra. Each one has attributes as herbivorous, color and nocturnal. The programmer uses the object-oriented programming paradigm for this. How will the system be conceptualized?

Options

class: Animal; objects: dog, lion and zebra; data members: herbivorous, color and nocturnal

class: Animal; objects: herbivorous, color and nocturnal; data members: dog, lion and zebra

classes: dog, lion and zebra; objects: Animal; data members: herbivorous, color and nocturnal

None of the above

Choose the correct option.

Aparajita wants to make a function that is not bound to any identifier. Which of the given functions should she incorporate in her program?

Options

Anonymous Function

Friend Function

Null Function

Global Function

PASSAGE

```
class rocket
{
private:
    integer height, weight
public: // Statement 1
function input( int a, int b )
{
    height = a;
    weight = b;
}
}

function main()
{
    rocket rocket1, rocket2
}
```

Choose the correct option.

Refer to the given pseudocode. The code is similar to that in C++ and is self-explanatory. An accessible member function and a data member for an object are accessed by the statements *objectname.functionname* and *objectname.datamembername*, respectively. What can be inferred from this code?

OPTIONS

"rocket" is a class with "rocket1" and "rocket2" as its objects, with "height" and "weight" as its attributes.

"rocket" is a class with "rocket1" and "rocket2" as its objects, with "height" and "weight" as its objects.

"rocket" is a class with "rocket1", "rocket2", "height" and "weight" as its attributes.

"rocket" is a class with "rocket1", "rocket2", "height" and "weight" as its objects.

Choose the correct option.

The function given below takes an even integer "n" as the input and calculates the sum of first "n" even natural numbers. The function is called by the statement "sum(30)". How many times will the function "sum" be called to compute the sum?

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

Options

1

30

15

16

Choose the correct option.

A programmer writes a code snippet in which a set of three lines occurs ten times in different parts of the program. What programming concept should be used to shorten the code length?

Options

For loops

Functions

Arrays

Classes

Choose the correct option.

A function in the base class is redefined in the inherited class. What is the term used to describe this situation?

Options

Inheritance

Overriding

Overloading

Encapsulation

Choose the correct option.

Which of the given options implies that there are two loops that are nested?

Options

Two loops, one after the other

Two loops, one inside the other

One loop with two different iteration counts

Two loops with the same iteration count

Choose the correct option.

For which of the given options is the stack implementation useful?

Options

Radix search

Breadth first search

Recursion

None of the above

Choose the correct option.

Assuming that the given variables have their usual meanings, which of the given options refer to an empty Linked List?

Options

HEAD->NEXT = NULL

HEAD = NULL

HEAD->PREV = NULL

HEAD->NEXT->NEXT = NULL

HEAD->NEXT = HEAD->PREV

Choose the correct option.

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

(.)

* /

+ -

AND

OR

The precedence is from left to right in the expression for the operators with equal precedence.

Which statement is true about the output of the code statements given below?

```
integer a = 40, b = 35, c = 20, d = 10  
print a * b / c - d  
print a * b / (c - d)
```

Options

The outputs differ by 80.

The outputs are the same.

The outputs differ by 50.

The outputs differ by 160.

Choose the correct option.

In an implementation of a linked list, each node contains data and address. What can the address field possibly contain?

Options

Address of the next node in sequence

Its own address

Address of the last node

Address of the first node

Choose the correct option.

A programmer prepares a questionnaire with "true or false" type of questions. He wants to define a data type that stores the responses of the candidates for the questions. Which is the most suited data type for this purpose?

Options

Integer

Boolean

Float

Character

Choose the correct option.

Which of the given options is used to convert source codes into target language?

Options

Linker

Compiler

Executer

Loader

PASSAGE

```
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
}
```

Choose the correct option.

Consider the given code. Assume that "a" and "b" are passed by value. What will be the output of the program when the function *calculate()* is executed?

OPTIONS

11 -5

10 -5

6 -5

5 -5

Choose the correct option.

A programmer wants the program given below to print the largest number out of three numbers entered by the user.

```
int number1, number2, 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
```

What should be used in place of "???" in Statement 1 in the code?

Options

number3>number2

number3>temp

number3<temp

number3>number1

Choose the correct option.

Which of the given statements is TRUE about a breadth first search?

Options

Beginning from a node, all the adjacent nodes are traversed first

Beginning from a node, each adjacent node is fully explored before traversing the next adjacent node

Beginning from a node, the nodes are traversed in cyclic order

None of the above

Choose the correct option.

The following operations are performed on an empty stack "A":

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

What will the stack contain after these operations?

(**Note:** The top of the stack is underlined in the options.)

Options

5 6

1 5

5 6

1 5

Choose the correct option.

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

Options

Insertion sort

Heap sort

Quick sort

Bubble sort

Choose the correct option.

How many nodes does a full binary tree with "n" non-leaf nodes contain?

Options

$\log n$

$n + 1$

$2n + 1$

$2n$

Choose the correct option.

What best describes the space complexity of a program?

Options

Amount of hard disk space required to store the program

Amount of hard disk space required to compile the program

Amount of memory required for the program to run

Amount of memory required for the program to compile

Choose the correct option.

Why is an algorithm designer concerned primarily about the run time and not the compile time while calculating time complexity of an algorithm?

Options

Run time is always more than the compile time.

Compile time is always more than the run time.

Compile time is a function of run time.

A program needs to be compiled once but can be run several times.

Choose the correct option.

What will be the input to the second pass, if the list before starting the Radix Sort is: 729, 150, 123, 931, 348, 517?

Options

150, 123, 348, 517, 729, 931

150, 931, 123, 517, 348, 729

517, 729, 123, 931, 348, 150

123, 150, 348, 517, 729, 931

Choose the correct option.

Two programmers independently write a program to find the mass of one mole of water, that includes the masses of hydrogen and oxygen.

The first programmer defines the variables as:

integer hydrogen, oxygen, water // Code A

The second programmer defines three quantities as:

integer a, b, c // Code B

Which of the two is a better programming practice and why?

Options

Code B is better because variable names are shorter.

Code A is better because the variable names are understandable and non-confusing.

Code A would run correctly while Code B would give an error.

Code B would run correctly while Code A would give an error.

Choose the correct option.

A programmer writes a sorting algorithm that takes different amount of time to sort two different lists of equal size. What is the possible difference between the two lists?

Options

All numbers in one list are more than 100 while in the other are less than 100.

The ordering of numbers with respect to the magnitude in the two lists has different properties.

One list has all negative numbers while the other has all positive numbers.

One list contains 0 as an element while the other does not.

Choose the correct option.

Which of the given statements is TRUE about a breadth first search?

Options

Beginning from a node, all the adjacent nodes are traversed first

Beginning from a node, each adjacent node is fully explored before traversing the next adjacent node

Beginning from a node, the nodes are traversed in cyclic order

None of the above

Choose the correct option.

Identify the lowest level format to which the computer converts a program in a higher language before execution.

Options

English code

Machine code

Assembly language

System language

Choose the correct option.

The function given below takes an even integer "n" as the input and calculates the sum of first "n" even natural numbers. The function is called by the statement "sum(30)". How many times will the function "sum" be called to compute the sum?

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

Options

1

30

15

16

Choose the correct option.

The function given below takes a number "n" as the input and calculates the sum of first "n" natural numbers. Which statement should be inserted in place of "???" to get the required output?

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

Options

n equals 1

n equals 2

n>= 1

n>1

PASSAGE

```
function MyDisplay( string MyStr ) //Statement 1
{
    print "Hello !"
    print MyStr
    return 1 //Statement 2
}
function main() // Statement 3
{
    string str = " Mickey"
    MyDisplay(str) // Statement 4
}
```

Choose the correct option:
A pseudo-code is used which is self explanatory.
// in pseudo code refers to comment

Consider the given code to print a name on the screen. Which statement will generate an error?

OPTIONS

Statement 1

Statement 2

Statement 3

Statement 4

This code will run without any error

Choose the correct option.

For which of the given options is the stack implementation useful?

Options

Radix search

Breadth first search

Recursion

None of the above

PASSAGE

```
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
}
```

Choose the correct option.

A programmer writes the given program to print the following pattern on the screen:

1
1 2
1 2 3

Will this program function properly? If not, which statement should be modified?

OPTIONS

Statement 1

Statement 2

Statement 3

Statement 4

This program will function properly

Choose the correct option.

Archana makes a program to create a number guessing game. She takes input from user, and gives him hints on whether it is equal to, lesser or greater than the actual number. Thus asking questions such as " Is 97 greater than, equal to or lesser than the actual number? " lower the sample space. Assuming that her range is from 1 to 100, what will be the least number of questions required to guess the actual number?

Options

6

7

8

10

PASSAGE

```
function preordertraverse(node)
{
    print node→value
    if (Condition X)
        {preordertraverse(node→left)}
    if (Condition Y)
        {preordertraverse(node→right)}
    return
}
```

Choose the correct option.

Consider a binary tree implementation. The root address is stored in the variable *root*. The address of a node is given in the variable *node*. The value of the node and its right and left child nodes can be accessed using the given statements.

node→value,
node→right,
node→left.

A programmer writes the given function to do a preorder traversal of the tree.

What are Condition X and Condition Y?

OPTIONS

Condition X: *node→left* isnotequal
Condition Y: *node→right* isnotequal

Condition X: *node→right* isnotequal
Condition Y: *node→left* isnotequal

Condition X: *node→left* isequal
Condition Y: *node→right* isequal

Condition X: *node→right* isequal
Condition Y: *node→left* isequal

Choose the correct option.

The program to print the sum of all cubes that lie between 0 and 100 is given below. Does this program have an error? If yes, which statement should be modified to correct the 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
```

Options

Statement 1

Statement 2

Statement 3

Statement 4

No error

Choose the correct option.

A programmer writes a code snippet in which a set of three lines occurs ten times in different parts of the program. What programming concept should be used to shorten the code length?

Options

For loops

Functions

Arrays

Classes

PASSAGE

```
class rocket
{
private:
integer height, weight
public: // Statement 1
function input( int a, int b)
{
height = a;
weight = b;
}
}

function main()
{
rocket rocket1, rocket2
}
```

Choose the correct option.

Refer to the given pseudocode. The code is similar to that in C++ and is self-explanatory. An accessible member function and a data member for an object are accessed by the statements *objectname.functionname* and *objectname.datamembername*, respectively. What can be inferred from this code?

OPTIONS

"rocket" is a class with "rocket1" and "rocket2" as its objects, with "height" and "weight" as its attributes.

"rocket" is a class with "rocket1" and "rocket2" as its objects, with "height" and "weight" as its objects.

"rocket" is a class with "rocket1", "rocket2", "height" and "weight" as its attributes.

"rocket" is a class with "rocket1", "rocket2", "height" and "weight" as its objects.

Choose the correct option.

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

(.)

* /

+ -

AND

OR

The precedence is from left to right in the expression for the operators with equal precedence.

Which statement is true about the output of the code statements given below?

```
integer a = 40, b = 35, c = 20, d = 10
print a * b / c - d
print a * b / (c - d)
```

Options

The outputs differ by 80.

The outputs are the same.

The outputs differ by 50.

The outputs differ by 160.

Choose the correct option.

A sorting mechanism uses the binary tree concept such that any number in the tree is larger than all the numbers in the sub-tree below it. What is this method called?

Options

Selection sort

Insertion sort

Heap sort

Quick sort

Choose the correct option.

Which of the given options is responsible for taking files and objects from different locations and combining them for execution?

Options

Linker

Loader

Interconnecting compiler

Interpreter

Choose the correct option.

What can be inherited by a derived class from a base class?

Options

Data members

Member functions

Constructors and destructors

Data members and member functions

Choose the correct option.

In an implementation of a linked list, each node contains data and address. What can the address field possibly contain?

Options

Address of the next node in sequence

Its own address

Address of the last node

Address of the first node

Choose the correct option.

Which of the given options is **NOT** a data type?

Options

Integer

Character

Boolean

Array

Choose the correct option.

What does function overloading imply?

Options

Many function definitions with the same name, same arguments and different return types

Many function definitions with the same name and different arguments

Many function definitions with the same name and same arguments

None of the above

Choose the correct option.

A programmer mistakenly writes "gor" instead of the keyword "for" used in loops, while writing a program in C++. What will this result in?

Options

The code would not compile.

The code would give an error while execution.

The code may work for some inputs and not for the others.

The code would not create any problem.

Choose the correct option.

What is the maximum number of edges in an undirected graph with "n" vertices?

Options

$n*(n-1)/2$

$n*(n+1)/2$

$n*n$

$2*n$

Choose the correct option.

Aina wants to use a sorting technique to sort a list of numbers such that the running time of the sorting technique that she uses won't be affected by the pre-order of the elements. Which sorting technique should she use?

Options

Merge Sort

Bubble Sort

Insertion Sort

Selection Sort

Choose the correct option.

Why is an algorithm designer concerned primarily about the run time and not the compile time while calculating time complexity of an algorithm?

Options

Run time is always more than the compile time.

Compile time is always more than the run time.

Compile time is a function of run time.

A program needs to be compiled once but can be run several times.

Choose the correct option.

In which of the given methods is sorting **NOT** possible?

Options

Insertion

Selection

Exchange

Deletion

Choose the correct option.

Which algorithm design technique is used in the quick sort algorithm?

Options

Dynamic programming

Back tracking

Divide and conquer

Greedy search