Question: 8

Regular expression (a | b) (a | b) denotes the set

{ a, b, ab, aa } { a, b, ba, bb } { a, b } { aa, ab, ba, bb }

Question: 9

Consider the following binary search tree.

What is the result of running a post order traversal on this tree?

A B F I O R S T O B A F I S R T A I F B R T S O A R B I S O F T T S R O I F B A

Question: 10

Which of the following is not a feature of a singly linked list?

Insertion can be done in at worst O(1) time. Searching takes at worst O(n) time. Deletion can be done in O(1) time in the worst case. If a node's next element is null it means it is the last element in the list. If the Head is null then the list is empty.

Question: 11

What will be the output of the following code?

1 10 6 2 11

Question: 12

Consider the following pseudocode. The number printed on the console by this program is equivalent to which of the following:

Sum of all odd numbers from 1 to n Sum of all odd numbers from 1 to 8 Sum of all even numbers from 1 to n Sum of all even numbers from 1 to 8 Sum of all numbers from 1 to 8 Just a random value calculated by (i*(i+1))/2

Question: 13

Which of the following is the correct way of handling exceptions?

Mention specific exception in catch block which is handlled Catch all execptions in a single catch block using generic exception handler Exceptions should not be specified in catch block to keep things flexible and so that code does not break in future. None of these

Question: 14

Consider a singly linked list of the form where A is a pointer to the first element in the linked list and B is a pointer to the last element in the list. The time of which of the following operations depends on the length of the list?

Delete the last element of the list Delete the first element of the list Add an element after the last element of the list Add an element before the first element of the list Interchange the first two elements of the list

Question: 15

Which phenomenon is being used in the example below:

Overloading Overriding Abstraction Composition

Question: 16

What will be the output of the following pseudocode when the function product is called with values n=4 and i=1?

481216 Runtime Error 812162024 4812162024 None Of These

Question: 17

What will be the expected output of the following program?

31 11 21 30 11 21 31 10 20 30 11 20 31 21 11

Question: 18

With SQL how can you return the number of records in the People table?

SELECT COLUMNS() FROM People SELECT COUNT() FROM People SELECT COUNT(*) FROM People SELECT COLUMNS(*) FROM People

Question: 19

The array ['b', 'A', 'x', 'Q', 'a', 'O', 'P', 'f', 'B'] has a mixture of lower case and upper case single characters. Most languages have a built-in sort method that can be used to sort an array/list. What should be the default output of such a sort method?

Default sort for any language will not be able to sort this Custom sort has to be defined for this, cannot be achieved using builtin sorts ['A', 'B', 'O', 'P', 'Q', 'a', 'b', 'f', 'x'] ['a', 'b', 'f', 'x', 'A', 'B', 'O', 'P', 'Q'] None of the options

Question: 20

With SQL, how do you select all the records from a table named Persons where the value of the column FirstName starts with an a?

SELECT * FROM Persons WHERE FirstName LIKE 'a%' SELECT * FROM Persons WHERE FirstName LIKE '%a' SELECT * FROM Persons WHERE FirstName > 'a' SELECT * FROM Persons WHERE FirstName > 'a%'

Question: 21

Worst case complexity of finding an element in a sparsely populated hashmap is:

O(1) O(lg n) O(n) O(n lgn) O(n^2)

Question: 22

Consider the following pseudocode. What will be its output?

```
function incrementer(decimal)
    if decimal / 0.25 <= 6
        return incrementer(decimal + 0.1)
    else if decimal >= 2.55
        return decimal
    else
        return incrementer(decimal + 0.25)


print incrementer(1)
```

Runtime Error 2.75 2.55 2.5 3 2.45

Question: 23

Which join will return all rows from the first table, and the matching rows from the second table?

Left outer join Right outer join Full outer join Half outer join

Question: 24

Which of the following operations are implemented on array by function p?

```
function p(array: [integer], x: integer)
{
    var k: integer
    k = 1
    while k < array.last
    {
        if (array[k] == x)
        {
            array[k] = array[array.last]
                array.last = array.last - 1
        }
        else
        {
            k = k + 1
        }

    }
}
```

Hint: array.last refers to the index of the last element in the array

Add x to array Delete x from array Intersect {x} and array Union {x} and array Make a copy of array

Question: 25

Consider following Scenario -

1. The six items: P, Q, U, R, S and T are inserted into Stack A one after another starting from T in reverse order

2. The Stack is popped four times and each element is inserted into another stack B.

3. Then two elements are popped from Stack B and pushed back onto the Stack A.

What are the topmost elements of Stack A and Stack B respectively?

R P U Q U P Q P

Question: 26

Amazon's HR department currently recruits 2 types of applicants: Fresh Graduates (Type A) and Seasoned Software Engineers (Type B). Each fresh graduate (Type A) is required to go through a 2-hour interview with Amazon's Engineering Team followed by a 3-hour interview with Amazon's HR Team. Each Seasoned Software Engineer (Type B) is required to go through a 1-hour interview with Amazon's Engineering Team followed by a 6-hour interview with Amazon's HR Team. If Amazon can only invest 200 hours per month on engineering interviews and only 900 hours per month on HR interviews, how many candidates from each type of applicant pool can Amazon interview in one month? Note: In any given month, Amazon would interview applicants from both pools

Type A: Approximately 50 Type B: Approximately 150 Type A: Approximately 33, Type B: Approximately 166 Type A: Approximately 100, Type B: Approximately 100 Type A: Approximately 33, Type B: Approximately 133

Question: 27

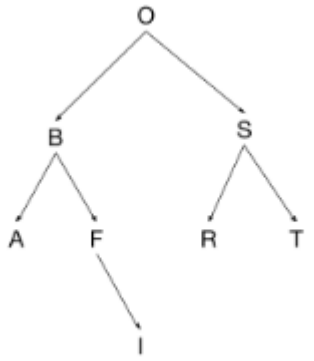
Suppose we have millions of phone numbers and we wish to sort them. Which of the following sorting algorithms is guaranteed to give the lowest worst case running time?

Insertion Sort Merge Sort Quick Sort Bubble Sort Selection Sort

0

Question: 28

Consider the following binary search tree. In this tree, it takes 1 comparison to find the letter O, 2 comparisons to find the letter B and 4 comparisons to find the letter I. What is the average number of comparisons needed to find a letter in this tree?



2 2.5 2.625 2.75 3

Question: 29

There is a gigantic list of numbers and you are responsible for saving the numbers in a data structure so that whenever asked, you have to tell whether a given number is in the list or not. Which data structure will be most time efficient in looking up the value from the maintained list?

Binary Tree Linked list Array Hashtable Double linked list

Question: 30

With SQL, how can you return all the records from a table named "Persons" sorted descending by "FirstName"?

SELECT * FROM Persons ORDER FirstName DESC SELECT * FROM Persons ORDER BY FirstName DESC SELECT * FROM Persons SORT 'FirstName' DESC SELECT * FROM Persons SORT BY 'FirstName' DESC

Question: 31

Suppose a program contains the following class definition

```
class Automobile
{
    public void setPrice(double newPrice) {}
    public void setProfit(double newProfit) {}
    public double getPrice() {return price;}
    private double price;
    private double profit;
    private double getProfit() {return profit;}
}
```

and suppose the main function of your program contains the following declarations:

```
Automobile hyundai = new Automoile();
Automobile jaguar = new Automobile();
```

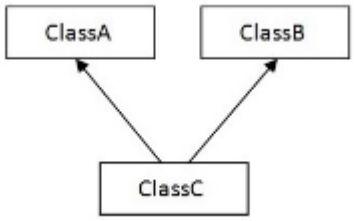
Which of the following are not allowed in the main function of your program ?

```
1.  hyundai.price = 4999.99;

2.  jaguar.setPrice(30000.97);

3.  double aPrice, aProfit;

4.  aPrice = jaguar.getPrice();

5.  aProfit jaguar.getProfit();

6.  aProfit = hyundai.getProfit();

7.  hyundai = jaguar;
```

1,5,6 1,5,6,7 5,6 1,5

Question: 32

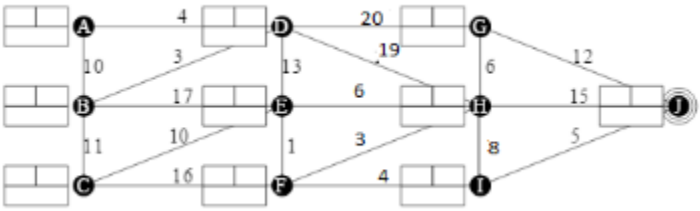
What does the following diagram depict?



Chain of Inheritance Complex Inheritance Multiple Inheritance None

Question: 33

What is the shortest path in the graph below, from Node A to the ringed node using Dijkstra's Algorithm?



ADEHIJ ADHIJ ADEHFIJ ADHFIJ

Question: 34

We have a list of n files arranged in ascending order by integer ids? Suppose we want to search for a particular file with a specific id from this list. What is the best asymptotic running time in which we can do this?

O(n) O(n^2) O(n logn) O(logn) O(1)

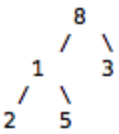
Question: 35

Which of the following is the best example of referential integrity in a database?

All phone numbers must include the area code Information on the customer must be known before anything can be sold to that customer When entering an order quantity, the user must input a number and not some text (i.e., 12 rather than ‘a dozen’)

Question: 36

Preorder Depth First Traversal for this binary tree is:



81325 81253 21853 25138

Question: 37

Consider the following pseudocode. What will be its output?

```
function is_special(start, end, str)
    if (start >= end)
        return 1
    if (str[start] != str[end])
        return 0
    return is_special(++start, --end, str)

print is_special(0,6,'racecar')
```

This program has a logical error 0 1 None Of These

Question: 38

Consider the following pseudocode. What will be the output of the program?

```
function super(integer value)
begin
    if (value == 6)
        super (5)
    if (value % 2 == 0 and value != 2)
        super(5)
    print value
end

super(6)
```

666 Error 556 566 665

Question: 39

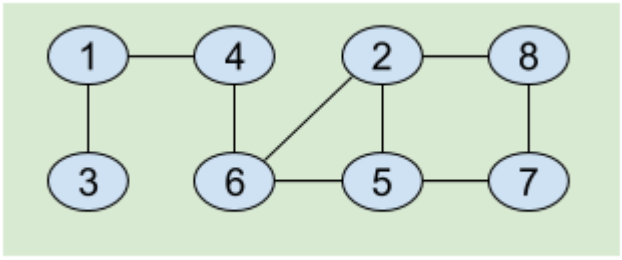
What is the asymptotic running time of the following piece of code?

```
int main()
{
    int n = 100000;
    int array[n];
    for (int i = 0; i < n; i++){
        array[i] = i;
    }
    for (int i = 0; i < n; i++){
        int sum = 0;
        for(int j = 0 ; j < n; j++){
            array[i] += array[j] + i + j;
        }
    }
    for (int i = 0; i < n ; i++){
        //Do nothing
    }
    return 0;
}
```

O(n^3) O(n^2) O(n*logn) O(n) O(1)

Question: 40

Consider the following graph



If we run Depth First Search starting from node 1, which of the following options correctly shows the order in which nodes are visited?

1 4 2 6 5 7 8 3 1 3 4 6 2 8 7 5 1 4 6 5 8 7 2 3 1 4 6 2 8 7 5 3 None of the Above 1 and 2 2 and 4 3 and 4

Question: 41

Suppose the physical memory in your computer can only hold 4 pages of data at any given time. If your program requests a page, the operating system checks if the page is in memory and returns it. If the page is not in memory the operating system fetches that page from disk and loads the page in memory. This is called a page fault. If all pages in memory are already full, it replaces the least recently requested (also called LRU or least recently used) page with the page from disk. Suppose the pages are numbered 1-8 and initially no page is in memory, if your program requests the pages in the following order, how many page faults will occur?

1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6

5 6 8 9 10

Question: 42

Cohesion is the degree to which elements of modules belong together while Coupling refers to the relationship between the modules. Choose their desired combination(s) for a good design having high readability, and maintainability.

Cohesion: high ; Coupling: low Cohesion: low ; Coupling: high Cohesion: low ; Coupling: low Cohesion: high ; Coupling: high None of the above

Question: 43

What will be the output of this code ?

```
public static void main(String[] args)
{
    public static int divideByZero(){
        try
        {
            System.out.println("try");
            int x = 4 / 0;
            return x;
        }
        catch (Exception e)
        {
            System.out.println("catch");
        }
        finally
        {
            System.out.println("finally");
            return 88;
        }
    }
}
```

Compile Error catch try catch finally catch finally

Question: 44

Suppose your password can only be between 1-4 characters long and can only contain any of the 10 lowercase letters from a to j e.g. ab, abc, bbbb, bccj are all valid passwords. If a hacker can try a password in 1 second, how long will it take for her, in the worst case, to crack your password using a brute force algorithm.

1024 seconds 4^10 seconds 11110 seconds 10000 seconds 10^4 seconds

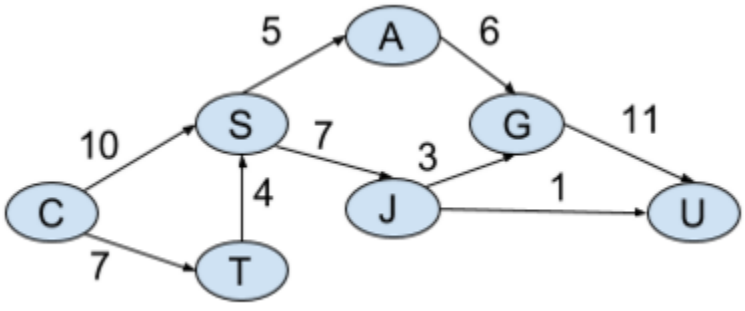
Question: 44

Suppose your password can only be between 1-4 characters long and can only contain any of the 10 lowercase letters from a to j e.g. ab, abc, bbbb, bccj are all valid passwords. If a hacker can try a password in 1 second, how long will it take for her, in the worst case, to crack your password using a brute force algorithm.

1024 seconds 4^10 seconds 11110 seconds 10000 seconds 10^4 seconds

Question: 45

Consider the following weighted, directed graph. Suppose we run Dijkstra's single source shortest path algorithm on this graph? What will be the final shortest distance from C to U?



22 18 31 21 17

Question: 46

Suppose you have an relational database with a table that has weather information on different cities. Which of the following is a correct SQL statement?

Select highest_temperature where name='Lahore' Select name,highest_temperature from weather where country='India' Select highest_temperature and name from weather where country='Pakistan' Select highest_temperature from weather where name='lahore' and where country='Pakistan' None of the options

Question: 47

If you have a NxN matrix in which rows are sorted but columns are not sorted, what is the worst case time to search a value?

N^2 log N N^3 N log N None of the above

Question: 48

Suppose you have two classes: 'class Aeroplane' and 'class Wing'. What should be the relationship between the two classes?

inheritance polymorphism composition None

Question: 49

Which data structure would be most appropriate to implement a collection of values with the following characteristics?

• Items are retrieved and removed from the collection in LIFO order only.

• There is no limit on the number of items in the collection.

Singly linked list with a head pointer and a tail pointer Singly linked list with a head pointer only Doubly linked list with a head pointer only A Hashtable A binary tree

Question: 50

If you increase the normalization of your database:

it takes less space but queries become slower it takes less space but queries become faster it takes more space but queries become faster it takes more space but queries become slower it takes less space but has no effect on query speed