1. What is the time complexity of deleting from the tail of a singly linked list?

A) O(N)

B) O(logN)

C) O(1)

D) O(N*N)

2. What will be the time complexity of the following code?

```
int main()
{
    int n;
    cin>>n;
    int a[n];
    for(int i=0;i<n;i++)
    {
        cin>>a[i];
    }
    sort(a,a+n);
    for(int i=0;i<n;i++)
    {
        cout<<a[i]<<" ";
    }
}
```

A) O(N)

B) O(logN)

C) O(NlogN)

D) O(N*N)

3. To implement Queue we should not use ____.

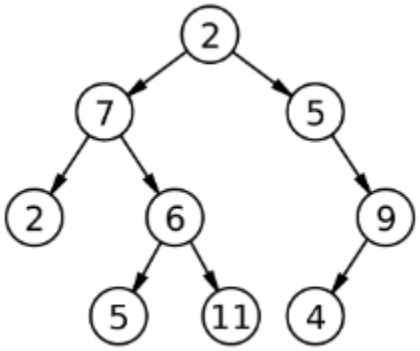
A) Singly Linked List.

B) Doubly Linked List.

C) Array

D) None of the above.

4. What will be the In-order traversal of this binary tree?



A) 2 7 5 6 2 5 4 11 9
B) 2 7 5 6 11 2 5 4 9
C) 2 7 2 6 5 11 5 9 4
D) 2 7 6 5 11 2 5 4 9

5. We have 5 numbers : 13, 26, 62, 23, 45. Now we will push them into a max priority queue. When we do the 3rd pop operation which number will be popped ?

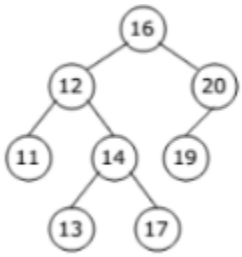
A) 62
B) 26
C) 45
D) 23

6. We have a Queue. Now we will do following operation:

push(10);
push(20);
push(30);
pop();
pop();
push(25);
After this operation, what is the current front value of the queue?

A) 25
B) 30
C) 10
D) 20

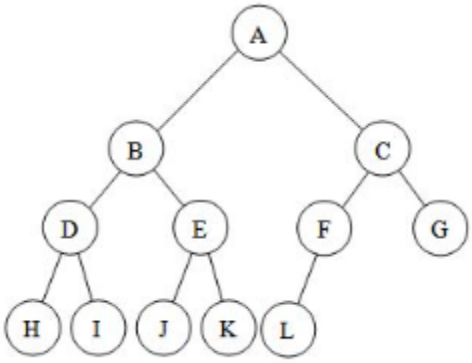
7. This is a binary search tree.



A) True

B) False

8. This is a complete binary tree.



A) True

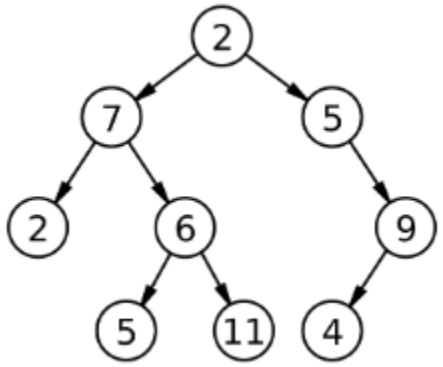
B) False

9. Queue follows ____.

A) First In Last Out

B) Last In Last Out

10. What will be the pre-order traversal of this binary tree?

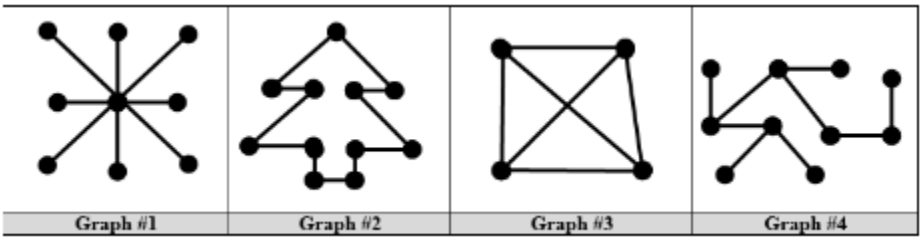


A) 2 7 2 6 5 5 11 9 4
B) 2 7 2 5 11 6 5 9 4
C) 2 7 2 6 5 11 5 9 4
D) 2 7 2 6 5 11 9 5 4

11. What is the maximum number of edges in a complete graph with n vertices?

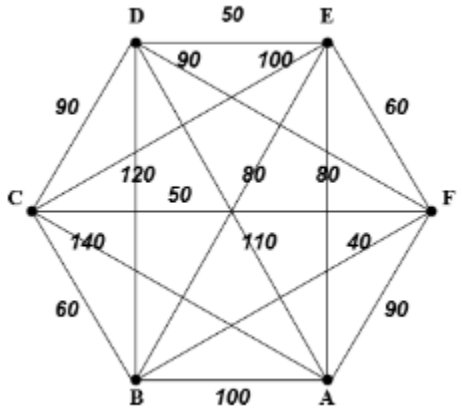
a) n
b) n-1
c) n (n - 1) / 2
d) 2n

12. Which of the four graphs pictured below are not trees?



a) Graph 3
b) Graph 2, 3
c) Graph 2, 4
d) Graph 1, 3

13. Find the minimum spanning tree using Kruskal's algorithm and provide the overall weight of the MST.



a) 240
b) 7
c) 280
d) 220

14 Which of the following is NOT a valid graph representation?

a) Heap
b) Adjacency matrix
c) Adjacency list
d) Edge list

15. Which algorithm is used to detect cycles in a directed graph?

a) Breadth-First Search (BFS)
b) Depth-First Search (DFS)
c) Bellman-Ford algorithm
d) Dijkstra's algorithm

16. In dynamic programming top-down approach is also known as____

a) Tabulation
b) optimization
c) Memoization
d) Generalization

17. What is the space complexity of the following dynamic programming implementation of the Knapsack problem?

a) O(n)
b) O(n+w)
c) O(nw)
d) O(n^2)

18. The complete graph with four vertices has k edges where k is

a) 6
b) 4
c) 3
d) 10

19. Dijkstra's SPF algorithm guarantees the shortest path only when

a) The graph is connected
b) There are no negative edge weights
c) All edges have the same weight
d) The graph is acyclic

20. In Dijkstra's SPF algorithm, what data structure is typically used to prioritize nodes with the smallest tentative distance?

a) Queue
b) Stack
c) Linked List
d) Heap

21. In OOP, what is polymorphism primarily concerned with?

a) Data hiding
b) Code reusability
c) Multiple forms of behavior
d) Grouping related data and methods

22. In the context of OOP, what is "method overriding"?

a) Defining a method with the same name but different parameters in the same class.
b) Providing a new implementation for a method in a subclass that already exists in the superclass.
c) Changing the accessibility of a method in a subclass.
d) Hiding a method in the base class using a method in the subclass.

23. What is a class variable in OOP?

a) A variable declared inside a class method

b) A variable shared by all instances of a class

c) A variable with a constant value

d) A variable that can only be accessed within the class

24. In OOP, what is the term for creating a new class that inherits from more than one class?

a) Multiclassing

b) Polymorphism

c) Multiple inheritance

d) Hybridization

25. What is the primary purpose of encapsulation in OOP?

a) Achieving code reusability

b) Grouping data and methods that operate on the data into a single unit

c) Implementing inheritance

d) Enforcing method overloading

26. What does the term "abstraction" mean in the context of OOP?

a) Creating an instance of a class

b) Hiding the implementation details and showing only the essential features

c) Calling a method in a child class that is defined in the parent class

d) Combining data and methods into a single unit

27. Does this code have any errors?

```
#include <iostream>
using namespace std;

class Animal {
    string type;
public:
    Animal(string t) {
        type = t;
    }
    void showType() {
        cout << "Animal type: " << type << endl;
    }
};

int main() {
    Animal *dog = new Animal("Dog");
    dog.showType();
    delete dog;
    return 0;
}
```

a) Yes
b) No

28. What will be the output for the following code?

```cpp
#include <iostream>
using namespace std;

class Example {
public:
    Example() {
        cout << "Constructor called" << endl;
    }
    ~Example() {
        cout << "Destructor called" << endl;
    }
};

int main() {
    Example* e = new Example();

    return 0;
}
```

a) Constructor called Destructor called
b) Constructor called
c) Destructor called
d) Error

29. Pick the term that relates to polymorphism:

A. Early binding
B. Dynamic allocation
C. Static typing
D. Static allocation

30. Pick the term that relates to compile-time polymorphism:

A. Late binding
B. Dynamic binding
C. Static typing
D. None of the above

31. How to rename a column of a table?

a) ALTER TABLE table_name
RENAME COLUMN old_column_name TO new_column_name;

b) ALTER TABLE RENAME table_name
COLUMN old_column_name TO new_column_name;

c) ALTER TABLE table_name
RENAME COLUMN new_column_name TO old_column_name ;

d) TABLE ALTER table_name
RENAME COLUMN old_column_name TO new_column_name;

32. Write a query to display the first ten records from a table.

a) select * from Student where Rownum == 10;
b) select * from Student where Rownum != 10;
c) select * from Student where Rownum < 10;
d) select * from Student where Rownum <= 10;

33. DML stand for

a) Data Multiple Language
b) Data Merging Language
c) Database Multiple Language
d) Data Manipulation Language

34. Which of the following is not a DML command?

a) SELECT
b) INSERT
c) UPDATE
d) CREATE

35. The SQL command to remove records from a database table is:

a) SELECT
b) DELETE
c) DROP
d) REMOVE

Django Rest Framework Assignment:

Recipe Management System
Marks : 20
Time : 30 minutes

Create a Recipe Management API where users can create and share recipes, rate them, and add comments. Each recipe can have multiple ingredients.

Requirements:

- Design the database schema for users, recipes, ingredients, ratings, and comments.
- Create models for the entities and define appropriate relationships.
- Create serializers for each model.
- Implement API views to perform CRUD operations and manage relationships.