Data Structures and Algorithms

Lab Journal - Lab 14

Name: _____

Enrollment #: _____

Class/Section: _____

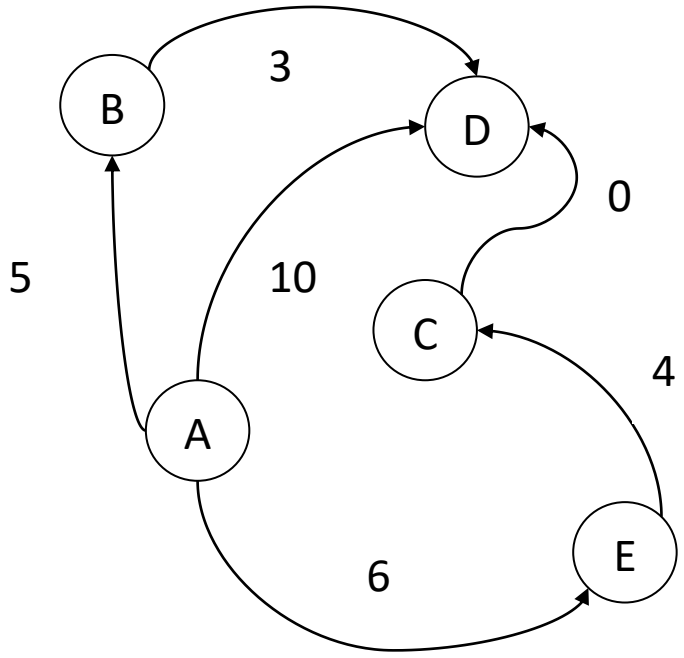
Objective

This lab session is intended to introduce students to the Graphs and concepts related to Graphs.

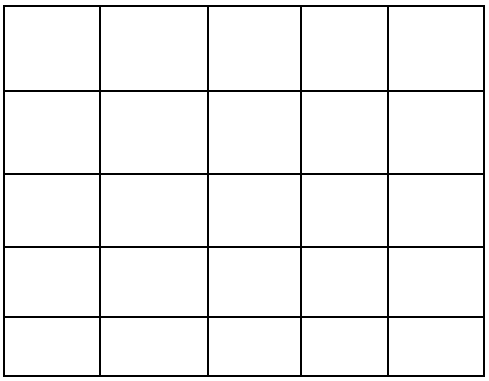
Task 1 :

Give answers to the following.

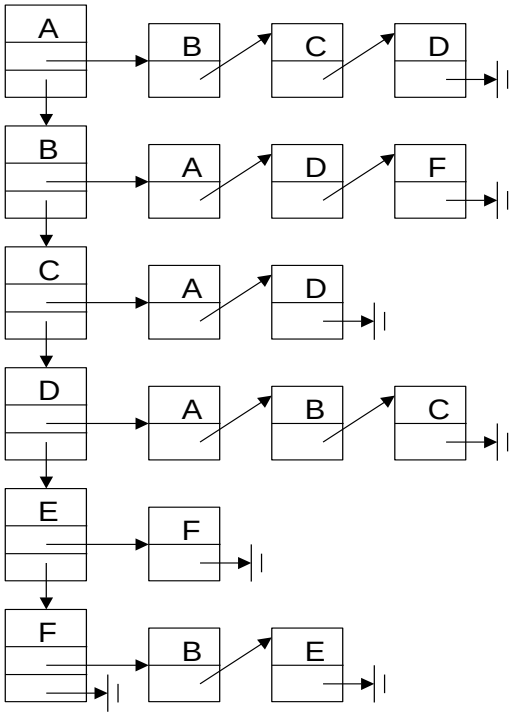
1. Consider the following directed graph.



Represent the given graph using an adjacency matrix and adjacency list.

	Adjacency Matrix:  Adjacency List: A, B, C, D, E
2.	Starting at vertex 'A', give the depth-first and breadth-first traversal of the graph in Question 1.

3. Generate a graph from the given adjacency list.



Task 2 :

Implement the following exercises.

Exercise 1

Consider the adjacency list implementation of a graph as illustrated in Figure 1.
Each node of such a list can be represented by the following class.

```
class AdjListNode
{
public:
 int dest;
 AdjListNode* next;
};
```

Likewise, an array of Adjacency lists can be maintained having the same size as the number of vertices in the graph.

```
class AdjList
{
public:
AdjListNode *head;
};
```

Given the above classes, implement the 'Graph' class outlined in the following.

```
class Graph
{
public:
  int V;  \\Number of vertices
  AdjList* arr; \\ An Array of adj lists
  Graph(int V);
\\ Create a new node of the list with value 'd'
 AdjListNode* newAdjListNode(int d);
\\ Create an edge from 'src' to 'dest'
 void addEdge(int src, int dest);
\\ Print the vertices in the adjacency list of each vertex
 void printGraph();
};
```

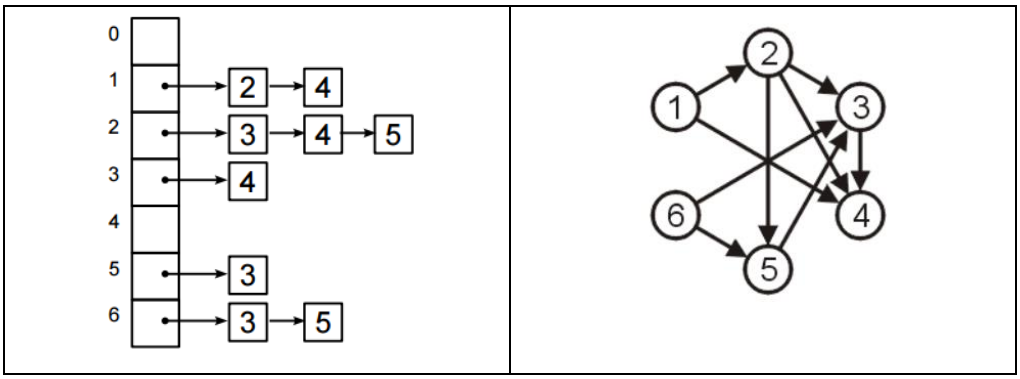


Figure 1 : Adajcency list implementation of a graph

Exercise 2

Complete the given 'Graph' class that is basedon adjacency matrix representation.

```
class Graph {
private:
      bool** adjacencyMatrix;
      int vertexCount;
public:
      Graph(int vertexCount);
      void addEdge(int i, int j) ;
      void removeEdge(int i, int j);
      bool isEdge(int i, int j) ;
      ~Graph() ;
};
```

Implement the given exercises and get them checked by your instructor. If you are unable to complete the tasks in the lab session, deposit this journal alongwith your programs (printed or handwritten) before the start of the next lab session.

S No.	Exercise	Checked By:
1.	Exercise 1	
2.	Exercise 2	

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