Data Structures and Algorithms - LAB 13 - 17.12.2022

Evaluation

Observation – 5 marks

Execution – 15 marks
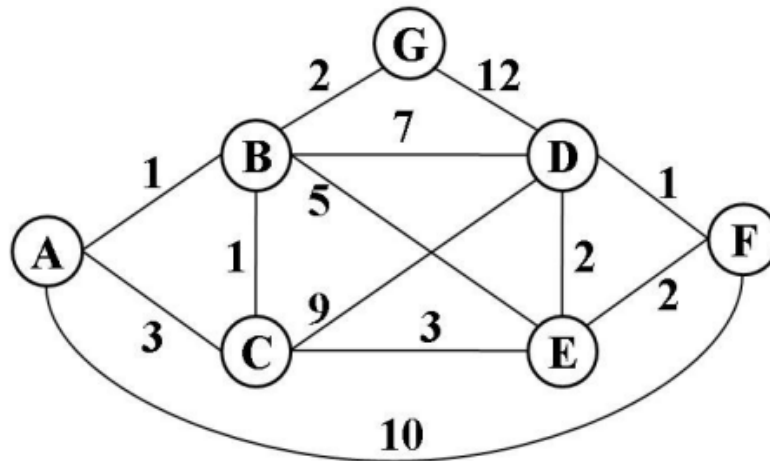**Spot – 5 marks**

Observation
1. Compare Fractional knapsack and knapsack 0/1.
2. Discuss its time complexity
3. Explain Dijikstra's algorithm with an example
4. Discuss its time complexity

Execution

1. Consider the following undirected, weighted graph:

Step through Dijkstra's algorithm to calculate the single-source shortest paths from A to every other vertex. Show your steps in the table below. Cross out old values and write in new ones, from left to right within each cell, as the algorithm proceeds. Also list the vertices in the order which you marked them known. Finally, indicate the lowest-cast path from node A to node F.

2.Implement knapsack 0/1 using least cost branch and bound.

$N = 4, C = 15, V[] = \{10, 10, 12, 18\}, W[] = \{2, 4, 6, 9\}$

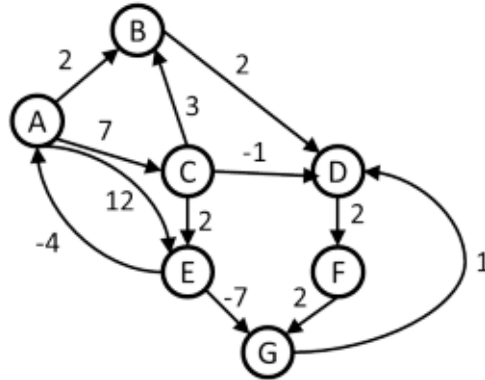## SPOT

1. **Solve the following instance of knapsack using LCBB for knapsack capacity M = 15.**

i	P_i	W_i
1	10	2
2	10	4
3	12	6
4	18	9

2.

2. Consider the following directed, weighted graph:

(a) Even though the graph has negative weight edges, step through Dijkstra's algorithm to calculate *supposedly* shortest paths from A to every other vertex. Show your steps in the table below. Cross out old values and write in new ones, from left to right within each cell, as the algorithm proceeds. Also list the vertices in the order which you marked them known.