

COMPSCI 220 A3**Question 1****a) Adjacency List****Numeric**

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

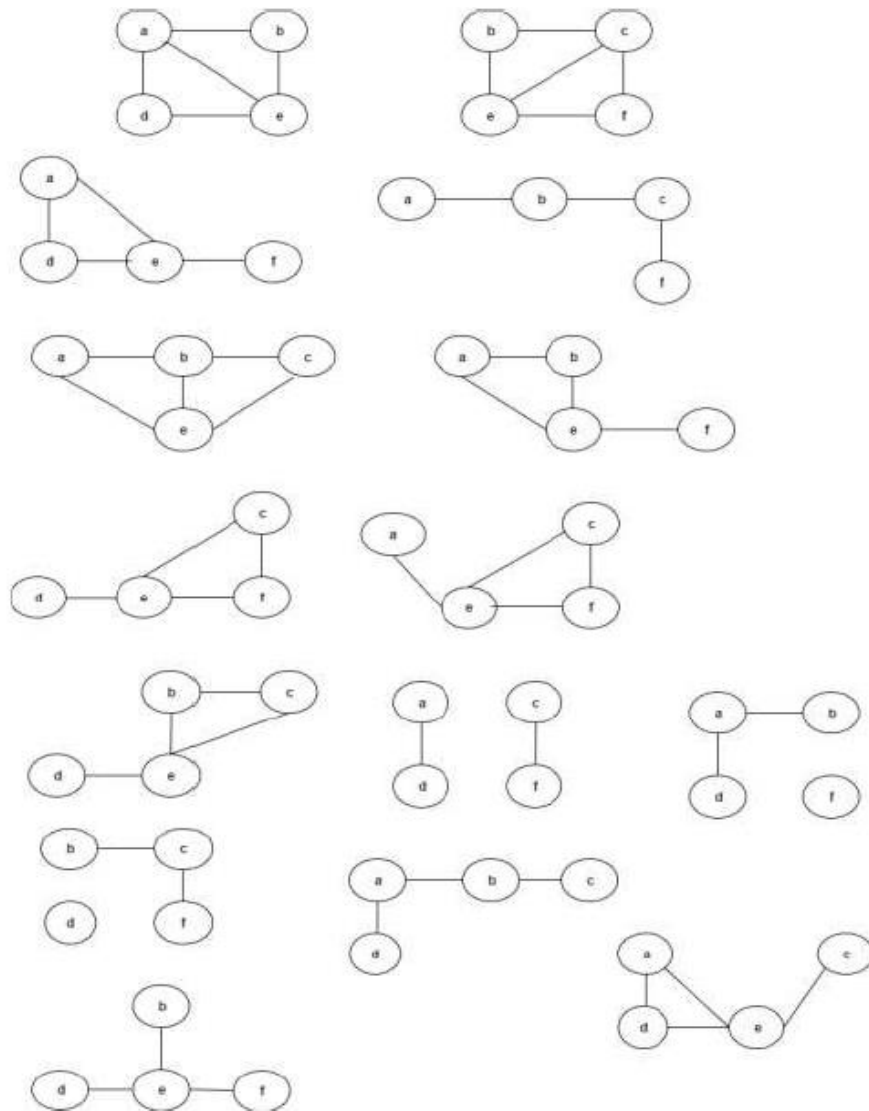
Adjacency matrix

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 3 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 5 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 6 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| 7 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |

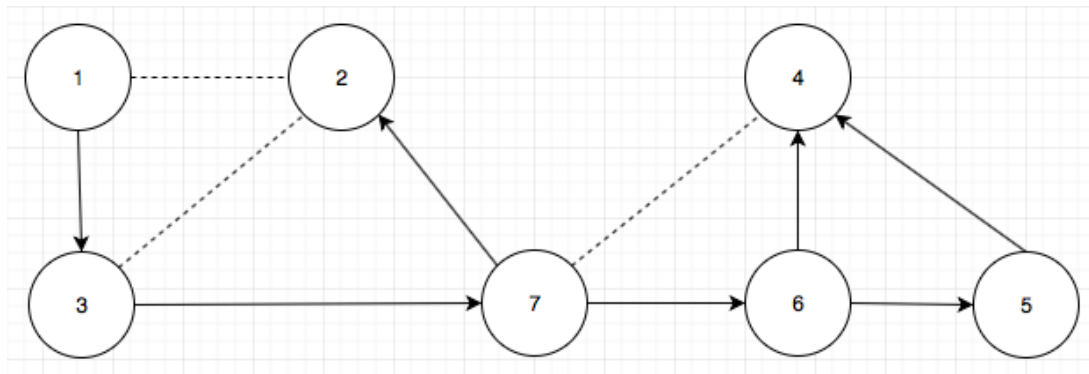
- b) order $n = 7$, size $m = 10$, diameter = 4, radius = 2, eccentricities (4,4,3,3,4,4,2)

Question 2

a)



- b) A spanning graph is a subgraph of a graph whose vertices set is the same as the vertices set of the original graph. For each possible edge in the original graph, there are 2 options; either it's in the subgraph or not. This will result in 2^m possible spanning subgraphs (where m is the number of edges) for the graph. So, G has $m=9$. Thus, $2^9 = 512$ total spanning subgraphs for the graph G .

Question 3

b)

- $\text{pred}[1] = \text{null}$
- $\text{pred}[2] = 7$
- $\text{pred}[3] = 1$
- $\text{pred}[4] = 5$
- $\text{pred}[5] = 6$
- $\text{pred}[6] = 7$
- $\text{pred}[7] = 3$

Question 4

Seen = [0, 10, 1, 5, 4, 3, 2]

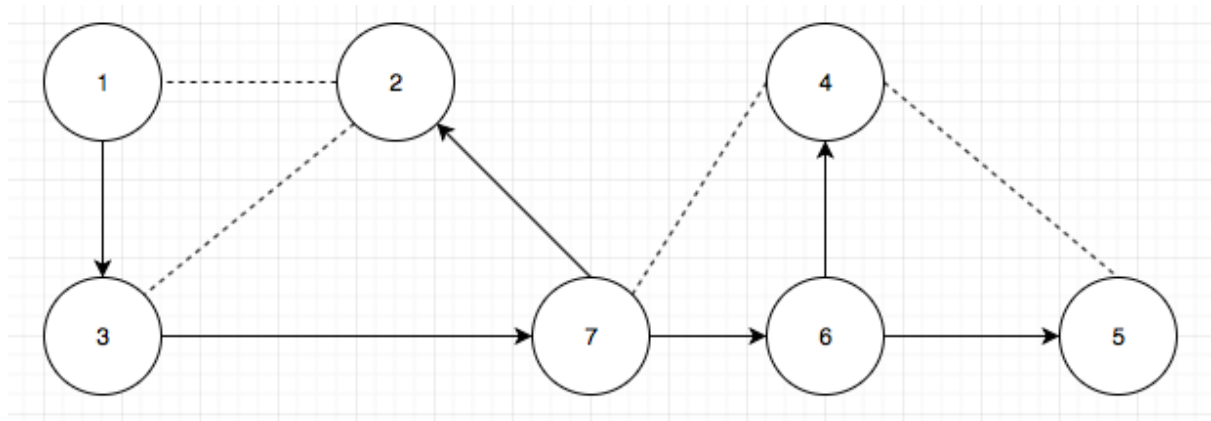
Done = [12, 11, 13, 6, 7, 8, 14]

b)

- (1,3) – tree arc
- (2,1) – back arc
- (2,3) – back arc
- (3,7) – tree arc
- (4,7) – back arc
- (5,4) – cross /forward arc
- (6,4) – tree arc
- (6,5) – tree arc
- (7,2) – tree arc
- (7,6) – tree arc

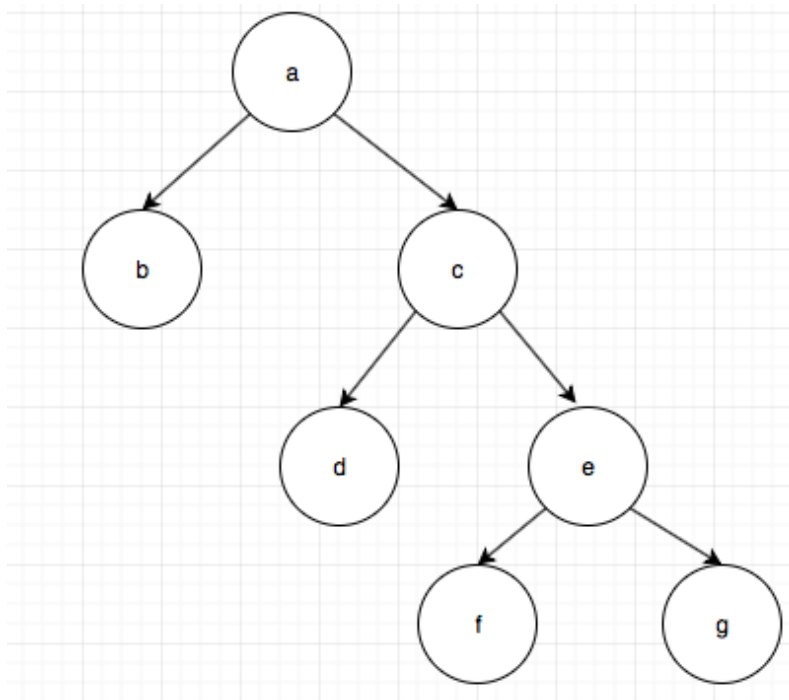
Question 5

a)

b) $d = [0, 1, 2, 3, 3, 4, 4]$

Question 6

a)



b)

