Question 1)

Adjacency matrix representation of figure 1.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | S | A | B | C | D | E | F | G |
| S | 0 | 3 | 2 | ∞ | ∞ | ∞ | ∞ | ∞ |
| A | ∞ | 0 | ∞ | ∞ | 1 | 2 | ∞ | ∞ |
| B | 3 | 2 | 0 | ∞ | 1 | ∞ | ∞ | ∞ |
| C | ∞ | ∞ | 4 | 0 | ∞ | ∞ | ∞ | ∞ |
| D | ∞ | ∞ | ∞ | ∞ | 0 | 1 | 2 | 2 |
| E | ∞ | ∞ | ∞ | ∞ | ∞ | 0 | 2 | 3 |
| F | ∞ | ∞ | ∞ | 1 | ∞ | ∞ | 0 | ∞ |
| G | ∞ | ∞ | ∞ | ∞ | ∞ | ∞ | 2 | 0 |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| STEP | VERTEX | S | A | B | C | D | E | F | G |
| 1 | S(0) | 0  S | 3  S | 2  S | ∞ | ∞ | ∞ | ∞ | ∞ |
| 2 | B(2) | 0  S | 3  S | 2  S | ∞ | 3  B | ∞ | ∞ | ∞ |
| 3 | A(3) | 0  S | 3  S | 2  S | ∞ | 3  B | ∞ | ∞ | ∞ |
| 4 | D(3) | 0  S | 3  S | 2  S | ∞ | 3  B | 4  D | 5  D | 5  D |
| 5 | E (4) | 0  S | 3  S | 2  S | ∞ | 3  B | 4  D | 5  D | 5  D |
| 6 | G (5) | 0  S | 3  S | 2  S | ∞ | 3  B | 4  D | 5  D | 5  D |
| 7 | F(5) | 0  S | 3  S | 2  S | 6  F | 3  B | 4  D | 5  D | 5  D |
| 8 | C(6) | 0  S | 3  S | 2  S | 6  F | 3  B | 4  D | 5  D | 5  D |

|  |  |
| --- | --- |
| Vertex | Distance from S |
| S | 0 |
| a | 3 |
| B | 2 |
| C | 6 |
| D | 3 |
| E | 4 |
| f | 5 |
| g | 5 |

A picture containing wall, white

Description automatically generated

Q2) Undireccted

Diagram

Description automatically generatedDiagram

Description automatically generatedDiagram

Description automatically generatedDiagram

Description automatically generatedDiagram

Description automatically generatedDiagram

Description automatically generatedDiagram

Description automatically generatedDiagram

Description automatically generated



Cost = S->B->D->E->F->C->G->A

2+1+1+2+1+3+2=12

Q3) Undirected

Diagram

Description automatically generatedDiagram

Description automatically generatedDiagram

Description automatically generated



Diagram

Description automatically generated



Diagram

Description automatically generatedDiagram

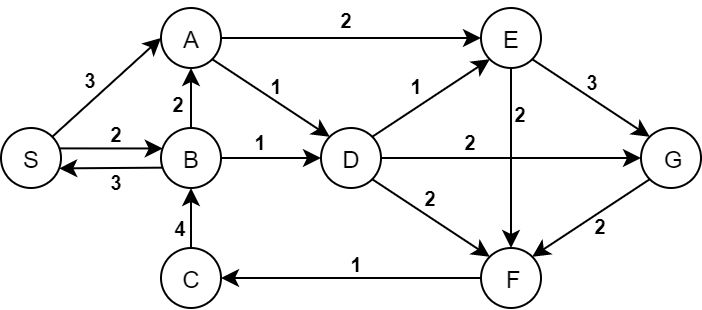
Description automatically generatedDiagram

Description automatically generated

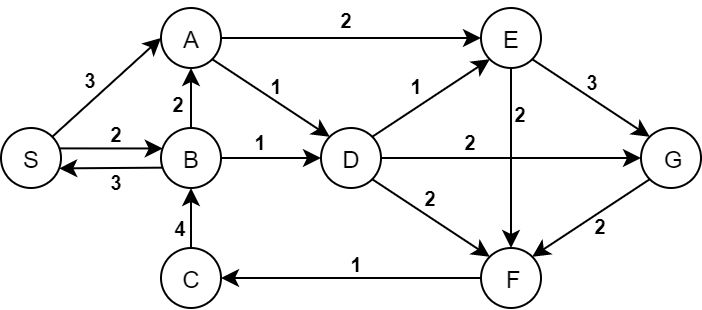


Q4)

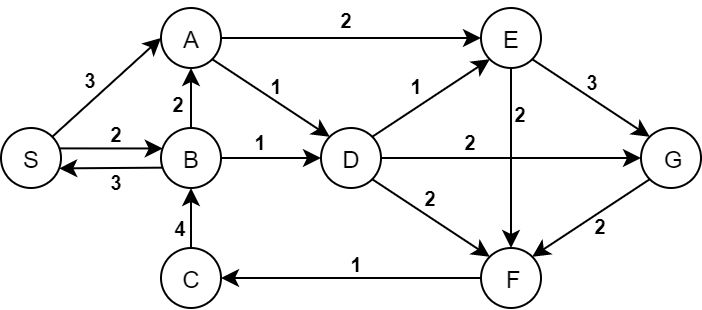
S -> A -> B -> D -> E -> F -> G -> C



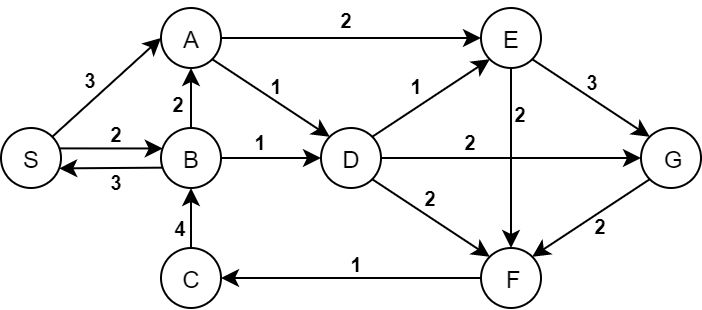




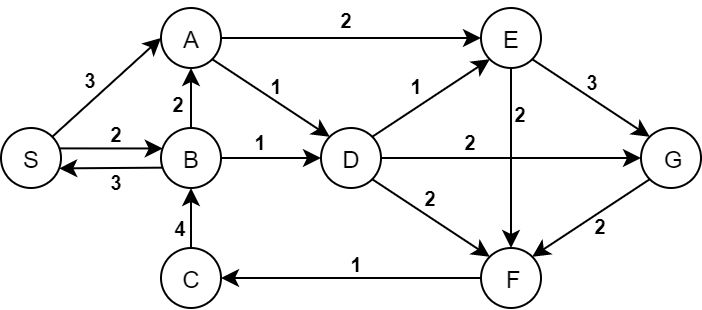




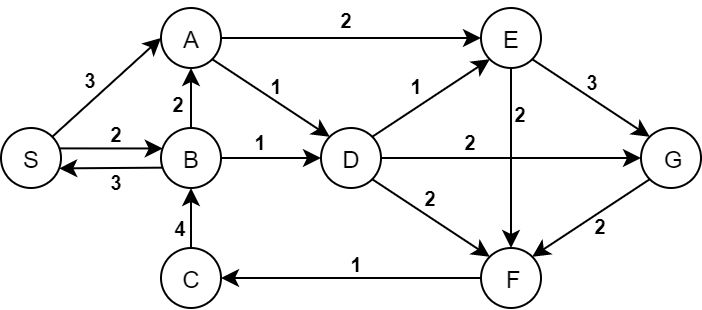




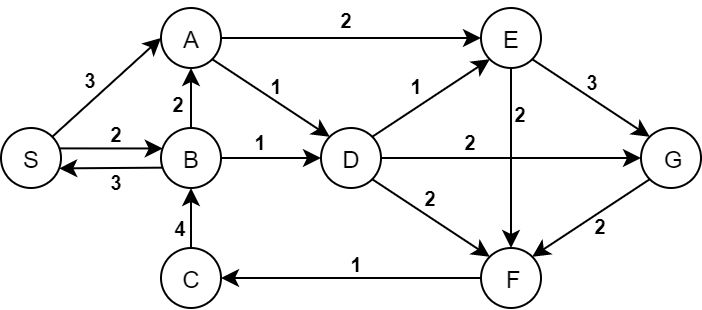








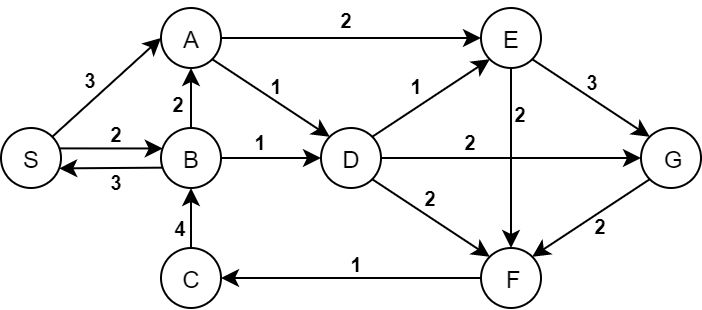




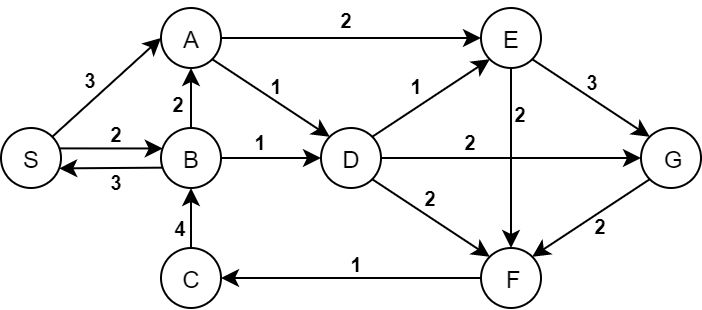


Q5)Part A

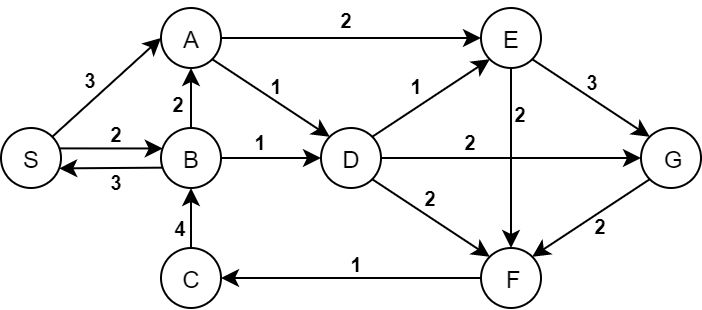
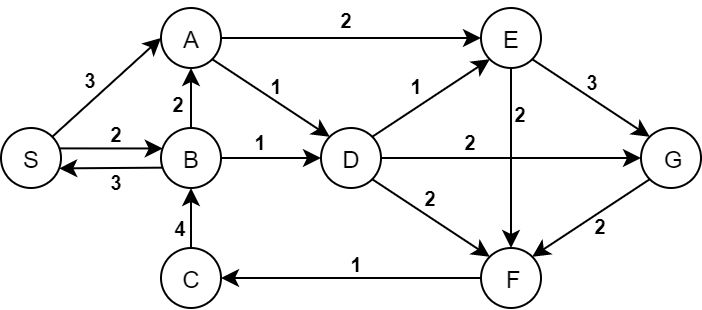
S -> A -> D -> E -> F -> C -> B -> G



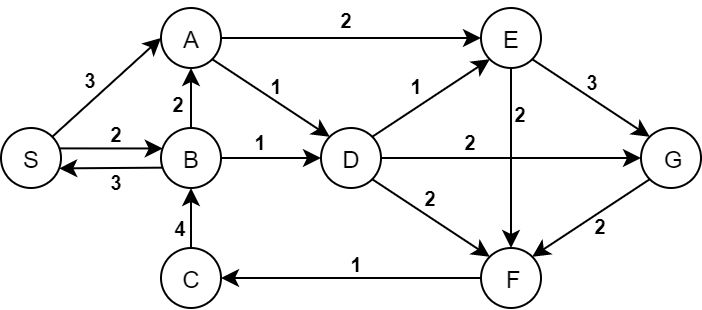




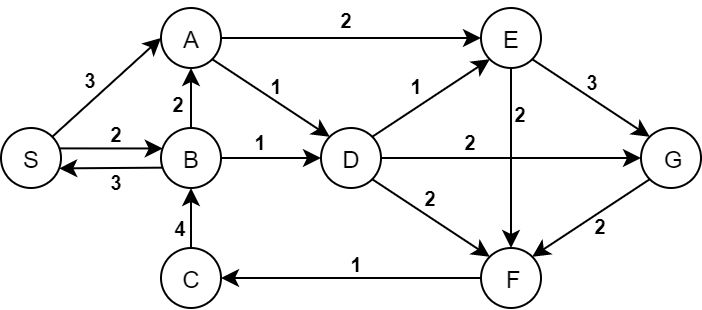




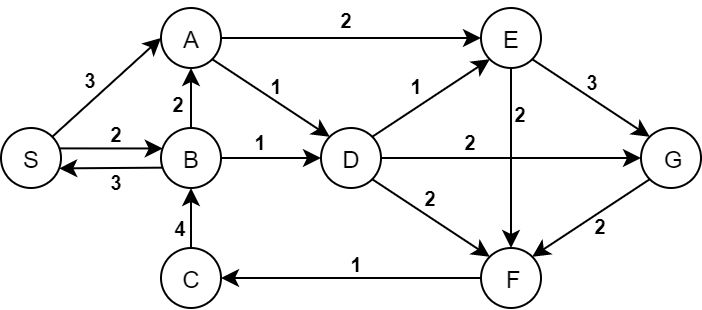












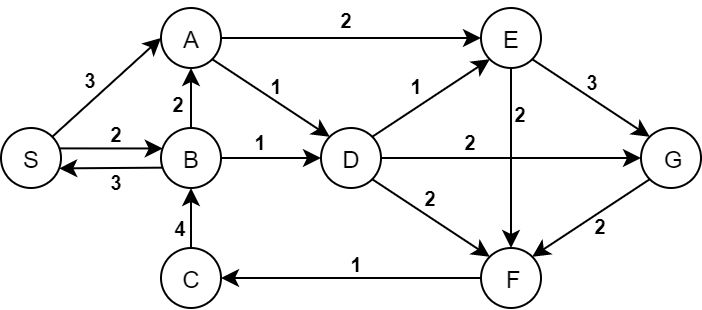


Part B && C of Q5

|  |  |  |
| --- | --- | --- |
|  | PRE | POST |
| S | 1 | 16 |
| A | 2 | 15 |
| D | 3 | 14 |
| E | 4 | 13 |
| F | 5 | 10 |
| C | 6 | 9 |
| B | 7 | 8 |
| G | 11 | 12 |

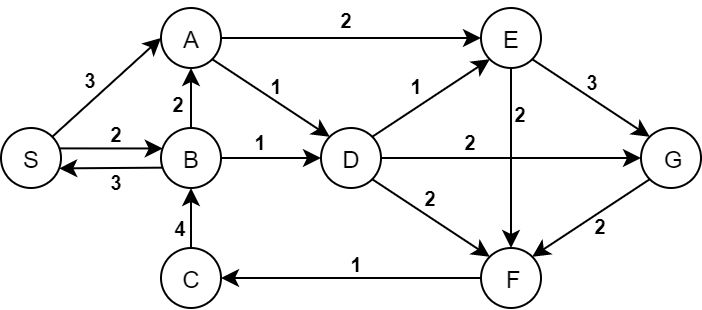
Q5 PART D)

Tree arcs



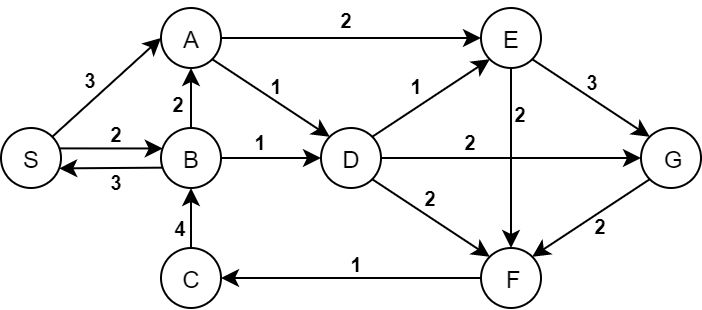


Forward arcs



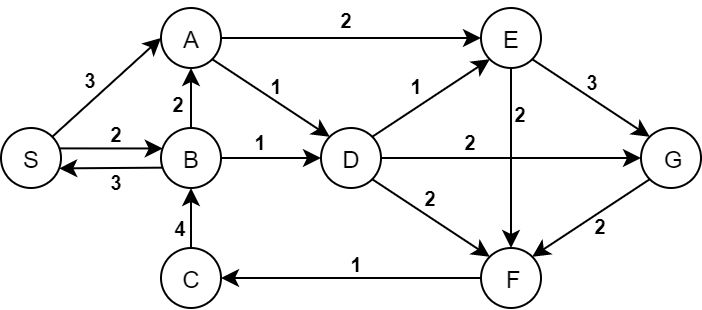


Backward Arcs



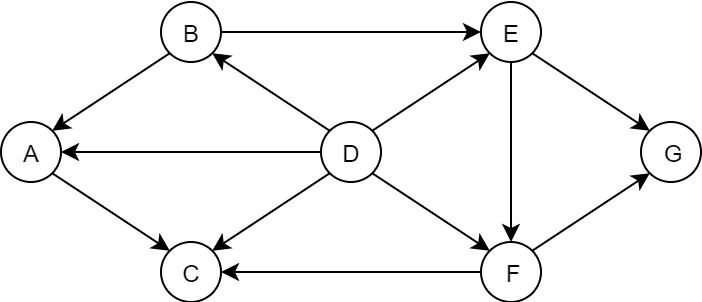


Cross Edge





Q6)



TOPOLOCİGAL ORDER : D->B ->E->F->G->A->C