

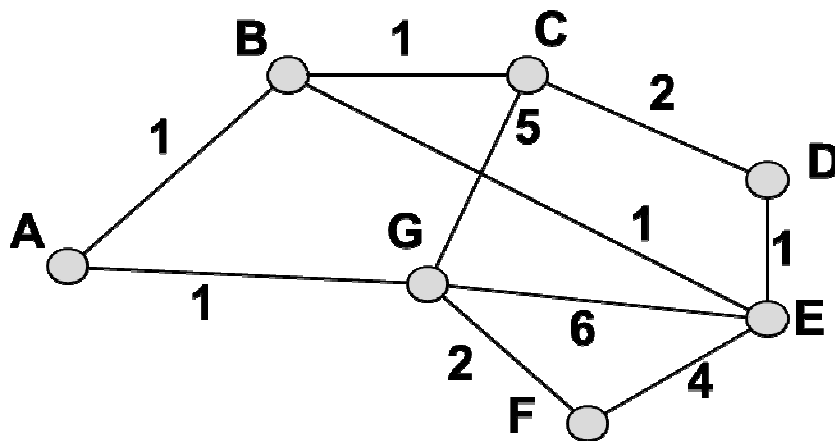
San

Quesito 1

Consider the graph shown in figure, in which the edges are bi-directional with equal cost in the two directions. Run the first 5 steps of the Dijkstra algorithm, starting from node G (in each step, a node is added, so that after 5 steps you'll have 6 nodes in the subset of the minimal spanning tree). Clearly report all the status for each step in the table below.

Which nodes are part of the minimal spanning tree after the first 5 steps?

Draw the subgraph that includes the nodes and the links identified by Dijkstra algorithm after 5 steps.



Step	T	L(A)	Path	L(B)	Path	L(C)	Path	L(D)	Path	L(E)	Path	L(F)	Path
0	G	1		∞		5		∞		6		2	
1													
2													
3													
4													
5													

Easy way to solve but you need to fill the table any case

<https://youtu.be/bZkzH5x0SKU>

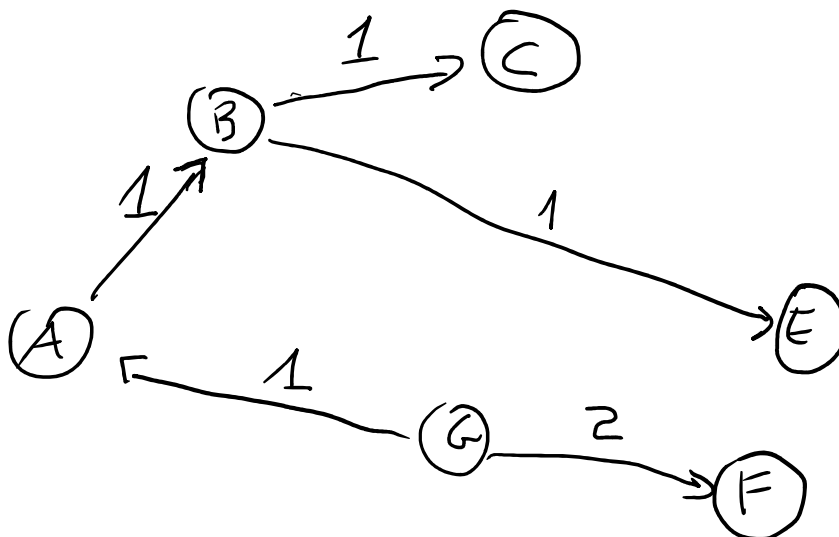
Solution

Step	T	L(A)	Path	L(B)	Path	L(C)	Path	L(D)	Path	L(E)	Path	L(F)	Path
0	G	1		∞		5		∞		6		2	
1	G, A	1	G-A	2		5		∞		6		2	
2	G A B	1	G-A	2	GAB	3		∞		3		2	
3	G A B F	1	G-A	2	GAB	3		∞		3		2	GF
4	GABFC	1	G-A	2	GAB	3	GABC	5		3		2	GF
5	GABFCE	1	G-A	2	GAB	3	GABC	4		3	ABE	2	GF

Which nodes are part of the minimal spanning tree after the first 5 steps?

GABFCE

Draw the subgraph that includes the nodes and the links identified by Dijkstra algorithm after 5 steps



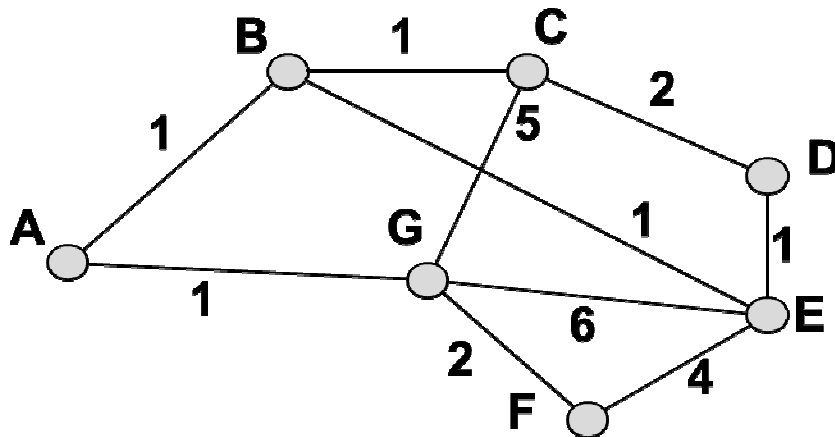
Note that the arcs are directed (they are represented with an arrow)

Quesito 2

Consider the graph shown in figure, in which the edges are bi-directional with equal cost in the two directions. Run the first 4 steps of the Dijkstra algorithm, starting from node E (in each step, a node is added, so that after 4 steps you'll have 5 nodes in the subset of the minimal spanning tree).

Clearly report all the status for each step in the table below.

Which nodes are part of the minimal spanning tree after the first 4 steps?



Step	T	L(A)	Path	L(B)	Path	L(C)	Path	L(D)	Path	L(F)	Path	L(G)	Path
0	E												
1													
2													
3													
4													

Solution

Step	T	L(A)	Path	L(B)	Path	L(C)	Path	L(D)	Path	L(F)	Path	L(G)	Path
0	E	∞		1		∞		1		4		6	
1	E, B	2		1	EB	2		1		4		6	
2	E B D	2		1	EB	2		1	ED	4		4	
3	E B D A	2	EBA	1	EB	2		1	ED	4		3	
4	E B D A C	2	EBA	1	EB	2	EBC	1	ED	4		3	

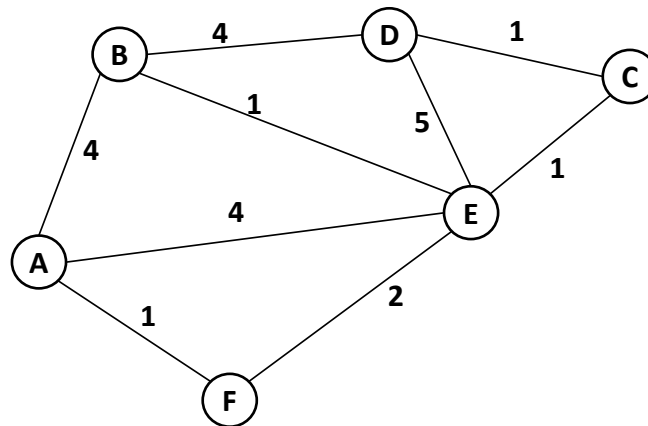
Which nodes are part of the minimal spanning tree after the first 4 steps?

E B D A C

Quesito 3

Consider the graph shown in figure, in which the edges are bi-directional with equal cost in the two directions. Find the minimal spanning tree starting from node D using the Dijkstra algorithm, Clearly report all the status for each step of the algorithm in the table below.

Draw the minimal spanning tree starting from node D indicating the cost of the links.

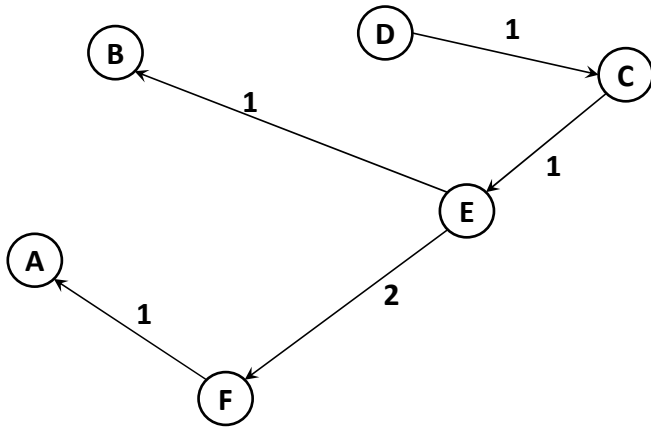


Step	T	L()	Path	L()	Path	L()	Path	L()	Path	L()	Path
0	D										
1											
2											
3											
4											
5											

Solution

Step	T	L(A)	Path	L(B)	Path	L(C)	Path	L(E)	Path	L(F)	Path
0	D	∞		4		1		5		∞	
1	D C	∞		4		1	DC	2		∞	
2	D C E	6		3		1	DC	2	DCE	4	
3	D C E B	6		3	DCEB	1	DC	2	DCE	4	
4	D C E B F	5		3	DCEB	1	DC	2	DCE	4	DCEF
5	D C E B F A	5	DCEFA	3	DCEB	1	DC	2	DCE	4	DCEF

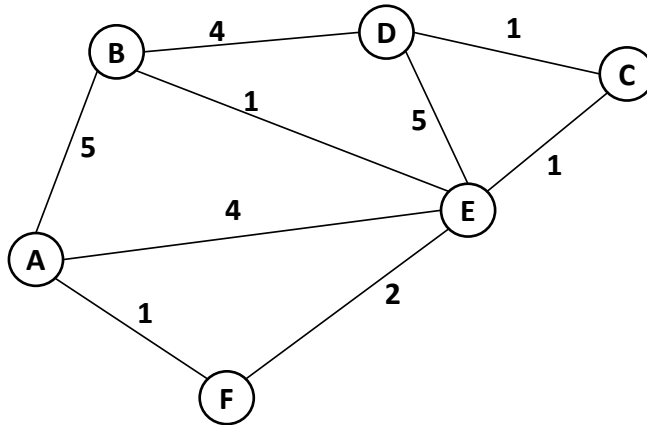
Draw the minimal spanning tree indicating the cost of the links



Quesito 4

Consider the graph shown in figure, in which the edges are bi-directional with equal cost in the two directions. Find the minimal spanning tree starting from node B using the Dijkstra algorithm, Clearly report all the status for each step of the algorithm in the table below.

Draw the minimal spanning tree starting from node B indicating the cost of the links.

[illegible]

Solution

Step	T	L(A)	Path	L(C)	Path	L(D)	Path	L(E)	Path	L(F)	Path
0	B	5		∞		4		1		∞	
1	B E	5		2		4		1	BE	3	
2	B E C	5		2	BEC	3		1	BE	3	
3	B E C D	5		2	BEC	3	BECD	2	BEC	3	
4	B E C D F	4		2	BEC	3	BECD	2	BEC	3	BEF
5	B E C D F A	4	BEFA	2	BEC	3	BECD	2	BEC	3	BEF

Draw the minimal spanning tree (drawing not reported in the solution)

wrong Solution refer to notes