

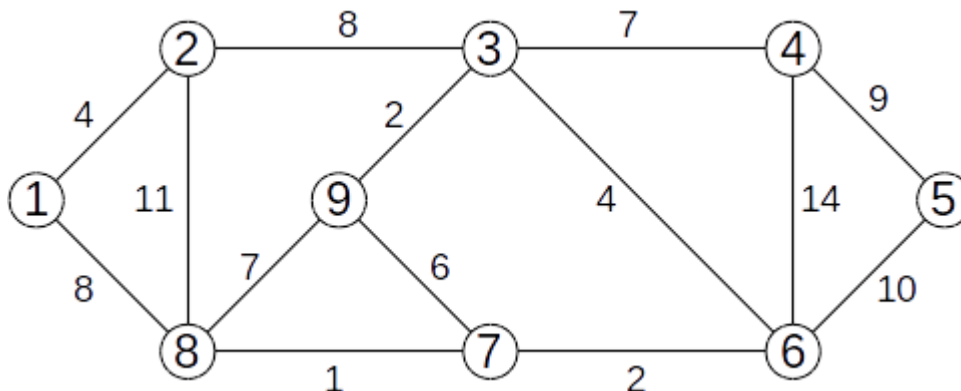
Aplicatii rezolvate – Arbori partiali de cost minim –

APLICATIA 1: Fie graful neorientat ponderat (G, c) reprezentat prin matricea costurilor:

$$A = \begin{pmatrix} 0 & 4 & \infty & \infty & \infty & \infty & \infty & 8 & \infty \\ 4 & 0 & 8 & \infty & \infty & \infty & \infty & 11 & \infty \\ \infty & 8 & 0 & 7 & \infty & 4 & \infty & \infty & 2 \\ \infty & \infty & 7 & 0 & 9 & 14 & \infty & \infty & \infty \\ \infty & \infty & \infty & 9 & 0 & 10 & \infty & \infty & \infty \\ \infty & \infty & 4 & 14 & 10 & 0 & 2 & \infty & \infty \\ \infty & \infty & \infty & \infty & \infty & 2 & 0 & 1 & 6 \\ 8 & 11 & \infty & \infty & \infty & \infty & 1 & 0 & 7 \\ \infty & \infty & 2 & \infty & \infty & \infty & 6 & 7 & 0 \end{pmatrix}$$

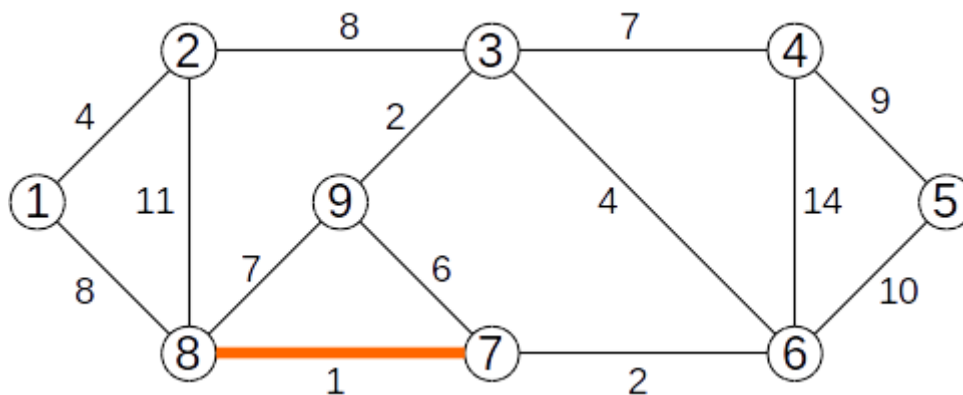
Determinati, folosind *Algoritmul lui Kruskal*, arborele parțial de cost minim pentru acest graf.

SOLUTIE: Reprezentam graful:



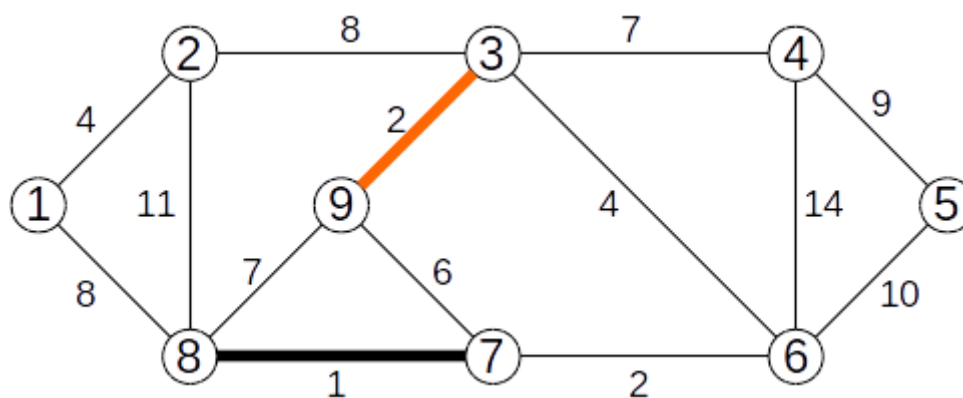
Vom determina, folosind Algoritmul lui Kruskal, arborele parțial de cost minim pentru acest graf. Muchiile se analizeaza în ordine crescătoare. Sunt adaugate doar cele care nu formeaza cicluri cu muchiile deja selectate (cele adaugate sunt reprezentat ingrosat, iar cele care formeaza cicluri se ignora si sunt reprezentate punctat in figuri).

1.



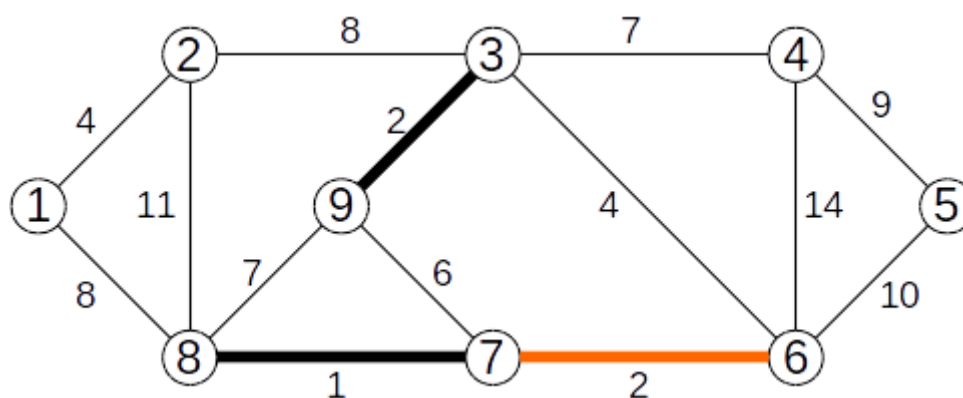
Se adaugă muchia (7,8) de cost 1.

2.



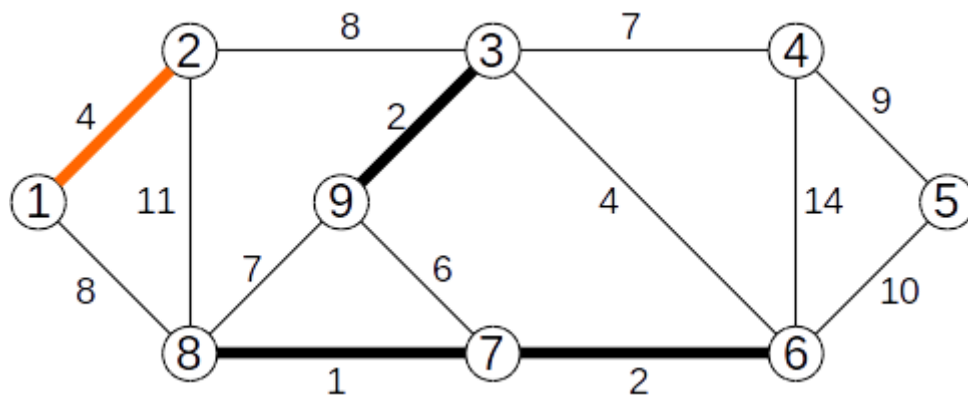
Se adaugă muchia (3,9) de cost 2

3.



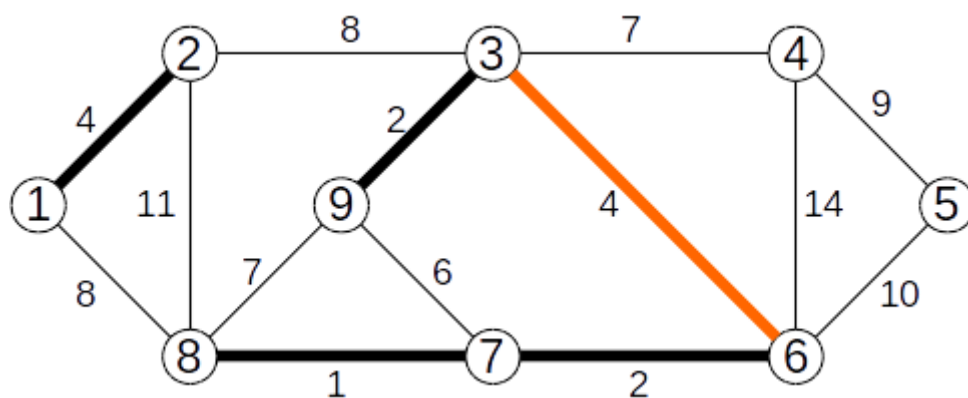
Se adaugă muchia (6,7) de cost 2

4.



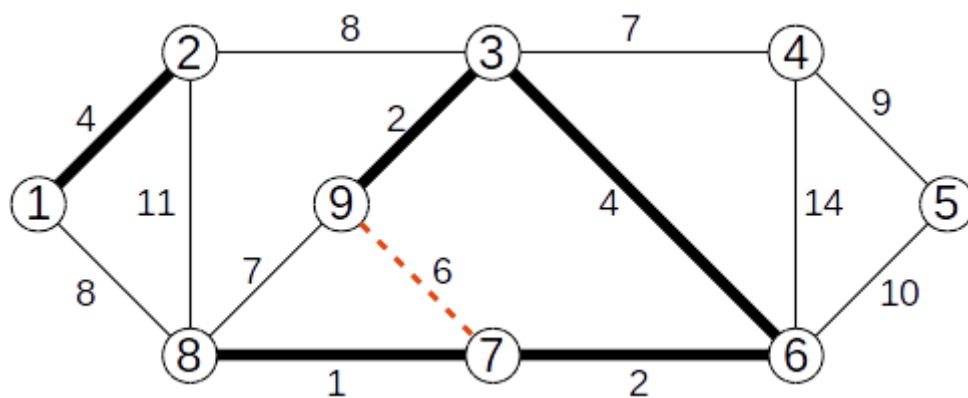
Se adaugă muchia (1,2) de cost 4

5.



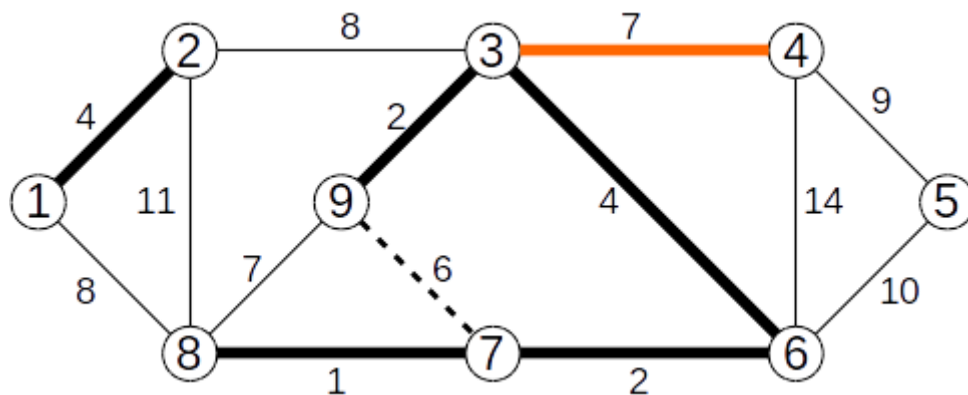
Se adaugă muchia (3,6) de cost 4

6.



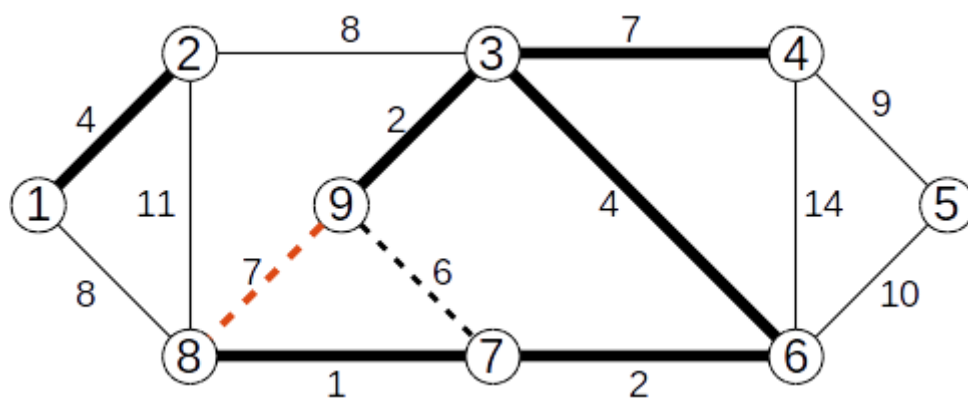
Se ignoră muchia (7,9) de cost 6

7.



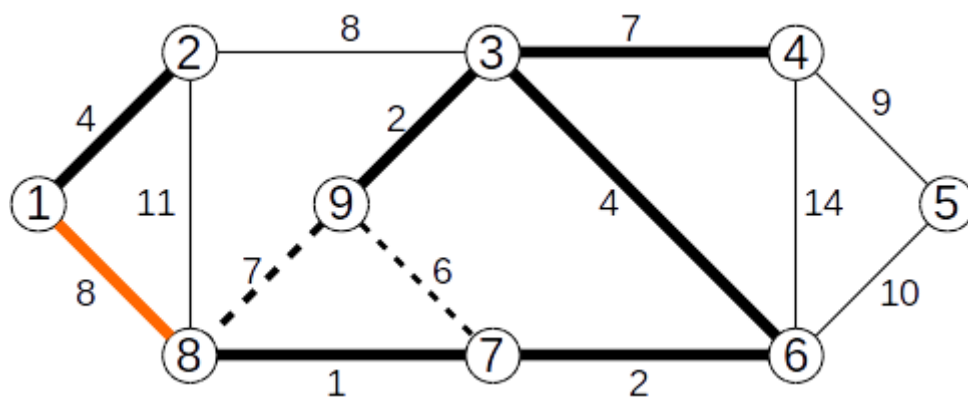
Se adaugă muchia (3,4) de cost 7

8.



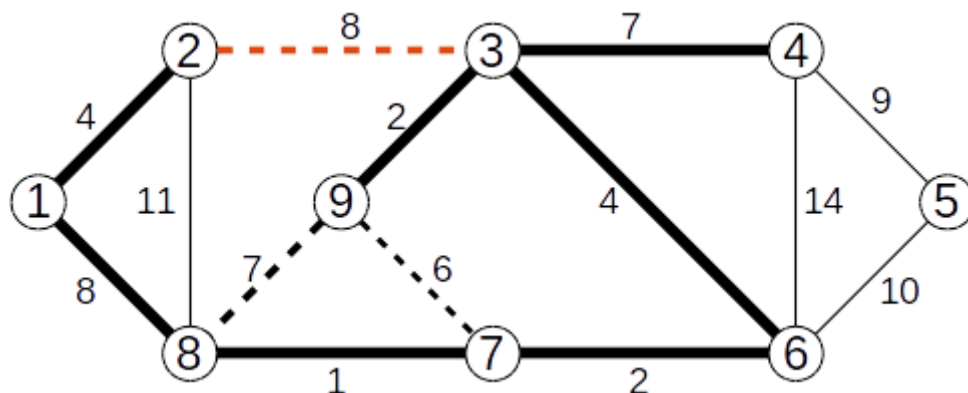
Se ignoră muchia (8,9) de cost 7

9.



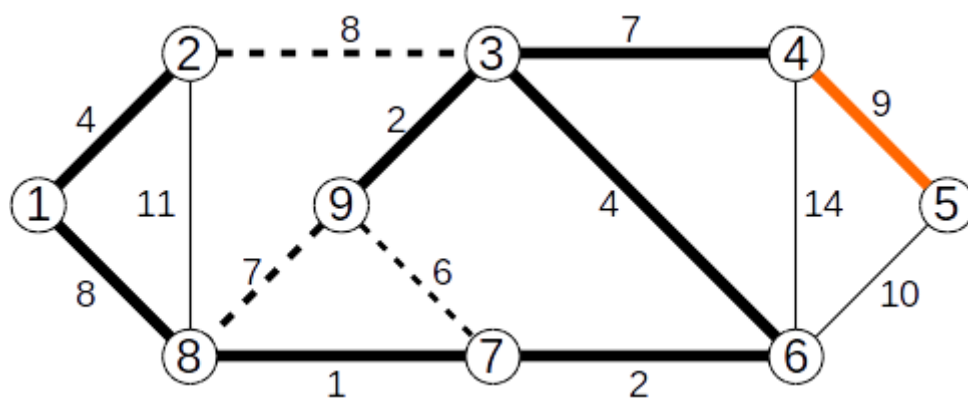
Se adaugă muchia (1,8) de cost 8

10.



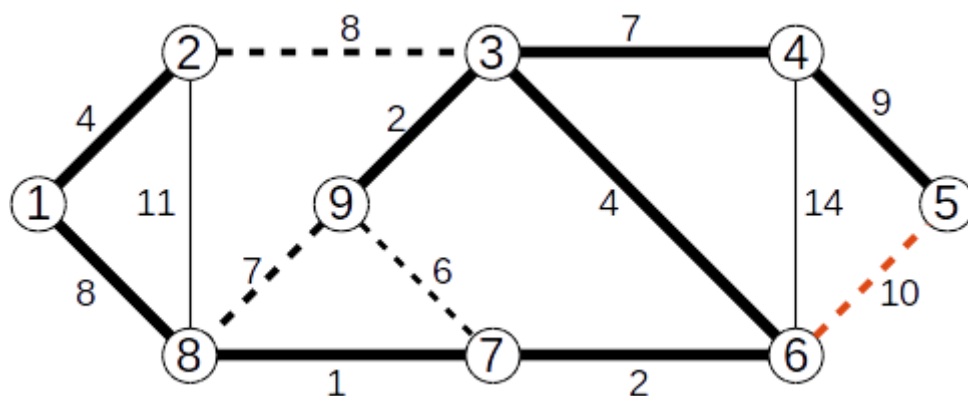
Se ignoră muchia (2,3) de cost 8

11.



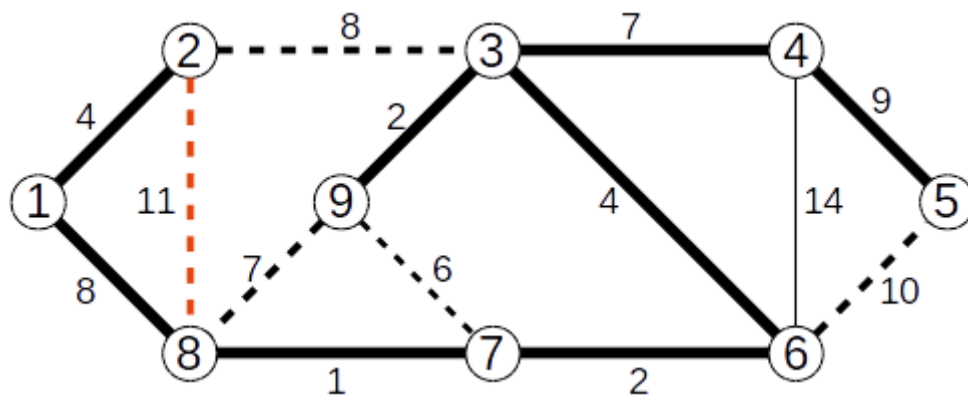
Se adaugă muchia (4,5) de cost 9

12.



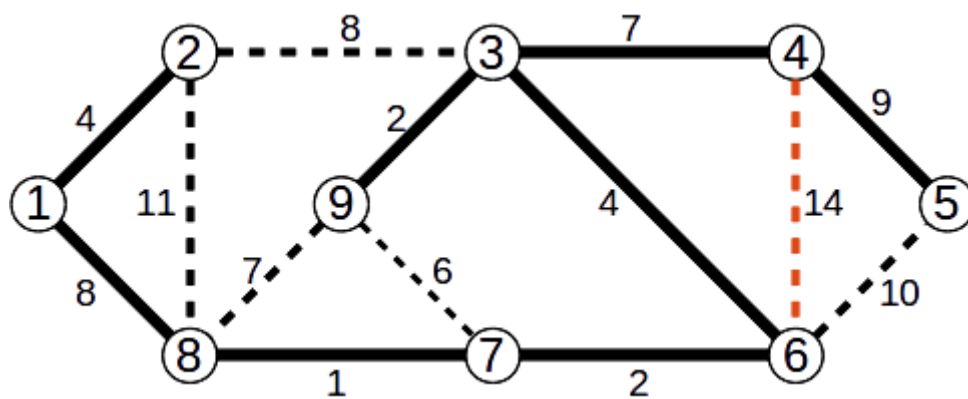
Se ignoră muchia (5,6) de cost 10

13.



Se ignoră muchia (2,8) de cost 11

14.



Se ignoră muchia (4,6) de cost 14.

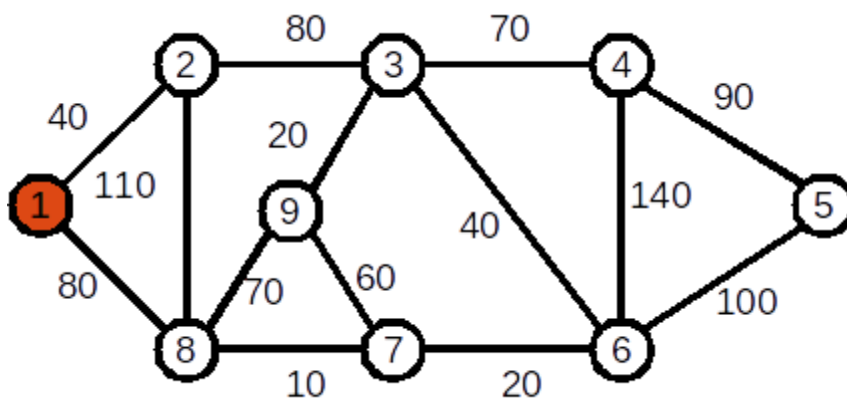
Costul total este 37.

APLICATIA 2: Fie graful neorientat ponderat (G, c) reprezentat prin matricea costurilor:

$$A = \begin{pmatrix} 0 & 40 & \infty & \infty & \infty & \infty & \infty & 80 & \infty \\ 40 & 0 & 80 & \infty & \infty & \infty & \infty & 110 & \infty \\ \infty & 80 & 0 & 70 & \infty & 40 & \infty & \infty & 20 \\ \infty & \infty & 70 & 0 & 90 & 140 & \infty & \infty & \infty \\ \infty & \infty & \infty & 90 & 0 & 100 & \infty & \infty & \infty \\ \infty & \infty & 40 & 140 & 100 & 0 & 20 & \infty & \infty \\ \infty & \infty & \infty & \infty & \infty & 20 & 0 & 10 & 60 \\ 80 & 110 & \infty & \infty & \infty & \infty & 10 & 0 & 70 \\ \infty & \infty & 20 & \infty & \infty & \infty & 60 & 70 & 0 \end{pmatrix}$$

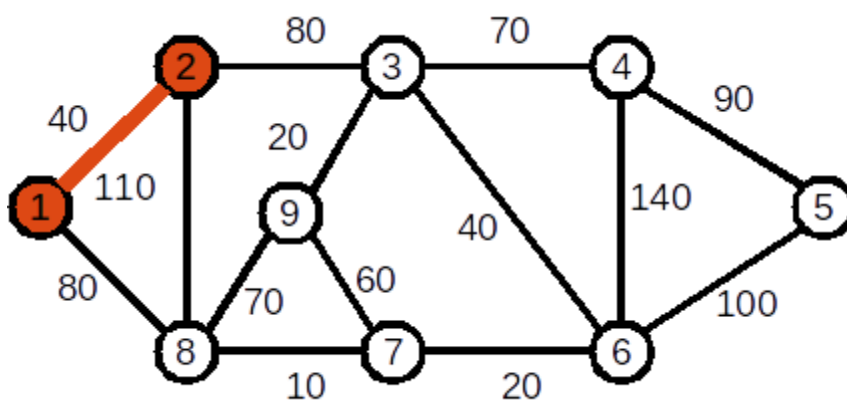
Determinati, folosind *Algoritmul lui Prim*, arborele parțial de cost minim pentru acest graf.

SOLUTIE: Reprezentăm graful. Mai jos este descris modul în care se aleg nodurile care se adaugă în arbore pentru acest graf ponderat. Selectăm de fiecare dată o muchie de cost minim care leagă un nod selectat de altul neselectat care devine acum selectat.



Nodul inițial este 1.

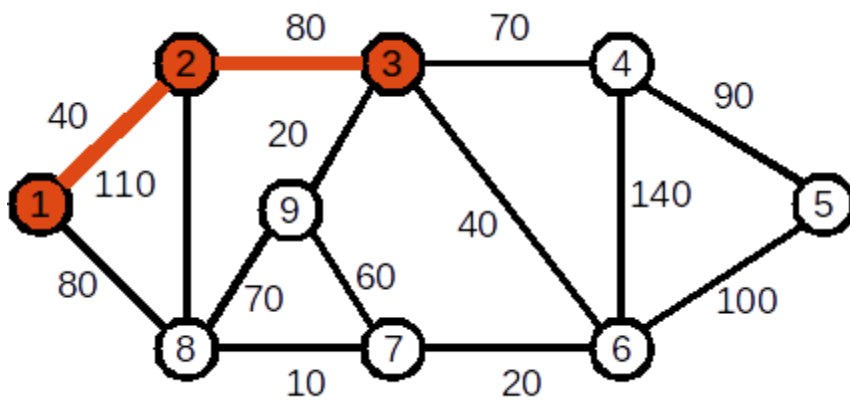
Costul curent al APM este 0



Se adaugă nodul 2.

Muchia folosită este (1,2).

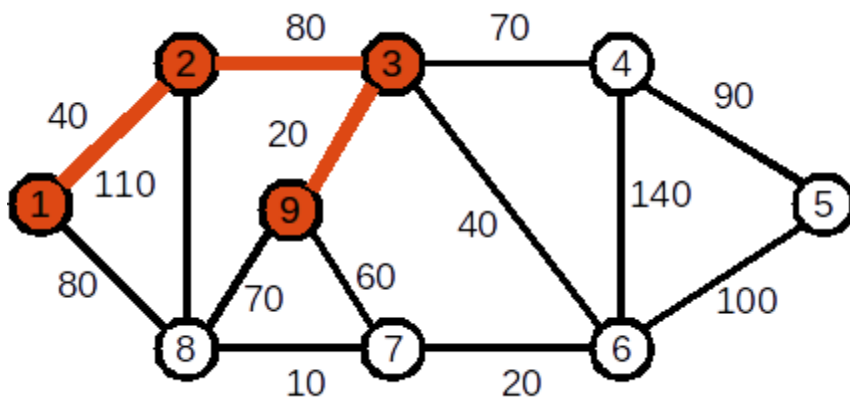
Costul curent al APM este 40



Se adaugă nodul 3.

Muchia folosită este (2,3).

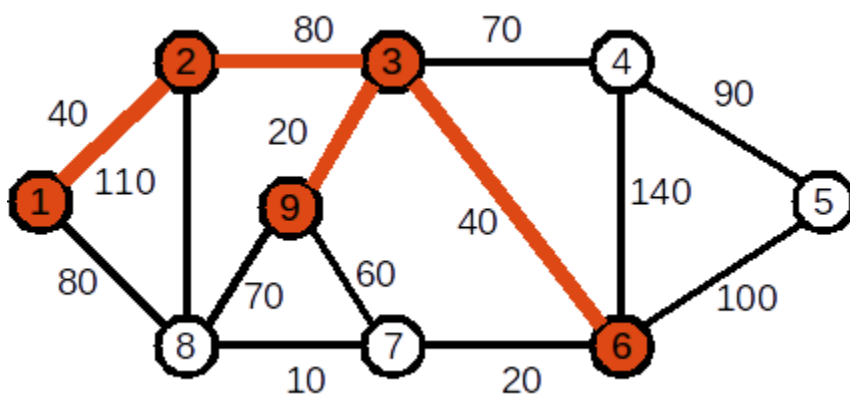
Costul curent al APM este 120



Se adaugă nodul 9.

Muchia folosită este (3,9).

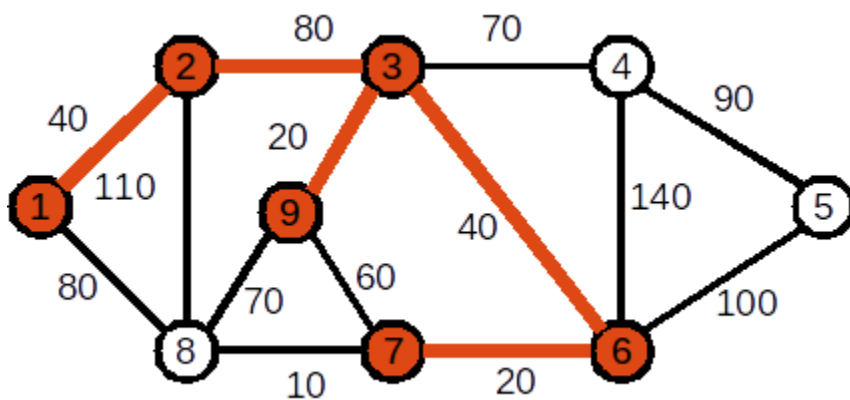
Costul curent al APM este 140



Se adaugă nodul 6.

Muchia folosită este (3,6).

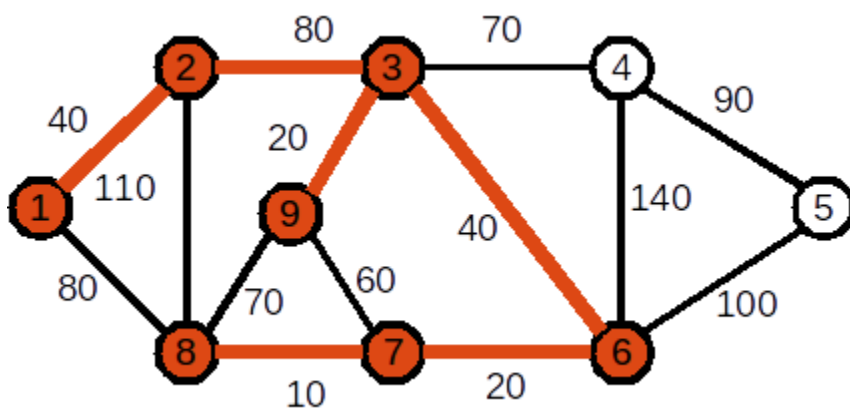
Costul curent al APM este 180



Se adaugă nodul 7.

Muchia folosită este (6,7).

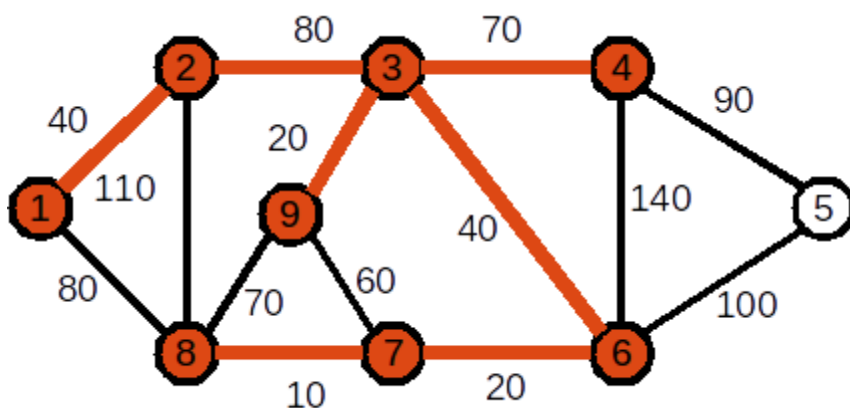
Costul curent al APM este 200



Se adaugă nodul 8.

Muchia folosită este (7,8).

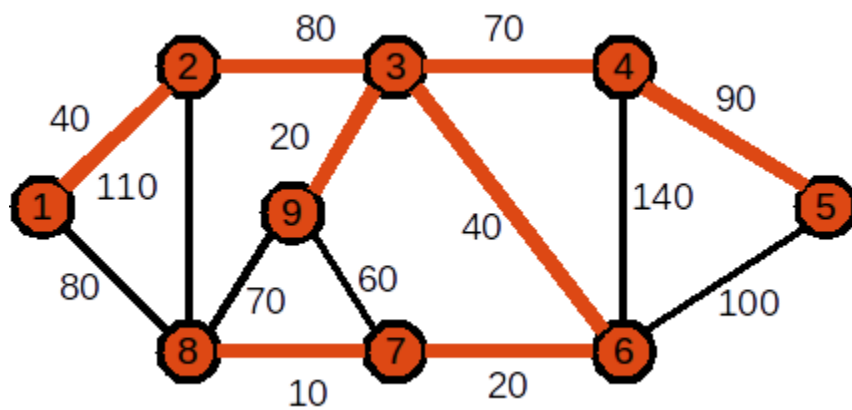
Costul curent al APM este 210



Se adaugă nodul 4.

Muchia folosită este (3,4).

Costul curent al APM este 280



Se adaugă nodul 5.

Muchia folosită este (4,5).

Costul curent al APM este 370.