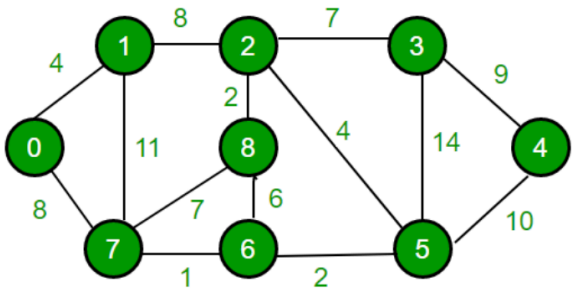
1. (20 points) Use Dijkstra to find the shortest path tree of the following weighted graph with source 0:



Starting at 0:
From 0 to 1 the shortest path is from 0 -> 1 which is its neighbor, the weight is 4.
From 0 to 2 the shortest path is from 0 ->1 ->2: the weight is 4+8 = 12
From 0 to 3 the shortest path is from 0 ->1 ->2 ->3: the weight is 4+8+7 = 19
From 0 to 4 the shortest path is from 0 -> 7 ->6 ->5 ->4: the weight is 8+1+2+10 = 21
From 0 to 5 the shortest path is from 0 -> 7 -> 6 -> 5: the weight is 8+1+2 = 11
From 0 to 6 the shortest path is from 0 -> 7 -> 6: the weight is 8+1 = 9
From 0 to 7 the shortest path is from 0 -> 7 which is its neighbor, the weight is 8
From 0 to 8 the shortest path is from 0 ->1 ->2 -> 8: the weight is 4+8+2 = 14

Vertices connections and weights
0 to 1 = 4
0 to 7 = 8
1 to 2 = 8
1 to 7 = 11
2 to 3 = 7
2 to 8 = 2
2 to 5 = 4
3 to 4 = 9
3 to 5 = 14
5 to 4 = 10
6 to 6 = 2
7 to 6 = 1
8 to 6 = 6
8 to 7 = 7