Kruskal's Algorithm

Algorithm that is guaranteed to find a minimum spanning tree in a graph

1. Rank your edges from lowest to highest cost

2. Have all vertices been connected to the minimum spanning tree?

A. If yes, stop. You have found the minimum spanning tree.

B. If no, go to step 3.

3. Pick one edge with the lowest cost that has not yet been added to the minimum spanning tree

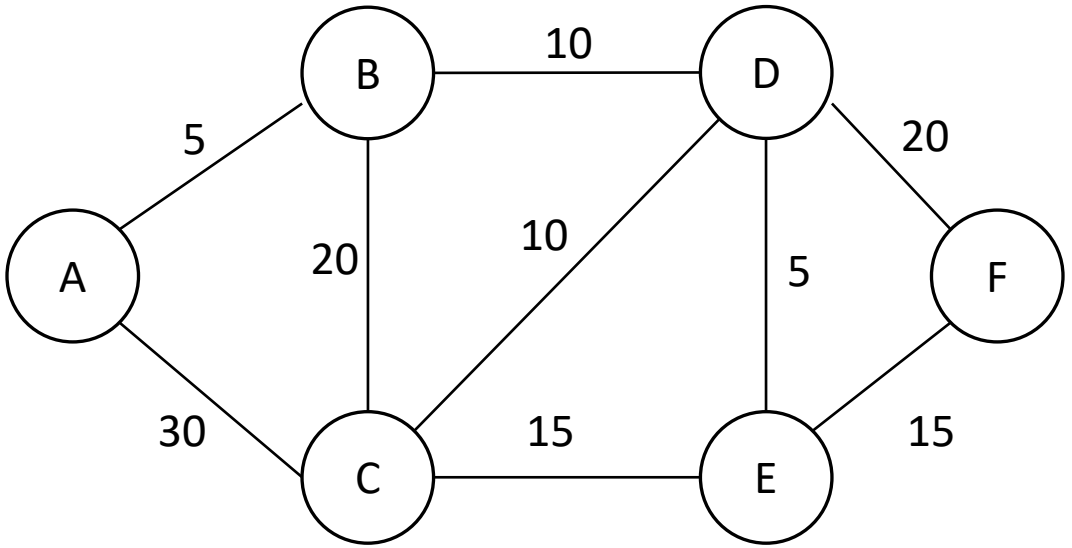
A. Does the edge create a cycle?

- If yes, eliminate the edge from consideration and go to step 3

- If no, add the edge to the minimum spanning tree and go to step 2

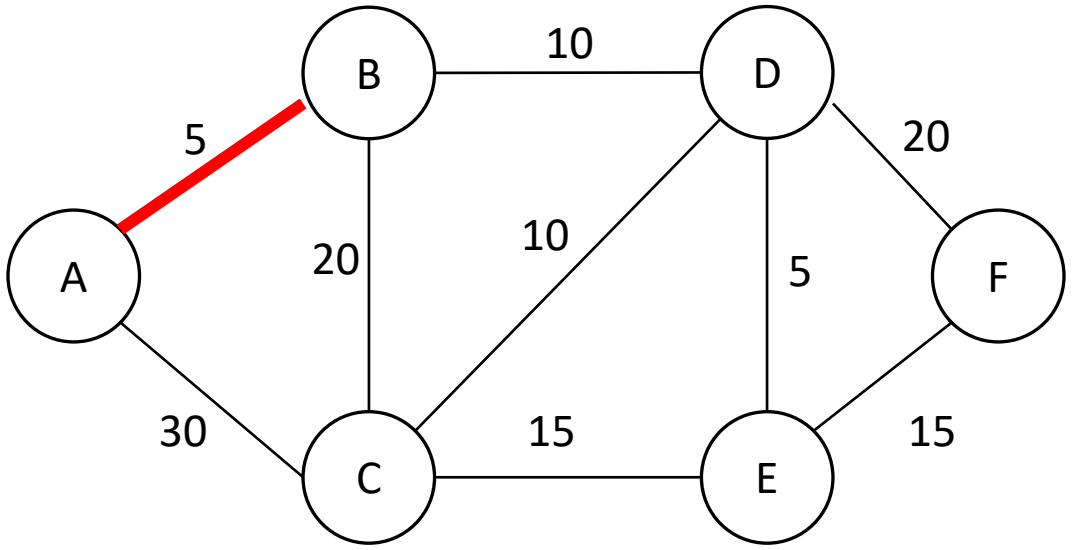
Example taken from Kenji Ikeda
http://www-b2.is.tokushima-u.ac.jp/~ikeda/

Example of Kruskal's Algorithm



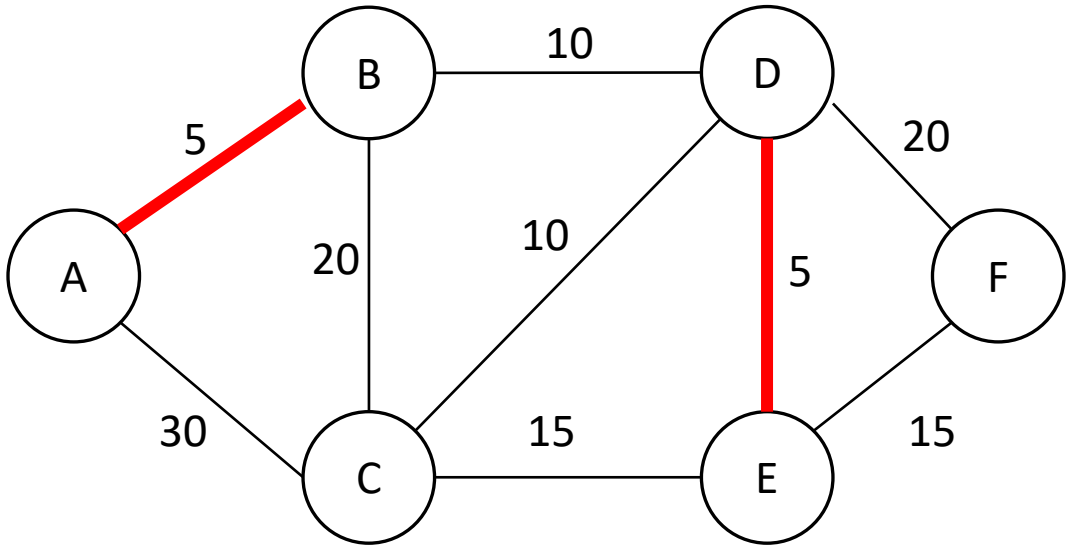
A – B = 5
D – E = 5
B – D = 10
C – D = 10
C – E = 15
E – F = 15
C – B = 20
D – F = 20
A -- C = 30

Example of Kruskal's Algorithm



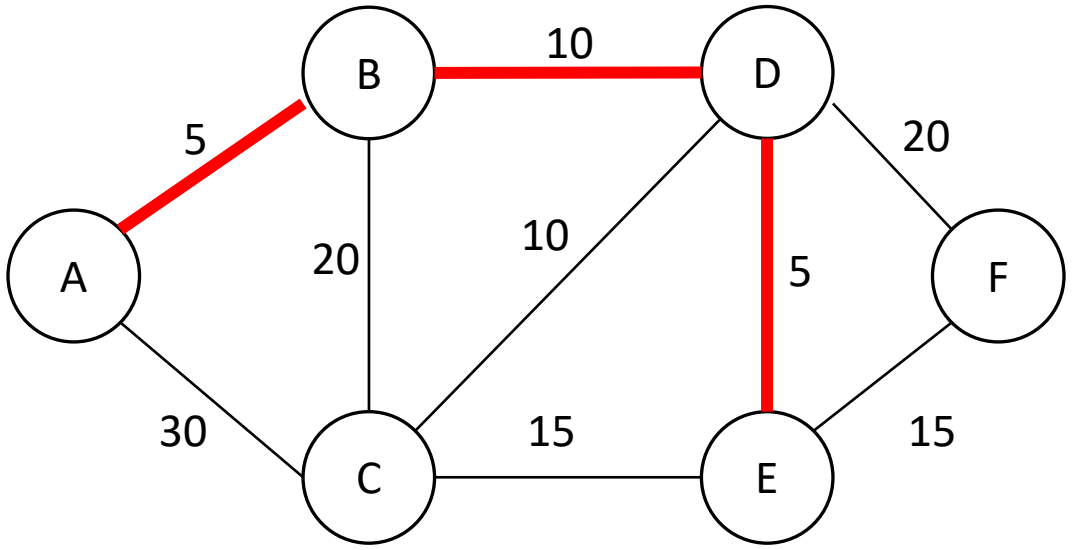
A – B = 5
D – E = 5
B – D = 10
C – D = 10
C – E = 15
E – F = 15
C – B = 20
D – F = 20
A -- C = 30

Example of Kruskal's Algorithm



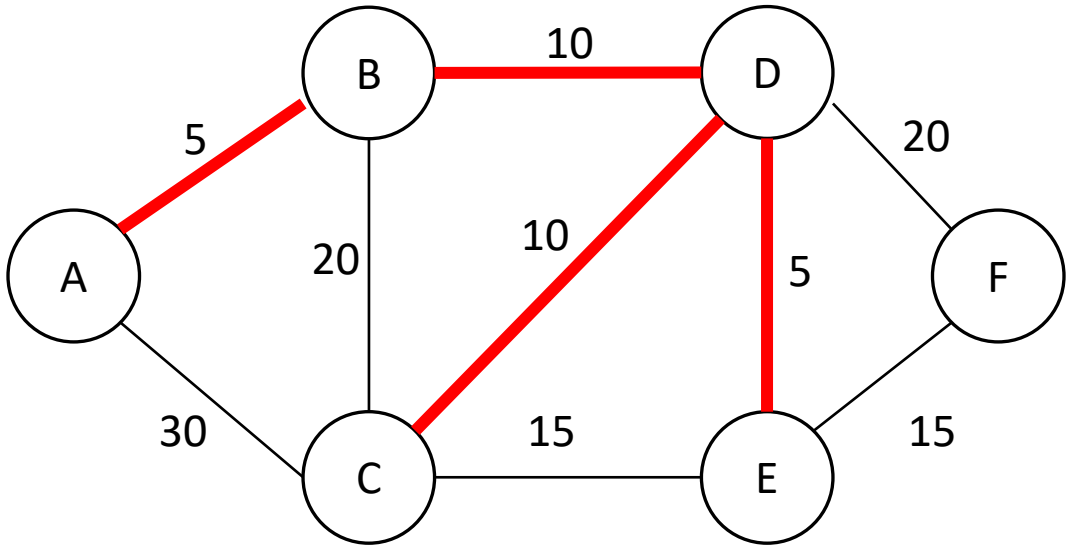
A – B = 5
D – E = 5
B – D = 10
C – D = 10
C – E = 15
E – F = 15
C – B = 20
D – F = 20
A -- C = 30

Example of Kruskal's Algorithm



A – B = 5
D – E = 5
B – D = 10
C – D = 10
C – E = 15
E – F = 15
C – B = 20
D – F = 20
A -- C = 30

Example of Kruskal's Algorithm



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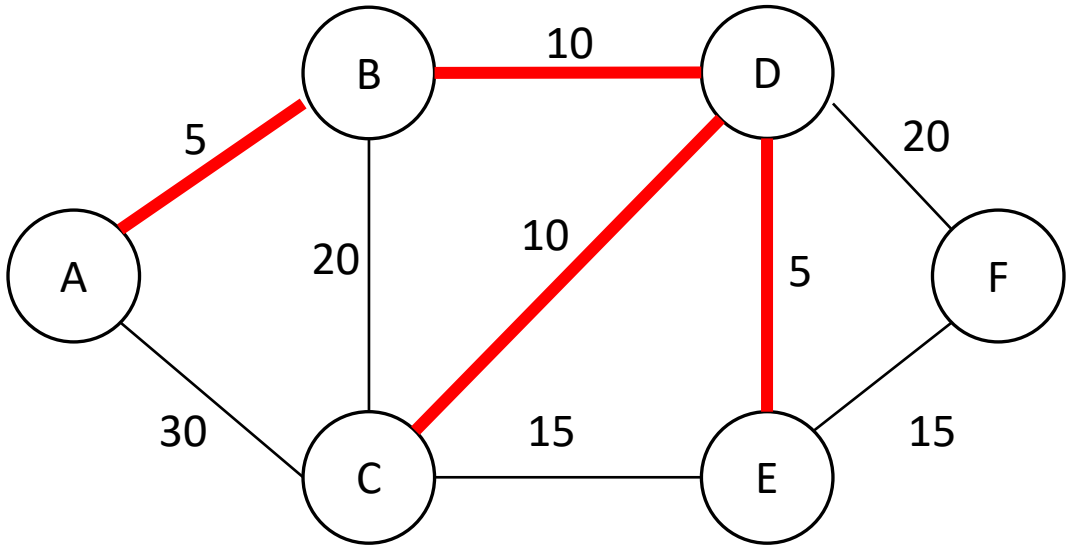
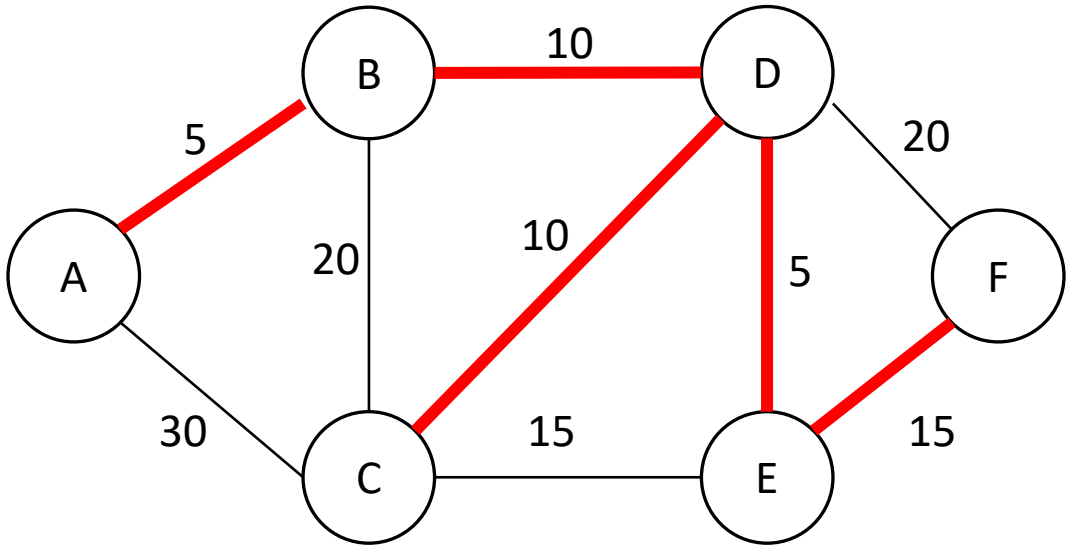
D – E = 5
B – D = 10
C – D = 10
C – E = 15
E – F = 15
C – B = 20
D – F = 20
A -- C = 30

Example of Kruskal's Algorithm



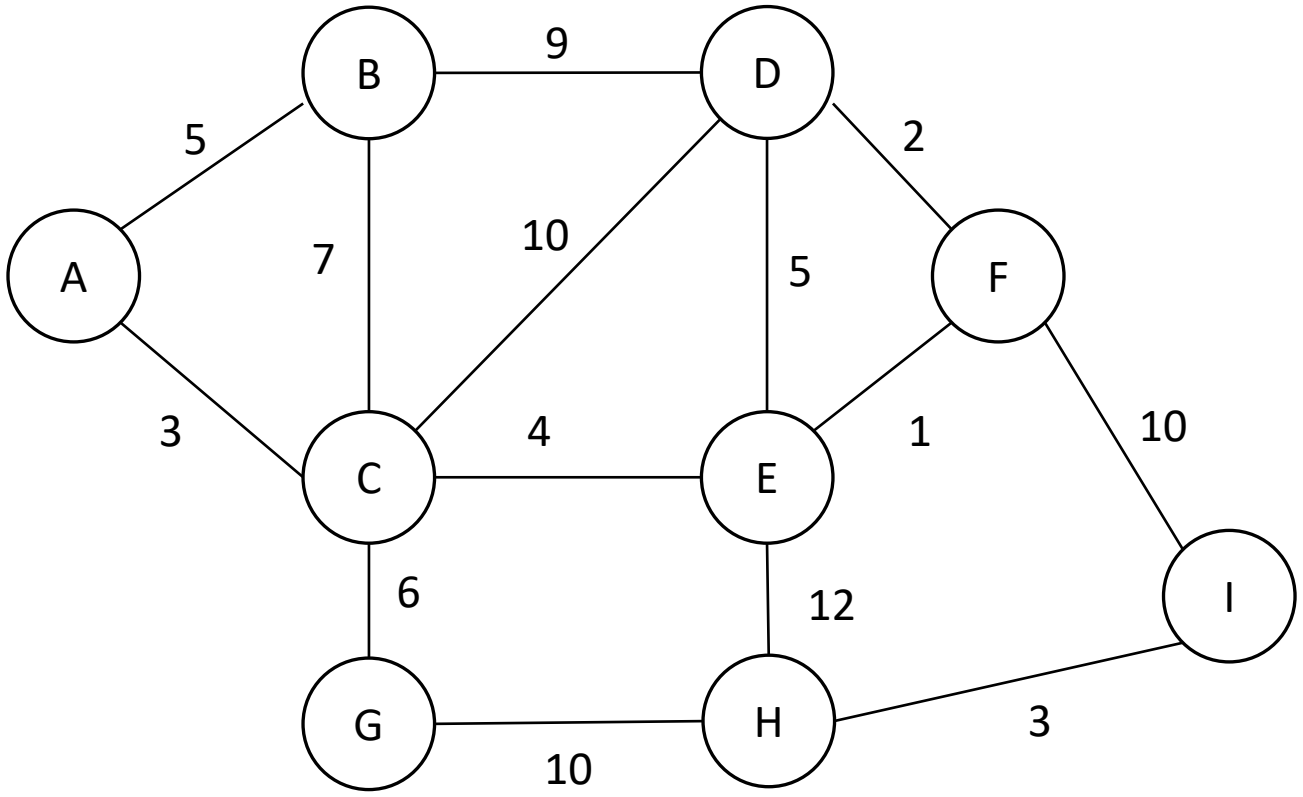
A – B = 5
D – E = 5
B – D = 10
C – D = 10
C – E = 15 ???
E – F = 15
C – B = 20
D – F = 20
A -- C = 30

Example of Kruskal's Algorithm

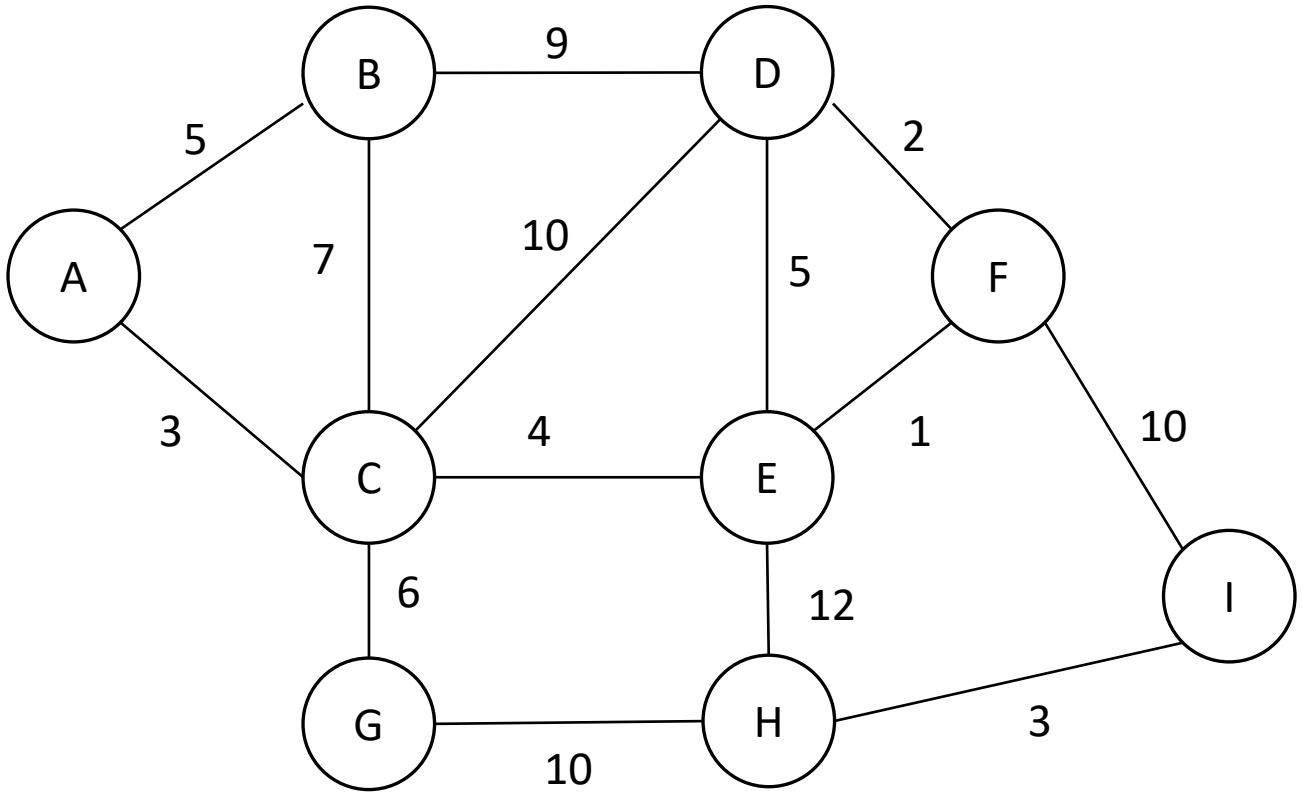


A – B = 5
D – E = 5
B – D = 10
C – D = 10
C – E = 15
E – F = 15
C – B = 20
D – F = 20
A -- C = 30

You Try It

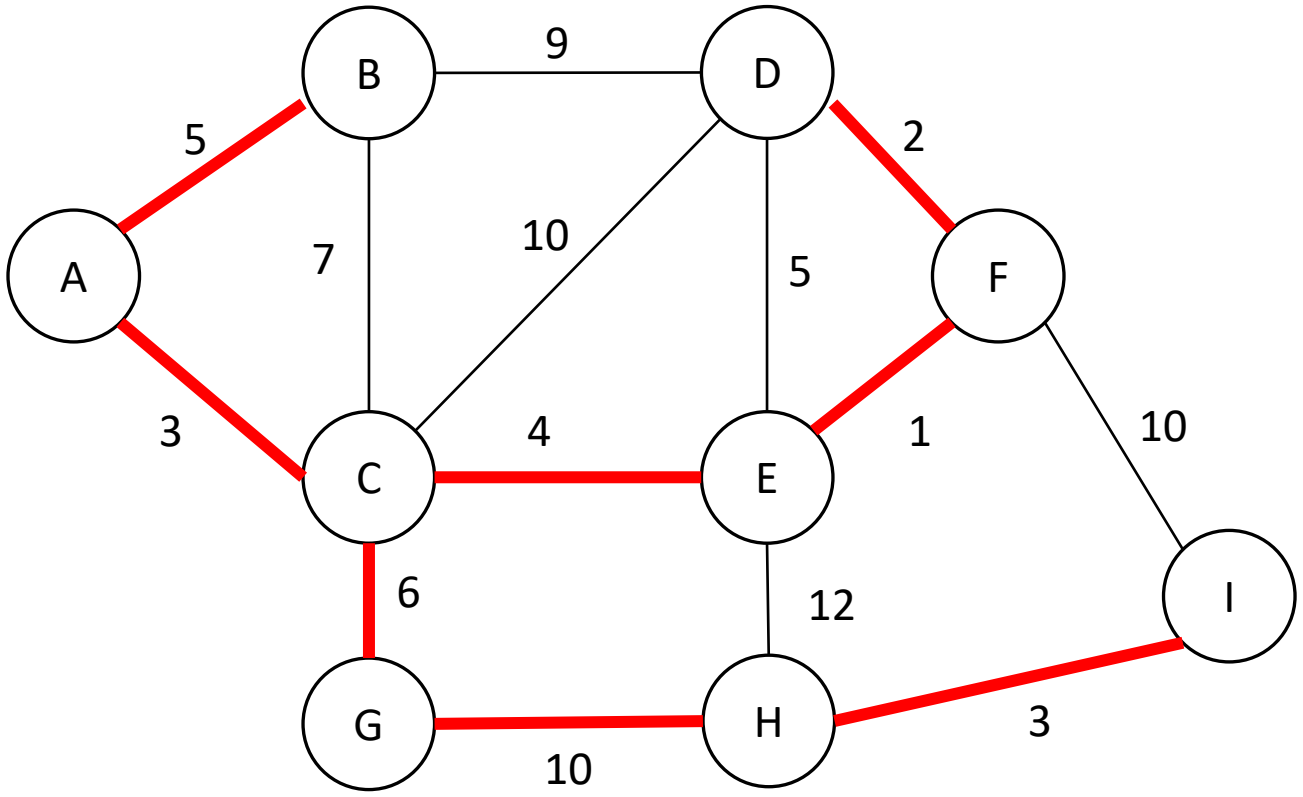


You Try It



E – F = 1
D – F = 2
A – C = 3
H – I = 3
C – E = 4
A – B = 5
D – E = 5
C – G = 6
B – C = 7
B – D = 9
C – D = 10
G – H = 10
F – I = 10
E – H = 12

You Try It



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A – B = 5
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B – C = 7
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C – D = 10
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F – I = 10
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