Kristin Schaefer

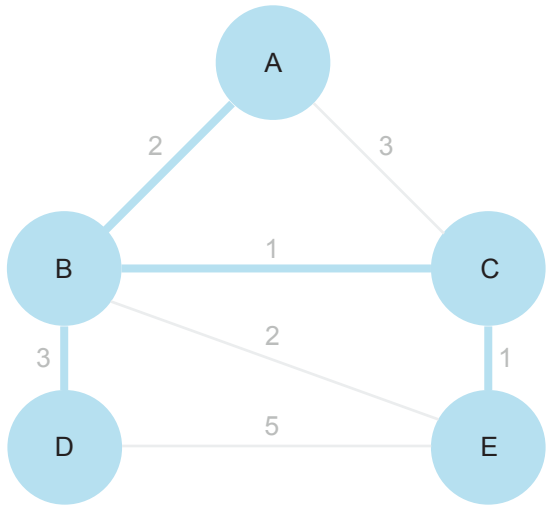
HW7 : Graph Algorithms 2

Sources:

Problem 2
1. https://www.geeksforgeeks.org/prims-minimum-spanning-tree-mst-greedy-algo-5/
2. https://bradfieldcs.com/algos/graphs/prims-spanning-tree-algorithm/
3. https://www.geeksforgeeks.org/kruskals-minimum-spanning-tree-algorithm-greedy-algo-2/
4. https://gist.github.com/hayderimran7/09960ca438a65a9bd10d0254b792f48f
Problem 3
1. CLRS, Section 23.2

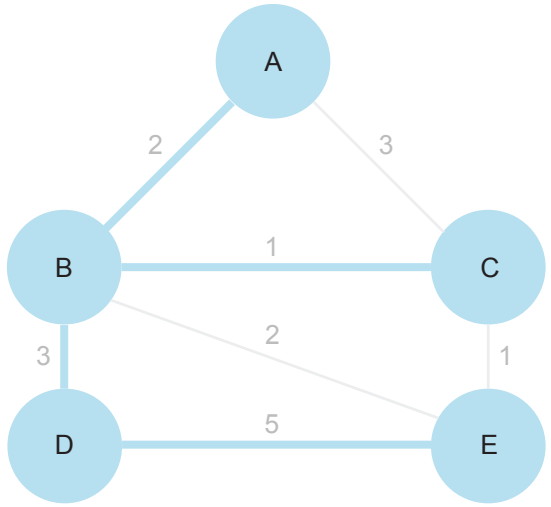
1. Minimum spanning tree

a. draw minimum spanning tree



Edge	Cost
A-B	2
B-C	1
B-D	3
C-E	1
total	7

b. draw spanning tree that is not minimum



Edge	Cost
A-B	2
B-C	1
B-D	3
D-E	5
total	11

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2. Minimum spanning tree implementation

c. What is the difference between Kruskal's algorithm and Prim's algorithm?

Although both Kruskal's algorithm and Prim's algorithm follow a greedy approach, they differ in how they find and add edges to their minimum spanning tree graph. Kruskal's algorithm creates a forest of vertices, where each vertex has its own tree. Then it checks the edge (u,v) which has the current minimum weight and ensures that a cycle is not created with (u,v), which means (u,v) are not in the same tree. Prim's algorithm does not need to check for cycles. Instead Prim's algorithm starts from an arbitrary root vertex and builds the minimum spanning tree edge by edge until the full minimum spanning tree is created. At each step Prim's algorithm selects the edge with the minimum weight, that is not currently in the minimum spanning tree but is connected.