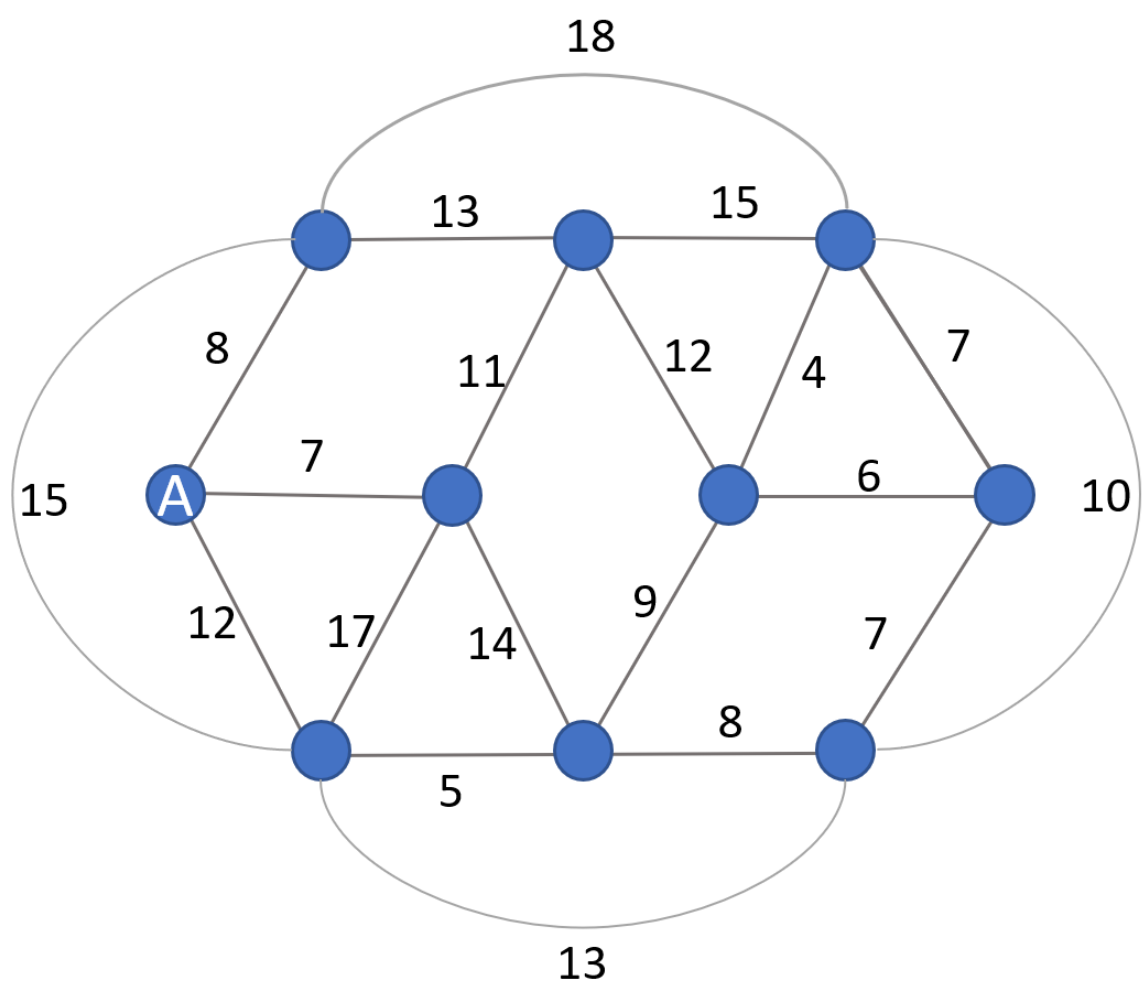


Homework 3



Using the above network answer the following questions.

- a. Solve for the minimum spanning tree using Prim’s Algorithm from node A
- b. Solve for the minimum spanning tree using Kruskal’s Algorithm
- c. Apply Christofide’s Algorithm [there may be multiple feasible starting trees, choose one]

From/To	A	B	C	D	E	F
A	-	13	9	7	5	12
B	13	-	4	5	8	15
C	9	4	-	1	3	5
D	7	5	1	-	2	6
E	5	8	3	2	-	9
F	12	15	5	6	9	-

Using the above distance matrix answer the following questions:

- a. Perform the Nearest Neighbor heuristic starting from node A. What is the full length of the tour?
- b. Perform the Nearest Insertion heuristic starting with the cycle A->E->A, What is the full length of the final tour?
- c. Would the Christofides’ Algorithm’s guarantee of  $<1.5 \times \text{Optimal}$  hold for this problem (you don’t need to solve to answer)? Why or why not?
- d. Using the distance matrix can you describe a simple way to bound the shortest and longest tours that could be made? (note that you need not create a tight bound i.e. find the length of the min or max tour only be able to say definitively no tour exists with a length less than or greater than that length) [Remember that a tour must contain 6 edges]