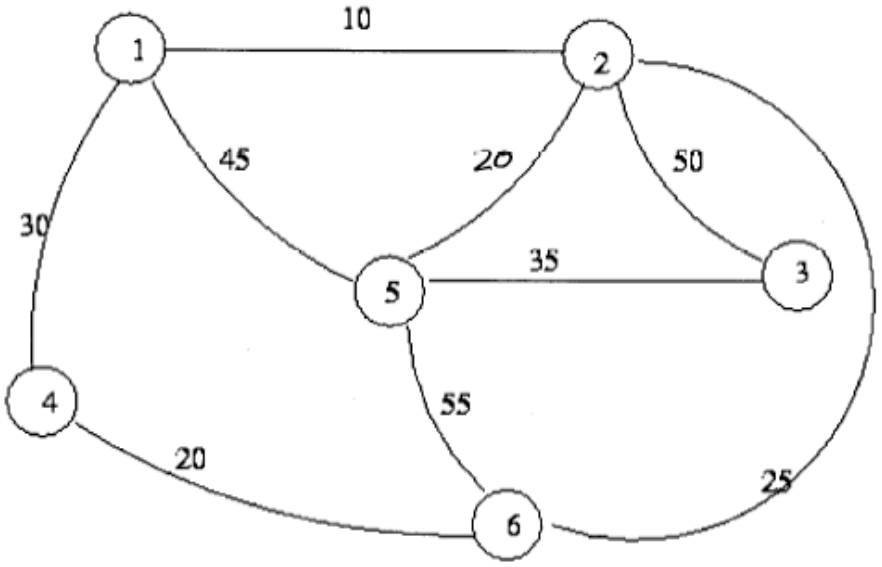
CP7_10

The problems in this problem set cover lectures C7, C8, C9 and C10

1. What is the Minimum Spanning Tree of the graph shown below using both Prim's and Kruskal's algorithm. Show all the steps in the computation of the MST (not just the final MST).



2. Compute the computation complexity of the bubble sort algorithm. Show all the steps in the computation based on the algorithm.

3. What are the best case and worst case computation complexity of:

a. Inserting a node into an unsorted singly linked list
b. Inserting a node into a sorted singly linked list

Show the steps in the complexity computation based on the algorithm and justify your answer by using a diagram of the insertion operation.

4.
a. Design an Ada95 Package to:
   i. Read in N integers from an input file into an array. (N is user defined <=50)
   ii. Sort the array in ascending order
   iii. Perform binary search on the array.

b. Write a program to test your package that will
   - Prompt the user for a number to search for.
   - If the number is found using the binary search algorithm

        - Display the location (index)
        - Display the number
    - If the number is not found using the binary search algorithm
        - Display “Number not in array” to the user

Turn in an electronic copy of your Package and test program and a hard copy of your algorithm and code listing.
Assume: Input file name is my_input.txt

5. Implement the merge sort algorithm as an Ada95 program. Your program should
    - Read in N integers from an input file. (N is user defined <=50)
    - Sort using your merge sort implementation.
    - Display the sorted and unsorted inputs to the user

Turn in an electronic copy of your code and a hard copy of your algorithm and code listing.
Assume: Input file name is my_input.txt