Greedy Algorithm: LAB 6

1. Write a c or c++ program for Huffman Coding for data compression using priority queues implemented as min-heap. (Create a message is a page long how much compression is obtained by doing Huffman coding?)

2. Write a c or c++ program the activity-selection problem (You are given n activities with their start and finish times. Select the maximum number of activities that can be performed by a single person, assuming that a person can only work on a single activity at a time. Example: Consider the following 6 activities. $start[] = \{1, 3, 0, 5, 8, 5\}$; $finish[] = \{2, 4, 6, 7, 9, 9\}$; The maximum set of activities that can be executed by a single person is 0, 1, 3, 4).

3. Knapsack (0-1) problem: The Integer Knapsack Problem (Duplicate Items Permitted). You have n types of items, where the ith item type has an integer size s_i and a real value v_i. Here items are indivisible; you either take an item(1) or not(0). You can add multiple items of the same type to the knapsack.
   Write a program in C or C++ to fill a knapsack of total capacity C with a selection of items of maximum value.

4. (Duplicate Items forbidden) This is the same problem as the example above, except here it is forbidden to use more than one instance of each type of item. (Take a example which does not give an optimal answer).

5. Fractional knapsack problem: You have n types of items, where the ith item type has an integer size s_i and a real value v_i. Here items are divisible; you can take any fraction of an item. Write a program in C or C++ to fill a knapsack of total capacity C with a selection of items of maximum value.