Experiment 6 & 7

Objective(s): To implement greedy algorithm for solving the Knapsack Problem and Activity Selection Problem.

Brief Theory:

Knapsack Problem: Given n objects of weight $(w_1, w_2, \ldots, w_n)$ and a profit vector $(p_1, p_2, \ldots, p_n)$, m is the capacity of the knapsack. Let, the ith object has weight w_i. If x_i fraction is filled the knapsack then $x_i p_i$ will be the profit. Problem is to fill the knapsack so that the total profit is maximized.

Activity Selection Problem: Suppose there is a set of n activities S = $\{1, 2, \ldots, n\}$ that wish to share a common resource such as a seminar hall. The hall can used by only one activity at a time. Each activity i has start time s_i and finish time f_i where $s_i \leq f_i$ If selected, the activity i takes place during $[s_i, f_i)$. The problem is to select maximum-size set of mutually compatible activities.

Task: 1) Write a program for solving the fractional Knapsack problem.

Task: 3) Write a program for activity selection problem.

Apparatus and components required: Computer with C or C++ Compiler and Linux platform.

Experimental/numerical procedure: Coding, compilation, editing, run and debugging.