Experiment 11-12

Objective(s): To implement greedy algorithms for solving 1) **Job Scheduling** and 2) optimal storage on tape problems.

Brief Theory:

Job Scheduling: We are given a set of *n* jobs, each job *i* has a deadline d_i. To complete a job it must be processed one unit time on a machine. A single machine is available. If job *i* is completed by its deadline d_i, profit pi is earned. The problem is to find the subset *J* of the jobs and their order so that the total profit $\sum_{i \in J} p_i$ is maximum.

Storage on tape: Given n programs $P_1, P_2, \ldots, P_n$ of length $L_1, L_2, \ldots, L_n$ respectively, store them on a tape of length L such that Mean Retrieval Time (MRT) is a minimum.
The retrieval time of the jth program is a summation of the length of first j programs on tape.

Let T_j be the time to retrieve program P_j. The retrieval time of P_j is computed as,

$$T_j = \sum_{k=1}^{j} L_k$$

Length of k^{th} program

Mean retrieval time of n programs is the average time required to retrieve any program. It is required to store programs in an order such that their Mean Retrieval Time is minimum. MRT is computed as

Average retrieval time over n programs

$$MRT = \frac{1}{n}\sum_{i=1}^{N} T_j = \frac{1}{n}\sum_{i=1}^{n}\sum_{k=1}^{j} L_k$$

Time to retrieve j^{th} program P_j

Length of k^{th} program

Task: 1) Write a program to solve the job scheduling problem. Specifically, the output will be the set of jobs with their order and the total profit.

Task: 2) Write a program to solve the **Storage on tape problem. The output will be** the order in which the programs should be stored in the tape and the Mean Retrieval Time.

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

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