CSP214 TASKs #5

Task 5.1

Consider that you have given a set of items N, each has associated with a weight and a worth value, then determine the number of each item to include in a collection so that the total weight is less than some given weight and the total value is as large as possible. Implement the dynamic programming solution to this 0-1 Knapsack Problem where N is number of items and W is the maximum weight of items that can be put in the knapsack. List the items that are taken inside the knapsack and possible valuable worth of the knapsack.

Task 5.2

Implement Huffman algorithm and Shannnon-Fano algorithm through Greedy approach to compare number of bits required to encode a data file given to them as *command line arguments*. Given data file may contains any sequence of characters which you wish to store compactly. Your program uses this data file to buildup the required table of frequencies/probabilities of occurrences of characters to build up an optimal way of representing each character as a binary string. Display in tabular format , its frequencies/probabilities and corresponding Huffman and Shannon-Fano codes. Write in a file the coded data file using each approach as a binary string.

Note:
 1. Create the program profile and analyze the running time of performance.
 2. Write your program using modules and multi-file programming approach i.e. your program file divided into multiple files and programs into modules.