CS207-ALGORITHMS LAB
Lab 7

NOTE:

- This lab is to be completed individually. Do not share your work or code with anyone else.

- You can use any programming language that you like; we suggest Python, C++, or C.

- For all of our labs, please avoid using Google to find suggestions or solutions. The goal is to use your own brain to work these problems out, which will help you develop the skills to do well in the exams and, more importantly, become a substantially better computer programmer.

- Save your work in your N-drive.

- You have to make lab report in hard copy.

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Problem 1 Write a Program to solve Fractional Knapsack Problem Using Greedy Method. Take input from the class example to test your code.
Procedure:
Fractional knapsack problem is solved using greedy method in the following steps
Step-01: For each item, compute its value / weight ratio.
Step-02: Arrange all the items in decreasing order of their value / weight ratio.
Step-03: Start putting the items into the knapsack beginning from the item with the highest ratio. Put as many items as you can into the knapsack.

Problem 2: Write a Programme to implement Hummfan's coding algorithm Using Greedy Method. Obtain the Huffman's Encoding for the following Data and encode the code message for word "baba" Using Variable length method.

Letters	a	b	c	d	e	f
Frequency	39	10	9	25	7	3

Steps to Create Huffman's Tree:
Input is an array of unique characters along with their frequency of occurrences and output is Huffman Tree.
1. Create a leaf node for each unique character and build a min heap of all leaf nodes.
2. Extract two nodes with the minimum frequency from the min heap.

3. Create a new internal node with a frequency equal to the sum of the two nodes frequencies. Make the first extracted node as its left child and the other extracted node as its right child. Add this node to the min heap.

4. Repeat steps#2 and #3 until the heap contains only one node. The remaining node is the root node and the tree is complete