

Greedy Algorithm Activities

New Attempt

Due No Due Date **Points** 0 **Submitting** a file upload **File Types** pdf, zip, and z
Available after Oct 31, 2022 at 12a.m.

A) The following table shows the weights and values of different items. Assume that we have a knapsack that can hold the maximum weight $W = 25$, what is the maximum value you may have in the knapsack? You can break the items.

item	weight	value
1	5	\$ 20
2	15	\$ 45
3	10	\$ 15
4	6	\$ 12

B) The following table shows the frequency of different characters in a file.

Character	A	B	C	D	E	F	H
Frequency	5	7	2	6	10	4	6

1. Determine the code of each character using Huffman's algorithm. Show the final tree.
2. What is the length of the file (in No. of bits) if you use **Huffamn's codes** for encoding the file?
3. What is the size of the file (in No. of bits) if you use **fixed-size codes** for encoding the file?

C) Implement (e.g., using python) a greedy algorithm to solve the fractional knapsack problem. Your program should print a percentage (0.0-1.0) for each item(s) to include in your knapsack such that the weight capacity (W) of the knapsack is not exceeded, and the total value (V , the sum of the value of all included items) is maximal.

Hint: One way that you could implement this problem is to pass 2 arrays into your procedure:

1) *weights*, where *weights*[*i*] is the weight of element *i*, and 2) *values*, where *values*[*i*] is the value of element *i*.

