

### Fractional knapsack:

```
.venv\mihirkatakdhond@Mihirs-MacBook-Air daa lab 5 % "/Users/mihirkatakdhond/Downloads/daa_lab_5/.venv/bin/python" /Users/mihirkatakdhond/Downloads/knapsack.py

Items (Weight, Value, Shelf Life):
Item 1: Weight = 22, Value = 93, Shelf Life = 3
Item 2: Weight = 2, Value = 439, Shelf Life = 18
Item 3: Weight = 12, Value = 360, Shelf Life = 13
Item 4: Weight = 17, Value = 387, Shelf Life = 12
Item 5: Weight = 42, Value = 494, Shelf Life = 6
Item 6: Weight = 4, Value = 404, Shelf Life = 25
Item 7: Weight = 44, Value = 352, Shelf Life = 25
Item 8: Weight = 29, Value = 149, Shelf Life = 19
Item 9: Weight = 20, Value = 345, Shelf Life = 17
Item 10: Weight = 29, Value = 35, Shelf Life = 30
Item 11: Weight = 42, Value = 411, Shelf Life = 24
Item 12: Weight = 15, Value = 257, Shelf Life = 8
Item 13: Weight = 29, Value = 72, Shelf Life = 9
Item 14: Weight = 3, Value = 205, Shelf Life = 12
Item 15: Weight = 8, Value = 102, Shelf Life = 27
Item 16: Weight = 31, Value = 336, Shelf Life = 7
Item 17: Weight = 3, Value = 22, Shelf Life = 3
Item 18: Weight = 2, Value = 178, Shelf Life = 14
Item 19: Weight = 23, Value = 431, Shelf Life = 6
Item 20: Weight = 28, Value = 315, Shelf Life = 18
Item 21: Weight = 41, Value = 161, Shelf Life = 27
Item 22: Weight = 36, Value = 262, Shelf Life = 25
Item 23: Weight = 49, Value = 405, Shelf Life = 6
Item 24: Weight = 33, Value = 384, Shelf Life = 19
Item 25: Weight = 46, Value = 168, Shelf Life = 21
Item 26: Weight = 39, Value = 44, Shelf Life = 18
Item 27: Weight = 40, Value = 378, Shelf Life = 25
Item 28: Weight = 44, Value = 168, Shelf Life = 29
Item 29: Weight = 30, Value = 482, Shelf Life = 7
Item 30: Weight = 33, Value = 368, Shelf Life = 29
Item 31: Weight = 11, Value = 381, Shelf Life = 20
Item 32: Weight = 6, Value = 454, Shelf Life = 1
Item 33: Weight = 14, Value = 451, Shelf Life = 13
Item 34: Weight = 36, Value = 39, Shelf Life = 9
Item 35: Weight = 16, Value = 31, Shelf Life = 27
Item 36: Weight = 20, Value = 297, Shelf Life = 19
Item 37: Weight = 10, Value = 369, Shelf Life = 22
Item 38: Weight = 11, Value = 435, Shelf Life = 3
Item 39: Weight = 20, Value = 186, Shelf Life = 27
Item 40: Weight = 23, Value = 59, Shelf Life = 2
Item 41: Weight = 5, Value = 19, Shelf Life = 10
Item 42: Weight = 18, Value = 77, Shelf Life = 20
Item 43: Weight = 45, Value = 204, Shelf Life = 3
Item 44: Weight = 34, Value = 195, Shelf Life = 22
Item 45: Weight = 20, Value = 331, Shelf Life = 21
Item 46: Weight = 36, Value = 465, Shelf Life = 15
Item 47: Weight = 39, Value = 374, Shelf Life = 9
Item 48: Weight = 45, Value = 427, Shelf Life = 5
Item 49: Weight = 48, Value = 336, Shelf Life = 24
Item 50: Weight = 34, Value = 369, Shelf Life = 10
Item 51: Weight = 50, Value = 48, Shelf Life = 30
Item 52: Weight = 43, Value = 65, Shelf Life = 1
Item 53: Weight = 33, Value = 475, Shelf Life = 24
Item 54: Weight = 30, Value = 474, Shelf Life = 2
```

```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
Python: knapsack + ⌂ ⌂ ...
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```

Item 55: Weight = 42, Value = 245, Shelf Life = 21
Item 56: Weight = 25, Value = 287, Shelf Life = 8
Item 57: Weight = 35, Value = 255, Shelf Life = 28
Item 58: Weight = 34, Value = 425, Shelf Life = 19
Item 59: Weight = 6, Value = 462, Shelf Life = 2
Item 60: Weight = 49, Value = 371, Shelf Life = 4
Item 61: Weight = 32, Value = 77, Shelf Life = 11
Item 62: Weight = 1, Value = 496, Shelf Life = 24
Item 63: Weight = 30, Value = 344, Shelf Life = 5
Item 64: Weight = 39, Value = 492, Shelf Life = 25
Item 65: Weight = 29, Value = 236, Shelf Life = 14
Item 66: Weight = 41, Value = 233, Shelf Life = 13
Item 67: Weight = 44, Value = 352, Shelf Life = 24
Item 68: Weight = 4, Value = 123, Shelf Life = 17
Item 69: Weight = 15, Value = 335, Shelf Life = 12
Item 70: Weight = 8, Value = 425, Shelf Life = 25
Item 71: Weight = 16, Value = 405, Shelf Life = 9
Item 72: Weight = 35, Value = 221, Shelf Life = 16
Item 73: Weight = 1, Value = 396, Shelf Life = 13
Item 74: Weight = 20, Value = 19, Shelf Life = 30
Item 75: Weight = 2, Value = 312, Shelf Life = 23
Item 76: Weight = 4, Value = 126, Shelf Life = 17
Item 77: Weight = 28, Value = 207, Shelf Life = 20
Item 78: Weight = 34, Value = 14, Shelf Life = 6
Item 79: Weight = 13, Value = 297, Shelf Life = 23
Item 80: Weight = 14, Value = 79, Shelf Life = 1
Item 81: Weight = 19, Value = 461, Shelf Life = 13
Item 82: Weight = 32, Value = 375, Shelf Life = 24
Item 83: Weight = 46, Value = 256, Shelf Life = 28
Item 84: Weight = 6, Value = 29, Shelf Life = 19
Item 85: Weight = 25, Value = 236, Shelf Life = 25
Item 86: Weight = 45, Value = 316, Shelf Life = 21
Item 87: Weight = 12, Value = 497, Shelf Life = 20
Item 88: Weight = 50, Value = 304, Shelf Life = 17
Item 89: Weight = 42, Value = 183, Shelf Life = 22
Item 90: Weight = 28, Value = 233, Shelf Life = 18
Item 91: Weight = 38, Value = 365, Shelf Life = 2
Item 92: Weight = 19, Value = 323, Shelf Life = 12
Item 93: Weight = 12, Value = 94, Shelf Life = 28
Item 94: Weight = 7, Value = 359, Shelf Life = 24
Item 95: Weight = 31, Value = 233, Shelf Life = 30
Item 96: Weight = 30, Value = 203, Shelf Life = 1
Item 97: Weight = 34, Value = 84, Shelf Life = 18
Item 98: Weight = 48, Value = 154, Shelf Life = 24
Item 99: Weight = 19, Value = 312, Shelf Life = 19
Item 100: Weight = 45, Value = 267, Shelf Life = 4
Knapsack Value for 100 items: 8757.00

```

Positive:

```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
Python: knapsack + ⌂ ⌂ ...
```

```

Item 98: Weight = 48, Value = 154, Shelf Life = 24
Item 99: Weight = 19, Value = 312, Shelf Life = 19
Item 100: Weight = 45, Value = 267, Shelf Life = 4
Knapsack Value for 100 items: 8757.00

Positive Test Cases

Items (Weight, Value, Shelf Life):
Item 1: Weight = 10, Value = 60, Shelf Life = 5
Item 2: Weight = 20, Value = 100, Shelf Life = 10
Item 3: Weight = 30, Value = 120, Shelf Life = 3
Knapsack Value for 3 items: 280.00

Items (Weight, Value, Shelf Life):
Item 1: Weight = 5, Value = 50, Shelf Life = 1
Item 2: Weight = 10, Value = 60, Shelf Life = 2
Item 3: Weight = 15, Value = 90, Shelf Life = 4
Knapsack Value for 3 items: 200.00

Items (Weight, Value, Shelf Life):
Item 1: Weight = 5, Value = 30, Shelf Life = 8
Item 2: Weight = 10, Value = 20, Shelf Life = 6
Item 3: Weight = 20, Value = 100, Shelf Life = 2
Item 4: Weight = 15, Value = 60, Shelf Life = 5
Knapsack Value for 4 items: 210.00

Items (Weight, Value, Shelf Life):
Item 1: Weight = 10, Value = 60, Shelf Life = 3
Item 2: Weight = 10, Value = 100, Shelf Life = 2
Item 3: Weight = 10, Value = 120, Shelf Life = 1
Knapsack Value for 3 items: 280.00

Items (Weight, Value, Shelf Life):
Item 1: Weight = 5, Value = 50, Shelf Life = 3
Item 2: Weight = 8, Value = 60, Shelf Life = 1
Item 3: Weight = 12, Value = 90, Shelf Life = 2
Knapsack Value for 3 items: 200.00

```

Negative:

Test case 1:

```
# Test Case 1: Negative values
items_with_errors_1 = [
    Item(5, -10, 3),
    Item(10, -20, 4),
    Item(15, -30, 5),
    Item(20, -40, 6),
]
```

```
Test Case 1: Negative values
Item 1:
- Invalid value: -10. Value cannot be negative.
Item 2:
- Invalid value: -20. Value cannot be negative.
Item 3:
- Invalid value: -30. Value cannot be negative.
Item 4:
- Invalid value: -40. Value cannot be negative.
```

Test case 2:

```
# Test Case 2: Negative weight
items_with_errors_2 = [
    Item(-5, 10, 3),
    Item(-10, 20, 4),
    Item(-15, 30, 5),
    Item(-20, 40, 6),
]
```

```
Test Case 2: Negative weight
Item 1:
- Invalid weight: -5. Weight must be greater than zero.
Item 2:
- Invalid weight: -10. Weight must be greater than zero.
Item 3:
- Invalid weight: -15. Weight must be greater than zero.
Item 4:
- Invalid weight: -20. Weight must be greater than zero.
```

Test case 3:

```
# Test Case 3: Empty knapsack capacity
try:
    print("\nTest Case 3: Empty knapsack capacity")
    fractional_knapsack(0, items_with_errors_1)
except ValueError as e:
    print(f"Error: {e}")
```

```
Test Case 3: Empty knapsack capacity
Error: Capacity of the knapsack must be greater than zero.
```

Test case 4:

```
# Test Case 4: String in weight
items_with_errors_3 = [
    Item("five", 10, 3),
    Item("ten", 20, 4),
    Item("fifteen", 30, 5),
    Item("twenty", 40, 6),
]
```

```
Test Case 4: String in weight
Item 1:
- Invalid weight: five. Weight must be a numeric value.
Item 2:
- Invalid weight: ten. Weight must be a numeric value.
Item 3:
- Invalid weight: fifteen. Weight must be a numeric value.
Item 4:
- Invalid weight: twenty. Weight must be a numeric value.
```

Test case 5:

```
# Test Case 5: All items with 0 weight
items_with_errors_4 = [
    Item(0, 10, 3),
    Item(0, 20, 4),
    Item(0, 30, 5),
    Item(0, 40, 6),
]
```

```
Test Case 5: All items with 0 weight
Item 1:
- Invalid weight: 0. Weight must be greater than zero.
Item 2:
- Invalid weight: 0. Weight must be greater than zero.
Item 3:
- Invalid weight: 0. Weight must be greater than zero.
Item 4:
- Invalid weight: 0. Weight must be greater than zero.
```

○ .venvmihirkatakdhond@Mihirs-MacBook-Air daa lab 5 % █

Huffman:

Positive:

### 1. Test case 1

```
● .venvmihirkatakdhond@Mihirs-MacBook-Air daa lab 5 % "/Users/mihirkatakdhond/Downloads/daa lab 5/.venv/bin/python" "/Users/mihirkatakdhond/
Downloads/daa lab 5/huff.py"
File Type: docx
Original text size (in bits): 1080
Compressed text size (in bits): 476
Compression ratio: 0.44
Huffman Codes (for letters only):
'h': 0000
'u': 0001
'e': 001
'i': 010
'd': 0110
'a': 0111
'o': 1000
'r': 1001
'g': 10100
'C': 101010
'k': 1010110
'J': 1010111
'I': 101100
'H': 1011010
'T': 1011011
'E': 1011100
'M': 1011101
'y': 101111
'm': 11000
'p': 110010
'f': 110011
'V': 1101000
'K': 1101001
'l': 110101
's': 11011
't': 1110
'n': 1111
```

## 2. Test case 2

```
● .venv@Mihir-MacBook-Air ~ % "/Users/mihirkatakdhond/Downloads/daa_lab_5/.venv/bin/python" "/Users/mihirkatakdhond/Downloads/daa_lab_5/huff.py"
File Type: txt
Original text size (in bits): 7544
Compressed text size (in bits): 3356
Compression ratio: 0.44
Huffman Codes (for letters only):
'n': 000
'J': 0010000
'E': 0010001
'T': 001001
'h': 00101
'r': 0011
'i': 010
'e': 011
'o': 1000
'I': 1001000
'w': 1001001
'm': 100101
'u': 10011
'f': 101000
'b': 1010010
'y': 10100110
'C': 101001110
'q': 1010011110
'A': 1010011111
'g': 10101
's': 1011
't': 1100
'c': 11010
'l': 11011
'a': 1110
'p': 111100
'j': 1111010000
'x': 1111010001
'M': 1111010001
'V': 11110101
'v': 1111011
'd': 11111
```

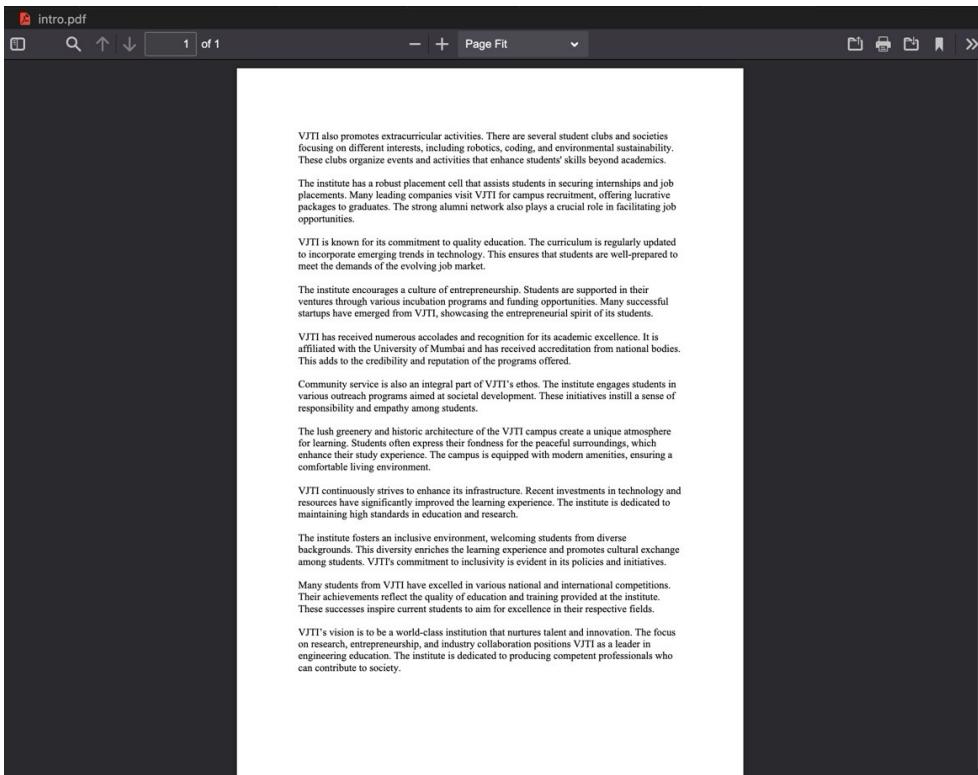
## 3. Test case 3

```
● .venv@Mihir-MacBook-Air ~ % "/Users/mihirkatakdhond/Downloads/daa_lab_5/.venv/bin/python" "/Users/mihirkatakdhond/Downloads/daa_lab_5/huff.py"
File Type: html
Original text size (in bits): 8200
Compressed text size (in bits): 3706
Compression ratio: 0.45
Huffman Codes (for letters only):
'k': 0000000
'M': 000000100
'q': 000000101
'A': 000000110
'S': 000000111
'I': 00000010
'C': 0000001100
'j': 0000001101
'J': 000000111
'w': 0000010
'y': 0000011
'l': 00001
't': 001
'o': 0100
'T': 010100
'V': 01010100
'x': 01010101
'b': 0101011
'p': 01011
'e': 011
'n': 1000
'r': 1001
'u': 10100
'g': 101010
'm': 101011
'i': 1011
'f': 110000
'v': 110001
'c': 11001
's': 1101
'd': 11100
'h': 11101
'a': 1111
```

#### 4. Test case 4

```
.venv\mihirkatakdhond@Mihirs-MacBook-Air daa lab 5 % "/Users/mihirkatakdhond/Downloads/daa lab 5/.venv/bin/python" "/Users/mihirkatakdhond/Downloads/daa lab 5/huff.py"
File Type: pdf
Original text size (in bits): 23456
Compressed text size (in bits): 10569
Compression ratio: 0.45
Huffman Codes (for letters only):
'i': 000
't': 001
'm': 01000
'T': 010010
'k': 01001100
'q': 010011010
'M': 010011011
'x': 01001110
'S': 010011100
'z': 01001111010
'R': 01001111011
'C': 01001111100
'U': 01001111101
'j': 0100111111
'o': 0101
'e': 011
'h': 10000
'l': 10001
'r': 1001
'a': 1010
'v': 101100
'b': 1011010
'w': 10110110
'J': 10110111
'd': 10111
'f': 110000
'g': 110001
'y': 1100100
'V': 11001010
'I': 11001011
'p': 110011
's': 1101
'u': 11100
'c': 11101
'n': 1111
```

#### Files:



**MIHIR KATAKDOND | 231070025 | S.Y. B.TECH COMPUTER**

1 Veermata Jijabai Technological Institute (VJTI) is a prestigious engineering institute located in Mumbai, India. Established in 1887, it is one of the oldest engineering colleges in Asia. The Institute was initially founded as a technical school and has since evolved into a leading engineering institution.

2

3 VJTI offers a wide range of undergraduate and postgraduate programs in engineering and technology. The undergraduate courses include disciplines such as Mechanical Engineering, Civil Engineering, and Computer Engineering. Each program is designed to provide students with a solid foundation in theoretical concepts and practical applications.

4

5 The campus of VJTI is spread over a sprawling area and features state-of-the-art facilities. The Institute boasts modern classrooms, well-equipped laboratories, and extensive libraries filled with technical resources. The campus environment fosters innovation and creativity among students.

**Negative:**

## 1. Test case 1

## 2. Test case 2

### 3. Test case 3

```
❸ .venv\mihirkatakdhond@Mihirs-MacBook-Air daa lab 5 % "/Users/mihirkatakdhond/Downloads/daa lab 5.venv/bin/python" "/Users/mihirkatakdhond/Downloads/daa lab 5/huff.py"
Traceback (most recent call last):
  File "/Users/mihirkatakdhond/Downloads/daa lab 5/huff.py", line 149, in <module>
    process_file('ipynb', 'intro.ipynb')
  ~~~~~~
  File "/Users/mihirkatakdhond/Downloads/daa lab 5/huff.py", line 117, in process_file
    raise ValueError(f"Unsupported file type: {file_type}")
ValueError: Unsupported file type: ipynb
❹ .venv\mihirkatakdhond@Mihirs-MacBook-Air daa lab 5 %
```

#### 4. Test case 4

- .venv mihirkatakdhond@Mihirs-MacBook-Air ~ % "/Users/mihirkatakdhond/Downloads/daa lab 5/venv/bin/python" "/Users/mihirkatakdhond/Downloads/daa lab 5/huff.py"  
No content extracted from docx file, since it does not include anything and it is blank hence huffman compression cant be done and found here, to proceed please enter some text.
- .venv mihirkatakdhond@Mihirs-MacBook-Air ~ %

## 5. Test case 5

```
.venv\mihirkatakdhond@Mihirs-MacBook-Air ~ % "/Users/mihirkatakdhond/Downloads/daa lab 5/venv/bin/python" "/Users/mihirkatakdhond/Downloads/daa lab 5/huffman.py"
Warning: The file 'intro.docx' is not a PDF file since you have selected the option of pdf file but uploaded a docx file which is a mismatch between the format!
No content extracted from pdf file. Since it does not include anything and it is blank, Huffman compression can't be done. To proceed, please enter some text.
.venv\mihirkatakdhond@Mihirs-MacBook-Air ~ %
```