

Assignment 5

November 29, 2024

The assignment is due on **Friday, 6 December, 9:00 PM**. Late submissions will be accepted until **Monday, 9 December, 9:00 PM** with a penalty of 10%. After that no submissions will be accepted.

1 Coding Question

Question 1 (90 points)

Overview: The Iron Bank of Braavos has called in its debts, and as the Master of Coin for the realm, you must repay a sum of S gold dragons. You have unlimited access to a set of coin denominations minted by various houses across the Seven Kingdoms.

Your goal is to try to gather coins that total **exactly** S gold dragons. You can use as many coins as needed from any denomination, including multiple coins of the same value. However, the Iron Bank values efficiency; they demand that you use the minimum number of coins to settle the debt.

Input: The input consists of 2 lines. The first line contains a list of available denominations. The second line contains a single integer, S .

1. Every coin denomination, d_i , is within the range: $1 \leq d_i \leq 10^3$
2. $1 \leq S \leq 10^5$ - the total sum you need to repay.

Output: Output a single integer - the minimum number of coins required to accumulate exactly S gold dragons. Or, **if you cannot make exactly** the sum S , return -1.

Example Input #1:

```
2 4 7
11
```

Example Output #1:

```
2
```

Example Input #2:

```
7 9
12
```

Example Output #2:

```
-1
```

Example Input #3:

```
3 7
12
```

Example Output #3:

4

Specifications:

- **Do not modify the `main()` function.**

Marking Rubric: This question will be marked out of 90 for correctness (pass test cases):

- 90/90: Pass all 5 of the test cases
- 72/90: Pass any 4 of the test cases
- 54/90: Pass any 3 of the test cases
- 36/90: Pass any 2 of the test cases
- 18/90: Pass any of the test cases

2 Writing and testing your solution

For the programming questions, you should edit the provided files and add your solution. You can check your solution by running `driver.py`. You can see the output of your program in the **Output/** folder, and any errors in the **Error/** folder.

Please do not change the driver file, only edit the solution file.

You can run the driver in a terminal as follows (assuming your working directory is the assignment folder):

```
$ cd assignment5
$ cd Question1
$ python3 driver.py
All tests passed!
$
```

Please add your name, student number, ccid, operating system and python version at the top of each solution file by replacing the provided comments.

3 Submission Instructions (10 points)

Please follow these submission instructions carefully. Correctly submitting all files is worth 10 points. In these files, you must replace `ccid` with your own ccid. Your ccid is the first part of your UAlberta email (`ccid@ualberta.ca`). Do not zip any of these files. Please submit the following files to eclass:

- `ccid_solutionQuestion1.py` : Edit the provided file for question 1. After your solution passes all test cases (which you must test using the driver), rename the file to include your ccid, that is, `ccid_solutionQuestion1.py` and submit it to eclass.