CS 171 - Homework 2

Overview

This homework has two parts. The first is about using math operations. The second is about working with functions.

Part 1: Making Historic Change

During the Roman Imperial Period from 27 BC until 476 AD, the following coins were used. The base unit of currency was the As. All other coins are mesaured relative to each other.

Name	Relative Value
Quadrans	1/2 a Semis
Semis	1/2 an As
As	Base Unit
Dupondius	2 Asses
Sestertius	2 Dupondii
Quinarius	2 Sesterii
Denarius	2 Quinarii
Antoninianus	2 Denarii
Gold Quinarius	25 Quinarii
Aureus	25 Denarii

Write a program that takes as input the number of Quadrans a person has in their account. This number is always an integer because there is no smaller currency than the Quadrans. Then print out the minimal number of coins that can be used to represent this amount. Start with the largest value currency and work down to the smallest.

For example, if the user has 12 Quadrans, this is 1 Dupondius and 1 As.

Part 1: Example 1

```
Enter Number of Quadrans: 12
Aureus: 0
Gold Quinarius: 0
Antoninianus: 0
Denarius: 0
Quinarius: 0
Sestertius: 0
Dupondius: 1
As: 1
Semis: 0
Quadrans: 0
```

Part 1: Example 2

```
Enter Number of Quadrans: 21432
Aureus: 13
Gold Quinarius: 0
Antoninianus: 4
Denarius: 1
Quinarius: 1
Sestertius: 1
Dupondius: 1
As: 0
Semis: 0
Quadrans: 0
```

Part 1: Example 3

```
Enter Number of Quadrans: 2655
Aureus: 1
Gold Quinarius: 1
Antoninianus: 1
Denarius: 1
Quinarius: 1
Sestertius: 1
Dupondius: 1
As: 1
Semis: 1
Quadrans: 1
```

Part 2: Working With Function

Functions are a key tool for designing functions. In this part of the assignment, you will create three functions and use them to create a number of output. All values you work with in this part will be integers.

The three functions you need to create are:

$$f(x) = 2x^2 - 7$$

$$g(x, y) = x^3 - y$$

$$h(x) = 2x^2 + 3x + 9$$

You **must** implement these are three Python functions.

Ask for two values from the user. Both values will be integers. Compute the following values using your three functions and the two values give. Call the first value a and the second value b.

- $f(a)$
- $f(b)$
- $g(a, b)$
- $g(b, a)$
- $h(a)$
- $h(b)$
- $f(h(a))$
- $h(f(b))$
- $g(f(a), h(b))$
- $g(h(a), f(b))$

Print out all the values you compute.

Part 2: Example 1

```
Enter Value 1: 10
Enter Value 2: 12
f(10)=193
f(12)=281
g(10,12)=988
g(12,10)=1718
h(10)=239
h(12)=333
f(h(10))=114235
h(f(12))=158774
g(f(10),h(12))=7188724
g(h(10),f(12))=13651638
```

Part 2: Example 2

```
Enter Value 1: 1
Enter Value 2: 9
f(1)=-5
f(9)=155
g(1,9)=-8
g(9,1)=728
h(1)=14
h(9)=198
f(h(1))=385
h(f(9))=48524
g(f(1),h(9))=-323
g(h(1),f(9))=2589
```

Part 2: Example 3

```
Enter Value 1: 20
Enter Value 2: 13
f(20)=793
f(13)=331
g(20,13)=7987
g(13,20)=2177
h(20)=869
h(13)=386
f(h(20))=1510315
h(f(13))=220124
g(f(20),h(13))=498676871
g(h(20),f(13))=656234578
```

Guidelines

All your code should be in two files

- `hw02_change.py` for Part 1
- `hw02_func.py` for Part 2

You may use Pothole Case or Camel Case, but be consistent in your file.

Your name, date, program description should be at the top of the file.

Add comments to claify how your code works.

Your output should be as close as possible to the examples given.

If inputs are not entered in the correct format, your program should crash.

What To Submit

- `hw02_change.py` a single file with your code for part 1.
- `hw02_func.py` a single file with your code for part 2.
- `readme.txt` a text file with any comments for the grader. (optional)

Rubric

All rubic items are graded on the following scale:

- Meets all Requirements: Full Credit
- Good with Minor Issues: 66% of points rounded up to nearest point
- Significant Issues: 33% of points round up to nearest point
- Not Attempted/ Does Not Meet Requirements: 0 points

Course Assistants may not award any other precent of points.

If a question is worth 2 points the scale is:

- Meet Requirements: 2 points
- Some Issues: 1 point
- Major Issues / Does Not Meet Requirements: 0 points

If a question is worth 1 point the scale is:

- Meets Requirements: 1 point
- Does Not Meet Requirements: 0 points

Rubric Item	Points
Part 1: Name in Comments	3
Part 1: Date in Comments	3
Part 1: Prog. Description in Comments	3
Part 1: Good Variables/Design	3
Part 1: Calculation of Amounts	18
Part 1: Matches Example 1	6
Part 1: Matches Example 2	6
Part 1: Matches Example 3	6
Part 2: Name in Comments	3
Part 2: Date in Comments	3
Part 2: Prog. Description in Comments	3
Part 2: Good Variables/Design	3
Part 2: F Function Defined	9
Part 2: G Function Defined	9
Part 2: H Function Defined	9
Part 2: Functions used correctly	12
File Names Correct	1