Week 2 Exercises

goo.gl/SxzVxN

**Problem 0: Radius of Circle**

Write a program that prompts the user for the area of a circle and calculates the radius of that circle and prints it out.

Sample Input and Output

What is the area of the circle?

78.54

The radius is 5.

**Problem 1: Dice Simulator**

Write a short python program that simulates rolling two twenty-sided dice (with numbers 1 through 20). Your program should print out what shows on each die as well as their sum.

Sample Input and Output

The first die shows 3.

The second die shows 14.

The total is 17.

**Problem 2: Picture Storage**

Write a program that calculates the number of pictures that can be stored on a thumb drive.

Ask the user to enter the number of gigabytes of data the thumb drive can store, as well as the length and width of each picture, in pixels.

Assume that each pixel takes 3 bytes of storage. (This isn’t really the case, since most pictures are stored in a compressed format.)

Output your answer as a whole number. (Hint: Use integer division.)

\*Note: There are 1073741824 bytes in a Gigabyte.

Sample IO

How many gigabytes can your thumb drive store?

4

What is the width of each picture in pixels?

3168

and height?

4752

You can store 95 pictures on your thumb drive.

**Problem 3: Trains**

Imagine a two-way straight railway and two trains approaching each other from opposite directions. You need to compute how long (in minutes) would it take for these trains to come side by side. You will also compute how many miles each train travels until they meet.

Write a program to read in the distance (in miles), speeds of the trains (in miles per hour), and output the time to meet (in minutes) and the distance traveled by each train (in miles).

Sample IO

What is the distance between the two trains (in miles)? 4

What is the speed of the first train (in miles per hour)? 120

What is the speed of the second train (in miles per hour)? 80

The trains will meet in 1.2 minutes.

The first train will travel 2.4 miles and the second train will travel 1.6 miles

**Problem 4: Currency Exchange**

As a frequent world traveler, Arup Guha has to exchange money to get various different currencies. However, he needs some help to determine exactly how much money he will have left after one of his trips. You will write a program to help him with his estimate. In particular, you will prompt the user for the following information:

1) How much US currency they have.

2) The exchange rate from US currency to the foreign currency.

3) How much of the foreign currency they spent.

The user exchanges all of their money for their trip. Usually, however, the user will have some money leftover when their trip is done. At this point, the user exchanges the rest of this currency for US dollars. Your goal will be to determine how much money the user has left in US dollars after his/her trip.

The charge for an exchange of currency is $2 US. Thus, if you are exchanging 1002 US dollars for Canadian dollars and the Canadian exchange rate is 1.5, then you will receive exactly 1500 Canadian dollars. If you spend 597 Canadian dollars, then you have 903 Canadian dollars left to exchange back to US dollars. This evaluates to $602 US. However, since the exchange fee is $2 US, the user would actually have exactly $600 US.

The exchange fee is always taken in US dollars, so it will be taken before you make the exchange to a foreign currency and after you make the exchange back to dollars.

You may assume that all the values the user enters are valid values. Specifically, you may assume that the user enters positive values for all three entries, and that the user will always have more than $2 US left after their trip is over. (This is necessary to pay for the transaction fee.)

Note: For actual exchange rates, go to http://www.xe.com/ucc/.

Sample IO 1

How many US dollars are you exchanging? 1002

What is the exchange rate from US dollars to the foreign currency? 1.5

How much foreign currency did you spend? 597

You will be left with $600.00 US currency.

Sample IO 2

How many US dollars are you exchanging? 500

What is the exchange rate from US dollars to the foreign currency? 35

How much foreign currency did you spend? 10000

You will be left with $210.29 US currency.

**Example Code**

Integer Division and Mod

<https://drive.google.com/file/d/0B7c0oBgP83iScHk3Vks2ZXJTSm8/view>

Cupcakes (int division and mod)

<https://drive.google.com/file/d/0B7c0oBgP83iSajRoTG1YcFRzSlU/view>

Distance Formula

<https://drive.google.com/file/d/0B7c0oBgP83iSdW9yT01TWXB2MGM/view>

Cipher

<https://drive.google.com/file/d/0B7c0oBgP83iSZ2dvN0FZNXRIRGM/view>