

Com S 127x

Fall 2016

Assignment 1

Due Date: Monday, September 12

(worksheet due in class on Monday, code on Blackboard by 11:59 pm (midnight))

“Late” deadline (25% penalty): Tuesday, September 13

(code on Blackboard by 11:59 pm, worksheet in class Wednesday)

General information

This assignment is to be done on your own. See the Academic Dishonesty policy in the syllabus for details.

If you need help, see your instructor or one of the TAs. Lots of help is also available through the Piazza discussions.

This assignment has a pencil and paper component and a programming component. There are three short worksheet problems to solve and three corresponding programs to write. The worksheet is on the last two pages of this document. You should print those pages and turn them in separately in class.

Please start the assignment as soon as possible and get your questions answered right away.

Problem 1

A store puts some clearance items on sale. They start with the original price. The first week, they discount it by 20%. The second week, they take an additional 25% off of the new price. The third week, they reduce it by another 30%. The fourth week, they take 50% off that price.

Part A: fill in the table for Problem 1, part A, in the worksheet at the end of this document.

Part B: Write an interactive Python script called `discounts.py` that prompts the user to input a price, and then prints out the four values for the discounted price each week, e.g.

Please enter a price: 100

Week 1: \$100.0

...and so on through all four weeks

(Use string concatenation to get the dollar sign directly to the left of the number as shown. Don't worry about formatting the correct number of decimal places in the output, we will learn how to do that later.)

Problem 2

A train system is based on *zones*. The cost of a ticket consists of a *base fare* plus a *per-zone charge* that is added whenever crossing between zones. We will assume the base fare is 3.50 and the per-zone charge is 1.75. For example, to travel starting in Zone 5 and ending in Zone 5 costs just the base fare, or 3.50. To travel from Zone 2 to Zone 5 is the base fare plus 3 times 1.75, or 8.75. We get the 3 by taking 5 minus 2, that is, you have to cross three zones to get from 2 to 5. Likewise, to travel from Zone 5 to Zone 2 would also be 8.75.

Part A: do the worksheet for Problem 2, part A, at the end of this document.

Part B: Write an interactive Python program `tickets.py` that prompts the user for the starting zone and the ending zone of a trip, and prints out the cost of the ticket. A useful function to know about is the built-in function `abs()`, the *absolute value* function (converts negative numbers to positive but leaves positive numbers alone). For example, `abs(5 - 2)` is 3, and `abs(2 - 5)` is 3 also, so you can find the difference without knowing in advance which number is larger. (Try this in the shell!)

Problem 3

The cost of a road trip depends on several values.

1. The length of the trip (distance in miles)
2. The price of gas
3. The fuel efficiency of your car (miles per gallon)
4. The price of a hotel room
5. The number of miles you're willing to drive per day

Part A: do the worksheet for Problem 3, part A, at the end of this document

Part B: Write an interactive Python script `roadtrip.py` that prompts a user for three values: the length of the trip, the car's mpg, and the number of miles per day. Assume that the price of gas is fixed at 3.00 per gallon and the cost of a hotel is fixed at 75.00 per night. The program prints out the total cost for the road trip.

If you have questions

For questions, please see the Piazza Q & A pages and click on the folder `hw1`. If you don't find your question answered, then create a new post with your question. Try to state the question or topic clearly in the title of your post, and attach the tag `hw1`. *But remember, do not post any source code for the classes that are to be turned in.* It is fine to post source code for general Python examples that are not being turned in. (In the Piazza editor, use the button labeled "pre" to have code formatted the way you typed it.)

If you have a question that absolutely cannot be asked without showing part of your source code, make the post "private" so that only the instructors and TAs can see it.

Documentation and style

Include comments at the top of each file with

- your name, and
- a brief statement of what the program does

What to turn in

1. Turn in your worksheet in class on Monday.
2. Upload your three files `discounts.py`, `roadtrip.py`, and `tickets.py` to the Homework 1 submission link on Blackboard. Be sure to check your submission history and make sure that you successfully submitted all three files. **Remember you can't just upload the files, you have to click the "Submit" button!**

Name _____

Worksheet for Homework 1

Problem 1, part A

Fill in the table below

	Value	How did you do it?
Initial price	100.0	Given
Week 1	80.0	100 minus $100 * .20$
Week 2		
Week 3		
Week 4		

(Tip: the final price above should be 21.00.)

Problem 2, part A

Calculate the cost of a ticket from Zone 7 to Zone 3. Show the steps of the calculation clearly and legibly below.

Name _____

Problem 3, part A

Suppose your trip is 1000 miles, your car gets 25 miles per gallon, gas is 3.00 per gallon, hotels are \$75 per night, and you can drive at most 300 miles in one day (i.e., you will need three nights in a hotel). How much does the trip cost? Work out the answer first on a piece of scratch paper, then carefully write each step below. Summarize the steps as a clear and legible set of instructions in English for making the calculation.