CSE 231 Fall 2011

Programming Project #2

Assignment Overview
This project focuses on some mathematical manipulation, in particular integer operations. It is worth 20 points (2% of your overall grade). It is due Monday, September 19th before midnight.

The Problem
(from David Pleacher's math page http://www.pleacher.com/mp/puzzles/tricks/trk99.html)

The 99 trick. There are two people in this game, you and a friend.

Your part:
- Select a number between 10 and 49. This is the **answer**.
- Calculate 99 – **answer** and remember it. This is **factor**.

Friends part:
- Have your friend select a number between 50 and 99.
- Add the **factor** from above to that number.
- Remove the hundred's digit and add it to the units digit.
- Subtract this number from your friend's original number.
- The result should be the **answer** from above.

For example.
Your part:
- Pick 15 as the **answer**.
- Subtract 15 from 99, for a **factor** of 84.

Friend part:
- Pick a number: 72.
- Add 72 and 84 (the **factor**) for 156.
- Remove the hundred's digit and add it to the unit digit: 156 ➔ 56 + 1 ➔57.
- Subtract the picked number and the previous result, 72 – 57 giving 15, the **answer**.

Program Specifications
Your program will play the game as follows:
1. Print a message to the user about the game and explain the rules.
2. Prompt for your number between 10 and 49, the **answer**.
3. Calculate the **factor** as indicated.
4. Prompt the player for a number between 50-99.
5. Do the calculations as indicated, print out the result.
6. Your number and the calculation result should be the same.

Deliverables
proj02.py -- your source code solution (remember to include your section, the date, project number and comments).

1. Please be sure to use the specified file name, i.e. “proj02.py”
2. Save a copy of your file in your CSE account disk space (H drive on CSE computers).
3. You will electronically submit a copy of the file using the "handin" program: http://www.cse.msu.edu/handin/webclient

Assignment Notes:
One of the main issues here is that we are working with integers, and division with integer numbers is a little different on a computer.

Integer division always returns an integer result—the quotient.
Thus, `10/3` yields `3`. The expression `4/5` yields `0`.

There is another operator, called the modulus operator, which returns the remainder after a division. The modulus operator is indicated by the `%` sign.
Thus, `10%3` yields `1` (a remainder of 1). The expression `4%5` yields `4`.

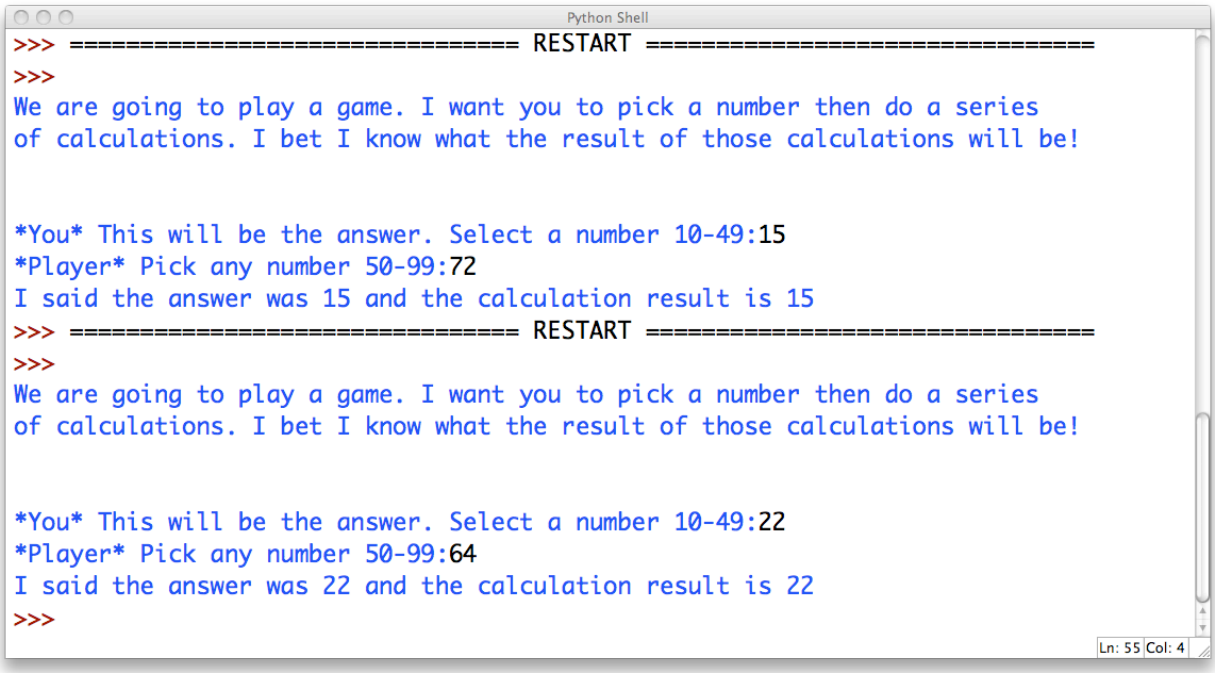
You can use these facts to gather the digit in the hundred’s place, remove it and add it to the remaining number. Experiment in the Python interpreter (a.k.a. “shell”) to see how to accomplish this task.

To clarify the problem specifications, at the end of this document we provide a snapshot of interaction with a program.

Getting Started
1. Using IDLE create a new program.
2. If you are in a CSE lab, select the H: drive as the location to store your file.
3. Save the name of the project: proj02.py
4. Create the preface and then prompt for the user integer.
5. Run the program stub and fix any errors.
6. Use the handin web site to hand in the program (incomplete as this point, but you should continually hand things in).
7. Now, take the user number and isolate the hundreds digit in the number.
8. Now that you have the hundreds kdigit, you can construct the answer.
9. Now you enter a cycle of edit-run to incrementally develop your program.
10. Use handin to hand in your final version.

Questions for you to consider (not hand in):
1. What happens when enter a number not in the proper range?
2. What happens when you enter a letter instead of a number at the prompt?
3. Why does the manipulation yield the correct answer?

Sample Interaction


Python Shell
>>> ================================ RESTART ================================
>>>
We are going to play a game. I want you to pick a number then do a series
of calculations. I bet I know what the result of those calculations will be!
You This will be the answer. Select a number 10-49:15
Player Pick any number 50-99:72
I said the answer was 15 and the calculation result is 15
>>> ================================ RESTART ================================
>>>
We are going to play a game. I want you to pick a number then do a series
of calculations. I bet I know what the result of those calculations will be!
You This will be the answer. Select a number 10-49:22
Player Pick any number 50-99:64
I said the answer was 22 and the calculation result is 22
>>>
Ln: 55 Col: 4