

Homework 2-5

Due: Oct. 20, 2011, 2:25 pm

Reminders

For the following problems you may discuss the concepts that will help solve these problems with classmates and course staff. You may *not* simply copy down the answers of your classmates as that is a violation of the collaboration policy. The one exception to this rule are those problems marked as Independent. You may discuss independent problems *with course staff only*.

Carl Friedrich Gauss (1777-1855) is one of the greatest mathematician of all time who contributed significantly to many fields in mathematics, statistics, physics and astronomy. There is a famous anecdote about him (whether true or not). When he was a little boy and was attending some elementary school in the countryside, his math teacher one day asked the class to add up all the integers from 1 through 100. The teacher thought it would take the kids a long while and he just got himself some time for a cigarette break. However, to his annoyance, little Carl raised his hand right after he pulled out a match.

‘The answer is 5050.’ said Gauss. The teacher frowned suspiciously and sneered ‘You are wrong. Do it again.’ Honestly he didn’t know the answer himself and there is no way to come up with the right answer *that* quickly. No, not with a computer, said the teacher to himself.

But Gauss looked down at his sketch paper and lifted up his head in about five seconds. ‘I just checked my calculation. I’m sure 5050 is the right answer.’

‘Now you’re just messing with me.’ said the teacher, as he strode through many amazed eyes towards Gauss’ desk. ‘Show me your work.’

‘Well, if you add 1 and 100, you get 101. Adding 2 and 99 also gives 101. The same goes for 3 and 98, 4 and 97, etc. There are 50 such pairs from 1 to 100. So the answer is 101 times 50 which is 5050.’

Task 1:

- a. We are not as smart as Gauss was so let's add 1 through 100 in the conventional way. Luckily we have computers and Python. Write a function that adds up all the numbers from 1 to `arg`, where `arg` is the argument to the function (**Hint:** To use iteration, you want to first create a list containing integers from 1 through 100. There is a built-in function `range(x,y)` that does this. First try to call this function in the interactive environment to see what it does.). Try run it with 100 and see if it produces Gauss' answer. What about 1,000,000? We've provided some starter code that you can build on (HW2-4.py).
- b. Next, write a function that adds up all the *odd* numbers from 1 to `arg`. (Hint: Iterate as you did in part (a), but add the number to your total only if it is odd. You can choose to use the function we've provided called `isOdd` to help.)

Task 2:

- a. Write a function that determines if an integer `a` is in a list of integers `myList`. To do this, iterate through all elements in the list, and check if it is the same as the integer `a`. Once you see a match, return `True`. After the iteration, return `False` (why?). Be careful with the indentations (what's within the iteration and what's not?)
- b. (**Extra Credit**) Now write a function that determines if all of the integers in a list `myList1` are in another list of integers `myList2`. To do this, iterate through all elements in `myList1`, and check if each element is in `myList2` (hmm... sounds like a familiar task – maybe you can reuse the function you wrote for part (a)). Again, just fill in the corresponding function skeletons in HW2-4.py.

Handin

Email your program to `cs0931tas@cs.brown.edu` and title the file `'YOURNAME'HW2-5.py` — for example, `DylanFieldHW2-5.py`.