Assignment 3
Due Date for Worksheets: by the end of the class
Due Date for Programs: September 28, 2016

☞ The parts of this assignment marked with the "together" icon, 🏗, should be completed in the groups of 2-3 students.

The parts of this assignment marked with the "alone" icon, 🚧, should be completed individually by each student.

You may discuss any parts of the assignments with your classmates and tutors (or anyone else) but you are responsible for understanding all of

the parts of the assignment that you submit. Any sharing or copying of the parts of the assignments marked with "alone" icon, 🚧, will be considered cheating.

You should not use any features of Python that have not been covered in class or recitations. If you have doubt if you are allowed to use certain structures, just ask one of the instructors.

For this assignment you will be writing 3 programs which should be saved independently as their own ".py" files. The filename you should use for each program is outlined in the sections below. When you're finished you should submit your programs to the Assignment 3 category inside of NYU Classes.

Problem 1 (10 points): Exercises

🏗 Note: You can work with a partner on this problem. You should submit a single worksheet per pair (do not fill out two different worksheets).

Complete the exercises on the attached worksheets.

What to Submit
You should hand in the completed worksheet to your instructor during the lab session.

Problem 2 (20 points): Multiplication By Prime Table

Write a program that prompts the user for a number and then produces a multiplication table for that number when multiplied by the fist seven primes (prime numbers are the ones that are divisible only by 1 and themselves, here are the first seven: 2, 3, 5, 7, 11, 13, 17). The program should format the output so that the original number and the prime number are left aligned and the result of the multiplication is right aligned. You should make sure that your program works and aligns the output correctly for any initial number (assume that the user never enters more than a 10-digit number).

Comment your source code by

- briefly describing parts of your program
- include your name, the date, and your class section at top of your file (above everything else)

Here is a sample run of the program:

Output:

```
Give me a number 17
17 * 2                          34
17 * 3                          51
17 * 5                          85
17 * 7                         119
17 * 11                        187
17 * 13                        221
17 * 17                        289
```

What to Submit

This program should be named (i.e., the name of the file containing the program should be) `multiply.py`. You only need to submit the source code for this problem.

Problem 3 (20 points): Percentage Table

Write a program that prompts the user for an amount of money and then produces a "percent table" for that amount. The program should compute the following percentages of the entered value: 1%, 2%, 5%, 10%, 20%, 25%. The program should format the output so that the original amount and the percentage are left aligned and the result is right aligned. You should make sure that your program works and aligns the output correctly for any initial amount entered (assume that the user never enters more than a 10-digits including decimal point).

Comment your source code by

- briefly describing parts of your program
- include your name, the date, and your class section at top of your file (above everything else)

Here is a sample run of the program:

Output:

```
Give me an amount 100.0
1.0% of 100.00                  $1.00
2.0% of 100.00                  $2.00
5.0% of 100.00                  $5.00
10.0% of 100.00                $10.00
20.0% of 100.00                $20.00
25.0% of 100.00                $25.00
```

The calculated amounts should be printed with two decimal places and a leading $ character.

What to Submit

This program should be named (i.e., the name of the file containing the program should be) `percent.py`. You only need to submit the source code for this problem.

Problem 4 (25 points): Salary Increases

Write a program that calculates person's salary at the end of the first, second and tenth year assuming that he/she receives a fixed annual percentage increase each year. The program should prompt the user for the initial salary and for the percentage increase (assume that salary will be entered without dollar sign and the percentage increase will be entered as a number without the percent sign).

Comment your source code by

- briefly describing parts of your program
- include your name, the date, and your class section at top of your file (above everything else)

Here is a sample run of the program:

Output:

```
What is your initial salary?
50000
What is your annual percentage increase?
2
At the end of year one, you will be making $51,000.00
At the end of year two, you will be making $52,020.00
At the end of year ten, you will be making $60,949.72
```

Make sure that the dollar amounts are printed with exactly two decimal places and with comma separator every three digits.

What to Submit

This program should be named (i.e., the name of the file containing the program should be) `salary.py`. You only need to submit the source code for this problem.

Problem 5 (25 points): Tax and Tip Calculator

In NYC the sales tax is 8.875%. Write a program that given the amount of a restaurant bill, calculates the tax due, and suggested tip amounts with the corresponding totals. The user should be prompted only for the total amount of their bill (excluding taxes). The suggested tips of 15%, 18%, 20% and 25% should be calculated (using the bill amount before taxes). For each suggested tip amount, the program should calculate the total that includes the tax and tip.

Comment your source code by

- briefly describing parts of your program
- include your name, the date, and your class section at top of your file (above everything else)

Here is a sample run of the program:

Output:

```
What is your bill?
100
8.875% NYC tax is $8.88

tip percent     tip amount      total
15.00%          $15.00          $123.88
18.00%          $18.00          $126.87
20.00%          $20.00          $128.87
25.00%          $25.00          $133.88
```

What to Submit

This program should be named (i.e., the name of the file containing the program should be) `tips.py`. You only need to submit the source code for this problem.

Grading

The only way to receive the credit for the worksheet problems is to hand them in before the end of the lab session in which they are given.

The programs are graded based on correctness, style of code, design and documentation.

What and how to submit?

You should submit the source code file for each program to NYU Classes by the due date stated above. Make sure that you get an email confirmation after you submit the assignment. You should keep that email until the grades are returned - it is your proof that the assignment was submitted! If you do not get an email confirmation, you should try to resubmit the assignment. If you do not get that email, it means that we did not get your assignment.

Alarm Clock

Name(s) and NetId(s):

It is currently midnight. You set an alarm to go off in 63 hours.

1. What time will it go off? Explain how you calculated this.

2. What time will the alarm go off if the current time was 2pm instead of midnigh? Explain how you calculated this.

3. Assume that the current time was stored in a variable called `cur_time` and the number of hours that the alarm was set for is stored in a variable called `num_of_hours` (63 from above). Can you write a single Python expression that would calculate the time at which the alarm is going to go off?

Paying Taxes

Name(s) and NetId(s):

Calculating taxes is complicated and there are a lot of rules. But you can get an estimate (ignoring all possible deductions, etc.) based on the tax bracket rates for people with different incomes.

Look at the following two pages that list tax brackets for 2015 and 2016:

http://taxfoundation.org/article/2015-tax-brackets

http://taxfoundation.org/article/2016-tax-brackets

Consider a person with annual taxable income of $90,000.00 in 2015 and $92,000.00 in 2016. Assume that the tax brackets for single filer apply.

1. How much money did he/she pay in taxes in 2015? How did you calculate this amount (show your work).

2. How much money did he/she had left after paying taxes in 2015?

3. How much money did he/she pay in taxes in 2016? How did you calculate this amount (show your work).

4. How much money did he/she had left after paying taxes in 2016?

5. Which year was their "take home" amount larger? Is the difference $2,000? If it is not $2,000, why do you think it is less/more?