

COSC 101 Homework 1: Fall 2024

The due date for this homework is **Thursday, Sep 12 at 11:59PM**.

Introduction

This assignment is designed to give you a first introduction to writing programs in Python! By completing this assignment, you will demonstrate that you understand a number of important concepts:

- built-in function calls, such as `print()`, `input()`, and `round()`
- working with different data types, including using type conversion functions and operators
- working with basic arithmetic

Important Tips

- Remember, computer science is a science. Always write code with a prediction in mind. While you can sparingly code to try and see output, you should focus on thinking through what you want your code to do, what you expect as a result, and compare what your code actually does to your result.
- Before you type, trace the execution of the starter code already provided
- Sometimes sub-tasks go together, like computation followed by printing. You should consider them simultaneously if that helps you follow the correctness of your work.
- Use extra steps if needed for your thought process, printing results to test your code. Just remember to remove these extra prints once you know your code is correct.
- Match your output to the output given. Precision is important in computer science.
- Don't change file names. You're generally given `.py` files to work in. Don't change the filenames of those files.

Your assignment

Your task is to complete following steps:

1. Download the `hw1.zip` file from the course website and open it. You will see two python files, `hw1_types.py` and `hw1_madlibs.py`, in the unzipped folder. You are expected to write your programs in these files.
2. Review the criteria used in [Grading](#)
3. Complete `hw1_types.py`. This file is used in [Task 1](#).
4. Complete `hw1_madlibs.py`. This file is used in [Task 2](#).
5. Complete your `trip_plan`. This file is from [Task 3](#).
6. Submit your completed work.

Notice that each starter `.py` file has a header with some information for you to fill in. Please do so. Your feedback helps the instructors better understand your experiences doing the homeworks and where we can provide better assistance.

Grading

When we are assessing your code, higher levels of achievement are demonstrated, in part, by

- Starter code left unmodified
- All lines of output are present
- Lines have proper formatting
- Variables are properly named and used

Task 1

Types and Casting Description

In the `hw1_types.py` file, you will find that the `main` function contains several variables that are already defined. This is *starter code*, which is provided to assist you for the relevant task. Starter code will be denoted by comments

and instructions as to whether the provided code should be modified or not. For this task (and all those in this homework), do not modify the starter code. You should write your code below the starter code (as indicated in the file).

Your task is to:

1. Write code to `print` the type of each of the existing variables in the same order in which they were assigned.
2. Write code convert the value of `r` to a float, raise it to the power of `u`, and display the type of the result, *without* modifying the values of any of the variables.
3. Update the variable `q` to be the remainder when `t` is divided by `u`.
4. Print the new value of the variable `q`.
5. Print the value of the variable `s`
6. Write code make a new variable `z` which contains the value `'hi43hi43hi43'` by only using basic operators and the variables.
7. Print the value of the variable `z`.

The full output of your program should be exactly equivalent to the following:

```
<class 'str'>
<class 'str'>
<class 'str'>
<class 'int'>
<class 'int'>
<class 'float'>
1
hi
hi43hi43hi43
```

Task 2

Madlibs Description

In the `hw1_madlibs.py` file, write a short program that asks for a noun (string) and two verbs (both strings). (The verbs should be third person singular). Using the three inputs, your program should print the sentence:

```
If it <verb 1> like a <noun> and <verb 2> like a <noun>, it probably is a
<noun>.
```

Here is an example run of the program:

```
What's the noun? cat
What's the first verb? sleeps
What's the second verb? eats
If it sleeps like a cat and eats like a cat, it probably is a cat.
```

Here's another example:

```
What's the noun? river
What's the first verb? flows
What's the second verb? bubbles
If it flows like a river and bubbles like a river, it probably is a river.
```

Task 3

Grocery Trip Description

The semester has just started and you are already tired of the dining hall food. You and your friends would like to know how much time it takes to drive to a grocery store. Oddly, you can only measure distance in feet.

In this task, you should sketch out either by hand on paper or on a whiteboard (make sure to take a picture) an algorithm that helps you plan your trip. Your algorithm should ask for a driver's name, the distance (in feet), and the speed (in miles per hour). It should calculate and report how long it will take for the driver to arrive at the destination. The time should be reported in units of days, hours, minutes, and seconds (rounding to the nearest second).

Your sketch should not be python code. Rather, it should describe the logic and steps needed to accomplish the task, drawing on the computational thinking you have demonstrated in lab and in class.

The following are some examples to demonstrate what your algorithm should output.

Fig is hungry. Price Chopper is roughly 14,446 feet from Colgate. You are driving in the town, so your average speed will be 31 mph. Your program's output should look like this:

```
Who will be driving? Fig
How far away is the destination (in feet)? 14446
How fast will fig be driving on average (in mph)? 31
It will take fig 0 days 0 hours 5 minutes and 18 seconds.
```

Luiz is willing to drive you all to Asia Food Market. The distance between Colgate and Asia Food Market is roughly 204,431 feet and Luiz will be driving at 30 mph (he is new to driving and nervous). Your program's output should look like this:

```
Who will be driving? Luiz
How far away is the destination (in feet)? 204431
How fast will Luiz be driving on average (in mph)? 30
It will take Luiz 0 days 1 hours 17 minutes and 26 seconds.
```

Aditi will be driving you all to Pike Place Fish Market in Seattle. The distance is roughly 14,691,600 feet, and Aditi will be driving at 75 mph on average. Your program's output should look like this:

```
Who will be driving? Aditi
How far away is the destination (in feet)? 14691600
How fast will Aditi be driving on average (in mph)? 75
It will take Aditi 1 days 13 hours 6 minutes and 0 seconds.
```

Submission Instructions

Submit two Python files and your `trip_plan` to the platform indicated in your class section:

- `hw1_types.py`
- `hw1_madlibs.py`
- `trip_plan` (either a scanned pdf of your algorithm or a photo)

Remember to complete the questions at the top of each file before submitting.