Homework 3

CSC-121, Fall 2025

Submission Instructions: Create a single text file for your answers (Use .txt or .pdf) with your name and ID number at the top. Include code written for any programs, and type-written answers to non-coding questions. Submit the file on Canvas to complete the assignment. You may work in groups or use genAI help, but written answers must be in your own words.

Q1. Warm up!

1. Write statements that do the following:

a) Declare a char variable named letter.
b) Assign the letter A to the letter variable.
c) Display the contents of the letter variable.

2. Is the division statement in the following code an example of *integer division* or *floating-point division*? What value will be stored in the variable `portion`? Make a prediction, then write a short program to test and print the value. Was your prediction correct? (No need to paste your code for this problem, just provide short answers to the questions.)

```
double portion;
portion = 70 / 3;
```

3. The variable a is a `float` and the variable b is a `double`. Write a statement that will assign the value of b to a without causing an error when the program is compiled. Test your code to make sure it runs without errors.

4. Which of the following are valid variable declaration statements?

a) `int x;`

b) `int y = 2;`

c) `int x, y;`

d) `int x, y = 2;`

e) All of the above.

Q2. Miles per Gallon

1. A car's miles-per-gallon (MPG) can be calculated with the following formula:

MPG = Miles driven / Gallons of gas used

Write a program that asks the user for the number of miles driven and the gallons of gas used. It should calculate the car's miles-per-gallon and display the result on the screen.

Q3. String Class Methods

Write a program that asks the user to enter the name of his or her favorite city. Use a String variable to store the input. The program should use String class methods to display the following:

- The number of characters in the city name.
- The name of the city in all uppercase letters.
- The name of the city in all lowercase letters.
- The first character in the name of the city.

Q4. Tax and Tips

Write a program that computes the tax and tip on a restaurant bill. The program should ask the user to enter the charge for the meal. The tax should be 6.75 percent of the meal charge. The tip should be 20 percent of the total after adding the tax. Display the meal charge, tax amount, tip amount, and total bill on the screen.

Q5. Student Ratios

Write a program that asks the user for the number of males and the number of females registered in a class. The program should display the percentage of males and females in the class.

Hint: Suppose there are 8 males and 12 females in a class. There are 20 students in the class. The percentage of males can be calculated as 8 ÷ 20 = 0.4, or 40%. The percentage of females can be calculated as 12 ÷ 20 = 0.6, or 60%

Q6. Madlibs

Write a program that plays a word game with the user. The program should ask the user to enter the following:

- His or her name
- His or her age
- The name of a city
- The name of a college
- A profession
- A type of animal
- A pet's name

After the user has entered these items, the program should display the following story, inserting the user's input into the appropriate locations:

"There once was a person named NAME who lived in CITY. At the age of AGE, NAME went to college at COLLEGE. NAME graduated and went to work as a PROFESSION. Then, NAME adopted a(n) ANIMAL named PETNAME. They both lived happily ever after!"

If you like, you may choose to write a completely different story from your imagination, but you must still ask for and use all of the same seven input values.

Q7. Cookie Recipe

A cookie recipe calls for the following ingredients:

• 1.5 cups of sugar
• 1 cup of butter
• 2.75 cups of flour

The recipe produces 48 cookies with these amounts of the ingredients. Write a program that asks the user how many cookies he or she wants to make, and then displays the number of cups of each ingredient needed for the specified number of cookies.

HINT: If you are not sure how to calculate the ratio, try asking on the class Discussion board.