Assignment 3

1. **Name Recognition** Problem -- 20 pts.
2. **Geometry Calculator** Problem -- 30 pts.
3. **Math Tutor Version 2** Problem -- 30 pts.
4. **The Greatest and the Least of These** Problem -- 40 pts.

TOTAL -- 120 pts.

Part 1

Name Recognition

Write a program that will ask first and last names of the user. If <u>your name</u> has been entered, output: "Hello, my creator!" Otherwise output: "Hello, *fist name last name*", where *fist name last name* is the data entered by the user.
Use <u>only c-strings</u> (arrays of characters) in the solution of this problem.

Geometry Calculator

Write the program that displays the following menu:

```
Geometry Calculator:

   1. Calculate the Area of a Circle
   2. Calculate the Area of a Rectangle
   3. Calculate the Area of a Triangle
   4. Quit

    Enter your choice (1 - 4):
```

If the user enters 1, the program should ask for the radius of the circle and then display its area. Use the following formula:

$$area = \pi r^2$$

Use 3.14159 for π and the radius of the circle for r. If user enters 2, the program should ask for the length and width of the rectangle and then display the rectangle's area. Use the following formula:

```
area = length * width
```

If the user enters 3 the program should ask for the length of the triangle's base and it's height, and then display its area. Use the following formula:

```
area = base * height * 0.5
```

If the user enters 4, the program should end.

Input Validation: Display an error message if the user enters number outside the range of 1 through 4 when selecting an item from the menu. Do not accept negative values for the circle's radius, the rectangle's length or width, or triangle's base or height.

Part 2

Math Tutor Version 2

Write a program that can be used as a math tutor for a young student.
The program displays a menu allowing the user to select an addition or subtraction problem. The final selection of the menu should let the user quit the program.
After the user made a choice, the program should display two random numbers to be added / subtracted, such as:

```
  247
+ 129      <- -  Output problem in this format.
-------
```

The program should wait for the student to enter the answer. If the answer is correct, the message of congratulations should be printed. If the answer is incorrect, a message should be printed showing the correct answer.
Then the program should display a menu again. This process is repeated until the user chooses to quit the program.

Input Validation: If the user selects an item not on the menu, display an error message and display the menu again.

The Greatest and the Least of These

Write a program with a loop that lets the user enter a series of integers. The user should enter -99 to signal the end of the series. After all the numbers have been entered, the program should display the largest and the smallest numbers entered.
Hint : Use "The greatest of a set of numbers" algorithm (see below) to solve the problem.

"The greatest of a set of numbers" algorithm:

1. Get (input) the first number, set it to be the greatest for now.
2. Get the next number.

3. If the new number is bigger than the “greatest” one – set the new one to be the “greatest”.
4. Repeat steps 2 - 4 until all the numbers are consumed.