# CSI 102: Lab 01

# Python Basics

Anthony Cavallo

09.04.2025

I certify that this lab report is entirely my own work.

# Introduction

Welcome to the first Lab of CSI 102, where the tasks were to be able to learn the very basics of programming in Python, organizing files, creating and using variables, synthesizing ASCII art using the print command, debugging pre-existing code, and creating complex mathematical equations and expressions all with Python through the usage of Visual Studio Code.

The main objective of this lab was to get the toes in the water so to speak, have a fundamental understanding of how Python functions and apply these concepts in real-world programming.

# Methods:

Task 1 was to create simple patterns in a file called “patterns.py”. The steps were as follows:

1. Creating the file.
2. Using the print command to make 2 patterns as shown below:

```
# Author: Anthony Cavallo
# Date: 09/04/2025
# Description: This file prints out patterns on the terminal.
# Honor Code: I affirm this work is my own and I've credited external sources.

print('****\n****\n****\n****')
print('*  *\n*  *\n*  *\n*  *')
```

Task 2 was a more in-depth version of the first, with a focus on making more advanced patterns to create shapes. The steps were:

1. Creating a file called “shapes.py”

2. Using the print command to display the shapes.

```
# Author: Anthony Cavallo
# Date: 09/04/2025
# Description: This file prints out shapes on the terminal.
# Honor Code: I affirm this work is my own and I've credited external sources.

print('----------')
print('    *    \n   ***   \n  *****  \n *******')
print(' -----\n |   |\n |   |\n |   |\n ---')
print('   *   \n  ***   \n *****  \n  ***   \n   *   ')
```

Task 3 was using these skills learned from Task 2 to create a pattern for our first initial in our first names.

1. Creating the file.
2. Using the skills learned from the other 2 tasks, create a pattern displaying the first letter of your first name using print.

```
# Author: Anthony Cavallo
# Date: 09/04/2025
# Description: This file prints out the first letter of my name on the terminal.
# Honor Code: I affirm this work is my own and I've credited external sources.

print('   A   \n  A A \n A   A\nA A A A \nA      A\nA      A')
```

Task 4 was to apply the input command to be able to prompt users to type their first and last names for Python to be able to print it out. This is done with variables, and input and print commands.

1. Create the file
2. Create the variables for the first and last names, create an input command and print out the results with the print command.

```
# Author: Anthony Cavallo
# Date: 09/04/2025
# Description: This file prompts for a full name and prints out the result.
# Honor Code: I affirm this work is my own and I've credited external sources.

firstName = input("Type first name here: ")
lastName = input("Type last name here: ")

print(lastName + ", " + firstName)
```

Task 5 was a unique one from the last 4. This one required the understanding and skill to debug existing code. It's as simple as understanding the code itself and fixing any errors.

1. Read the code
2. Fix any syntax or logic errors found.

```
# Author: Anthony Cavallo
# Date: 09/04/2025
#
# Description: This program computes the slope of a line given
#              the end points of the line.
#              The result is then printed to the shell.


# Initialize the end points.
startX = -2
startY = 1
endX = 5
endY = 36

# Compute the slope.
slope = startY - endY / endX - startX

# Print the results.
print("Starting point: (", startX, ",", startY, ")")
print("Ending point: (", endX, ",", endY, ")")
print("Slope of the line =", slope)
```

And finally, Task 6 was another unique one. This one was learning how to use Python for mathematical calculations of a sphere, creating variables and printing out equations to find specific properties of a sphere.

1. Modify the file (add variables, etc) to find, calculate, and display the diameter, surface area, and volume of a sphere.

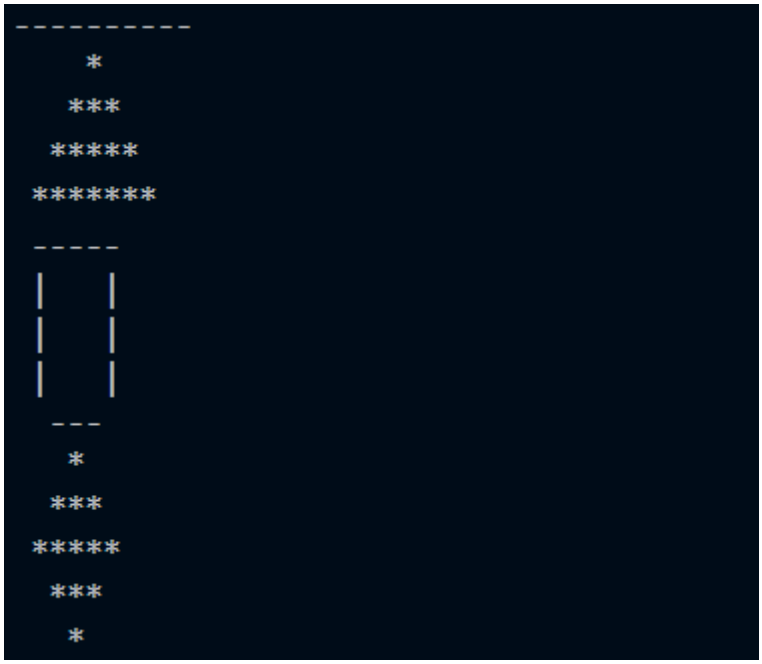
```python
# Author: Anthony Cavallo
# Date: 09/04/2025
#
# Description:  Given the radius of a sphere, this program computes its
#               diameter, surface area, and volume.

# A useful value:
PI = 3.14159265359

# Initialize the radius:
radius = 4.0

# Calculate the properties of the sphere:
diameter = radius*2
surface_area = 4*PI*radius
volume = (4/3)*PI*(radius**2)

# Print the results:
print("diameter =", diameter)
print("surface area =", surface_area)
print("volume =", volume)
```

# Results:

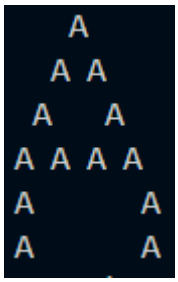
Task 1:

```
****
****
****
****
*  *
*  *
*  *
*  *
```

Task 2:




Task 3:




Task 4:

```
Type first name here: Anthony
Type last name here: Cavallo
Cavallo, Anthony
```

Task 5:

```
Starting point: ( -2 , 1 )
Ending point: ( 5 , 36 )
Slope of the line = -4.2
```

Task 6:

```
diameter = 8.0
surface area = 50.26548245744
volume = 67.02064327658667
```

# Discussion:

I learned quite a lot from this lab exercise, about Python and as well as about structuring reports in general. I learned how to structure print commands to create shapes, reminding me of the times when I would run programs or do debugging for those programs from websites like GitHub and see the text made from shapes when running them. I've also learned the input command it's usage during the first name/last name task. This lab exercise has really helped me understand and memorize the foundational concepts of these commands and has deepened my understanding for the future of learning Python. As for the usage of these commands in future projects, like I've already said, I can use them for printing out text, but it can also be used for creating custom dialogue options in games for example, or username creation, or just dialogue between characters in general. There are many use cases where text is needed and this might be one of the simpler exercises, but one of the most important, especially in game design.

# Challenges:

I haven't ran into that many challenges besides learning the input command, which after running into trial and error in VS Code, I managed to find it and when I tried it, it worked as expected, and I made sure to use a string because I intuitively understood from the previous lessons we had on Python basics about strings and print commands, so I applied the same logic here. That was the only challenge I encountered in this lab that would've been a major obstacle. I'm glad I managed to learn by myself what an input command was, however.

# Conclusion:

I learned quite a bit of things from this lab, such:

- Input commands
- Commenting
- Organization of file structure
- How to structure a lab report for CSI 102

I’m glad I was able to learn quite a bit about the structure of labs and Python code in this because it would surely help me in future labs and lessons.