

Lab 2 - Getting Started with Python II

Chapter	1. Introduction to Computers, Programs, and Python
Time	80 Minutes

Lab 2

Objectives

- To familiarize with the programming environment.
- To write simple programs.

Current Lab Learning Outcomes (LLO)

By completion of the lab the students should be able to

- Use the programming environment.
- Use `print` function.
- Write simple programs that include simple calculations.
- Document the code.

Lab Requirements

- PyCharm (IDE).



Practice Activities with Lab Instructor (25 minutes)

Problem 1

Programming Exercises (1.5)

Write a program that displays the result of the following equation:

$$\frac{9.5 \times 4.5 - 2.5 \times 3}{45.5 - 3.5}$$



0.8392857142857143

Solution

Phase 1: Problem-Solving Phase:

1- Decompose the equation (Step 1):

- From:

$$\frac{9.5 \times 4.5 - 2.5 \times 3}{45.5 - 3.5}$$

- To:

$$\frac{(9.5 * 4.5) - (2.5 * 3)}{45.5 - 3.5}$$

- Note: in Python, (/) means division sign and (*) multiplication sign.

2- Decompose the equation (Step 2):

- From:

$$\frac{(9.5 * 4.5) - (2.5 * 3)}{45.5 - 3.5}$$

- To:

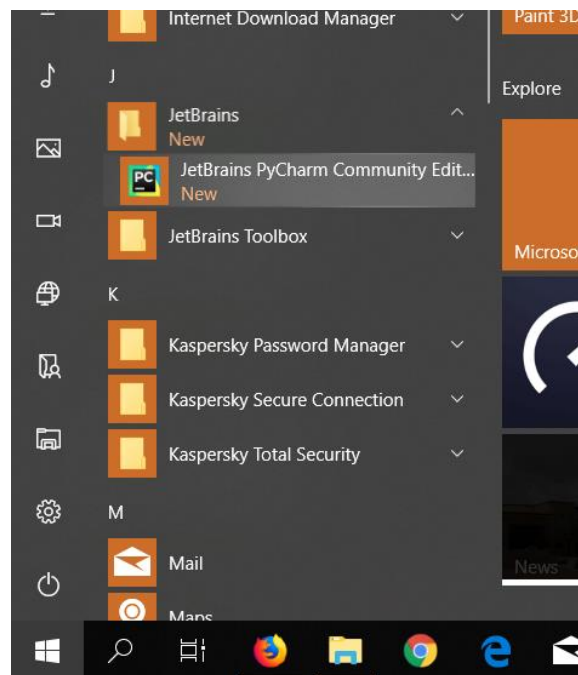
$$((9.5 * 4.5) - (2.5 * 3)) / (45.5 - 3.5)$$

3- Print the decomposed equation.

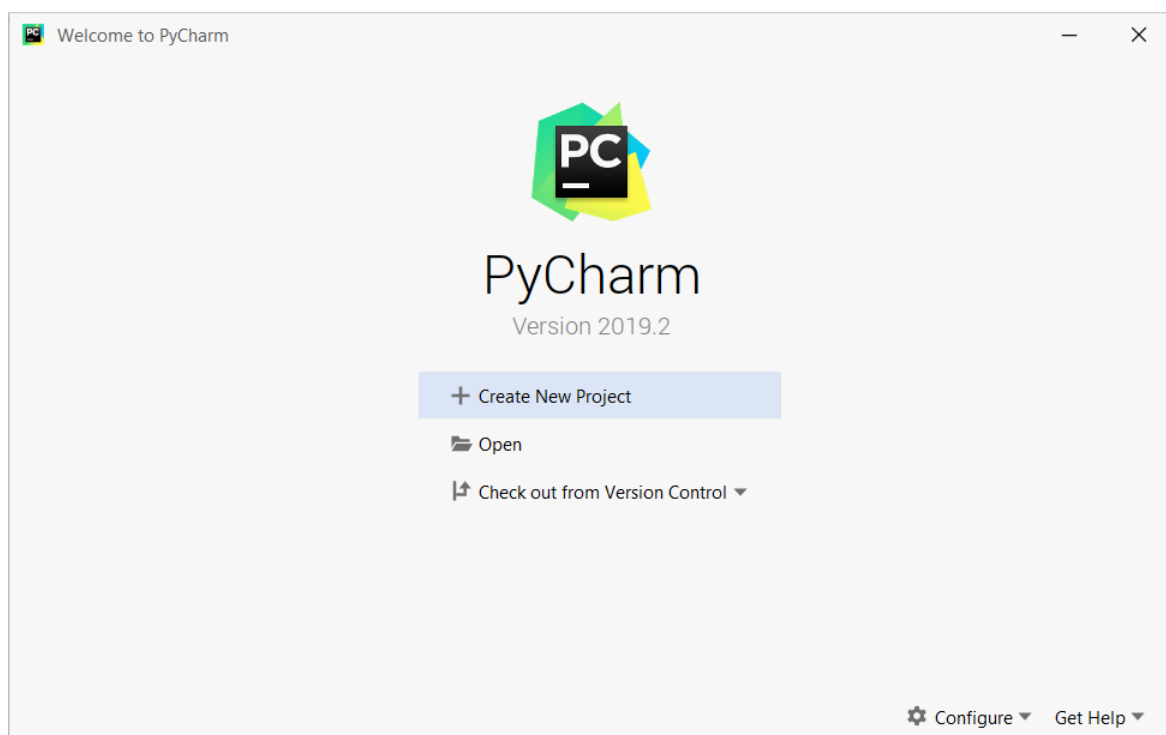
- Note: do not treat it as a string (do not enclose it with quotation marks)
- `print(((9.5 * 4.5) - (2.5 * 3)) / (45.5 - 3.5))`

Phase 2: Implementation Phase:

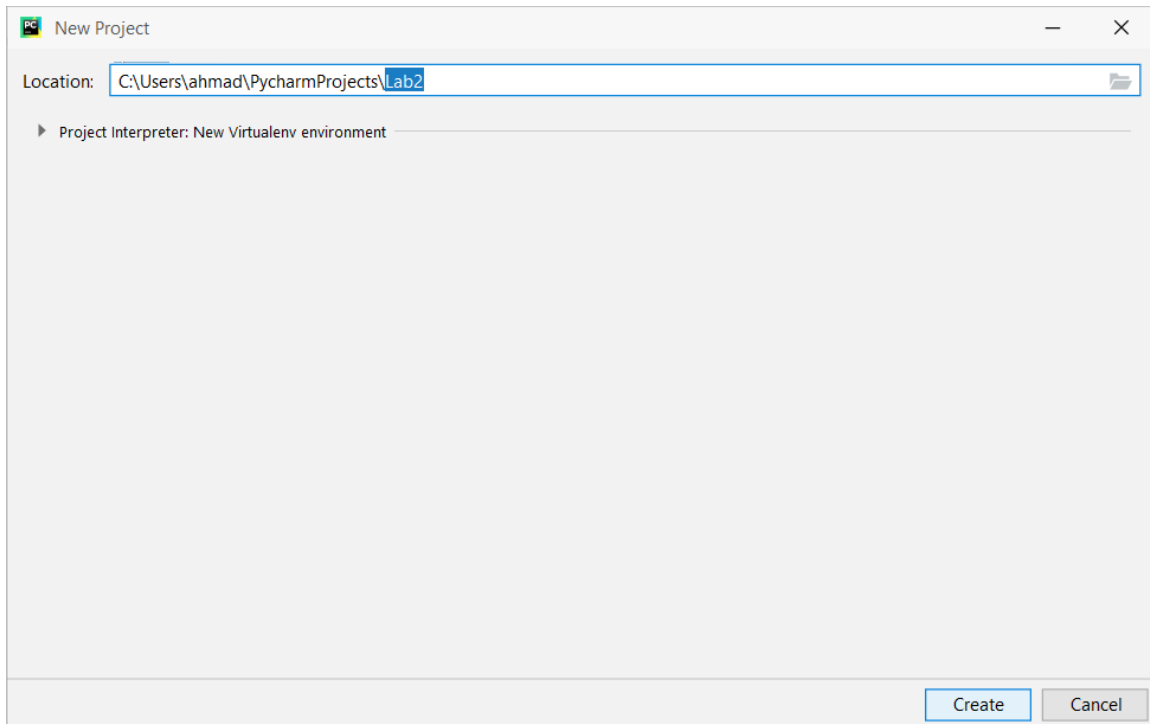
1. Open PyCharm.



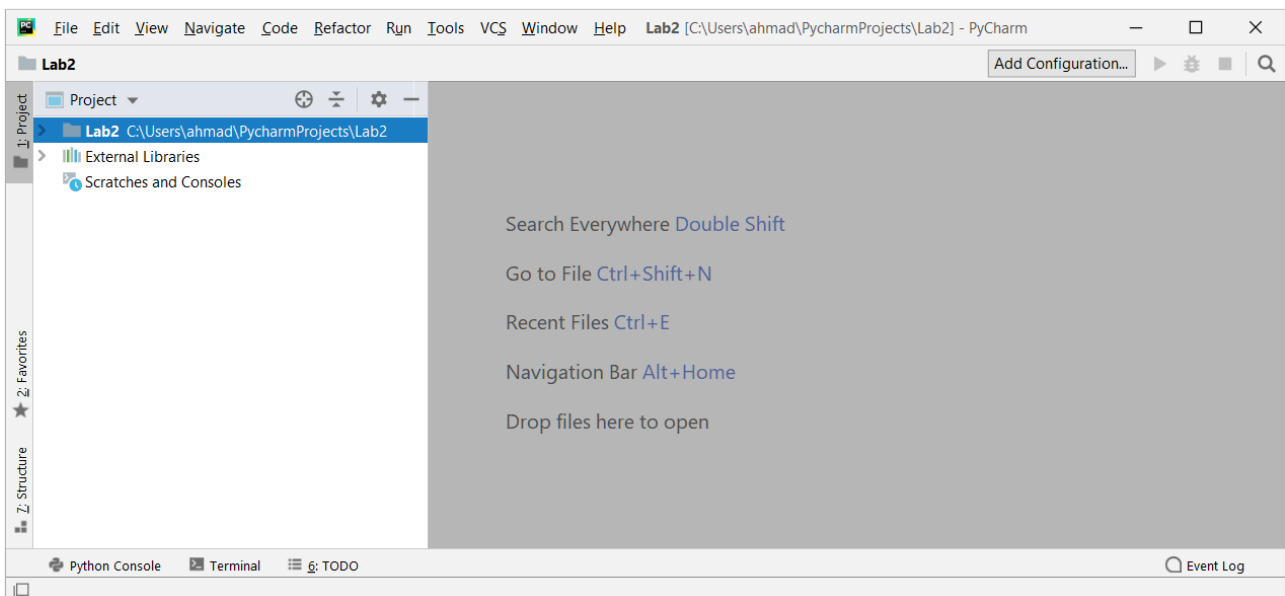
2. Then, click on *“Create New Project”*.



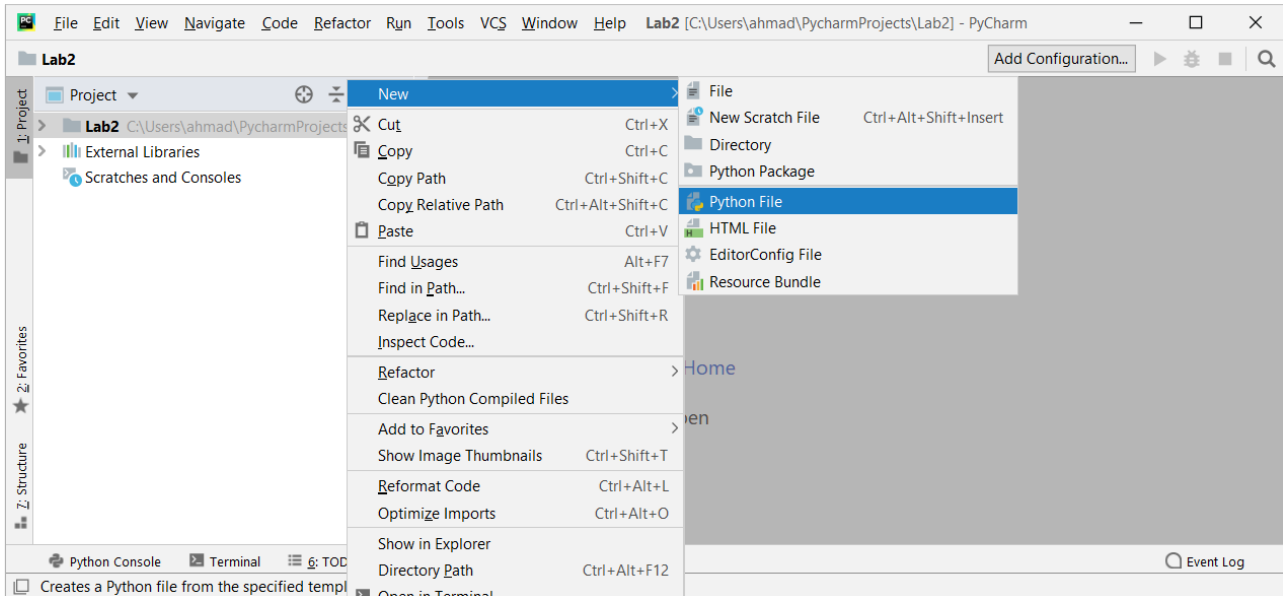
3. Then, name it “Lab 2”.



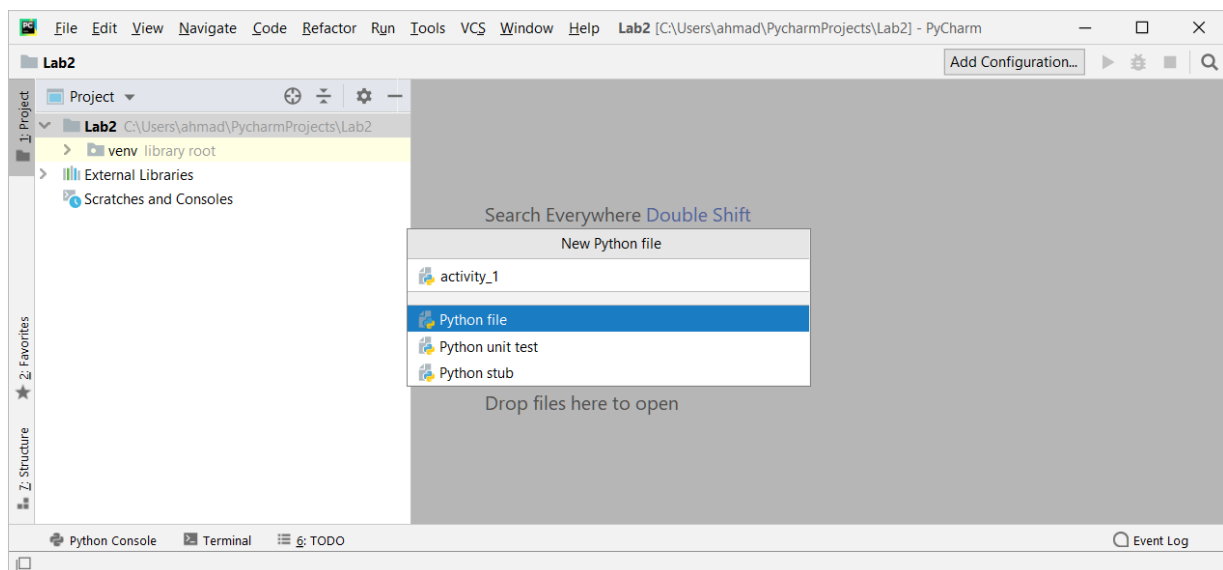
4. Then, the new project is created and opened. After that, you have to create a new Python file inside the project to write the code on it.



5. Select the project name on the left menu, right click on it and select “New” → “Python File”.



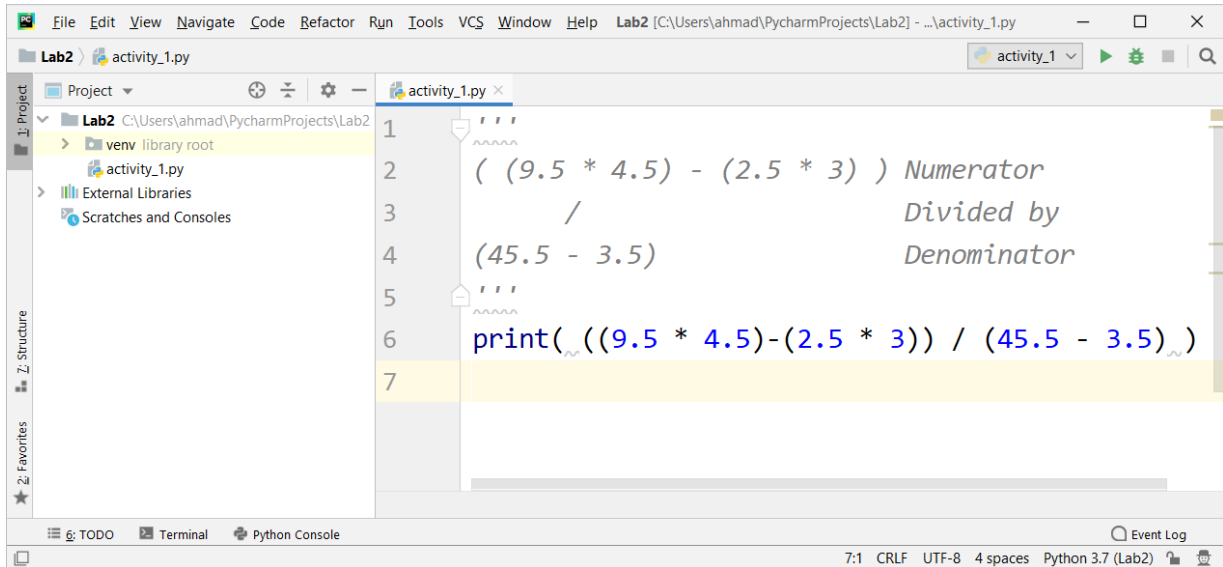
6. Then, name the new file “activity_1”, and click on “Python file”.



7. Now, the new file is created and opened. Write the code in it:

activity 1.py

```
1 '''
2 ( (9.5 * 4.5) - (2.5 * 3) ) Numerator
3 / Divided by
4 (45.5 - 3.5) Denominator
5 '''
6 print( ((9.5 * 4.5) - (2.5 * 3)) / (45.5 - 3.5) )
```

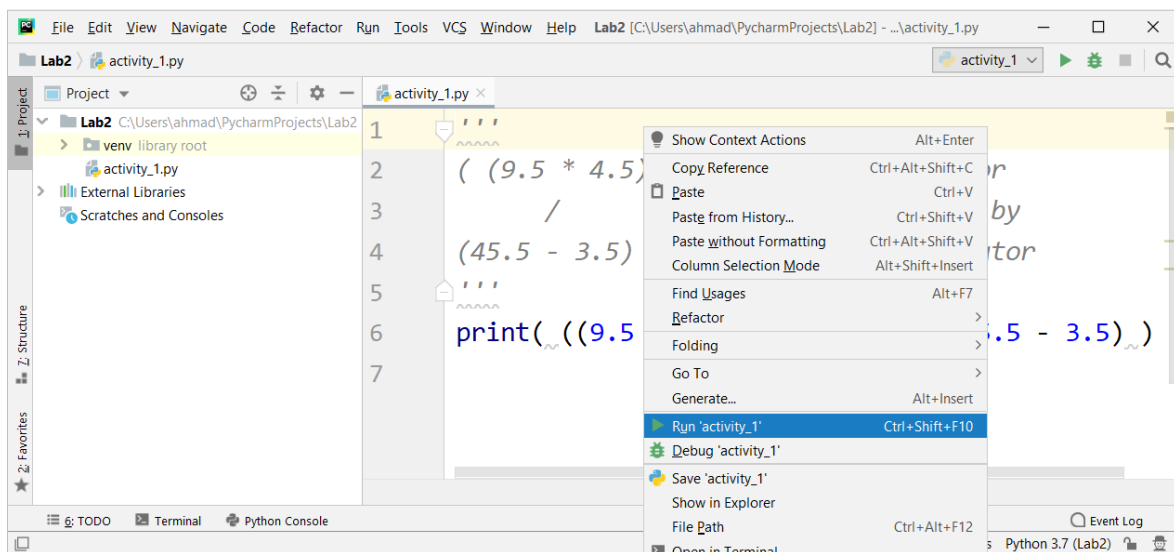


```

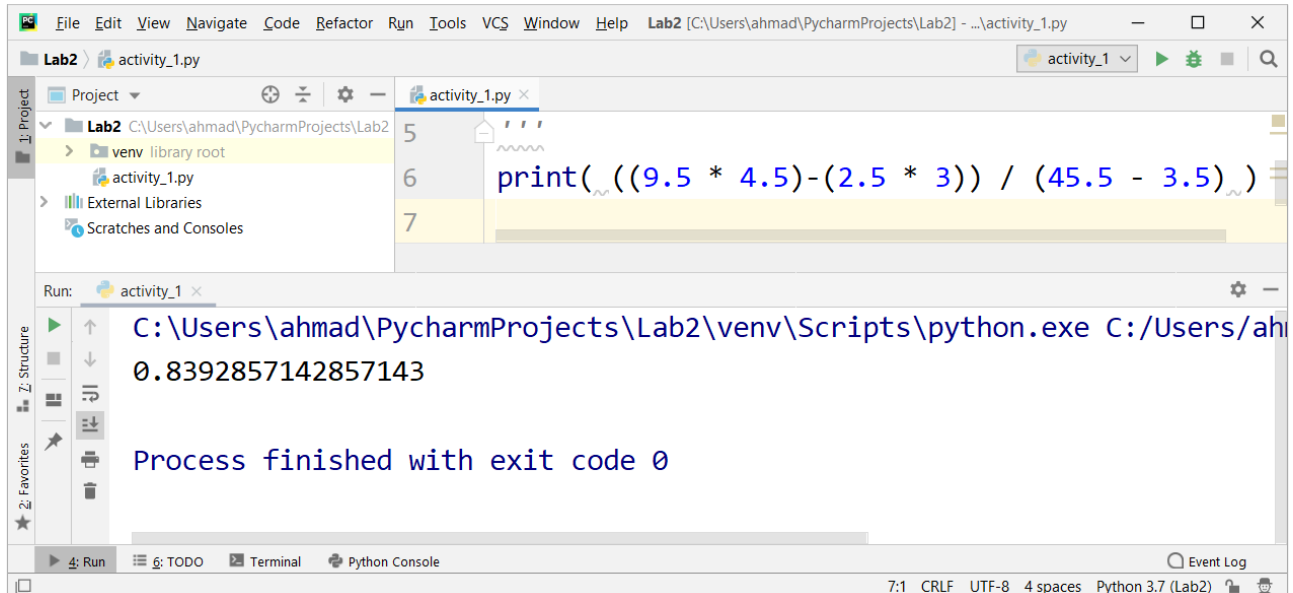
1  '''
2  ( (9.5 * 4.5) - (2.5 * 3) ) Numerator
3      /
4  (45.5 - 3.5)                Divided by
5  '''                        Denominator
6  print(((9.5 * 4.5)-(2.5 * 3)) / (45.5 - 3.5))
7

```

8. To run the file, right click on any area of the editor and click on (Run 'activity_1'), which is the name of the file.



9. After that, PyCharm is going to run the file using the Python interpreter, and then display the output of the file to you.



```

File Edit View Navigate Code Refactor Run Tools VCS Window Help Lab2 [C:\Users\ahmad\PycharmProjects\Lab2] - ...activity_1.py
Project
  Lab2 C:\Users\ahmad\PycharmProjects\Lab2
    venv library root
    activity_1.py
  External Libraries
  Scratches and Consoles
activity_1.py
5
6 print(((9.5 * 4.5) - (2.5 * 3)) / (45.5 - 3.5))
7
Run: activity_1
C:\Users\ahmad\PycharmProjects\Lab2\venv\Scripts\python.exe C:/Users/ah
0.8392857142857143
Process finished with exit code 0
7:1 CRLF UTF-8 4 spaces Python 3.7 (Lab2)

```

Problem 2

Programming Exercises (1.7)

π can be computed using the following formula:

$$\pi = 4 \times \left(1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11} + \dots \right)$$

Write a program that displays the result of $\pi = 4 \times \left(1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11} \right)$

and $\pi = 4 \times \left(1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11} + \frac{1}{13} - \frac{1}{15} \right)$



```

2.9760461760461765
3.017071817071818

```

Solution

Phase 1: Problem-Solving Phase:

1- Decompose the first equation:

a. From:

$$4 \times \left(1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11} \right)$$

b. To:

$$4 * (1 - (1/3) + (1/5) - (1/7) + (1/9) - (1/11))$$

2- Decompose the second equation:

a. From:

$$4 \times \left(1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11} + \frac{1}{13} - \frac{1}{15} \right)$$

b. To:

$$4 * (1 - (1/3) + (1/5) - (1/7) + (1/9) - (1/11) + (1/13) - (1/15))$$

3- Print the first decomposed equation.

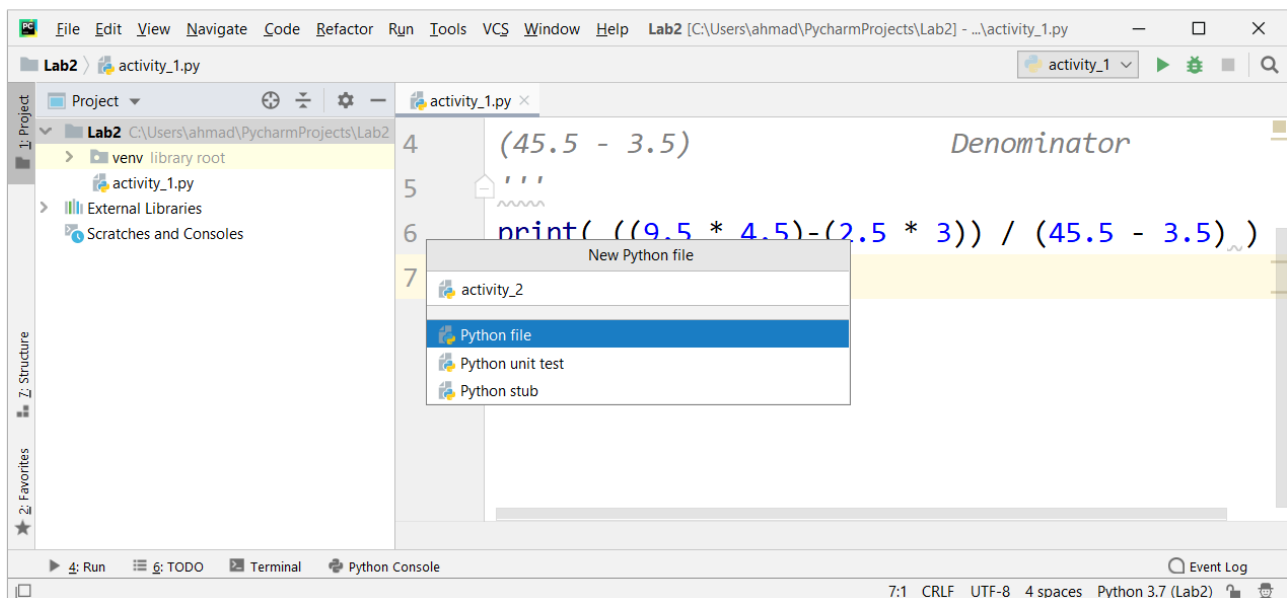
a. `print(4 * (1 - (1/3) + (1/5) - (1/7) + (1/9) - (1/11)))`

4- Print the second decomposed equation.

a. `print(4 * (1 - (1/3) + (1/5) - (1/7) + (1/9) - (1/11) + (1/13) - (1/15)))`

Phase 2: Implementation Phase:

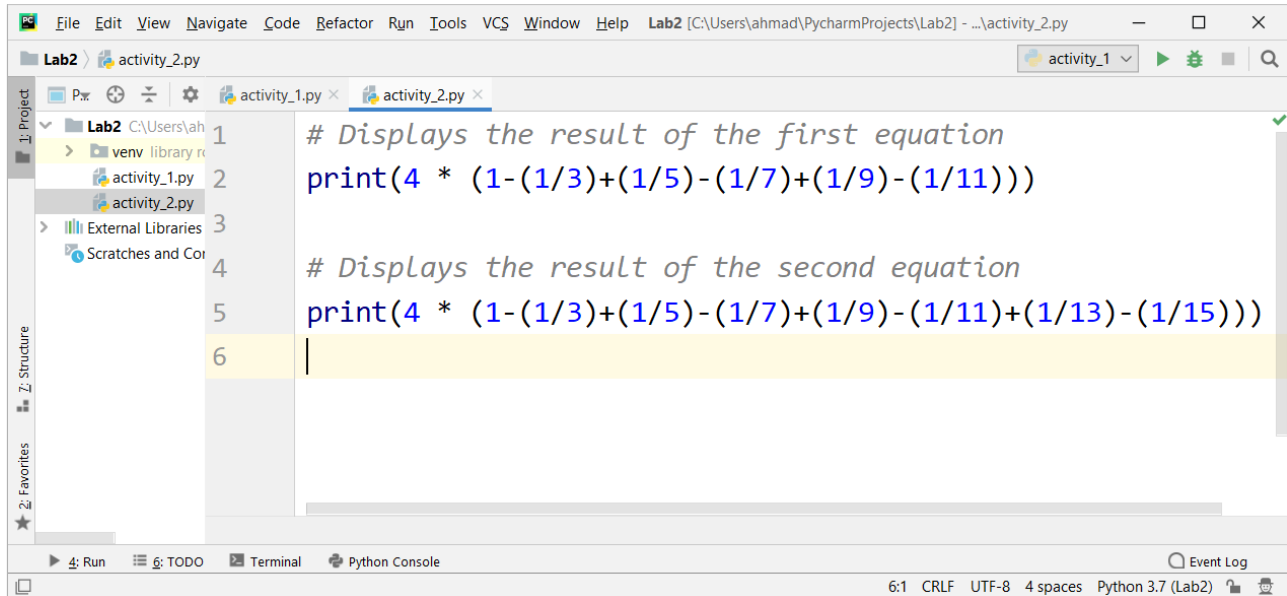
1. Open the project "Lab 2" if it was not opened.
2. Create a new file and name it "activity_2.py".



3. Write the following code in the file:

activity 2.py

```
1 # Displays the result of the first equation
2 print(4 * (1 - (1/3) + (1/5) - (1/7) + (1/9) - (1/11)))
3
4 # Displays the result of the second equation
5 print(4 * (1 - (1/3) + (1/5) - (1/7) + (1/9) - (1/11) + (1/13) - (1/15)))
```

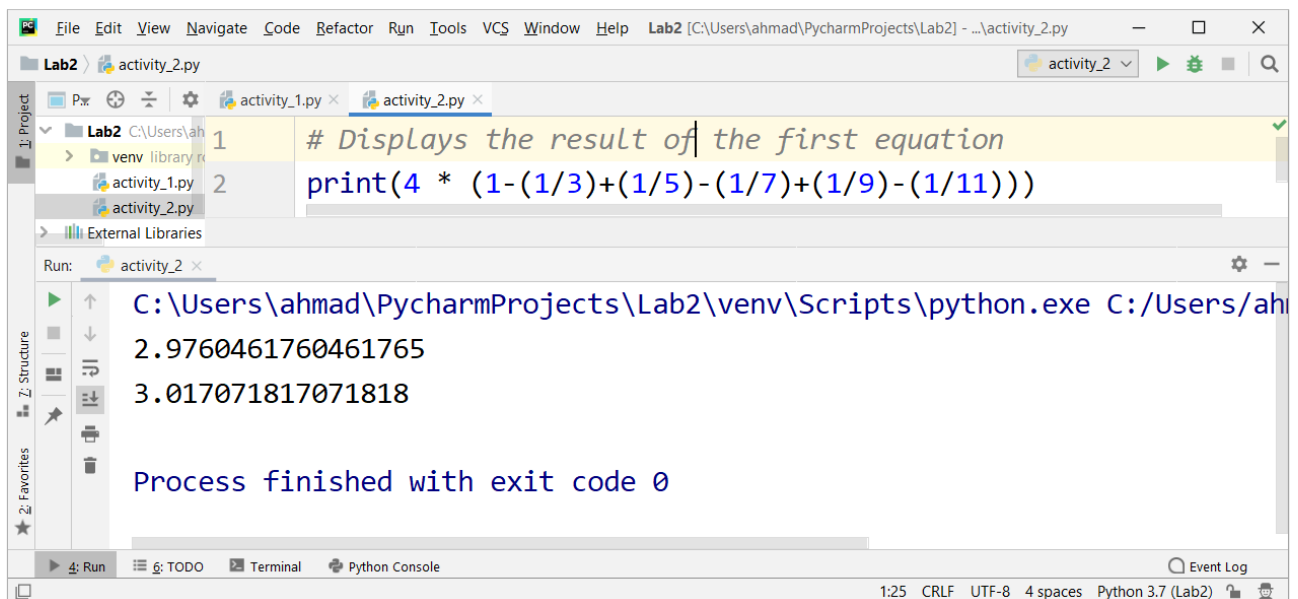



```

1 # Displays the result of the first equation
2 print(4 * (1-(1/3)+(1/5)-(1/7)+(1/9)-(1/11)))
3
4 # Displays the result of the second equation
5 print(4 * (1-(1/3)+(1/5)-(1/7)+(1/9)-(1/11)+(1/13)-(1/15)))
6

```

4. Run the code:



```

C:\Users\ahmad\PycharmProjects\Lab2\venv\Scripts\python.exe C:/Users/ah
2.9760461760461765
3.017071817071818
Process finished with exit code 0

```



Individual Activities (50 minutes)

Problem 3

Programming Exercises (1.6)

Write a program that displays the result of $1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9$.



45

Problem 4

Programming Exercises (1.8)

Write a program that displays the area and perimeter of a circle that has a radius of 5.5 using the following formulas (Note: $\pi = 3.14159$):

$$\text{area} = \text{radius} \times \text{radius} \times \pi$$

$$\text{perimeter} = 2 \times \text{radius} \times \pi$$



95.0330975
34.55749

Extra Exercises (**Homework**)

From the Textbook

- Programming Exercises:
 - 1.10
 - 1.11

From MyProgrammingLab (<https://pearson.turingscraft.com>)

- 1.5
 - 60155
 - 60156
- 1.8
 - 60169
 - 60170
 - 60183

Upload Your Solutions



Upload your solutions of the lab activities to Blackboard.