

Lab 3: Unit Testing

SYSA 3204 – Dr. Sukhwant Sagar

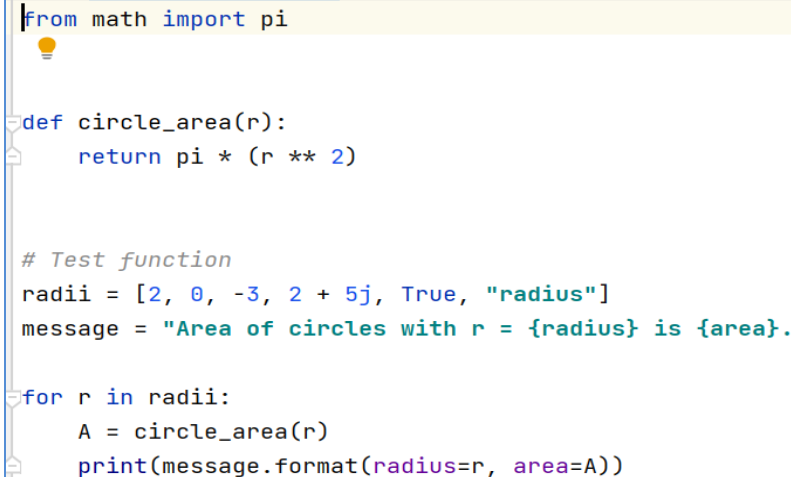
Setting up the Python Project

This lab assignment will be completed by pairs of students. Submissions by individual students will not be accepted under normal circumstances. The intent is that the two students work together.

Create a new Python Application project. **Name the project** *Lab3_GroupN* but replace **N** with your actual group number. Create two python projects – **app** and **test**. Create your coding file as *Lab3_firstname1_firstname2.py* and test file as *test_Lab3_firstname1_firstname2.py*. Failure to follow this naming format makes it more difficult for me to download and grade your solution, so attention to this detail is appreciated.

Program Requirements:

An inexperienced coder was working on a project of finding the areas of different shapes. He started with finding the area of a circular shape and wrote the following code:



```
from math import pi

def circle_area(r):
    return pi * (r ** 2)

# Test function
radii = [2, 0, -3, 2 + 5j, True, "radius"]
message = "Area of circles with r = {radius} is {area}."

for r in radii:
    A = circle_area(r)
    print(message.format(radius=r, area=A))
```

He got weird outputs which were not anticipated. You are required to analyze the output with your partner to understand the mistakes of the coder.

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```
Area of circles with r = 2 is 12.566370614359172.
Area of circles with r = 0 is 0.0.
Area of circles with r = -3 is 28.274333882308138.
Area of circles with r = (2+5j) is (-65.97344572538566+62.83185307179586j).
Area of circles with r = True is 3.141592653589793.
Traceback (most recent call last):
  File "[REDACTED]", line 1, in <module>
    A = circle_area(r)
  File "[REDACTED]", line 1, in circle_area
    return pi * (r ** 2)
TypeError: unsupported operand type(s) for ** or pow(): 'str' and 'int'

Process finished with exit code 1
```

The project manager got annoyed with him and requested you to complete the project along with best test cases without any failure.

Design an **application and its test cases file along with fixtures** which calculates the areas of four shapes: Circle, Trapezium, Ellipse, and Rhombus.

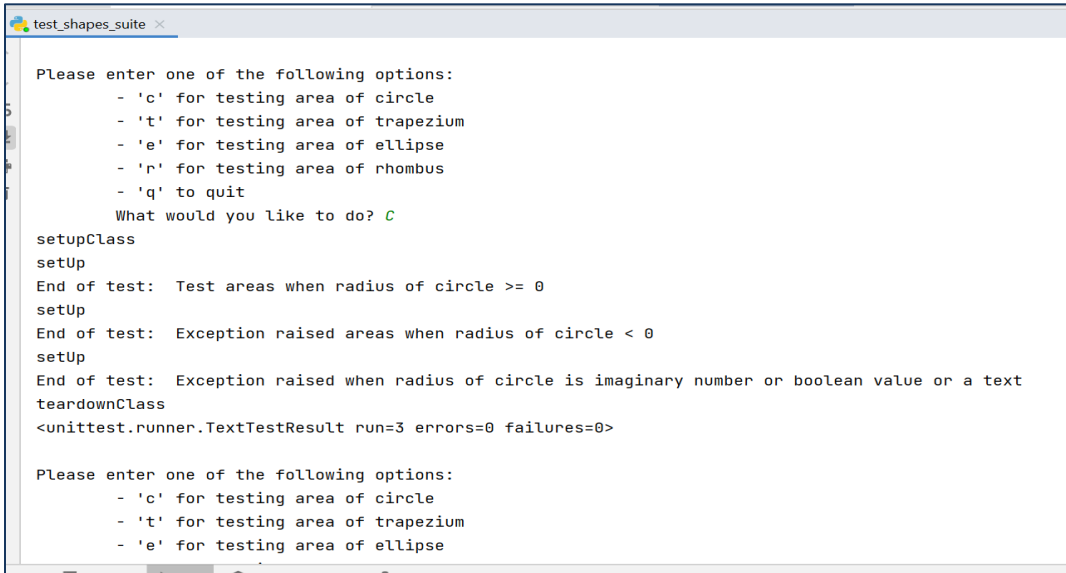
You are required to **create a test case document** (description of test cases and test case design table- same as ICE2 and Lab2) and submit it along with your project.

Your project should execute the test cases of only the concerned shape. The shape option should be selected by the user. The option of selection should work for both uppercase and lowercase. [Hint: Create a **test suite** which contains a menu-driven options, and individual test cases are added to the suite depending upon the option selection]

For e.g., it could look like this:

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```
test_shapes_suite x
Please enter one of the following options:
- 'c' for testing area of circle
- 't' for testing area of trapezium
- 'e' for testing area of ellipse
- 'r' for testing area of rhombus
- 'q' to quit
What would you like to do? c
setUpClass
setUp
End of test: Test areas when radius of circle >= 0
setUp
End of test: Exception raised areas when radius of circle < 0
setUp
End of test: Exception raised when radius of circle is imaginary number or boolean value or a text
tearDownClass
<unittest.runner.TextTestResult run=3 errors=0 failures=0>

Please enter one of the following options:
- 'c' for testing area of circle
- 't' for testing area of trapezium
- 'e' for testing area of ellipse
```

Expected Output:

The faculty would discuss few of the test cases for you to start-up during discussion of Lab 3 requirements. Please check the program requirements for test case design and its instructions.

Things to Explore:

You are welcome to explore beyond the mandatory requirements if you wish.

General Requirements

- Include an opening comment with your full name, the full names on the student(s) you are working with, the name of the program, the date, and a short description.
- Follow the course style guide! Use descriptive names for variables, constants, arrays, functions, etc. that follow our naming conventions.
- **Attach the zipped project to the assignment folder. The zipped project should have all packages along with coding file, test case file with fixtures and test suite file. A separate document containing description of test cases for all shapes and test case design table should also be submitted.**
- Each of the lab partner should submit a video recording (sharing screen) explaining the code line by line along with its execution. The lab partner should also mention the distribution of tasks for this lab. Both these requirements would be considered for the teamwork component of the rubric.