PYTHON

Pytest unit testing

Objective:

Create test cases using pytest

Install Pytest


```
C:\>easy_install -U pytest
Searching for pytest
Reading https://pypi.org/simple/pytest/
Downloading https://files.pythonhosted.org/packages/19/cf/711f1d887cb92c5155c9a1eb338f1b5d2411b50e4492a3b20e4a188a22
ytest-5.3.2-py3-none-any.whl#sha256=e41d489ff43948babd0fad7ad5e49b8735d5d55e26628a58673c39ff61d95de4
Best match: pytest 5.3.2
Processing pytest-5.3.2-py3-none-any.whl
Installing pytest-5.3.2-py3-none-any.whl to c:\users\arvind\appdata\local\programs\python\python38-32\lib\site-packa
writing requirements to c:\users\arvind\appdata\local\programs\python\python38-32\lib\site-packages\pytest-5.3.2-py3
gg\EGG-INFO\requires.txt
Adding pytest 5.3.2 to easy-install.pth file
Installing py.test-script.py script to c:\users\arvind\appdata\local\programs\python\python38-32\Scripts
Installing py.test.exe script to c:\users\arvind\appdata\local\programs\python\python38-32\Scripts
Installing py.test.exe.manifest script to c:\users\arvind\appdata\local\programs\python\python38-32\Scripts
Installing pytest-script.py script to c:\users\arvind\appdata\local\programs\python\python38-32\Scripts
Installing pytest.exe script to c:\users\arvind\appdata\local\programs\python\python38-32\Scripts
Installing pytest.exe.manifest script to c:\users\arvind\appdata\local\programs\python\python38-32\Scripts

Installed c:\users\arvind\appdata\local\programs\python\python38-32\lib\site-packages\pytest-5.3.2-py3.8.egg
Processing dependencies for pytest
Searching for wcwidth
Reading https://pypi.org/simple/wcwidth/
Downloading https://files.pythonhosted.org/packages/7e/9f/526a6947247599b084ee5232e4f9190a38f398d7300d866af3ab571a5b
cwidth-0.1.7-py2.py3-none-any.whl#sha256=f4ebe71925af7b40a864553f761ed559b43544f8f71746c2d756c7fe788ade7c
Best match: wcwidth 0.1.7
Processing wcwidth-0.1.7-py2.py3-none-any.whl
Installing wcwidth-0.1.7-py2.py3-none-any.whl to c:\users\arvind\appdata\local\programs\python\python38-32\lib\site-
ages
Adding wcwidth 0.1.7 to easy-install.pth file
```



```
Adding pyparsing 2.4.6 to easy-install.pth file

Installed c:\users\arvind\appdata\local\programs\python\python38-32\lib\site-packages\pyparsing-2.4.6-py3.8.e
gg
Finished processing dependencies for pytest

C:\>
```

Create two python files "math_func" file and test file "test.py"
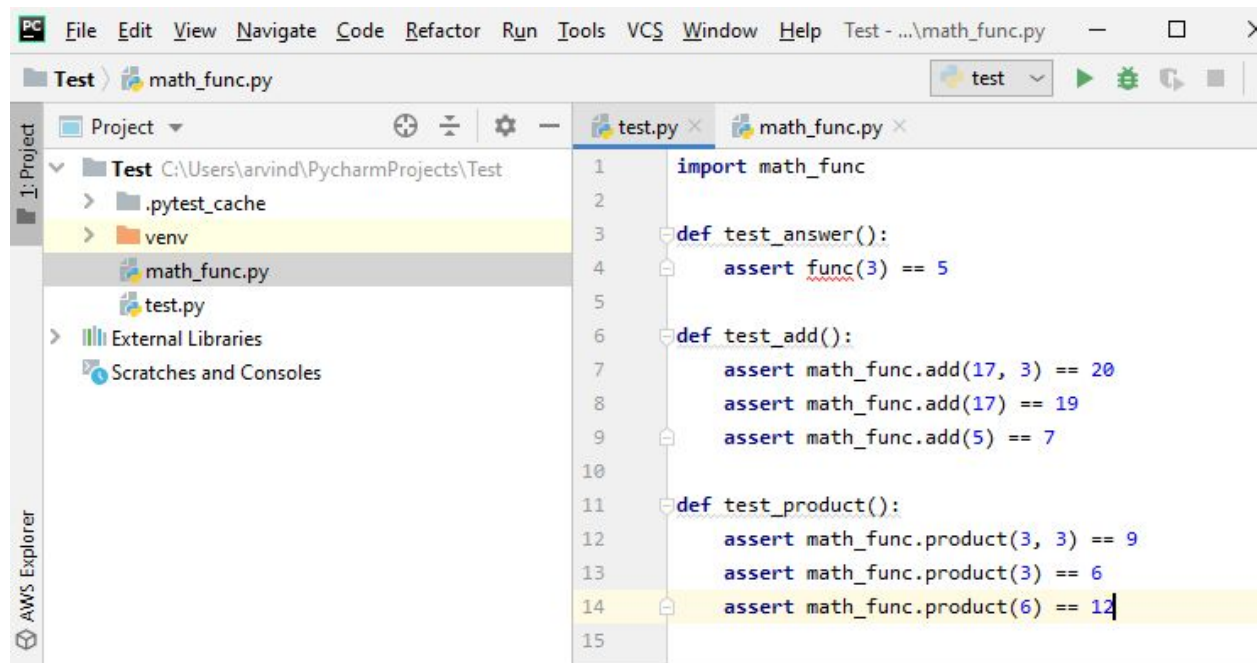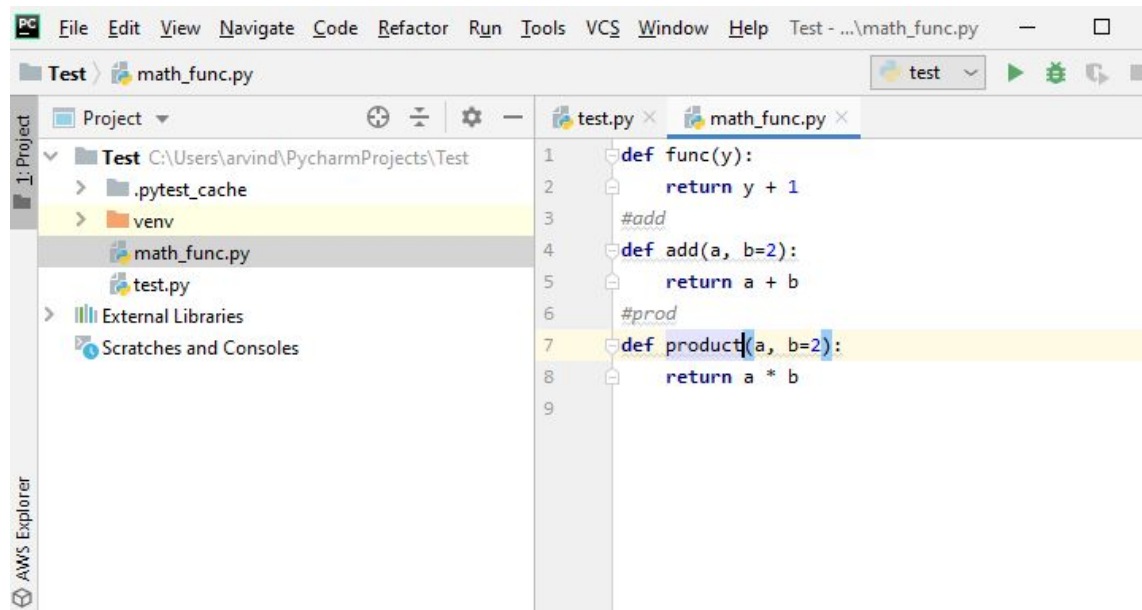
Execute the functions and verify output

```
Command Prompt
C:\>cd C:\Users\arvind\PycharmProjects\Test\test.py
The directory name is invalid.

C:\>cd Users\arvind\PycharmProjects\Test\test.py
The directory name is invalid.

C:\>cd Users

C:\Users>cd arvind

C:\Users\arvind>cd PycharmProjects

C:\Users\arvind\PycharmProjects>cd Test

C:\Users\arvind\PycharmProjects\Test>cd test.py
The directory name is invalid.

C:\Users\arvind\PycharmProjects\Test>pytest test.py
================================================ test session starts ================================================
platform win32 -- Python 3.8.1, pytest-5.3.2, py-1.8.1, pluggy-0.13.1
rootdir: C:\Users\arvind\PycharmProjects\Test
collected 3 items

test.py F..

===================================================== FAILURES =====================================================
_____ test_answer _____

    def test_answer():
>       assert func(3) == 5
E       NameError: name 'func' is not defined

test.py:4: NameError
============================================= 1 failed, 2 passed in 0.88s =============================================

C:\Users\arvind\PycharmProjects\Test>
```

From the output, 1 test failed as
func(3) was not defined in test.py file and
The func(3) did not return 5.
Hence, define the func(3) in test.py file and change the correct value in the program
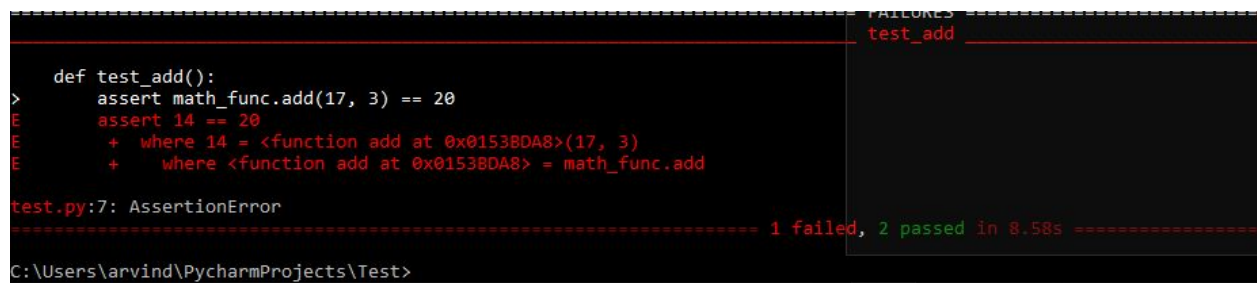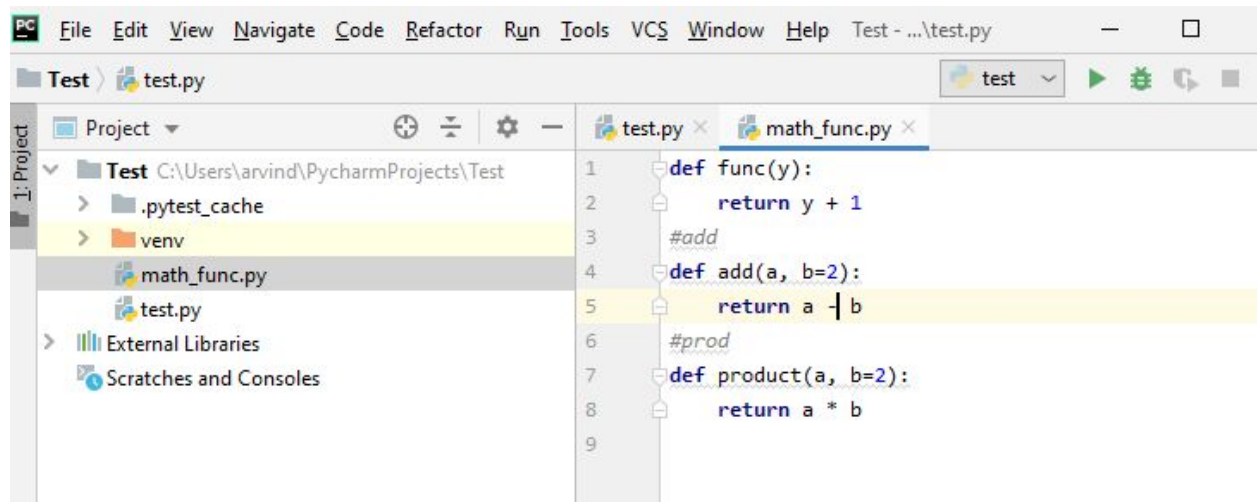and execute it again.

```
C:\Users\arvind\PycharmProjects\Test>pytest test.py
================================================ test session starts ================================================
platform win32 -- Python 3.8.1, pytest-5.3.2, py-1.8.1, pluggy-0.13.1
rootdir: C:\Users\arvind\PycharmProjects\Test
collected 3 items

test.py ...

================================================= 3 passed in 1.84s =================================================

C:\Users\arvind\PycharmProjects\Test>
```

Make modifications to the add function(change a+b to a-b and verify output, must
f\display error message.

```
File  Edit  View  Navigate  Code  Refactor  Run  Tools  VCS  Window  Help    Test - ...\test.py
```
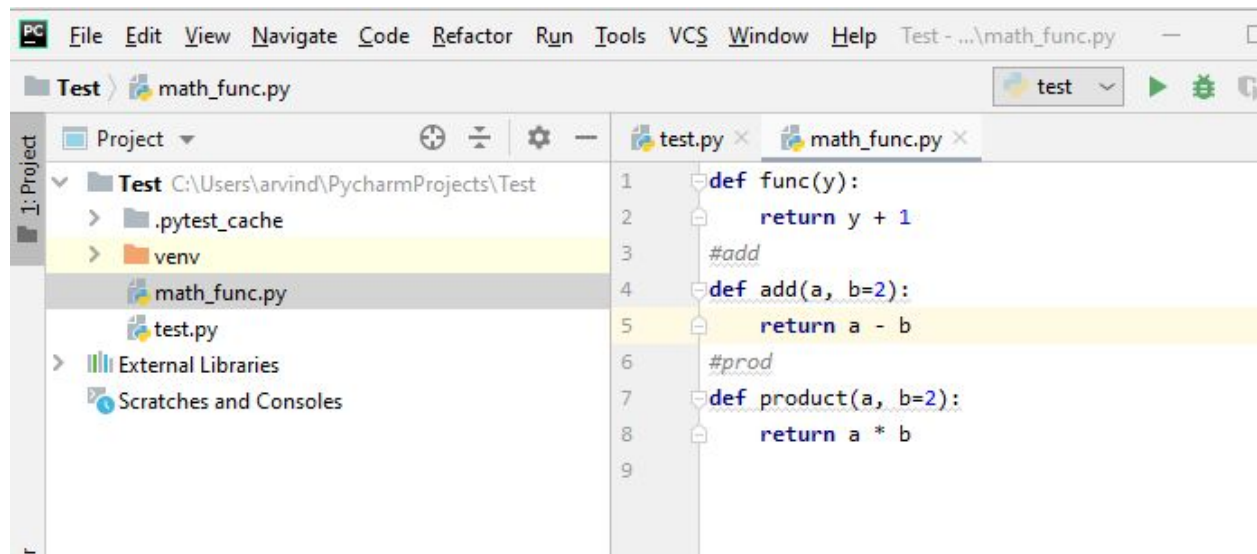
Test > test.py

test

```
test.py   math_func.py

Test  C:\Users\arvind\PycharmProjects\Test        1    def func(y):
  > .pytest_cache                                   2        return y + 1
  > venv                                            3    #add
    math_func.py                                    4    def add(a, b=2):
    test.py                                         5        return a - b
  > External Libraries                              6    #prod
    Scratches and Consoles                          7    def product(a, b=2):
                                                    8        return a * b
                                                    9
```

```
                                                            FAILURES
                                                             test_add
    def test_add():
>       assert math_func.add(17, 3) == 20
E       assert 14 == 20
E        +  where 14 = <function add at 0x0153BDA8>(17, 3)
E        +    where <function add at 0x0153BDA8> = math_func.add

test.py:7: AssertionError
============================================== 1 failed, 2 passed in 8.58s ==============

C:\Users\arvind\PycharmProjects\Test>
```

USING OPTIONS WITH PYTEST

Use the -v option while executing the functions in order to get the detailed test results.

Modify the code again to view detailed output with errors

Modify the name of the add function in test.py file by removing t prefix in add function from def test.add to def tes.py and execute the add function will not run. The add function should be prefixed with test.
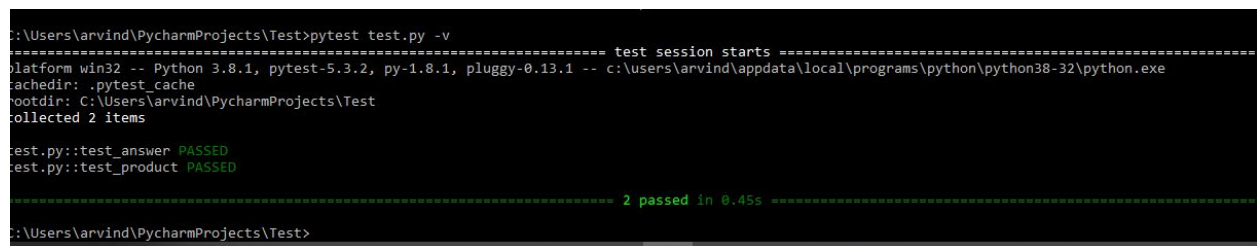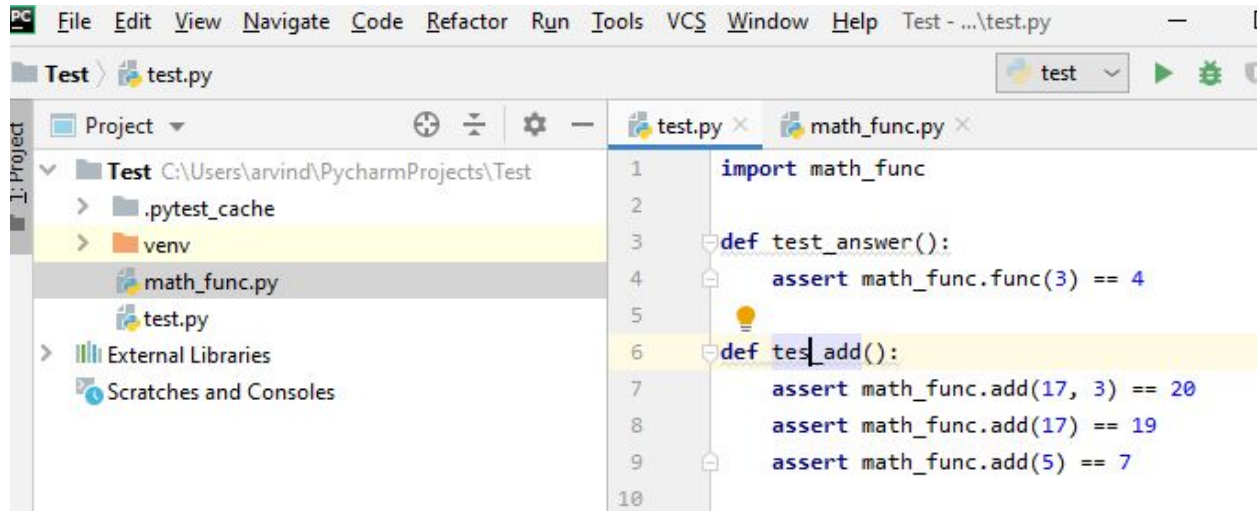
Change the name of the test.py file to tes.py file and execute the program.

Execute only test_add function in test.py file and verify output

Execute only the functions that contain the "add" keyword using option -k

```
C:\Users\arvind\PycharmProjects\Test>pytest test.py -v -k "add"
============================================ test session starts ============================================
platform win32 -- Python 3.8.1, pytest-5.3.2, py-1.8.1, pluggy-0.13.1 -- c:\users\arvind\appdata\local\programs\python\python38-32\python.exe
cachedir: .pytest_cache
rootdir: C:\Users\arvind\PycharmProjects\Test
collected 5 items / 3 deselected / 2 selected

test.py::test_add PASSED
test.py::test_add_strings PASSED

============================================ 2 passed, 3 deselected in 0.26s ============================================

C:\Users\arvind\PycharmProjects\Test>
```

Execute only the functions that contain the "add" or "string" keyword using option -k
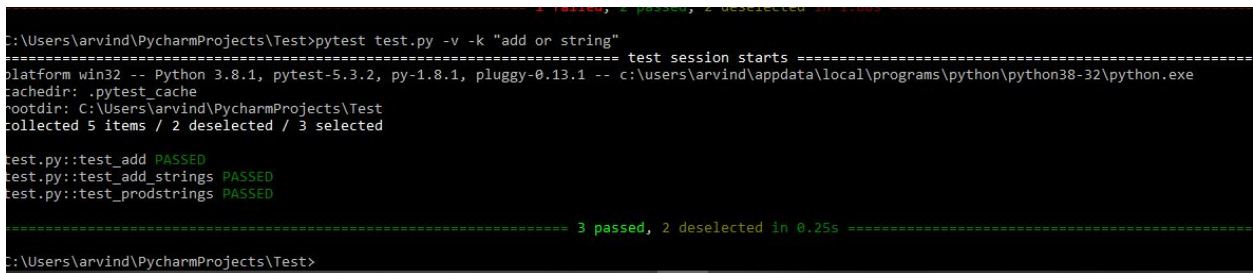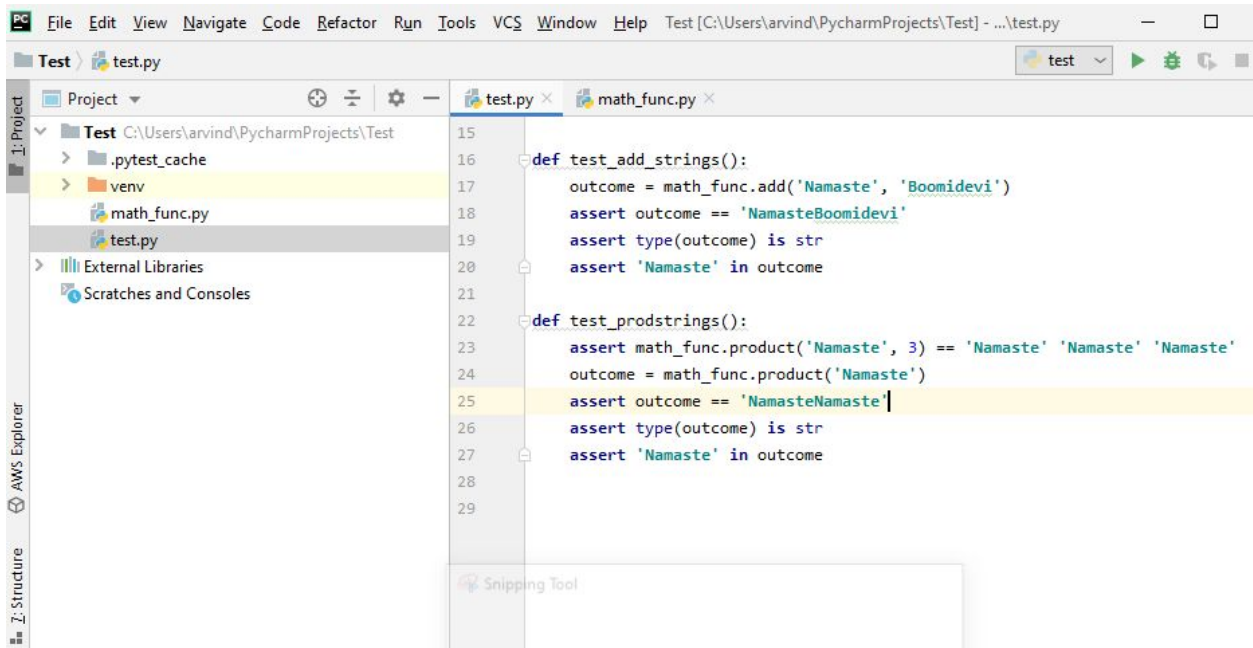
Modify the prodstring function execute test.py file the output must contain error message
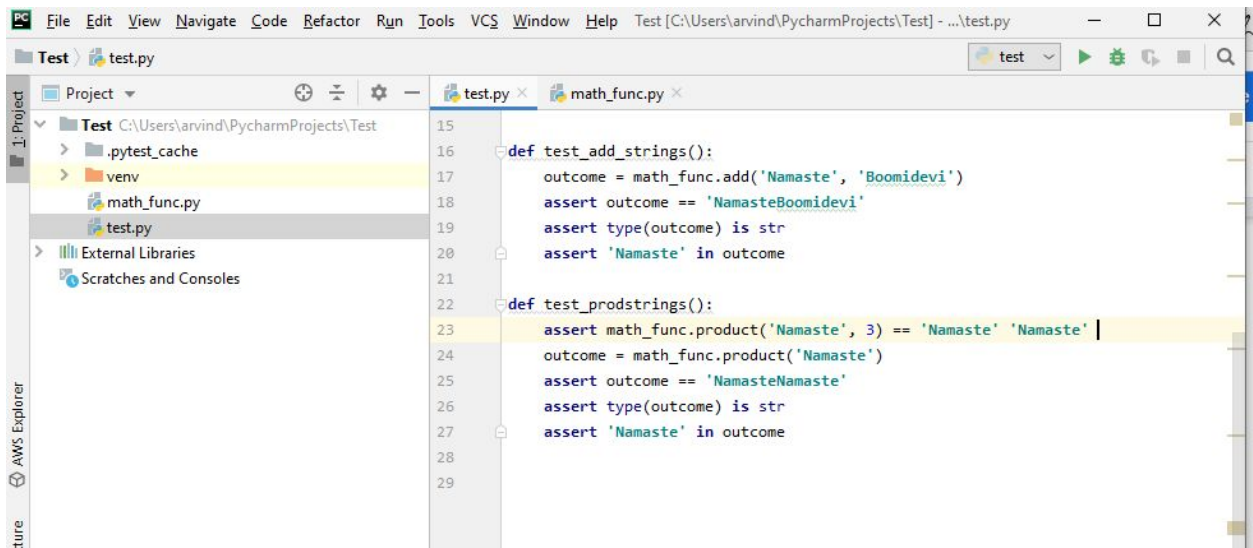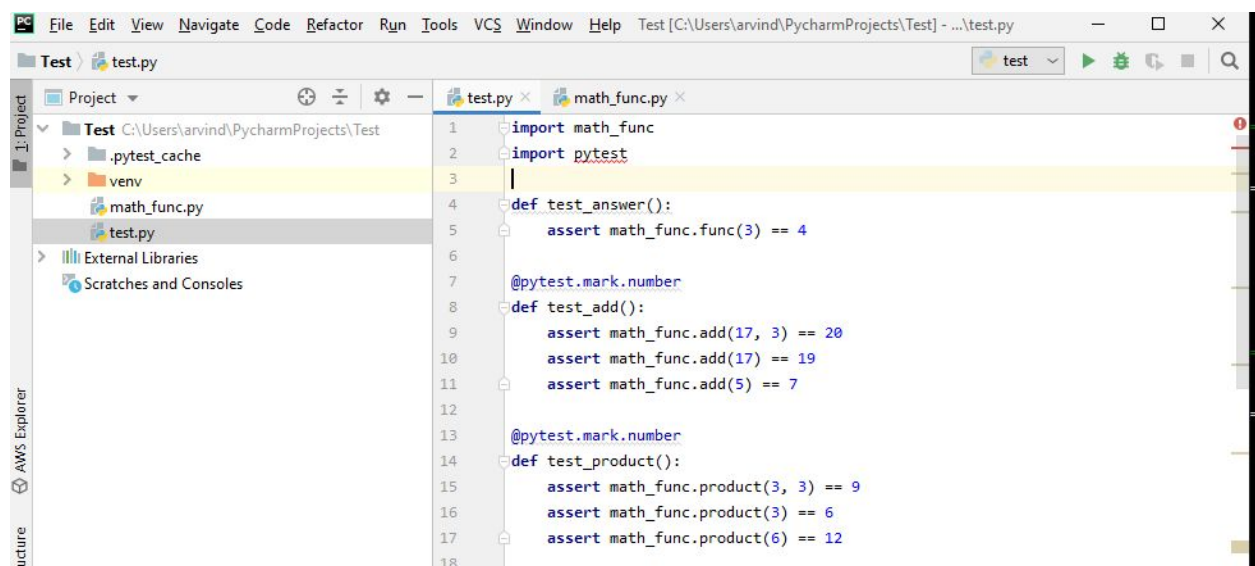
Execute only the functions in test.py file with -k option containing the word "add" and "string". Must display only 1 function as there is only i function that satisfies both conditions.

#Execute only the functions in test.py file with -m option number
#mark the number functions and string function in test.py file with the following code before using option "m"
@pytest.mark.number
@pytest.mark.strings

```
C:\Users\arvind\PycharmProjects\Test>pytest test.py -v -m number
======================================== test session starts ========================================
platform win32 -- Python 3.8.1, pytest-5.3.2, py-1.8.1, pluggy-0.13.1 -- c:\users\arvind\appdata\local\programs\python\python38-32\python.exe
cachedir: .pytest_cache
rootdir: C:\Users\arvind\PycharmProjects\Test
collected 5 items / 3 deselected / 2 selected

test.py::test_add PASSED
test.py::test_product PASSED
```

#Mark the number functions and string function in test.py file with the following code before using option "m"
@pytest.mark.strings
#Execute only the functions in test.py file with -m option strings
Output will display string functions only


```
:\Users\arvind\PycharmProjects\Test>pytest test.py -v -m strings
======================================== test session starts ========================================
latform win32 -- Python 3.8.1, pytest-5.3.2, py-1.8.1, pluggy-0.13.1 -- c:\users\arvind\appdata\local\programs\python\python38-32\python.exe
achedir: .pytest_cache
ootdir: C:\Users\arvind\PycharmProjects\Test
ollected 5 items / 3 deselected / 2 selected

est.py::test_add_strings PASSED
est.py::test_prodstrings PASSED
```

#Execute test.py file with -x option, add some failure assert statement to the function in test.py file
#the program will exit when it encounters first failure at test_product function

```
PC  File  Edit  View  Navigate  Code  Refactor  Run  Tools  VCS  Window  Help   Test [C:\Users\arvind\PycharmProjects\Test] - ...\test.py        —    □

  Test  test.py                                                                                    test  ▶  🐞  🔾  ■

  Project ▼                    ⊕  ÷  ✦  —      test.py ×      math_func.py ×
  Test  C:\Users\arvind\PycharmProjects\Test    3
    .pytest_cache                           4    def test_answer():
    venv                                    5        assert math_func.func(3) == 4
    math_func.py                            6
    test.py                                 7    @pytest.mark.number
    External Libraries                      8    def test_add():
    Scratches and Consoles                  9        assert math_func.add(17, 3) == 20
                                           10        assert math_func.add(17) == 19
                                           11        assert math_func.add(5) == 7
                                           12
                                           13    @pytest.mark.number
                                           14    def test_product():
                                           15        assert math_func.product(3, 3) == 9
                                           16        assert math_func.product(3) == 6
                                           17        assert math_func.product(6) == 13
                                           18
```
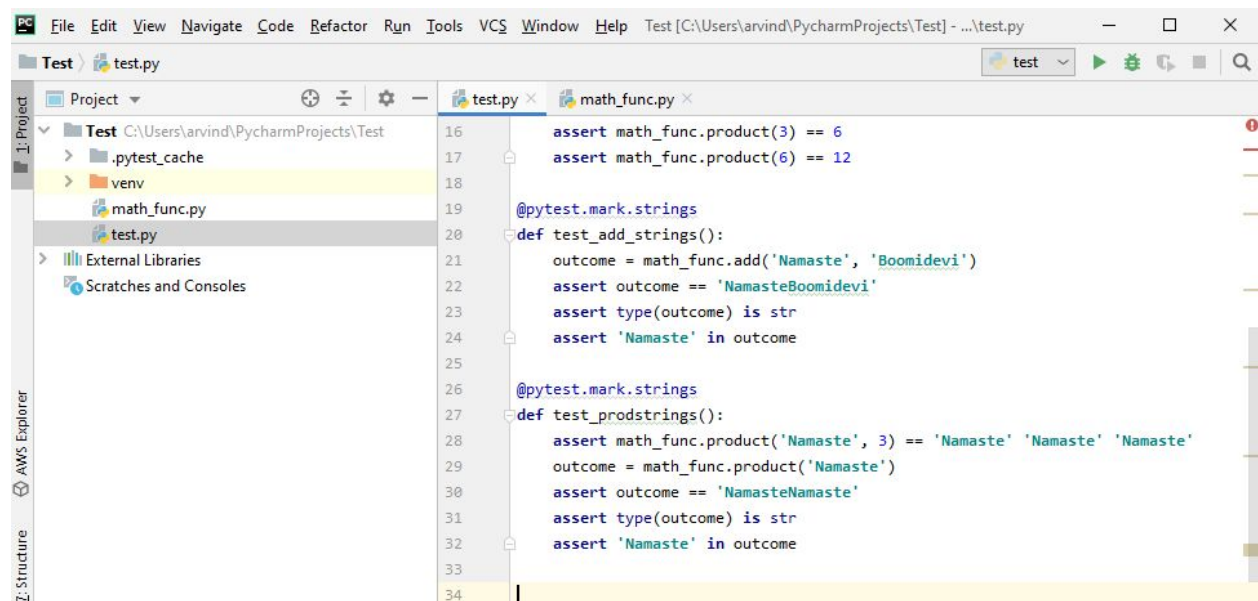
```
C:\Users\arvind\PycharmProjects\Test>pytest test.py -v -x
=============================== test session starts ===============================
platform win32 -- Python 3.8.1, pytest-5.3.2, py-1.8.1, pluggy-0.13.1 -- c:\users\arvind\appdata\local\programs\python\python38-32\python.exe
cachedir: .pytest_cache
rootdir: C:\Users\arvind\PycharmProjects\Test
collected 5 items

test.py::test_answer PASSED
test.py::test_add PASSED
test.py::test_product FAILED

=================================== FAILURES ===================================
_____ test_product _____

    def test_product():
        assert math_func.product(3, 3) == 9
        assert math_func.product(3) == 6
        assert math_func.product(6) == 13
>       assert 12 == 13
E        -12
E        +13

test.py:17: AssertionError
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!! stopping after 1 failures !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
========================= 1 failed, 2 passed in 2.71s =========================

C:\Users\arvind\PycharmProjects\Test>
```

#Execute test.py file with -tb=no option without the error option without stack trace
#the program will exit when it encounters first failure

```
C:\Users\arvind\PycharmProjects\Test>pytest test.py -v -x --tb=no
=============================== test session starts ===============================
platform win32 -- Python 3.8.1, pytest-5.3.2, py-1.8.1, pluggy-0.13.1 -- c:\users\arvind\appdata\local\programs\python\python38-32\python.exe
cachedir: .pytest_cache
rootdir: C:\Users\arvind\PycharmProjects\Test
collected 5 items

test.py::test_answer PASSED
test.py::test_add PASSED
test.py::test_product FAILED

!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!! stopping after 1 failures !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
========================= 1 failed, 2 passed in 0.98s =========================

C:\Users\arvind\PycharmProjects\Test>
```

#Execute test.py file with --maxfile=2 option
#all the four functions were executed because only maxfailof two functions were expected but only one program failed.

```
C:\Users\arvind\PycharmProjects\Test>pytest test.py -v --maxfail=2
============================== test session starts ==============================
platform win32 -- Python 3.8.1, pytest-5.3.2, py-1.8.1, pluggy-0.13.1 -- c:\users\arvind\appdata\local\programs\python\python38-32\python.exe
cachedir: .pytest_cache
rootdir: C:\Users\arvind\PycharmProjects\Test
collected 5 items

test.py::test_answer PASSED
test.py::test_add PASSED
test.py::test_product FAILED
test.py::test_add_strings PASSED
test.py::test_prodstrings PASSED

==================================== FAILURES ===================================
_____ test_product _____

    def test_product():
        assert math_func.product(3, 3) == 9
        assert math_func.product(3) == 6
>       assert math_func.product(6) == 13
E       assert 12 == 13
E         -12
E         +13

test.py:17: AssertionError
=============================== 1 failed, 4 passed in 0.56s ======================

C:\Users\arvind\PycharmProjects\Test>
```

#Execute test.py file with --maxfile=1 option
#the program exits after the first failure as maxfail=1

```
C:\Users\arvind\PycharmProjects\Test>pytest test.py -v --maxfail=1
============================== test session starts ==============================
platform win32 -- Python 3.8.1, pytest-5.3.2, py-1.8.1, pluggy-0.13.1 -- c:\users\arvind\appdata\local\programs\python\python38-32\python.exe
cachedir: .pytest_cache
rootdir: C:\Users\arvind\PycharmProjects\Test
collected 5 items

test.py::test_answer PASSED
test.py::test_add PASSED
test.py::test_product FAILED

==================================== FAILURES ===================================
_____ test_product _____

    def test_product():
        assert math_func.product(3, 3) == 9
        assert math_func.product(3) == 6
>       assert math_func.product(6) == 13
E       assert 12 == 13
E         -12
E         +13

test.py:17: AssertionError
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!! stopping after 1 failures !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
=============================== 1 failed, 2 passed in 0.56s ======================

C:\Users\arvind\PycharmProjects\Test>
```

#Execute test.py file with skip option in order to skip a function in test.py file
#add the following code to the test file
@pytest.mark.skip(reason="skipping the test_add function")
pytest -v

```
PC   File  Edit  View  Navigate  Code  Refactor  Run  Tools  VCS  Window  Help   Test [C:\Users\arvind\PycharmProjects\Test] - ...\test.py        —      □

Test  >  test.py                                                                                          test  ∨   ▶  🐞  🔖

  Project ∨                    ⊕  ∓  ⚙  —     test.py ×    math_func.py ×
  Test C:\Users\arvind\PycharmProjects\Test      1    import math_func
    .pytest_cache                                2    import pytest
    venv                                         3
    math_func.py                                 4    def test_answer():
    test.py                                      5        assert math_func.func(3) == 4
  External Libraries                             6
  Scratches and Consoles                         7    @pytest.mark.skip(reason ="skipping the test_add function")
                                                 8    #@pytest.mark.number
                                                 9    def test_add():
                                                10        assert math_func.add(17, 3) == 20
                                                11        assert math_func.add(17) == 19
                                                12        assert math_func.add(5) == 7
                                                13
```

```
C:\Users\arvind\PycharmProjects\Test>pytest test.py -v
=============================== test session starts ===============================
platform win32 -- Python 3.8.1, pytest-5.3.2, py-1.8.1, pluggy-0.13.1 -- c:\users\arvind\appdata\local\programs\python\python38-32\python.exe
cachedir: .pytest_cache
rootdir: C:\Users\arvind\PycharmProjects\Test
collected 5 items

test.py::test_answer PASSED
test.py::test_add SKIPPED
test.py::test_product FAILED
test.py::test_add_strings PASSED
test.py::test_prodstrings PASSED

==================================== FAILURES =====================================
_____ test_product _____

    def test_product():
        assert math_func.product(3, 3) == 9
        assert math_func.product(3) == 6
>       assert math_func.product(6) == 13
E       assert 12 == 13
E        -12
E        +13

test.py:18: AssertionError
============================= 1 failed, 3 passed, 1 skipped in 2.79s =============================

C:\Users\arvind\PycharmProjects\Test>
```