Lab Exercise 1- Test-Driven Development (TDD) Using GitHub Copilot in VS Code

Objective

- Learn how to use **Test-Driven Development (TDD)** with GitHub Copilot.
- Write tests **before** implementing a feature.
- Use **Copilot to generate test cases** and function implementations.

Prerequisites

- **VS Code** installed.
- **GitHub Copilot extension** enabled.
- **Python** installed with pytest. Install using:

```
pip install pytest
```

Step 1: Create a New Project

1. Open **VS Code** and create a new folder: TDD_Project.
2. Inside the folder, create two files:

```
calculator.py
test_calculator.py
```

Step 2: Write a Test First (TDD Approach)

1. Open test_calculator.py.
2. Type the following comment and let Copilot generate the test function:

#Write a test for an add function

```
import pytest
from calculator import add


def test_add():
    assert add(2, 3) == 5
    assert add(-1, 1) == 0
    assert add(0, 0) == 0
```

3. Save the file.

Step 3: Run the Test Before Implementing the Function

1. Run the test using:

```
pytest test_calculator.py
```

2. It will **fail** because add() is not implemented yet.

Step 4: Use Copilot to Implement the Function

1. Open calculator.py.
2. Type the following comment and press Tab:

```
# Implement an add function
def add(a, b):
    return a + b
```

3. Save the file.

Step 5: Run the Test Again

1. Run the test again using:

```
pytest test_calculator.py
```

2. The test should **pass** now.

Step 6: Extend with More TDD Cases

1. Modify test_calculator.py to add tests for a **subtract function**:

from calculator import subtract

```
def test_subtract():
    assert subtract(5, 3) == 2
    assert subtract(0, 1) == -1
    assert subtract(10, 10) == 0
```

2. Run the test:

```
pytest test_calculator.py
```

3. It will fail since subtract() is missing.

Step 7: Use Copilot to Implement subtract()

1. Open calculator.py.

2. Type:

Implement a subtract function

```
def subtract(a, b):
    return a - b
```

3. Save the file and run the test again:

```
pytest test_calculator.py
```

4. All tests should pass.

Lab Summary

1. Used **TDD** to write tests before implementation.

2. Used **GitHub Copilot** to assist with function creation.

3. Successfully tested and implemented **add() and subtract()** functions.