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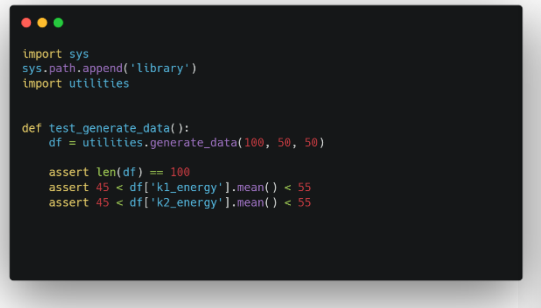
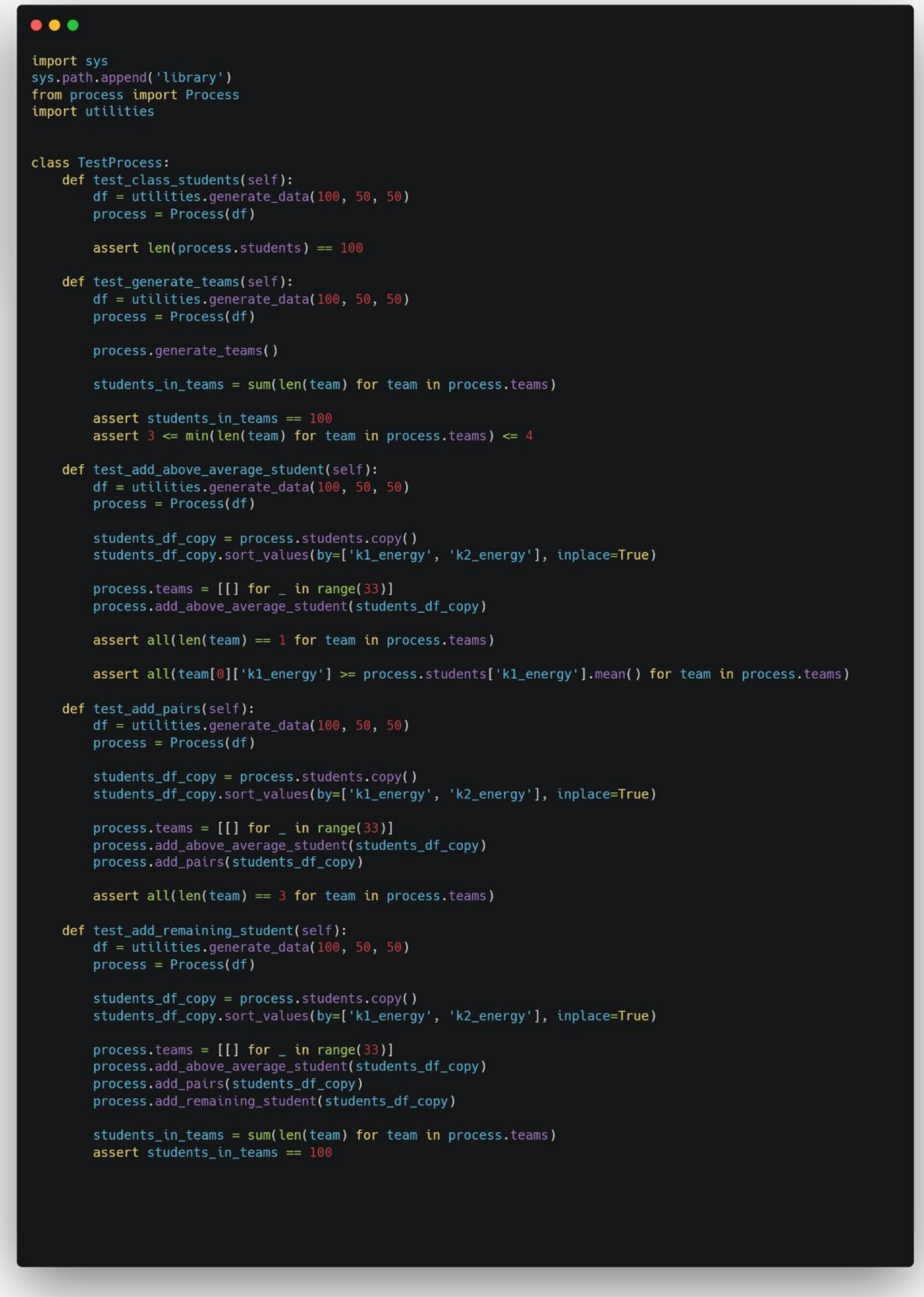
Lab 7

Below is the code for the tests for the utilities and process modules. Ignore the test_input and test_output bellow. Also note that the tests were already worked on before this lab so the they exists in my developer branch and not a separate branch/PR.

Python test cases:

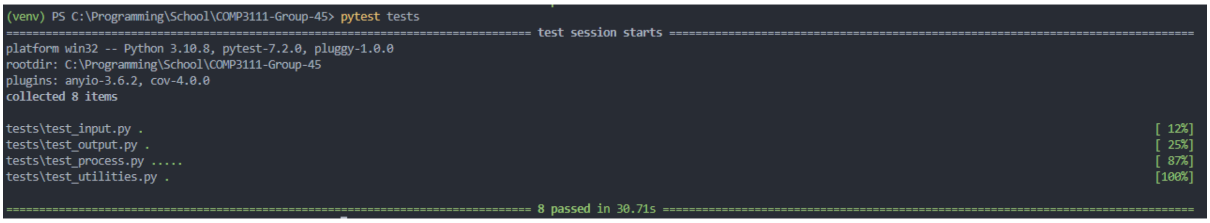


```python
import sys
sys.path.append('library')
import utilities


def test_generate_data():
    df = utilities.generate_data(100, 50, 50)

    assert len(df) == 100
    assert 45 < df['k1_energy'].mean() < 55
    assert 45 < df['k2_energy'].mean() < 55
```



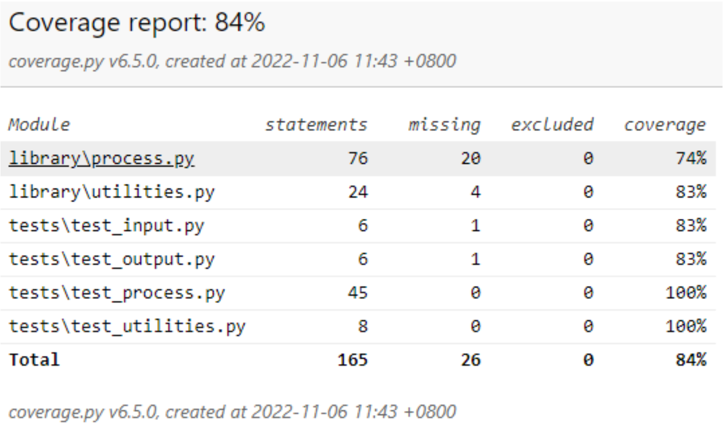
```python
import sys
sys.path.append('library')
from process import Process
import utilities


class TestProcess:
    def test_class_students(self):
        df = utilities.generate_data(100, 50, 50)
        process = Process(df)

        assert len(process.students) == 100

    def test_generate_teams(self):
        df = utilities.generate_data(100, 50, 50)
        process = Process(df)

        process.generate_teams()

        students_in_teams = sum(len(team) for team in process.teams)

        assert students_in_teams == 100
        assert 3 <= min(len(team) for team in process.teams) <= 4

    def test_add_above_average_student(self):
        df = utilities.generate_data(100, 50, 50)
        process = Process(df)

        students_df_copy = process.students.copy()
        students_df_copy.sort_values(by=['k1_energy', 'k2_energy'], inplace=True)

        process.teams = [[] for _ in range(33)]
        process.add_above_average_student(students_df_copy)

        assert all(len(team) == 1 for team in process.teams)

        assert all(team[0]['k1_energy'] >= process.students['k1_energy'].mean() for team in process.teams)

    def test_add_pairs(self):
        df = utilities.generate_data(100, 50, 50)
        process = Process(df)

        students_df_copy = process.students.copy()
        students_df_copy.sort_values(by=['k1_energy', 'k2_energy'], inplace=True)

        process.teams = [[] for _ in range(33)]
        process.add_above_average_student(students_df_copy)
        process.add_pairs(students_df_copy)

        assert all(len(team) == 3 for team in process.teams)

    def test_add_remaining_student(self):
        df = utilities.generate_data(100, 50, 50)
        process = Process(df)

        students_df_copy = process.students.copy()
        students_df_copy.sort_values(by=['k1_energy', 'k2_energy'], inplace=True)

        process.teams = [[] for _ in range(33)]
        process.add_above_average_student(students_df_copy)
        process.add_pairs(students_df_copy)
        process.add_remaining_student(students_df_copy)

        students_in_teams = sum(len(team) for team in process.teams)
        assert students_in_teams == 100
```

Tests Report:



```
(venv) PS C:\Programming\School\COMP3111-Group-45> pytest tests
================================================================================ test session starts ================================================================================
platform win32 -- Python 3.10.8, pytest-7.2.0, pluggy-1.0.0
rootdir: C:\Programming\School\COMP3111-Group-45
plugins: anyio-3.6.2, cov-4.0.0
collected 8 items

tests\test_input.py .                                                                                                                                                         [ 12%]
tests\test_output.py .                                                                                                                                                        [ 25%]
tests\test_process.py .....                                                                                                                                                   [ 87%]
tests\test_utilities.py .                                                                                                                                                     [100%]

================================================================================ 8 passed in 30.71s =================================================================================
```

Tests Coverage:



Coverage report: 84%

coverage.py v6.5.0, created at 2022-11-06 11:43 +0800

Module	*statements*	*missing*	*excluded*	*coverage*
library\process.py	76	20	0	74%
library\utilities.py	24	4	0	83%
tests\test_input.py	6	1	0	83%
tests\test_output.py	6	1	0	83%
tests\test_process.py	45	0	0	100%
tests\test_utilities.py	8	0	0	100%
Total	**165**	**26**	**0**	**84%**

coverage.py v6.5.0, created at 2022-11-06 11:43 +0800