1. Faza Red

Zrzut ekranu przedstawiający Visual Studio Code z plikiem `zadanie_test.py`:

```python
import pytest
from zadanie import bubbleSort

testdata1 = [-2, 45, 0, 11, -9]

def test_bubbleSort_1():
    got = bubbleSort(testdata1)
    want = [-9, -2, 0, 11, 45]

    assert got == want


testdata2 = [-10, 0, 1, 7, 9, 12, 20]

def test_bubbleSort_best_case():
    got = bubbleSort(testdata2)
    want = [-10, 0, 1, 7, 9, 12, 20]

    assert got == want


testdata3 = [40, 30, 20, 10, 5, 2, 1, 0]

def test_bubbleSort_worst_case():
    got = bubbleSort(testdata3)
    want = [0, 1, 2, 5, 10, 20, 30, 40]

    assert got == want
```

Terminal:

```
    def test_bubbleSort_best_case():
        got = bubbleSort(testdata2)
        want = [-10, 0, 1, 7, 9, 12, 20]

>       assert got == want
E       assert [20, 12, 9, 7, 1, 0, ...] == [-10, 0, 1, 7, 9, 12, ...]
E         At index 0 diff: 20 != -10
E         Use -v to get more diff

test/zadanie_test.py:19: AssertionError
_____ test_bubbleSort_worst_case _____

    def test_bubbleSort_worst_case():
        got = bubbleSort(testdata3)
        want = [0, 1, 2, 5, 10, 20, 30, 40]

>       assert got == want
E       assert [40, 30, 20, 10, 5, 2, ...] == [0, 1, 2, 5, 10, 20, ...]
E         At index 0 diff: 40 != 0
E         Use -v to get more diff

test/zadanie_test.py:28: AssertionError
=============================== short test summary info ===============================
FAILED test/zadanie_test.py::test_bubbleSort_1 - assert [45, 11, 0, -2, -9] == [-9, -2, 0, 11, 45]
FAILED test/zadanie_test.py::test_bubbleSort_best_case - assert [20, 12, 9, 7, 1, 0, ...] == [-10, 0, 1, 7, 9, 12, ...]
FAILED test/zadanie_test.py::test_bubbleSort_worst_case - assert [40, 30, 20, 10, 5, 2, ...] == [0, 1, 2, 5, 10, 20, ...]
============================== 3 failed in 0.08s ==============================
(base) student@PCL187:~/AIBD_Wolny/L13_Martyna_Wolny$
```


Zrzut ekranu przedstawiający Visual Studio Code z plikiem `zadanie.py`:

```python
def bubbleSort(array):

    for i in range(len(array)):

        for j in range(0, len(array) - i - 1):

            if array[j] < array[j + 1]:

                temp = array[j]
                array[j] = array[j+1]
                array[j+1] = temp


    return array
```

Terminal:

```
    def test_bubbleSort_best_case():
        got = bubbleSort(testdata2)
        want = [-10, 0, 1, 7, 9, 12, 20]

>       assert got == want
E       assert [20, 12, 9, 7, 1, 0, ...] == [-10, 0, 1, 7, 9, 12, ...]
E         At index 0 diff: 20 != -10
E         Use -v to get more diff

test/zadanie_test.py:19: AssertionError
_____ test_bubbleSort_worst_case _____

    def test_bubbleSort_worst_case():
        got = bubbleSort(testdata3)
        want = [0, 1, 2, 5, 10, 20, 30, 40]

>       assert got == want
E       assert [40, 30, 20, 10, 5, 2, ...] == [0, 1, 2, 5, 10, 20, ...]
E         At index 0 diff: 40 != 0
E         Use -v to get more diff

test/zadanie_test.py:28: AssertionError
=============================== short test summary info ===============================
FAILED test/zadanie_test.py::test_bubbleSort_1 - assert [45, 11, 0, -2, -9] == [-9, -2, 0, 11, 45]
FAILED test/zadanie_test.py::test_bubbleSort_best_case - assert [20, 12, 9, 7, 1, 0, ...] == [-10, 0, 1, 7, 9, 12, ...]
FAILED test/zadanie_test.py::test_bubbleSort_worst_case - assert [40, 30, 20, 10, 5, 2, ...] == [0, 1, 2, 5, 10, 20, ...]
============================== 3 failed in 0.08s ==============================
(base) student@PCL187:~/AIBD_Wolny/L13_Martyna_Wolny$
```

2. Faza Green

```python
import pytest
from zadanie import bubbleSort

testdata1 = [-2, 45, 0, 11, -9]

def test_bubbleSort_1():
    got = bubbleSort(testdata1)
    want = [-9, -2, 0, 11, 45]

    assert got == want


testdata2 = [-10, 0, 1, 7, 9, 12, 20]

def test_bubbleSort_best_case():
    got = bubbleSort(testdata2)
    want = [-10, 0, 1, 7, 9, 12, 20]

    assert got == want


testdata3 = [40, 30, 20, 10, 5, 2, 1, 0]

def test_bubbleSort_worst_case():
    got = bubbleSort(testdata3)
    want = [0, 1, 2, 5, 10, 20, 30, 40]

    assert got == want
```

```
(base) student@PCL187:~/AIBD_Wolny/L13_Martyna_Wolny$ python3 -m pytest
================================================= test session starts =================================================
platform linux -- Python 3.8.8, pytest-7.2.0, pluggy-0.13.1
rootdir: /home/student/AIBD_Wolny/L13_Martyna_Wolny
plugins: anyio-2.2.0
collected 3 items

test/zadanie_test.py ...                                                                                        [100%]

================================================== 3 passed in 0.01s ==================================================
(base) student@PCL187:~/AIBD_Wolny/L13_Martyna_Wolny$
```

```python
def bubbleSort(array):

    for i in range(len(array)):

        for j in range(0, len(array) - i - 1):

            if array[j] > array[j + 1]:

                temp = array[j]
                array[j] = array[j+1]
                array[j+1] = temp


    return array
```

```
(base) student@PCL187:~/AIBD_Wolny/L13_Martyna_Wolny$ python3 -m pytest
================================================= test session starts =================================================
platform linux -- Python 3.8.8, pytest-7.2.0, pluggy-0.13.1
rootdir: /home/student/AIBD_Wolny/L13_Martyna_Wolny
plugins: anyio-2.2.0
collected 3 items

test/zadanie_test.py ...                                                                                        [100%]

================================================== 3 passed in 0.01s ==================================================
(base) student@PCL187:~/AIBD_Wolny/L13_Martyna_Wolny$
```

3. Faza Refactor


```python
import pytest
from zadanie import bubbleSort

testdata1 = [-2, 45, 0, 11, -9]

def test_bubbleSort_1():
    got = bubbleSort(testdata1)
    want = [-9, -2, 0, 11, 45]

    assert got == want


testdata2 = [-10, 0, 1, 7, 9, 12, 20]

def test_bubbleSort_best_case():
    got = bubbleSort(testdata2)
    want = [-10, 0, 1, 7, 9, 12, 20]

    assert got == want


testdata3 = [40, 30, 20, 10, 5, 2, 1, 0]

def test_bubbleSort_worst_case():
    got = bubbleSort(testdata3)
    want = [0, 1, 2, 5, 10, 20, 30, 40]

    assert got == want
```

```
(base) student@PCL187:~/AIBD_Wolny/L13_Martyna_Wolny$ python3 -m pytest
================================================ test session starts ================================================
platform linux -- Python 3.8.8, pytest-7.2.0, pluggy-0.13.1
rootdir: /home/student/AIBD_Wolny/L13_Martyna_Wolny
plugins: anyio-2.2.0
collected 3 items

test/zadanie_test.py ...                                                                                      [100%]

================================================= 3 passed in 0.01s =================================================
(base) student@PCL187:~/AIBD_Wolny/L13_Martyna_Wolny$
```



```python
def bubbleSort(array):

    for i in range(len(array)):

        swapped = False

        for j in range(0, len(array) - i - 1):

            if array[j] > array[j + 1]:

                temp = array[j]
                array[j] = array[j+1]
                array[j+1] = temp

                swapped = True

        if not swapped:
            break

    return array
```

```
(base) student@PCL187:~/AIBD_Wolny/L13_Martyna_Wolny$ python3 -m pytest
================================================ test session starts ================================================
platform linux -- Python 3.8.8, pytest-7.2.0, pluggy-0.13.1
rootdir: /home/student/AIBD_Wolny/L13_Martyna_Wolny
plugins: anyio-2.2.0
collected 3 items

test/zadanie_test.py ...                                                                                      [100%]

================================================= 3 passed in 0.01s =================================================
(base) student@PCL187:~/AIBD_Wolny/L13_Martyna_Wolny$
```