

# Test Report

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## 1 Revisions

Table 1: Revisions

Name	Date	Description
Keyur Patel	27/11/2015	Created Test Report latex file
Keyur Patel	27/11/2015	Added table template for unit testing AND info
Alex Guerrero	27/11/2015	Edited Structural Testing
Shafeeq Rabbani	27/11/2015	Edited Usability Testing

## 2 Structural (White Box) Testing

### 2.1 Unit Tests for Food

Table 2: Revisions

Test Case	Initial State	Expected Output	Output
testRandomPos.1	foodA and foodB randomly placed	positions compared and not equal	pass
testRandomPos.2	foodC randomly placed	——	pass
testRandomPos.3	foodD randomly placed	——	pass

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### 3 Features that were Tested

- 1:The functional requirements of the product
- 2:The classes and methods of the product (Model)
- 3:The GUI of the product

### 4 Testing Types

Testing can be broken up into different types, which each have their own role in the testing the product. These test types should be utilized to comprehensively evaluate the quality of the product.

#### 4.1 Structural Testing

Structural testing is also known as white box testing. Structural tests are derived from the program's internal structure. It focuses on the nonfunctional requirements of the product. This type of testing shows errors that occur during the implementation by focusing on abnormal and extreme cases the product could encounter.

#### 4.2 Functional Testing

Functional testing is also known as black box testing. Functional tests are derived from the functional requirements of the program. It focuses less on how the program works and more on the output of the system. These tests are focused on test cases where the product receives expected information.

#### 4.3 Static vs. Dynamic Testing

Static testing simulate the dynamic environment and does not focus on code execution. This testing involves code walkthroughs and requirements walkthroughs. Static testing is used prevalently in the design stage. In contrast, dynamic testing needs code to be executed.

Dynamic testing involves test cases to be run and checked against expected outcomes. A technique to save time during dynamic testing is to choose representative test cases.

#### 4.4 Manual vs. Automatic Testing

Manual testing is done by people. It involves code walkthroughs and inspection.

Automatic testing can usually be conducted by computers. The tools used to assist with automatic are unit testing tools for the respective programming language. Automatic testing relies on people for testing more qualitative aspects like GUI.

## 5 Automated Unit Testing

### 5.1 Testing for Snake.py

Table 3: Test Case for constructor

<b>Function Tested</b>	Snake()
<b>Preconditions</b>	none
<b>Expected outcome</b>	a Snake() object is instantiated
<b>Function Input</b>	none
<b>Test Description</b>	This test asserts equality of two Snake() objects once in
<b>Testing Type</b>	Correctness

Table 4: Test Case for changeDir

<b>Function Tested</b>	changeDir(newDirection)
<b>Preconditions</b>	Snake object is already instantiated
<b>Expected outcome</b>	The test object's direction is updated if it is a valid input
<b>Function Input</b>	an integer from [-1,1,-2,2]
<b>Test Description</b>	This test uses Snake objects in different directions and calls changeDir on them with all possible direction inputs
<b>Testing Type</b>	Correctness and Robustness

Table 5: Test Case for grow

<b>Function Tested</b>	grow
<b>Preconditions</b>	there is an instantiated Snake() object
<b>Expected outcome</b>	The snake's length increases by 1
<b>Function Input</b>	none
<b>Test Description</b>	This test asserts equality between pre-grown Snake objects and newly grown objects
<b>Testing Type</b>	Correctness

Table 6: Test Case for remove

<b>Function Tested</b>	remove
<b>Preconditions</b>	a Snake object is instantiated
<b>Expected outcome</b>	every point in the snake after the inputted index is removed
<b>Function Input</b>	integer value corresponding to the index
<b>Test Description</b>	This test asserts equality between the length of a Snake object that has remove executed at various indexes and said indexes+1. This test also tests for abnormal and extreme values
<b>Testing Type</b>	Correctness,Robustness

```

>>>
test_changeDirTests (__main__.TestSnakePy) ... ok
test_constructorTests (__main__.TestSnakePy) ... ok
test_grow (__main__.TestSnakePy) ... ok
test_remove (__main__.TestSnakePy) ... ok

-----
Ran 4 tests in 0.070s

OK
^^^

```

## 5.2 Testing for MainMenu.py

Table 7: Test Case for constructor

<b>Function Tested</b>	MainMenu()
<b>Preconditions</b>	none
<b>Expected outcome</b>	a MainMenu object is instantiated
<b>Function Input</b>	none
<b>Test Description</b>	constructor equality test
<b>Testing Type</b>	Correctness

Table 8: Test Case for changeState

<b>Function Tested</b>	changeState
<b>Preconditions</b>	a MainMenu object has been instantiated
<b>Expected outcome</b>	the state is updated if input is valid
<b>Function Input</b>	string value corresponding to the new state

<b>Test Description</b>	This test asserts equality between the inputted new-State and the state of the MainMenu object after running changeState on it
<b>Testing Type</b>	Correctness,Robustness

```
>>>
test_changeState (__main__.TestMainMenuPy) ... ok
test_constructor (__main__.TestMainMenuPy) ... ok
```

```
-----
Ran 2 tests in 0.042s
```

```
OK
```

### 5.3 Testing for Food.py

Table 9: Test Case for constructor

Function Tested	Food()
Preconditions	none
Expected outcome	random x and y position
Function Input	none
Test Description	Assert that two food objects have different positions
Testing Type	Correctness

```
>>>
testRandomPos (__main__.TestFood) ... ok
```

```
-----
Ran 1 test in 0.032s
```

```
OK
```

```
>>>
```

## 5.4 Testing for PlayMap.py

Table 10: Test Case for setDiff

Function Tested	setDiff(difficulty)
Preconditions	none
Expected outcome	difficulty changes to number passed
Function Input	0, 1, and 2
Test Description	Assert that difficult changes after being set
Testing Type	Correctness

Table 11: Test Case for didSnakeHitBoarder

Function Tested	didSnakeHitBoarder()
Preconditions	moving snake head to desired test location
Expected outcome	Return true when snake hits border, False else
Function Input	none
Test Description	Assert that function returns true only when snake hits border
Testing Type	Correctness

Table 12: Test Case for didSnakeHitSelf

Function Tested	didSnakeHitSelf()
Preconditions	moving snake head to desired test location
Expected outcome	Return True when snake hits self, False else



Function Input	none
Test Description	Assert that function returns true only when snake hits self
Testing Type	Correctness

Table 13: Test Case for isSnakeDead

Function Tested	isSnakeDead()
Preconditions	moving snake head to desired test location
Expected outcome	Return True when snake dies, False else
Function Input	none
Test Description	Assert that snake dies when it hits itself or a border
Testing Type	Correctness

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## 5.5 Testing for Food.py

Table 14: Test Case for constructor

Function Tested	Food()
Preconditions	none
Expected outcome	random x and y position
Function Input	none
Test Description	Assert that two food objects have different positions
Testing Type	Correctness

```
>>>
testRandomPos (__main__.TestFood) ... ok
```

```
-----
Ran 1 test in 0.032s
```

```
OK
>>>
```

```
>>>
test_changeDirTests (__main__.TestSnakePy) ... ok
test_constructorTests (__main__.TestSnakePy) ... ok
test_grow (__main__.TestSnakePy) ... ok
test_remove (__main__.TestSnakePy) ... ok
```

```
-----
Ran 4 tests in 0.070s
```

```
OK
\\
```

```
>>>
test_changeState (__main__.TestMainMenuPy) ... ok
test_constructor (__main__.TestMainMenuPy) ... ok
```

```
-----
Ran 2 tests in 0.042s
```

```
OK
```

```
>>>
testRandomPos (__main__.TestFood) ... ok
```

```
-----
Ran 1 test in 0.032s
```

```
OK
>>>
```

```
=====
```

Table 15: Test Case for updateState

Function Tested	updateState()
Preconditions	snake and food position
Expected outcome	Snake grows by 1 when it eats food, remains the same length else
Function Input	none
Test Description	Assert that playMap updates correctly
Testing Type	Correctness

8698856a52c458cf17ced3a5137cdb5774a13f42

Table 16: Test Case for getCurrentState

Function Tested	getCurrentState()
Preconditions	moving snake head to desired test location
Expected outcome	Return -1 when dead, an array of state variables else
Function Input	none
Test Description	Assert that getCurrentState returns correct value
Testing Type	Correctness

```
testDidSnakeHitBorder (__main__.TestPlayMap) ... ok
testDidSnakeSelf (__main__.TestPlayMap) ... ok
testGetCurrentState (__main__.TestPlayMap) ... ok
testIsSnakeDead (__main__.TestPlayMap) ... ok
testSetDiff (__main__.TestPlayMap) ... ok
testUpdateState (__main__.TestPlayMap) ... ok
```

```
-----
Ran 6 tests in 0.095s
```

```
OK
.
```

## 5.6 Testing for GamePause.py

Table 17: Test Case for updateState

Function Tested	updateState(score)
Preconditions	none
Expected outcome	Score variable in pause updates to number passed
Function Input	21
Test Description	Assert that score changes after being updated
Testing Type	Correctness

Table 18: Test Case for getCurrentState

Function Tested	getCurrentState()
Preconditions	none
Expected outcome	Return an array consisting of score, and the 4 buttons on the display
Function Input	none
Test Description	Assert that function returns the proper array of items
Testing Type	Correctness

```
>>>
testGetCurrentState (__main__.TestGamePause) ... ok
testUpdateState (__main__.TestGamePause) ... ok
```

```
-----
Ran 2 tests in 0.045s
```

```
OK
```

## 5.7 Testing for GameOver.py

Table 19: Test Case for updateState

Function Tested	updateState(score)
Preconditions	none
Expected outcome	Score variable in pause updates to number passed
Function Input	21
Test Description	Assert that score changes after being updated
Testing Type	Correctness

Table 20: Test Case for getCurrentState

Function Tested	getCurrentState()
Preconditions	none
Expected outcome	Return an array consisting of score, and the 2 buttons on the display
Function Input	none
Test Description	Assert that function returns the proper array of items
Testing Type	Correctness

```
>>>
testGetCurrentState (__main__.TestGameOver) ... ok
testUpdateState (__main__.TestGameOver) ... ok
```

```
-----
Ran 2 tests in 0.043s
```

```
OK
.
```

## 6 Testing functional requirements

## 7 Usability Testing

Usability testing is carried get response from gamers on their experience of the game. Testing was carried by allowing youth between the age of 18 to 25. The comments and ratings given by this focus group reflect the interests and needs of youth of today.

Table 21: User 1

Number of times played	5
Rate entertainment (from 1 to 10)	8
Rate Power Up feature (from 1 to 10)	11
Rate graphics (from 1 to 10)	8
Suggested Improvements	There must be a way of knowing which difficulty level has been chosen. Response of keys was slow. The game would be more interesting had it been multiplayer.

Table 22: User 2

Number of times played	2
Rate entertainment (from 1 to 10)	7.5
Rate Power Up feature (from 1 to 10)	10
Rate graphics (from 1 to 10)	8
Suggested Improvements	There should be more menu options.

Table 23: User 3

Number of times played	6
Rate entertainment (from 1 to 10)	6
Rate Power Up feature (from 1 to 10)	7
Rate graphics (from 1 to 10)	7
Suggested Improvements hline	The game should be more colorful.

Table 24: User 4

Number of times played	5
Rate entertainment (from 1 to 10)	6
Rate Power Up feature (from 1 to 10)	7

Rate graphics (from 1 to 10)	2
Suggested Improvements	There appears to be a lag. Make the score board at the top of the screen more noticeable.

Table 25: User 5

Number of times played	2
Rate entertainment (from 1 to 10)	7.5
Rate Power Up feature (from 1 to 10)	10
Rate graphics (from 1 to 10)	8
Suggested Improvements	There should be more options in the options menu.

Table 26: User 6

Number of times played	8
Rate entertainment (from 1 to 10)	7
Rate Power Up feature (from 1 to 10)	8
Rate graphics (from 1 to 10)	5 .
Suggested Improvements	The top ten scores ever should be saved

Table 27: User 7

Number of times played	3
Rate entertainment (from 1 to 10)	6
Rate Power Up feature (from 1 to 10)	2
Rate graphics (from 1 to 10)	1
Suggested Improvements	Fix the lag. Add more modes such as a mode to make the snake go through one wall and come out from the other side. Add obstacles for the snake. Reward 'bonus' food points which appear for 5 seconds and disappear if not eaten by snake within this time.

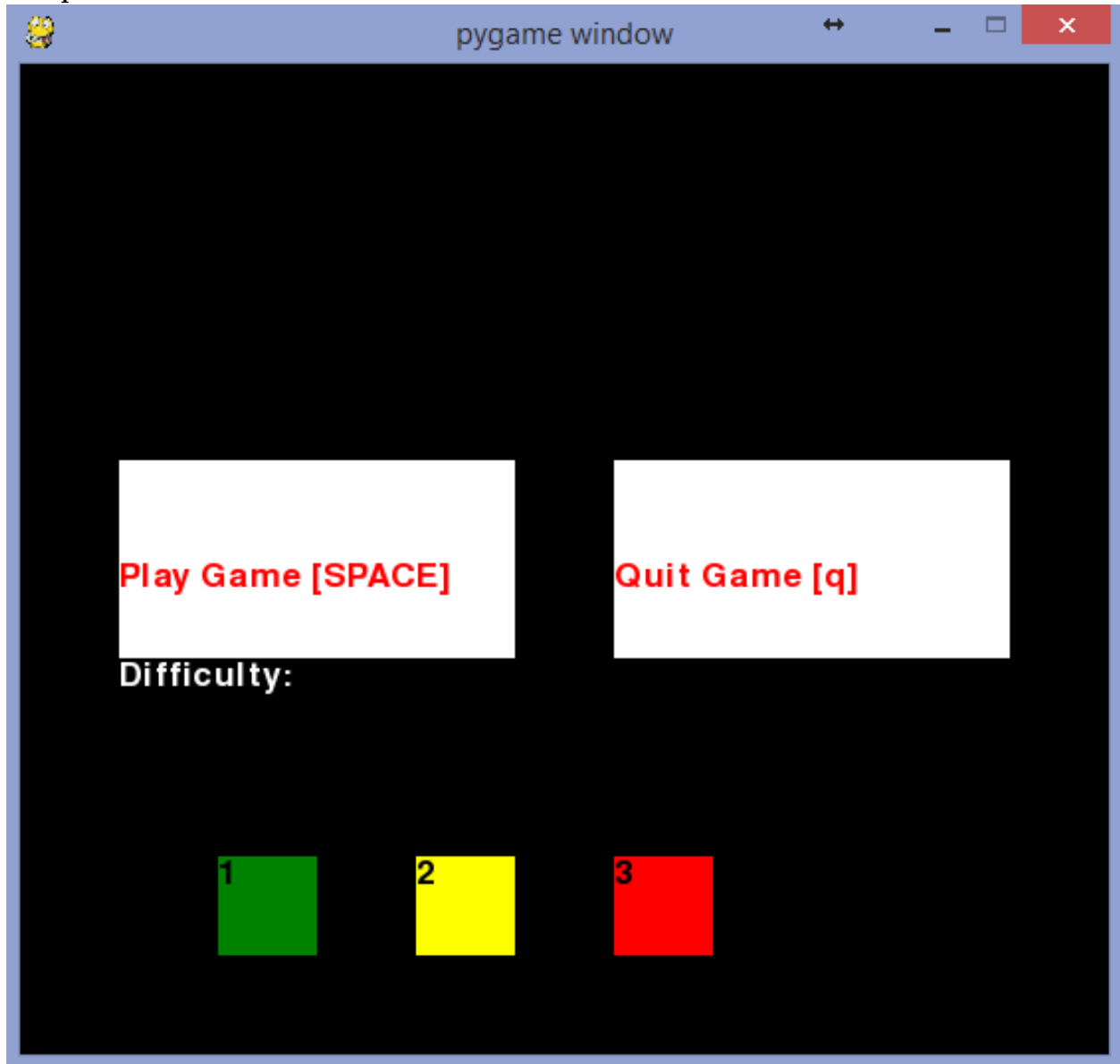
## 8 GUI Testing

All features of the graphical user interface were tested to see that they correctly respond to the inputs let they be from mouse or the keyboard.

**Test Input:** The program is first run.

**Expected:** The option menu appears.

**Output:** Pass.

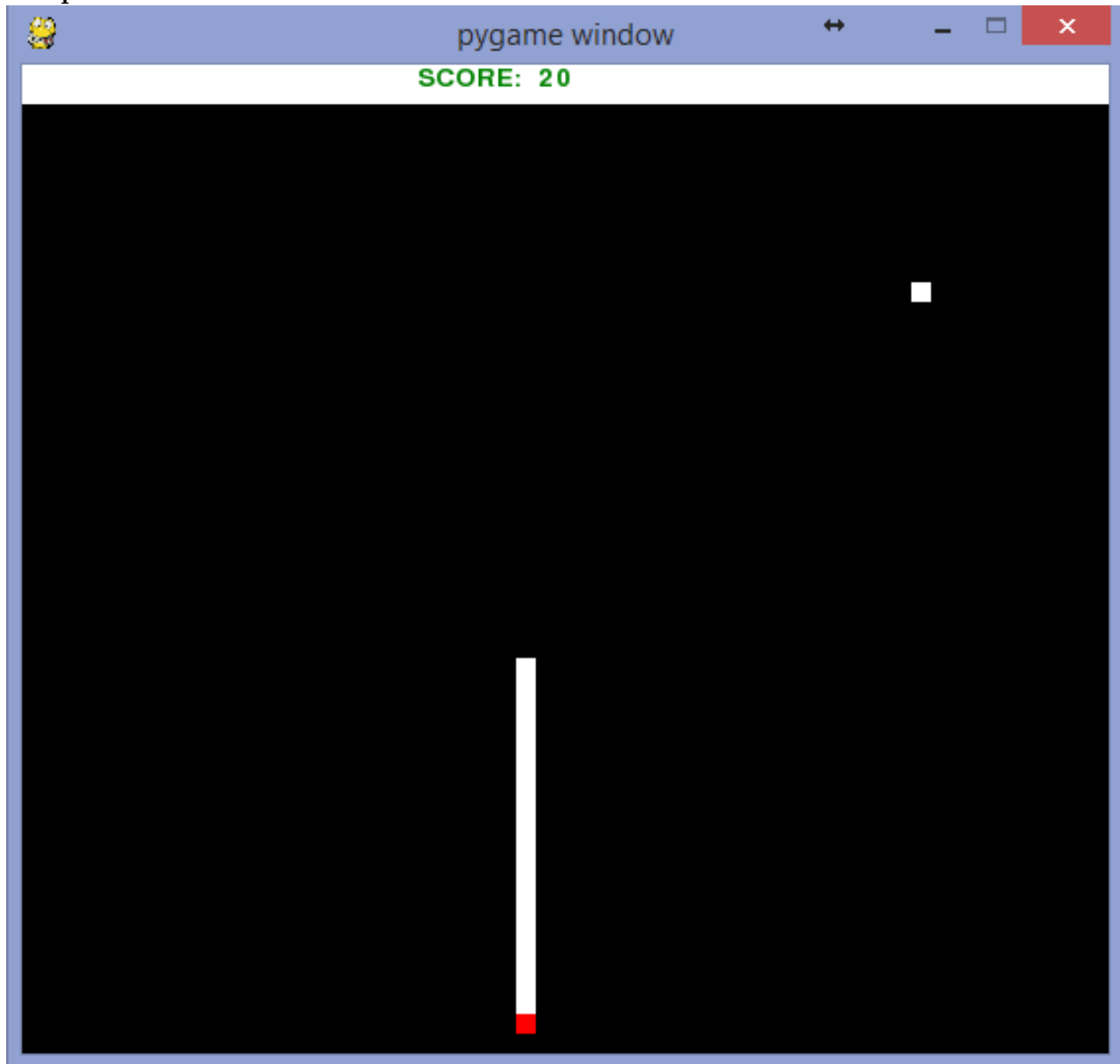




**Test Input:** In the option menu, Play Game is clicked or the space bar is pressed.

**Expected:** The snake game begins.

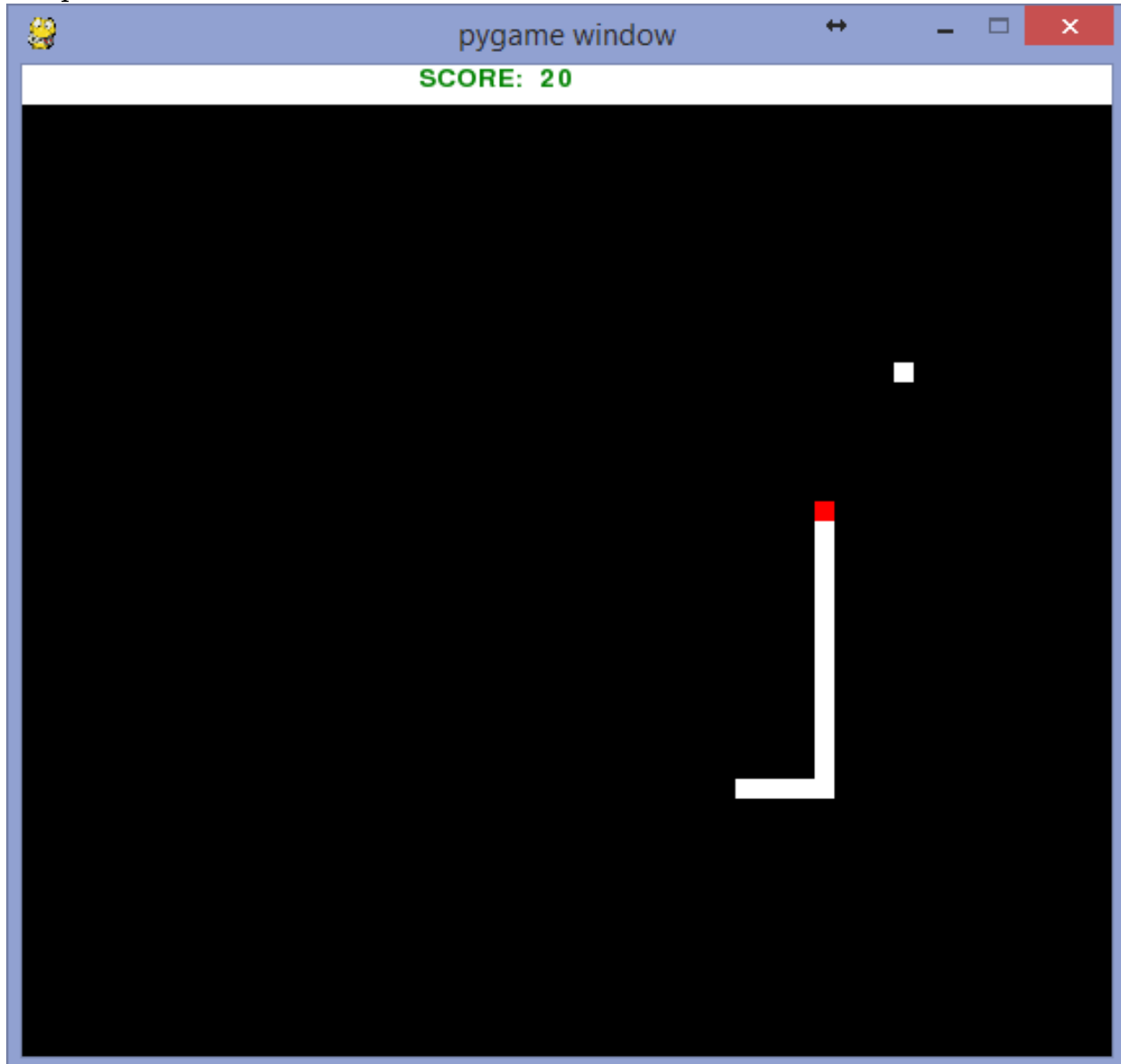
**Output:** Pass.



**Test Input:** In the game, UP arrow key is pressed while the snake is horizontally positioned.

**Expected:** The snake turns up.

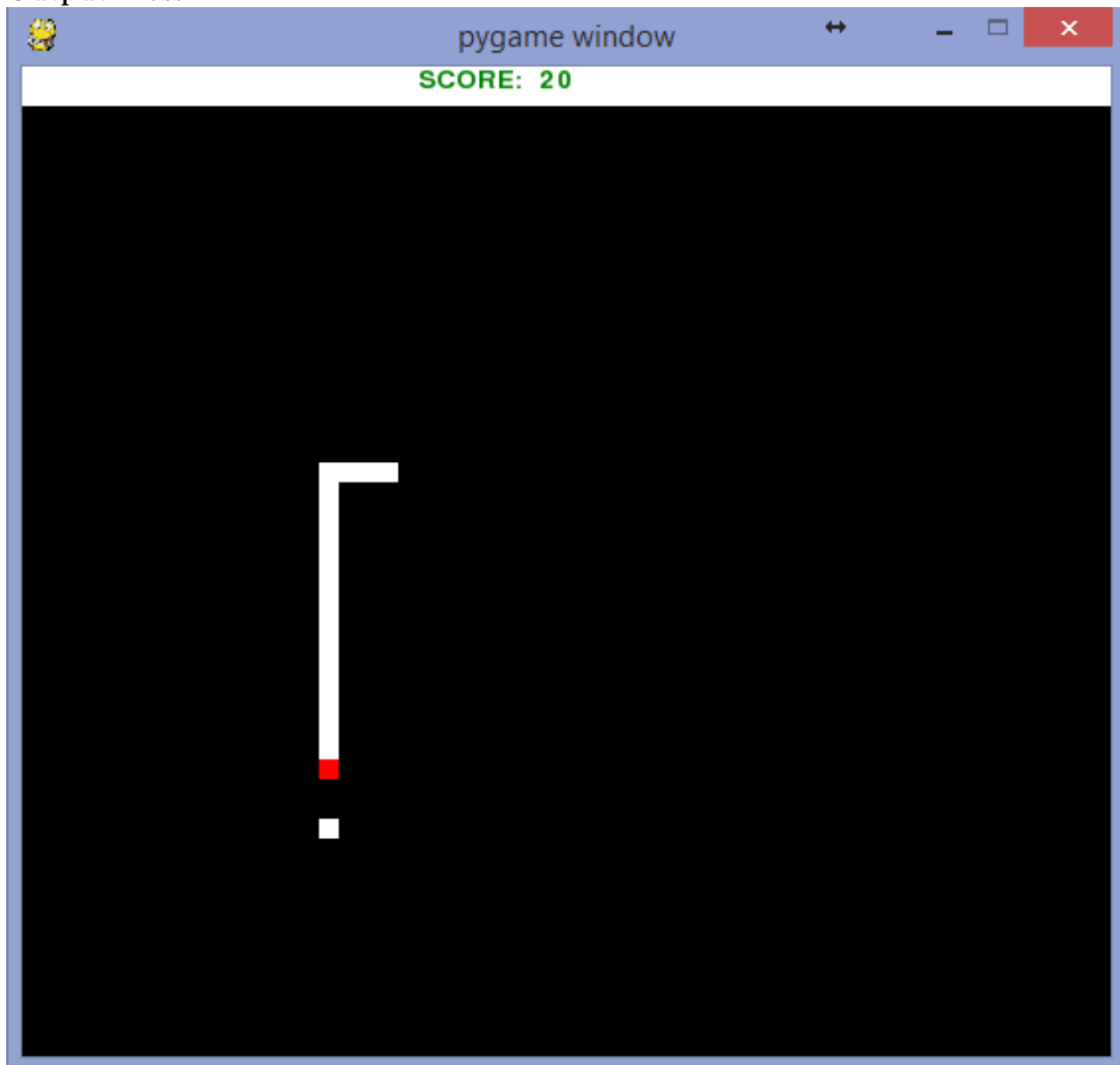
**Output:** Pass.



**Test Input:** The DOWN arrow key is pressed when the snake is horizontally positioned.

**Expected:** The snake turns down.

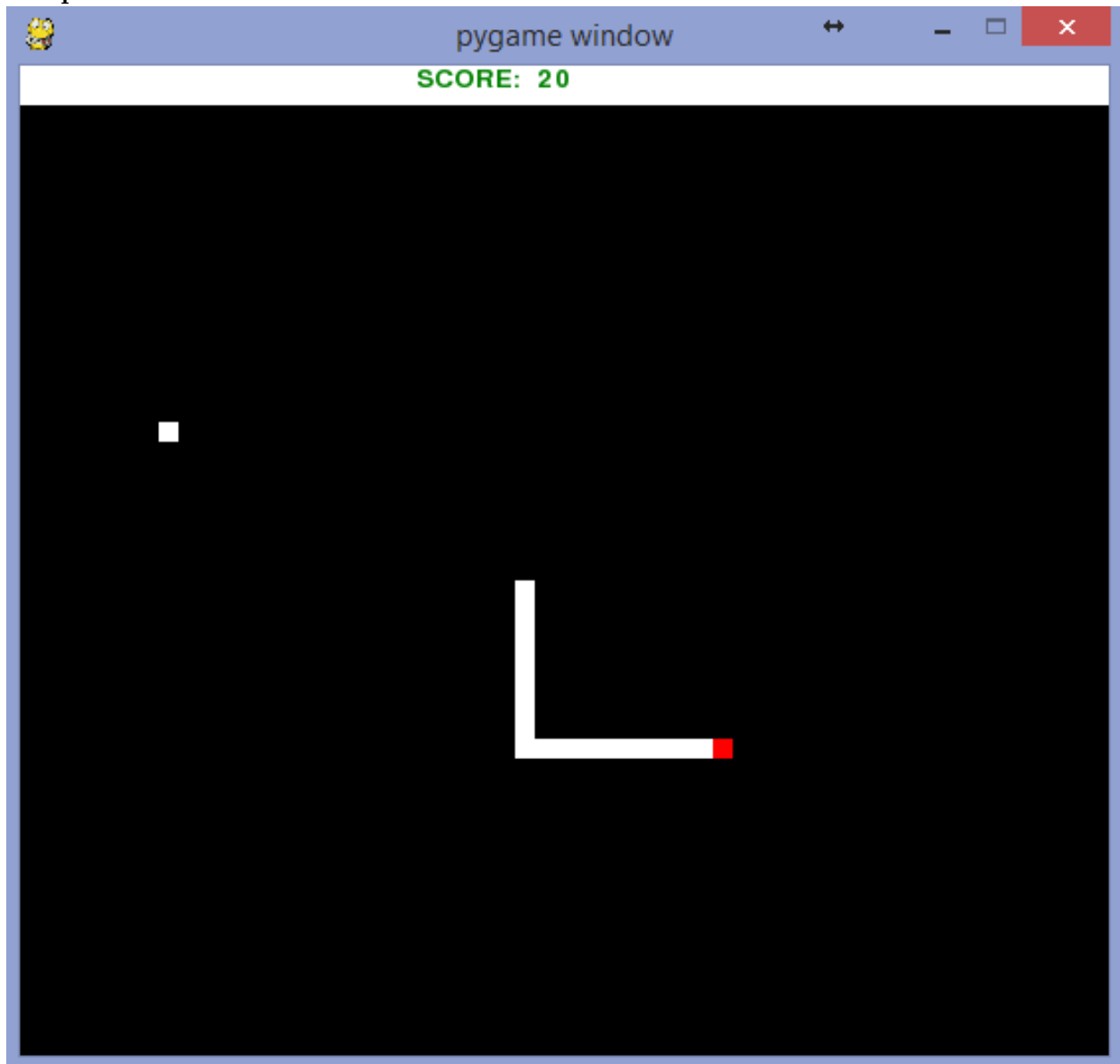
**Output:** Pass.



**Test Input:** the RIGHT arrow key is pressed when the snake vertically positioned.

**Expected:** The snake turns right.

**Output:** Pass.



**Test Input:** The LEFT arrow key is pressed when the snake is vertically positioned.

**Expected:** The snake turns left.

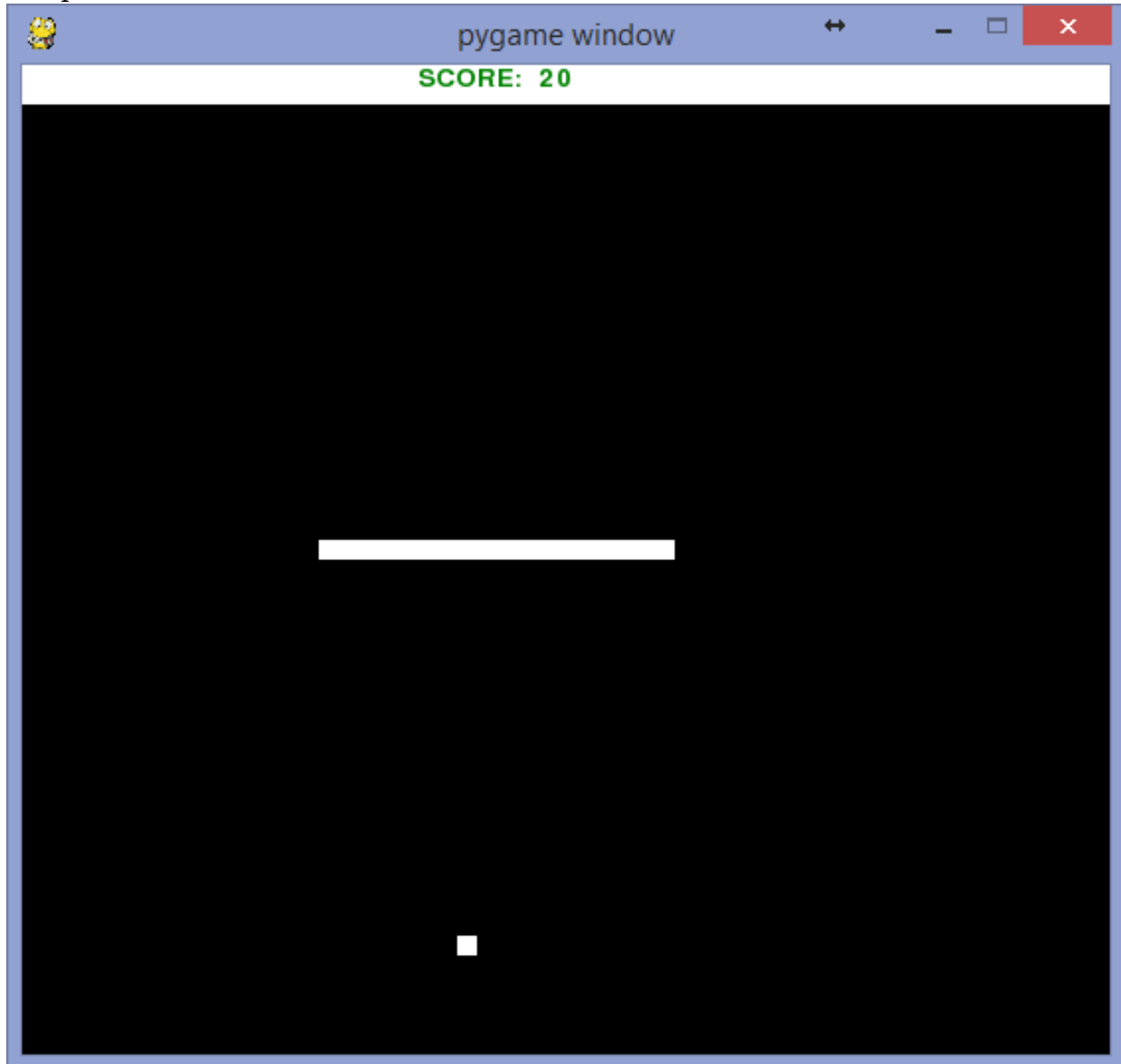
**Output:** Pass.



**Test Input:** The snake crashes into itself.

**Expected:** ,It's Power up will be used, the size of the snake will shrink and the red head disappears.

**Output:** Pass.

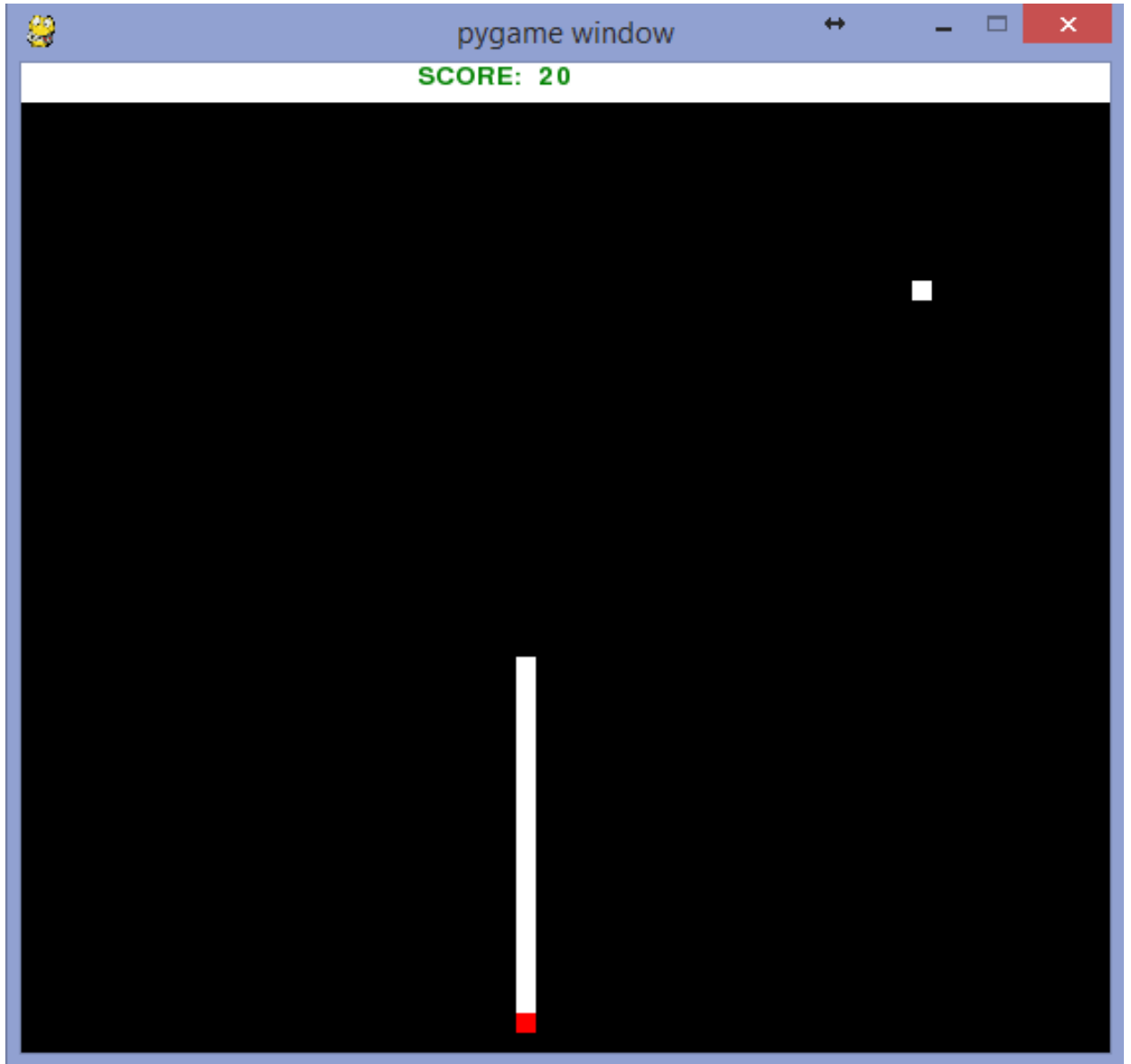


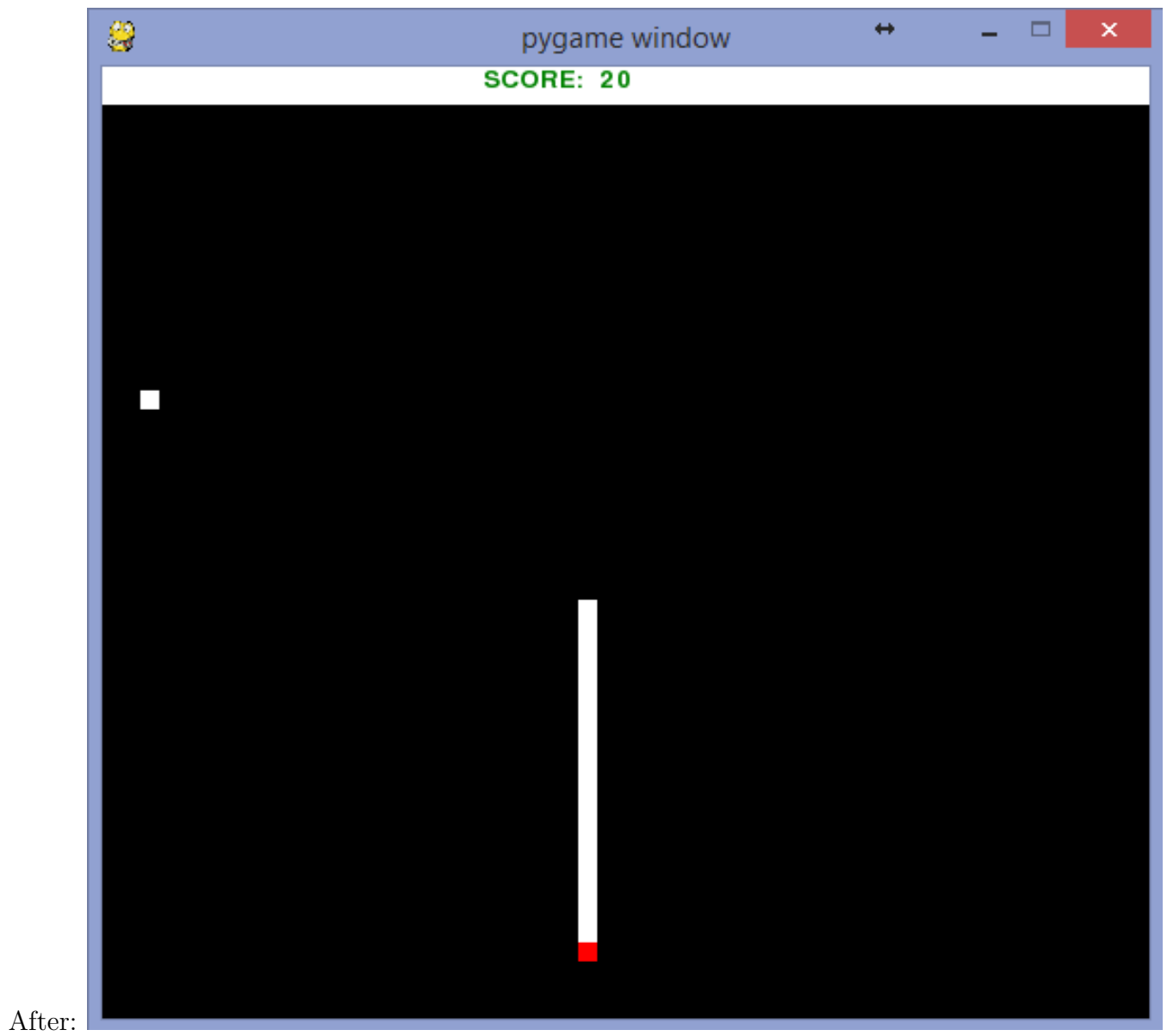
**Test Input:** The snake crashes the border.

**Expected:** The Game Over screen pops up and the game ends. The screen displays the score and options to either restart or quit the game.

**Output:** Pass.

Before:



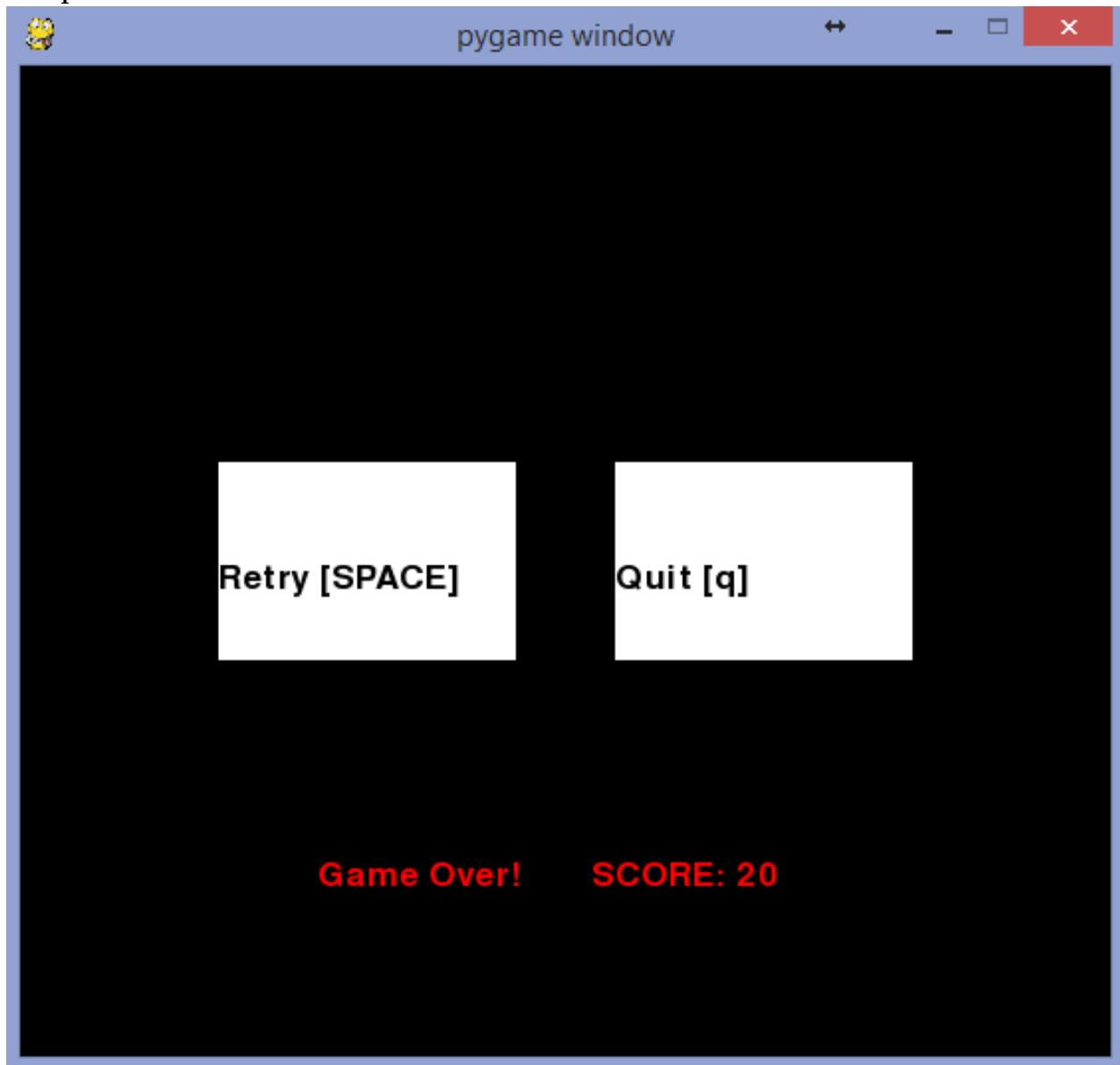




**Test Input:** In the game over menu, the space bar is pressed.

**Expected:** The game successfully restarts.

**Output:** Pass.



**Test Input:** The letter 'q' is pressed in the options menu, during the game and in the game over menu.

**Expected:** Pressing q quits the program.

**Output:** Pass.

Program window successfully closed in all three test cases.