

CS 1632 – DELIVERABLE 2:

Unit Testing and Code Coverage

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<https://github.com/brandonhang/Pitt-Projects/tree/master/cs1632/Deliverable%202>

(github.com/brandonhang/Pitt-Projects in case of a bad link)

I faced a number of challenges while completing this project, the greatest of which was producing testable code. I normally make liberal use of private modifiers as a way of data hiding and limiting unwanted (or unforeseen) changes to data. However, these methods would then be rather difficult to test as private methods are not testable by JUnit conventions. Thus, I had to figure out ways to change my code in order for it to be testable while limiting the excessive use of public modifiers. I also had to move many of my methods from the main Java class file in order for them to be testable as well. In the end, I feel as if my code is much more testable now at the expense of being more complex with a greater number of “setter”, “getter”, and public methods than my program originally had.

Another challenge I faced was dealing with “impure” methods. By nature, Coffee Maker Quest is a very impure program as many methods simply print text to the console window. I tried to combat this by having many of those methods return a string (or in some cases, an integer). This string, labeled *lastCommand* in *CoffeeGame.java*, was strictly used for debugging purposes and allowed me to properly test the gameplay aspect of the program using a litany of test cases.

Other challenges I encountered included simply learning how to use both JUnit and Mockito and also ensuring my test cases covered a significant amount of my code. The former simply took time while the latter required reshuffling of code away from the main Java class file. As it stands now, my main Java class file has very little code in it, aside from the main method.

My Question: Is there a magic ratio between the tradeoff of using more public methods for testability over private methods for security?

Java - CoffeeMakerQuest/src/coffee_maker_junit_tests/QuestRoomTest.java - Eclipse

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Package Explorer JUnit

Finished after 0.46 seconds

Runs: 63/63 Errors: 0 Failures: 0

- coffee_maker_junit_tests.QuestRoomTest [Runner: JUnit 4] (0.226 s)
 - testNewRoomNullFurnishing (0.001 s)
 - testHasSouthDoor (0.000 s)
 - testNewRoomNullSouthDoor (0.000 s)
 - testFurnishing (0.000 s)
 - testSetNorthDoor (0.000 s)
 - testToString (0.000 s)
 - testSouthDoor (0.000 s)
 - testNoSouthDoor (0.000 s)
 - testNullNorthRoom (0.000 s)
 - testGetItem (0.000 s)
 - testHasItem (0.000 s)
 - testHasNorthDoor (0.000 s)
 - testNewRoomNullNorthDoor (0.000 s)
 - testNewRoomNullItem (0.000 s)
 - testNorthDoor (0.000 s)
 - testCollectItem (0.000 s)
 - testNoNorthDoor (0.000 s)
 - testNoItem (0.000 s)
 - testSetItem (0.000 s)
 - testRoomAdjective (0.000 s)
 - testNullSouthRoom (0.000 s)
 - testNewRoomNullAdj (0.225 s)
- coffee_maker_junit_tests.CoffeeGameTest [Runner: JUnit 4] (0.097 s)
 - testEquivalentCaseH (0.027 s)
 - testEquivalentCaseL (0.001 s)
 - testEquivalentCaseN (0.017 s)
 - testEquivalentCaseS (0.002 s)
 - testNoInitialCoffee (0.000 s)
 - testLookAndNoItem (0.002 s)
 - testEmptyInput (0.000 s)
 - testBuildGameWithNull (0.007 s)
 - testValidMoveNorth (0.001 s)
 - testValidMoveSouth (0.001 s)
 - testBadPrint (0.000 s)
 - testLookAndSugarExists (0.002 s)
 - testHelp (0.001 s)
 - testInventoryNoItems (0.001 s)
 - testInvalidMoveNorth (0.001 s)
 - testInvalidMoveSouth (0.001 s)
 - testBuildGame (0.009 s)
 - testInventoryAllItems (0.003 s)
 - testValidMoveNorthReturn (0.001 s)
 - testLookAndItemNotRecognized (0.001 s)
 - testVictoryScenario1 (0.002 s)
 - testNumberInput (0.001 s)
 - testNoInitialCream (0.000 s)
 - testNoInitialSugar (0.001 s)
 - testLookAndCoffeeExists (0.001 s)
 - testDefeatScenario2 (0.002 s)
 - testDefeatScenario3 (0.002 s)
 - testDefeatScenario4 (0.002 s)
 - testDefeatScenario5 (0.001 s)
 - testDefeatScenario6 (0.002 s)
 - testDefeatScenario7 (0.002 s)
 - testDefeatScenario8 (0.000 s)
 - testLookAndCreamExists (0.001 s)
 - testGameOverPrint (0.001 s)
 - testTitlePrint (0.000 s)
 - testValidMoveSouthReturn (0.001 s)
- coffee_maker_junit_tests.QuestHouseTest [Runner: JUnit 4] (0.005 s)
 - testZeroStartingRooms (0.001 s)
 - testSameInitialRoom (0.001 s)
 - testEmptyInitialRoom (0.002 s)
 - testSetInitialRoom (0.000 s)
 - testIncrementNumberOfRooms (0.001 s)

Total JUnit Test Cases: 63

Java - CoffeeMakerQuest/src/coffee_maker_junit_tests/QuestRoomTest.java - Eclipse

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Problems Javadoc Declaration Console Coverage

coffee_maker_junit_tests (Feb 16, 2016 2:47:24 AM)

Element	Coverage	Covered Instruction...	Missed Instructions	Total Instructions
✓ CoffeeMakerQuest	96.4 %	2,387	90	2,477
✓ src	96.4 %	2,387	90	2,477
✓ coffee_hunter_pro	91.8 %	922	82	1,004
> CoffeeMakerQuest.java	0.0 %	0	74	74
> CoffeeGame.java	98.9 %	720	8	728
> QuestHouse.java	100.0 %	26	0	26
> QuestRoom.java	100.0 %	176	0	176
✓ coffee_maker_junit_tests	99.5 %	1,465	8	1,473
> CoffeeGameTest.java	99.2 %	991	8	999
> QuestHouseTest.java	100.0 %	76	0	76
> QuestRoomTest.java	100.0 %	398	0	398

Java - CoffeeMakerQuest/src/coffee_maker_junit_tests/CoffeeGameTest.java - Eclipse

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Problems Javadoc Declaration Console Coverage

CoffeeGameTest (Feb 16, 2016 2:45:59 AM)

Element	Coverage	Covered Instruction...	Missed Instructions	Total Instructions
✓ CoffeeMakerQuest	71.8 %	1,778	699	2,477
✓ src	71.8 %	1,778	699	2,477
✓ coffee_maker_junit_tests	67.3 %	991	482	1,473
> QuestRoomTest.java	0.0 %	0	398	398
> QuestHouseTest.java	0.0 %	0	76	76
> CoffeeGameTest.java	99.2 %	991	8	999
✓ coffee_hunter_pro	78.4 %	787	217	1,004
> QuestRoom.java	38.1 %	67	109	176
> CoffeeMakerQuest.java	0.0 %	0	74	74
> QuestHouse.java	0.0 %	0	26	26
> CoffeeGame.java	98.9 %	720	8	728

Java - CoffeeMakerQuest/src/coffee_maker_junit_tests/QuestHouseTest.java - Eclipse

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Problems Javadoc Declaration Console Coverage

QuestHouseTest (Feb 16, 2016 2:46:49 AM)

Element	Coverage	Covered Instruction...	Missed Instructions	Total Instructions
✓ CoffeeMakerQuest	4.1 %	102	2,375	2,477
✓ src	4.1 %	102	2,375	2,477
✓ coffee_maker_junit_tests	5.2 %	76	1,397	1,473
> CoffeeGameTest.java	0.0 %	0	999	999
> QuestRoomTest.java	0.0 %	0	398	398
> QuestHouseTest.java	100.0 %	76	0	76
✓ coffee_hunter_pro	2.6 %	26	978	1,004
> CoffeeGame.java	0.0 %	0	728	728
> QuestRoom.java	0.0 %	0	176	176
> CoffeeMakerQuest.java	0.0 %	0	74	74
> QuestHouse.java	100.0 %	26	0	26

Java - CoffeeMakerQuest/src/coffee_maker_junit_tests/QuestRoomTest.java - Eclipse

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Problems Javadoc Declaration Console Coverage

QuestRoomTest (Feb 16, 2016 2:47:03 AM)

Element	Coverage	Covered Instruction...	Missed Instructions	Total Instructions
✓ CoffeeMakerQuest	23.2 %	574	1,903	2,477
✓ src	23.2 %	574	1,903	2,477
✓ coffee_maker_junit_tests	27.0 %	398	1,075	1,473
> CoffeeGameTest.java	0.0 %	0	999	999
> QuestHouseTest.java	0.0 %	0	76	76
> QuestRoomTest.java	100.0 %	398	0	398
✓ coffee_hunter_pro	17.5 %	176	828	1,004
> CoffeeGame.java	0.0 %	0	728	728
> CoffeeMakerQuest.java	0.0 %	0	74	74
> QuestHouse.java	0.0 %	0	26	26
> QuestRoom.java	100.0 %	176	0	176

Total Code Coverage: 96.4%

Tests correspond to Java files appended with "Test"

CoffeeMakerQuest.java was not tested due to only having a main method