

Assignment 4 - Decision Code Coverage


[New Attempt](#)

- Due Mar 26, 2023 by 11:59pm
- Points 80
- Submitting a file upload
- File Types pdf and java

Introduction

This assignment requires you to use structural-based testing techniques to develop test cases for control flow analysis and identify data flow anomalies in the given code.

Part 1

Select any tool that provides statement and decision code coverage. Utilizing the [VendingMachine.java code \(https://canvas.asu.edu/courses/140381/files/59149933?wrap=1\)](https://canvas.asu.edu/courses/140381/files/59149933?wrap=1)  [\(https://canvas.asu.edu/courses/140381/files/59149933/download?download_frd=1\)](https://canvas.asu.edu/courses/140381/files/59149933/download?download_frd=1) given to you, develop a set of test cases using JUnit for your code based on the following requirements:

- Takes in an integer input
- Allows users to select between three products: Candy (20 cents), Coke (25 cents), Coffee (45 cents)
- Returns the selected product and any remaining change
- If there is not enough money to buy the product, displays the amount necessary to buy the product and other products to purchase.

Execute the program with your test cases and observe the code coverage of your test cases.

The goal is to reach **100% in statement coverage and at least 90% decision coverage**. For decision coverage, please make sure to test all the decisions except the False decision for line 32 (input < 45).

NOTE: Almost every IDE has its own plugin for code coverage, but here are a few specific match-ups: NetBeans can be used with JaCoCo, Eclipse with EcEmma, and IntelliJ with JaCoCo or Emma.

Task 1.

- Develop Junit test cases which achieves 100% statement coverage and 90% decision coverage

- Execute test cases and observe coverage achieved. Update your test cases if not achieved the required coverage.

Task 2.

Create a report which contains the following:

1. Description of the tool used explaining the scope, purpose and an example usage
2. Explain the types of code coverage the tool provides and is used for
3. Description of the your test cases, their scope and coverage. **(Do not insert your Java code in the document, instead explain the test case in the report)**
4. Screenshot of the tool's report showing the coverage achieved for the test cases developed
5. Your evaluation of the tool's usefulness in your own words in terms of
 - usability
 - coverage
 - tool features

Part 2

Select any static source code analysis tool. The [StaticAnalysis.java](https://canvas.asu.edu/courses/140381/files/59149932?wrap=1)

(<https://canvas.asu.edu/courses/140381/files/59149932?wrap=1>) 

(https://canvas.asu.edu/courses/140381/files/59149932/download?download_frd=1) code given to you contains two different data flow anomalies. Execute the tool on StaticAnalysis.java and identify what the two data flow anomalies are. The inputs are:

- the weight of the package as an integer
- the length of the package as an integer
- the type of product as a String

Task 3

1. Include in your report a description of the two data flow anomalies, explain why you consider them data anomalies.
2. Include a screenshot showing the analysis performed for detecting data anomalies (high resolution image)
3. Include your evaluation of the tool's usefulness in your own words in terms of
 - usability
 - coverage
 - tool features

General Submission Rules:

1. Submit a single document in pdf format containing both parts and all tasks
2. Submit Junit test cases in zip file (from Part 1)
3. Use [MLA \(https://www.grammarly.com/blog/mla-format/\)](https://www.grammarly.com/blog/mla-format/) (Modern Language Association) or [APA \(https://www.grammarly.com/blog/apa-format/\)](https://www.grammarly.com/blog/apa-format/) (American Psychological Association) citation style
4. Use high resolution images in your report
5. There is no limit on the number of pages for the report

Rubric (1)

Criteria	Ratings			Pts
PART 1 - Describe a tool that provides statement and decision code coverage and mention the types of coverage it provides. Explain its scope, purpose and its usage	10 pts Full Marks	5 pts Half Marks	0 pts No Marks	10 pts
PART 1 - Included Test cases developed for VendingMachine.java code.	10 pts Full Marks	5 pts Half Marks	0 pts No Marks	10 pts
PART 1 - Evaluation of the tool in terms of its usability, coverage, tool features	10 pts Full Marks	5 pts Half Marks	0 pts No Marks	10 pts
PART 1 - Screenshot showing the coverage achieved for the test cases developed.	10 pts Full Marks	5 pts Half Marks	0 pts No Marks	10 pts
PART 2 - Description of the two data flow anomalies and explanation of the reason	10 pts Full Marks	5 pts Half Marks	0 pts No Marks	10 pts
PART 2 - Include screenshot showing the analysis performed for detecting data anomalies.	10 pts Full Marks	5 pts Half Marks	0 pts No Marks	10 pts
PART 2 - Evaluation of the tool in terms of its usability, coverage, tool features	15 pts Full Marks	7.5 pts Half Marks	0 pts No Marks	15 pts
References Cite references used in the report and include a references list.	2.5 pts Full Marks	1.25 pts Half Marks	0 pts No Marks	2.5 pts
General: Proofreading with no grammar or formatting errors.	2.5 pts Full Marks	1.25 pts Half Marks	0 pts No Marks	2.5 pts
Total Points: 80				