**Assignment #4 \_\_\_/31 MARKS**

* You are encouraged to work in groups of 2 or 3 for this assignment
* There are 3 pages to this assignment description
* Due: Friday 11:59pm on Nov 8, 2024
* Submission Instructions:

1. Complete this MS Word document by filling in your answers below.
   1. Name your file as: ***lastname\_firstname\_Assignment\_4*** using one of the member’s name in your group.
   2. Save as PDF
2. For your source code, please zip them up using the name you used above: ***lastname\_firstname\_Assignment\_4\_Q2\_Source\_Code.zip,***

***lastname\_firstname\_Assignment\_4\_Q3\_Source\_Code.zip, etc.***

1. Submit all files to CourseLink

**Group Members**

Member #1:

First Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; Last Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Student ID: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Member #2:

First Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; Last Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Student ID: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Member #3:

First Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; Last Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Student ID: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Chapter 7.3, Question 1 (a) [2 marks]
2. This question is based on Chapter 7.3, Question 2: *Select a commercial coverage tool of your choice. Note that some have free trial evaluations. Choose a tool, download it, and run it on some software. You can use one of the examples from this text, software from your work environment, or software available over the Web. Write up a short summary report of your experience with the tool. The main grading criterion is that you actually collect some coverage data for a reasonable set of tests on some program.”* You may use any programming language you wish; I would recommend Java, to be consistent with the textbook, however, Python, C, C#, C++, and others would be just fine. Provide your report, 1-2 pages in the space below. [10 marks]
3. This question is based on Chapter 7.6, Question 1:
4. Construct the *Get Balance* use case and use case scenarios for interactions with a bank Automated Teller Machine. Include the following [12 marks in total]:

*Use Case Name: Get Balance*

*Summary [0.5 marks]:*

*Actor [0.5 marks]:*

*Precondition [0.5 marks]:*

*Description [4 marks]:*

*Alternatives [4 marks]:*

*Postcondition [0.5 marks]:*

*One use case scenario for this use case [2 marks]:*

1. Describe the Test Case for this use case. [7 marks]

Use the following table as a guide:

|  |  |
| --- | --- |
| Purpose:  [0.5 marks] |  |
| Prerequisite:  [2 marks] |  |
| Test Data:  [0.5 marks] |  |
| Steps:  [2 marks] |  |
| Expected Output:  [2 marks] |  |

1. [BONUS] Introduction to MATLAB Stateflow – Building a Simple Traffic FSM [Bonus 4 marks]

**Objective**

Learn to use MATLAB Stateflow to create a basic Finite State Machine (FSM) for a simple traffic light system. The FSM will cycle through **Red**, **Green**, and **Yellow** states, simulating the operation of a traffic light.

**Software Requirements**

* MATLAB with the Stateflow add-on [download the 30-day free trial]:

**Background**

Stateflow in MATLAB is a graphical tool for modeling and simulating state machines and logic in dynamic systems. In this assignment, you will build an FSM representing a traffic light that changes states in response to time.

**Rubric:**

1. **Correct State Setup** [1 Mark]: Each state (Red, Green, Yellow) is set up correctly.
2. **Transitions and Timing Conditions** [1 Mark]: Transitions are created between each state with the correct timing conditions.
3. **Output Signal** [1 Mark]: The output variable lightStatus is correctly configured and reflects the traffic light state. You can also use the Lamp UI component to visually show a traffic light (red, yellow, green).
4. **Simulation Results** [1 Mark]: Simulation runs correctly, with observed transitions matching the expected cycle.
5. **Documentation and Screenshot**: Include clear and complete screenshots and descriptions in the space below.
6. Submit your MATLAB source code to CourseLink