**Lab Sheet 4: State Machines**

Submit before the end of your week 6 lab session

# Aims

The aims of this lab are to:

* Practice the use of Stateflow to model control systems.
* Understand the abstract concepts of control states/modes and transitions.

# Activities

Perform the following tasks and answer the questions on the answer sheet.

1. Task 0: Download and load the sample diagram.
2. Task 1: Model the original flashing LED control loop.
3. Task 2: Model the button-controlled external LED.

## Task 0: Download and Load the Sample Diagram

Download the sample diagram. The diagram has the following features:

* A single stateflow chart.
* Constant inputs to a switch (which will model the button).
* A scope logging the outputs to LEDs.

## Task 1: Model the Original Flashing LED Control Loop

## Task 2: Model the Button-controlled external LED

# Answer Sheet

*This sheet should be printed out and handed in during the lab session. It can be completed either electronically or by hand.*

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| **Date submitted** | 30/10/2015 |

## Questions from The Lab

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| **Question** | | **Answer** |
| 1 | How do you mark the initial state of a state machine? | An unconnected arrow (in one of the ends) pointing to one of the states |

## Viva Record

Task 1: Demonstrate simulation of the flashing LEDs.

Task 2: Demonstrate simulation of the button-controlled system.

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| **Viva comment (completed by TA / lecturer)** |  |
| **Name:** |  |

## Question about concepts

Answer the following questions concisely (up to 30 words each):

1. What is the role of a guard in state machines?   
   They only enable transitions when their value is equal to the specified by the developer
2. How does full (or partial) address decoding select the flip-flops to load data from.?

The developer sets the address at the available pins. Then, the memory bank will pass the address data for a decoder, which will then enable the right flip-flops. Those are connected to a data bus.

There is a pin that have to be set to write or read operation. If it is read, the memory bank will output the data at the bus and, if it is set to write, it will accept the data at the same bus and then write to the specified flip-flops.

## Feedback

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| **Marker** | **Date** | **Grade** |
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