CT101: Assignment 4 – Finite State Machines

For this assignment, you will need to research some information on Finite State Machines. You should then produce a report with the following content:

- Using both a text description **and** a simple illustrated example, define what is meant by a Finite State Machine. Provide some example uses for FSMs. This section of the report should include the following:
    - Definition **and** History of FSMs
    - Basic illustrated example (diagram) with accompanying description
    - Provide **three** example uses for FSMs (provide details for these; not just the name elevator/traffic light.. etc)

- Mealy versus Moore machines
    - Define both and discuss the differences between them using a simple illustrated example of each for representing the same FSM.
    - Are there any advantages of using one over the other? Provide a comparison table.

- Full FSM Example
    - *This section will take a significant amount of time, so you should plan accordingly.*
    - Draw up the specification of an FSM example of your choice. You can use various sources of information for inspiration with your design, but you should **not** copy an existing example directly. The example should also be sufficiently different to those we covered in class (i.e. not a Modulo 8 counter!).
    - There should be a minimum of 6 states and a maximum of 10.
    - Decide if the implementation will be either Mealy or Moore and then create the *state table* and corresponding *state diagram* based on your specification.
    - Construct Karnaugh maps based on the data from your state table and then calculate the *next state logic*.
    - Illustrate the next state logic implementation using logic gates (see slides 33-35 of FSM lecture notes). Your final diagram will resemble the one shown on slide 35. You should research online tools to help you with the production of this diagram.

The report should include appropriate headings, based on the content above. The time in the labs should be spent researching credible sources of information. You should ensure that you clearly reference **all** websites/books that you use. Marks will be awarded for clear, well-structured reports that are backed up by credible sources. Any evidence of plagiarism will result in 0 marks.

You have four lab sessions (starting on Week 3) to complete this report. You should submit your final report as a PDF file through Blackboard by **Friday the 18th of February**. The submission link will be made available on Blackboard closer to the time.