Candidate Number- 215875

Supervisor- Dr Niel De Beaudrap

**Working Title- Visual Nondeterministic-Finite-Automaton Builder And Simulator**

**The aims and objectives of the project.**

In this project I plan to create an application that allows users to build and simulate Nondeterministic-Finite-Automaton for education purposes. An Automaton is a tree-like structure that has a starting state and one or many end states based on a language. It consumes a string of input symbols and for each symbol It transitions to a new state until all input symbols have been used up. What makes it Nondeterministic is that it can transition from one state to multiple others. If all symbols are consumed and the Automation ends in an end state then the input string is accepted otherwise it is rejected.

When working with Nondeterministic-Finite-Automaton I found them to be interesting as they work as a good visual representation of languages and how strings are accepted into these languages. Also the large application of Nondeterministic-Finite-Automaton means they can be applied across a large variety of areas such as mathematics, computer science, linguistics and logic. By creating an education tool for understanding Nondeterministic-Finite-Automaton I hope to help users with first understanding how they work and then further how they can be applied within different subject areas.

As a primary objective for the project I plan to write and create a program that allows for users to select a language or create one of their own, then with that language take an input string from the user and inform the user if it passes or fails.

Another primary objective is to create a web-based or other graphical interface to show the user the Nondeterministic-Finite-Automaton created from the language given.

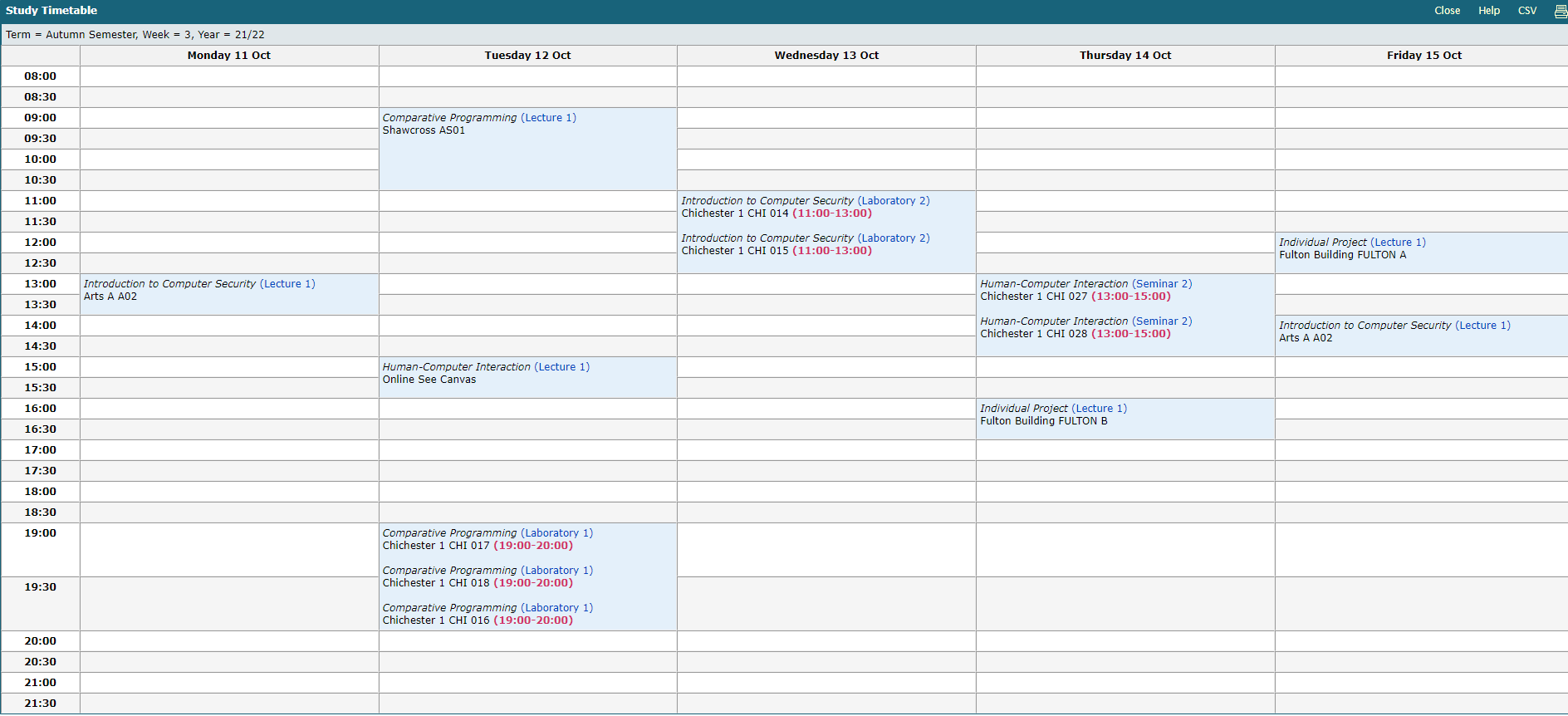
If time allows or I am able an extension objective to this a step by step visual indication of the input string working its way through the Nondeterministic-Finite-Automaton graphical interface to show clearly how an automation operates.

Further to this another extension objective will be to add some languages that have real applicable uses, such as logical operations or simple computer languages to show the user how Nondeterministic-Finite-Automaton can be used in real word applications.

**Relevance**

The project that I am undertaking is relevant to my degree, Computer Science as Nondeterministic-Finite-Automaton are used to express languages and pass acceptable strings into these. This can be used across a large variety of topics within computer science such as machine learning with linguistics , compilers as well as computer languages themselves.

Throughout this term I plan to devote a couple of hours on Monday Wednesday and Friday afternoons towards working on this project.

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