Year 12 Computer Science
Project Proposal

Introduction

Circuit simulator – simulates simple circuits to determine if they will work, and to generally design current flow. This would be good for the physics department as the equipment there is fairly old, and often broken, and so a simple program would be a good way to show current split, resistance over distance, voltages, etc.

Existing Solutions

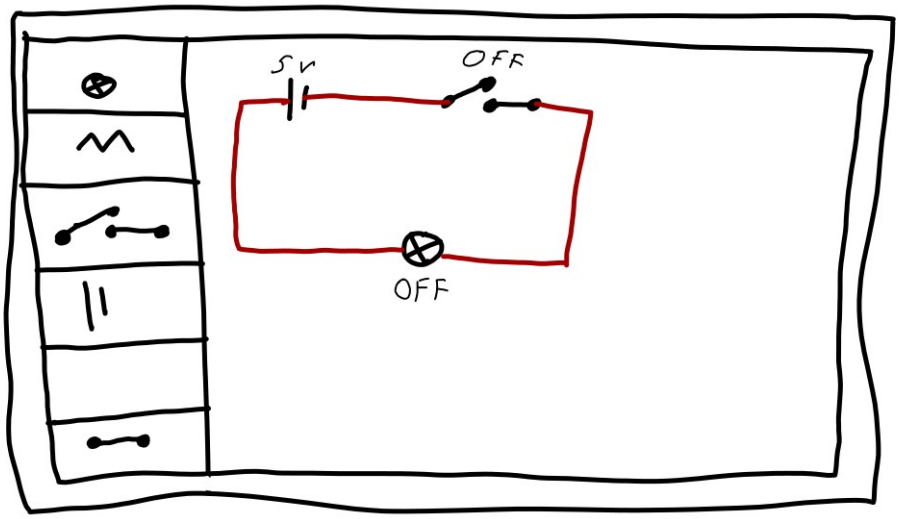
https://www.partsim.com/simulator - a website, but is more suited to the industrial market, many components which are completely irrelevant to most people.

https://sourceforge.net/projects/qucs/ - a GUI program, this is more like what I had imagined, although there are many components that are not relevant, and some that would be helpful, but are not included here.

Classes and Methods

Classes	Methods
Component (parent, children inherit from this to create the various components)	getOutput(takes in input voltage, current, etc), getName(returns the component name), getImage(returns the icon that is used for the component), getConnected(returns a list of components that are connected),
MainWindow – is the window where the elements are placed	init(initialises the main window, adds the toolbar, graphicsArea, infoMenu, etc),
GraphicsArea – the window element which is where images and connections are drawn, and where the user can interact with them	addComponent, removeComponent
Toolbar – where the components are stored	addComponent(add item to the toolbar), deleteComponent, collapse(collapses the toolbar to hide it), expand(opposite of collapse)
InfoMenu – shows information/toggles for a specific, selected component, e.g. can turn on/of a switch or battery, or change battery voltage.	selectComponent(takes in a component reference) collapse, expand

Interface



Success Criteria

- *Simple circuits can be saved, loaded and executed, e.g. as above with a switch, bulb, battery*
- *A few simple components such as switches, bulbs, resistors, capacitors, LEDs, diodes, buttons, batteries*
- *Have a simple interface that can be understood by a normal person*

Skills Needed

[please indicate how you feel your current programming/algorithm skill level compares with the program that you are planning to write. Please also provide a bullet list of any coding elements (whether they are individual skills or more general) that you would need to work on and practice to support the program you are looking to develop]

I feel that I am capable of completing the project, but may need to further learn the specific toolkit that I will be using, e.g. using tutorials to understand fully how to use layouts, slots and signals.

- I Would need to advance my knowledge of the QT toolkit, such as signals, slots and layouts.
- I would need to refresh my knowledge of electricity calculations for the algorithm.
- I would need to create a linked list to act as the path for the circuit, so each circuit can call the next one, to create a sequence of current flows.