School of Electronics And Computer Science
ELEC6050 MEng Group Design Project

Project Specification And Plan

Title: Raspberry Pi control kit for teaching

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Customer: David Argles (da@ecs.soton.ac.uk)
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Project Specification:

In 2012, the Raspberry Pi Foundation developed a single-board computer with the intention of promoting the teaching and learning of programming in schools. This device, known as Raspberry Pi (RPi), constitutes a low-cost computing and interfacing machine to external devices, which allows for greater accessibility in designing integrated systems. However, RPi does not yet comprise the necessary scaffolding tools in interfacing and controlling the system. Consequently, users find it difficult to quickly and efficiently learn the concepts necessary to understand and work with computers.

Currently, there are several projects being undertaken for the development of such scaffolding tools. This assignment, proposed by Haven Consulting is a learning application tool that aims to inspire a new generation in acquiring knowledge in practical Computer Science. This project simulates a virtual lab environment like CECIL on RPi. CECIL is a simulation of a simplified microcontroller which is specially designed for education. It is an assembly language IDE, which allows the users to write, compile and run their own programs.

The main goals of this project are:

- User friendly interface:
  - facilitate teaching and learning of computer architecture, such as registers and microprocessors
  - encourage computational thinking for students at high school level
- CECIL-like compiler and simulator
- I/O ‘hooks’: Drivers to access to the physical I/O ports of the RPi
  - increase the level of interactivity and usability of the tool
  - offer future further development scope

The scope of this project involves software development, following an agile methodology, and does not include any practical electronic engineering tasks. The first three weeks will be allocated for background and technical research on the topic as well as regular communication with the client, David Argles, in order to achieve a clearer project execution plan. In addition, software design, implementation and testing stages will be applied accordingly. The design will be subdivided into two parts: backend and frontend (i.e. wireframes) designs. The testing will be subdivided into unit automated testing and integration testing. Furthermore, this assignment will make use of the Java programming language and the open-source repository GitHub.

Initial Gantt Chart

Tasks	Weeks												
	1	2	3	4	5	6	7	8	9	10	11	12	13
GDP Specification Creation													
GDP Specification Submission													
Research													
Backend Design													
Frontend Design													
Seminar 1 preparation													
Progress Seminar 1													
Implementation													
Unit Testing													
Integration Testing													
Seminar 2 preparation													
Progress Seminar 2													
Report Writing													
Final Presentation Preparation													
Report Submission													
Final Presentation													
Individual Reflection Report													

Table 1 – Initial Gantt Chart

Please note the following colour scheme for table 1:
Red – Submission dates
Blue – Project Execution