School of Electronics And Computer Science
ELEC6050 MEng Group Design Project

Project Specification And Plan

Title: Raspberry Pi control kit for teaching

Supervisor: Gary Wills (gbw)

Team Members: Shreeprabha Aggarwal (sa10g10@soton.ac.uk)
Cathy Jin (cj8g10@soton.ac.uk)
Karishma Nune (kkn1g10@soton.ac.uk)
Carolina Ferreira (cf4g09@soton.ac.uk)

Customer: David Argles (da@ecs.soton.ac.uk)
Kate Bittles, (outreach) IBM Hursley Executive Briefing Centre Manager

Project Specification:

In the year 2012, the Raspberry Pi Foundation developed a single-board computer with the intention of promoting the teaching and learning of Computer Science 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, customers find it difficult to quickly, efficiently and enjoyably learn the concepts necessary to understand and work with RPi.

Currently, there are several projects being undertaken for the development of such scaffolding tools. This assignment, proposed by Haven Consulting, constitutes the foundation for a smart-phone/tablet learning application to inspire a new generation in acquiring knowledge in Computer Science. This project simulates a virtual lab environment like CECIL, based in Java, on a 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.

In order to achieve the above purposed goal, this assignment will incorporate a user-friendly interface. This will facilitate both the teaching and learning of computer architecture, such as registers and microprocessors, as well as encourage computational thinking for students at high school level. In addition, as an extensible feature to this virtual lab, ‘hooks’ will be implemented to allow access to the physical I/O ports of RPi. This addition is expected to increase the level of interactivity and usability of the tool. Finally, if time doesn’t permit to achieve further goals, this project is to be extended upon by Haven Consulting.

The scope of this assignment will follow the agile methodology of software development. 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. This is due to the fact that none of the group members are familiar with the concepts of Raspberry Pi and CECIL. 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 subversion and storage facility 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