EE322: Embedded Systems Design - Project

Coin Sorter and Calculator

Project Progress Report 3

Date of submission : 20/08/2021
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Introduction

This report covers the progress of this project for the period from 30/07/2021 to 20/08/2021. During this period, the team was able to make significant progress on the simulation. The team took meetings to discuss the project and work on the required documents. Majority of the discussions were done via Google Meet while using Google Jamboard to collaboratively brainstorm and present ideas. GitHub was used to host and update assembly code.

Brief of past progress

Initially, a Google Jamboard and Google Drive folder were created to make collaboration and sharing of resources easier. After deciding on “Coin Sorter and Calculator” as the topic for the project, the mechanical components and the structure of the product were discussed. Experimental measurements of coin weights were taken to get an idea of input ranges. A PICkit 3 Microchip Programmer, a PIC16F84A microcontroller, a load cell for sensing input, and 0.47 mm steel sheet shaping for the body were purchased during this period. Furthermore, the UML class diagram, use case diagram and state diagram, and sequence diagrams were developed and submitted. Submission of the project proposal as well as the first and second progress reports was also done during this time. An experimental LED circuit was built to test the hardware implementation. A GitHub repository was created to collaboratively develop the assembly code and the simulation.

Progress for the period from 30/07/2021 to 20/08/2021

31/07/2021

An MPLAB X Project was created in order to interface the firmware with the upcoming hardware implementation. The main Assembly language source file was integrated into this project.

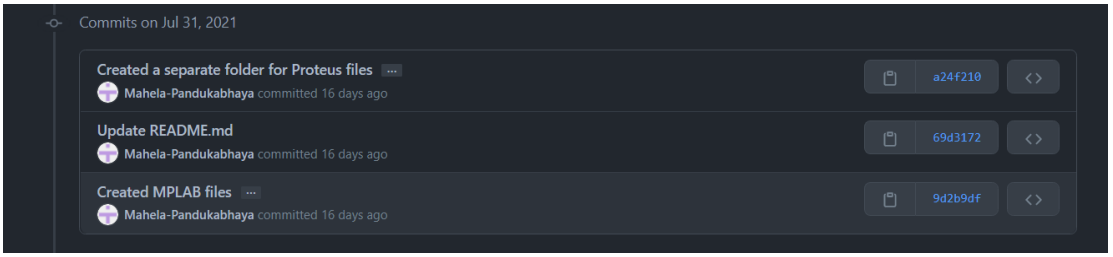

Figure 01: Commits made to the project repository on 31/07/2021

06/08/2021

Meeting 13: 2000h - 2145h

GitHub repository was updated with the support of interrupts and necessary code changes were discussed. It was discussed how the implementation of the sensor and interfacing of it onto the PIC. A brief discussion was held about the simulation of the sensor in Proteus simulation software.

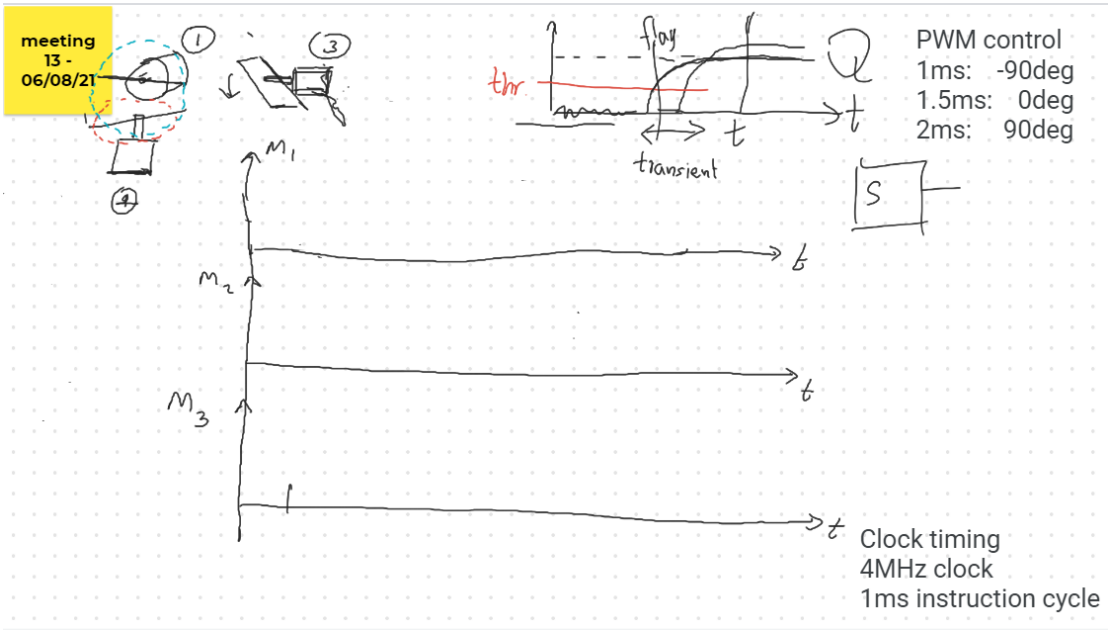

Figure 02: Jamboard session from Meeting 13

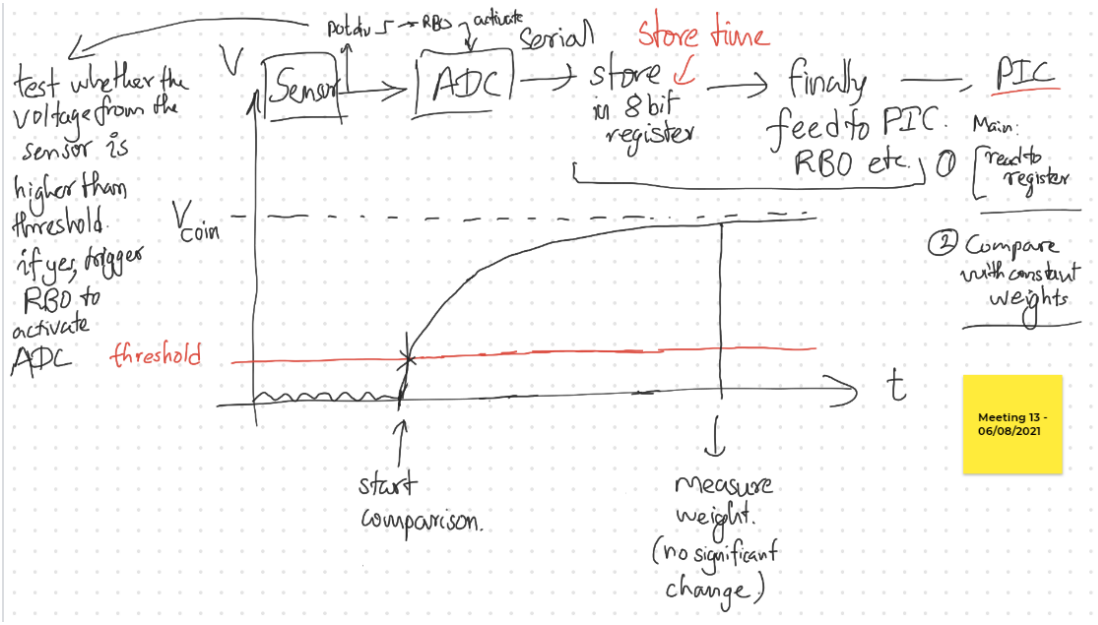

Figure 03: Jamboard session from Meeting 13 continued

07/08/2021

A simulation-based experiment was carried out to test the functionality of servo motors connected to PIC16F84A. The simulation was done in Proteus, and motor control logic was written using Assembly language. It was observed that the servo motors were working as expected as far as the simulation is concerned. The motor controller logic was uploaded to the GitHub repository, in order to be integrated to the main project.

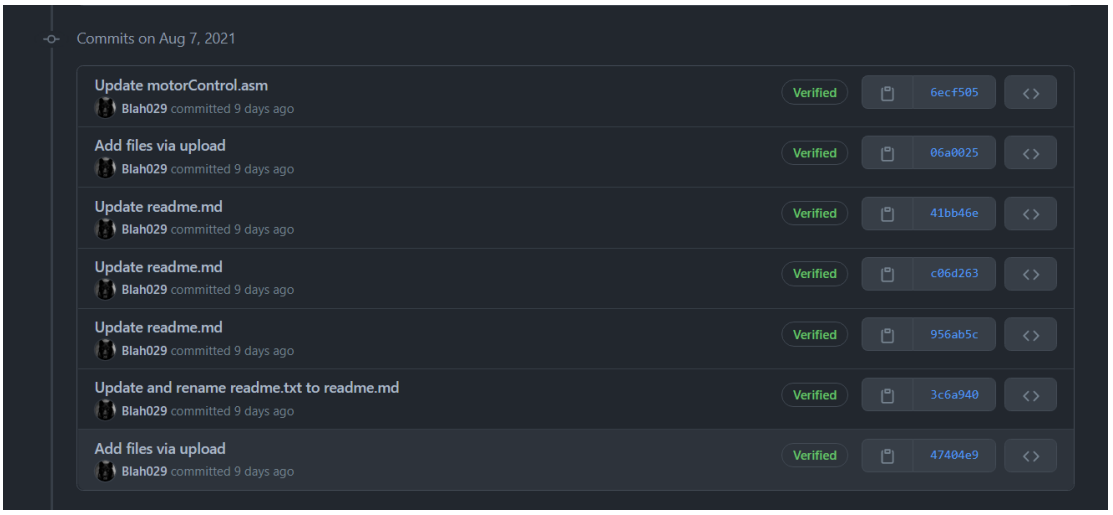

Figure 04: Commits made to the project repository on 07/08/2021

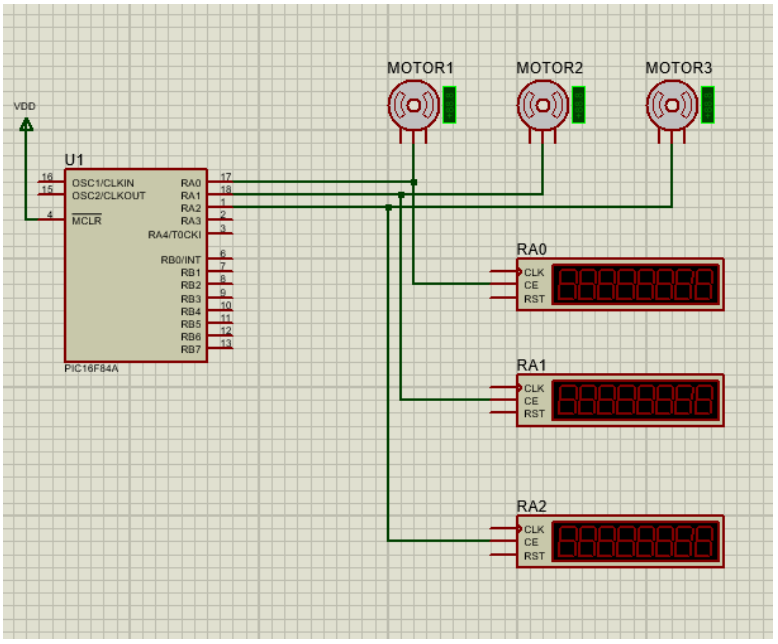

Figure 05: Motor control simulation

09/08/2021

Meeting 14: 2000h - 2100h

A discussion was held regarding the design of sensor input and ADC. The input system was proposed to be composed of an ADC and an external shift register. In addition, the possibility of directly interfacing the ADC with the PIC was discussed.

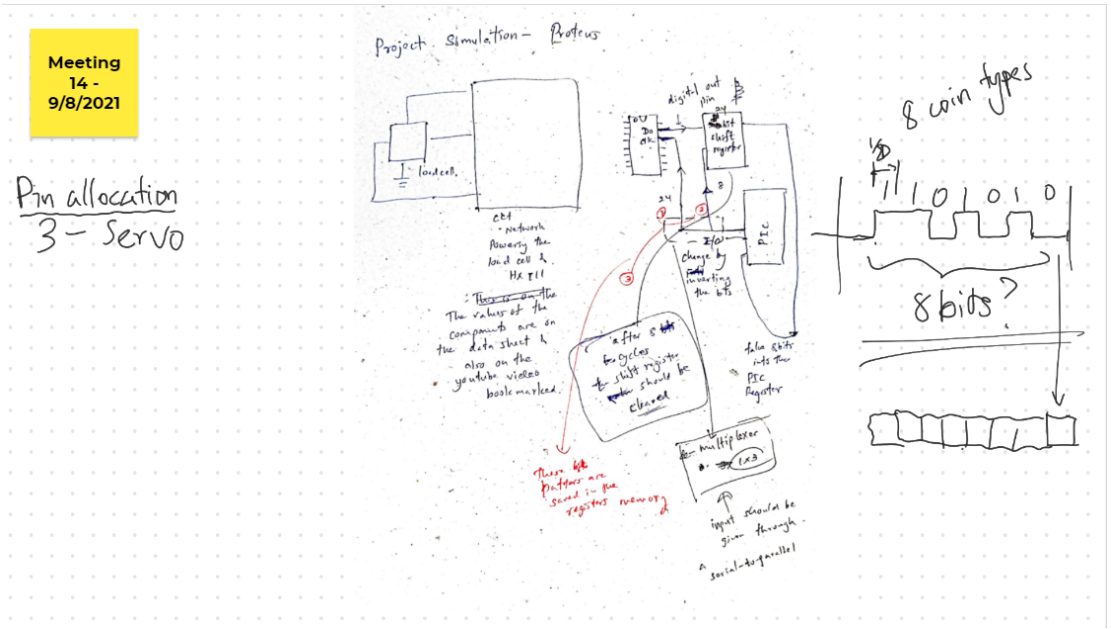

Figure 06: Jamboard session from Meeting 14

12/08/2021

An overall schematic for the simulation was drawn in Proteus simulation software.

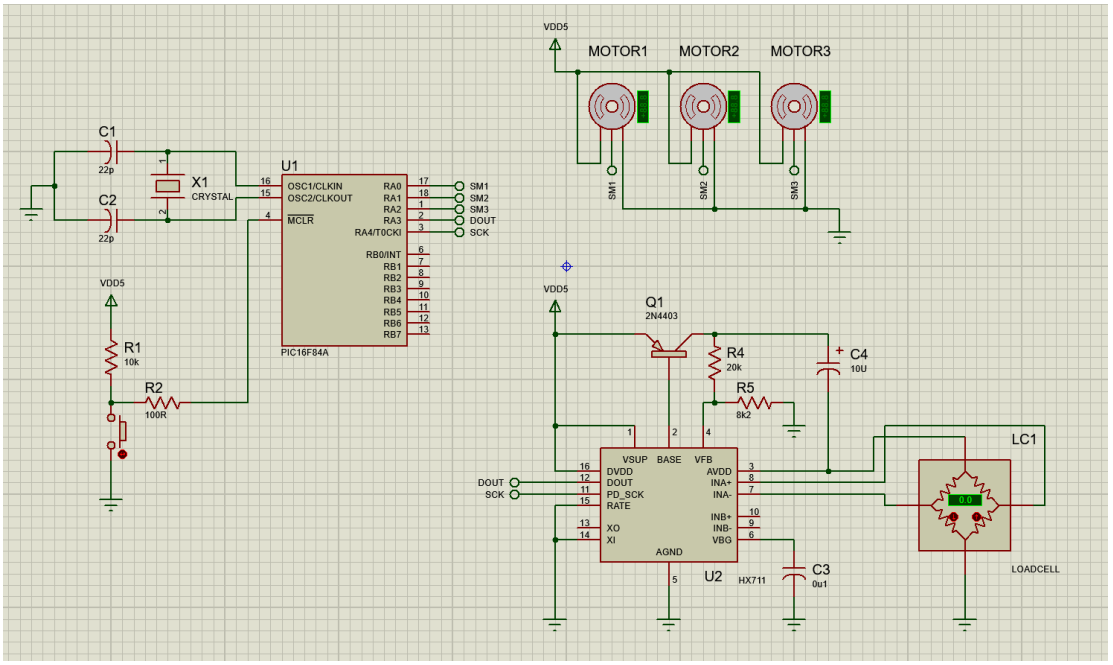

Figure 07: Overall circuit simulation

14/08/2021

After applying necessary modifications, the code segment corresponding to servo motor control was integrated into the main project.

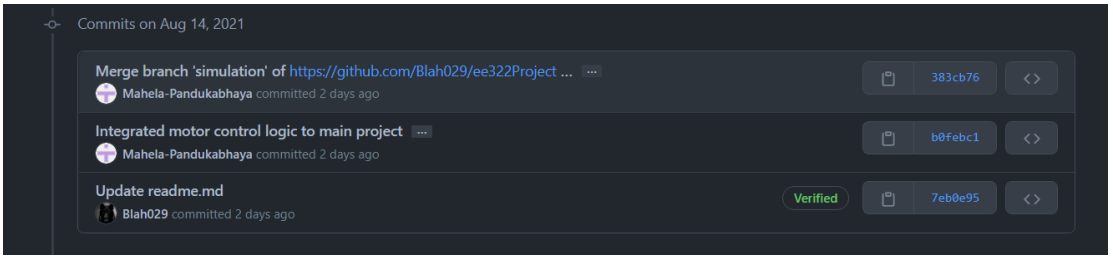

Figure 08: Commits made to the project repository on 14/08/2021

16/08/2021

Meeting 15: 1700h - 1930h

A discussion on sensor interfacing and servo motor control was held regarding. It was decided to interface the sensor directly to the PIC microcontroller instead of using an intermediate shift register. In addition, the preparation of the Project Progress Report 3 was commenced.

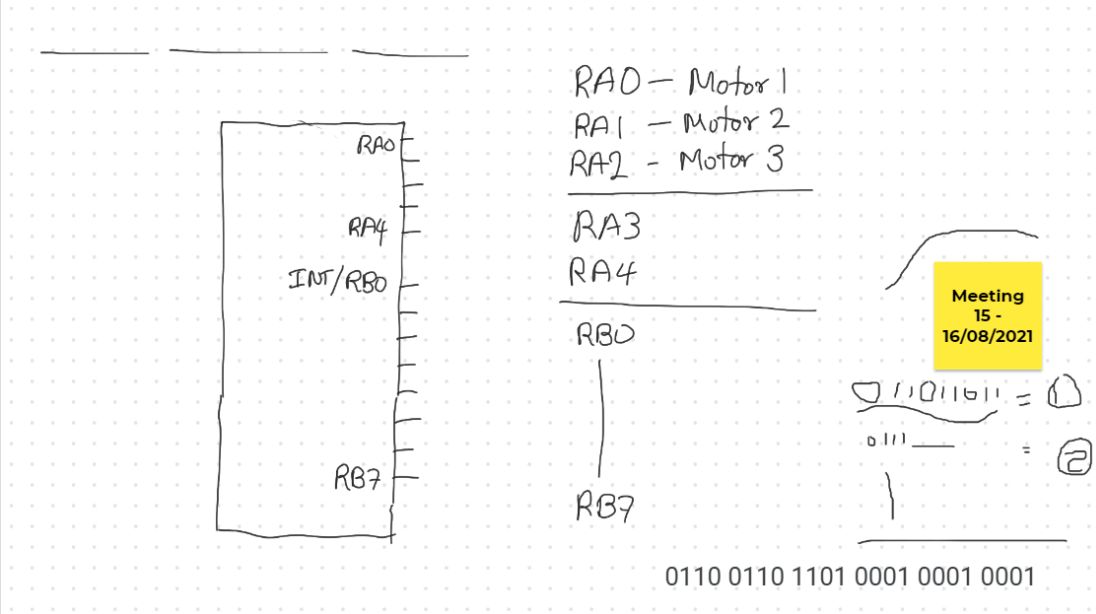

Figure 09: Jamboard session from meeting 15

20/08/2021

Meeting 16: 1700h - 1930h

Progress report was finalized and is planned to be submitted to FEeLS.

Cost Analysis

No purchases were made during the period from 30/07/2021 to 20/08/2021.

Timeline: Planned vs. Actual

A comparison between the planned execution time and the actual execution time of each task that was proposed in our project proposal is given in Table 02.

Table 01: Timeline: Planned vs. actual

	Activity	2021											
		June				July				August			
1.	Project start and submission of the proposal												
2.	Analysis and designing												
3.	Simulation												
4.	Hardware implementation												
5.	Report writing and project completion												

Planned execution time of the task as of the initial proposal

Actual execution time of the task due to delays etc.