SIT210

Embedded Systems Development

Learning Summary Report

Don Kushan Nilanga Athalage

219397418

Self-Assessment Details

The following checklists provide an overview of my self-assessment for this unit.

	Pass (D)	Credit (C)	Distinction (B)	High Distinction (A)
Self-Assessment				✓

Self-Assessment Statement

	Included
Learning Summary Report	✓
Pass tasks complete	✓

Minimum Pass Checklist

	Included
All Credit Tasks are Complete on OnTrack	✓

Minimum Credit Checklist (in addition to Pass Checklist)

	Included
Distinction tasks (other than Custom Program) are Complete	✓
Custom program meets Distinction criteria	✓

Minimum Distinction Checklist (in addition to Credit Checklist)

	Included
Something Awesome included	✓
Custom project meets HD requirements	✓

Minimum High Distinction Checklist (in addition to Distinction Checklist)

Declaration

I declare that this portfolio is my individual work. I have not copied from any other student's work or from any other source except where due acknowledgment is made explicitly in the text, nor has any part of this submission been written for me by another person.

Signature: **Don**

Portfolio Overview

This portfolio includes work that demonstrates that I have achieve all Unit Learning Outcomes for SIT210 Unit Title to a **High Distinction** level.
During the study of this unit, I have completed all the tasks including all pass, credit, distinction, and high distinction tasks. I have shown the knowledge I have gained through unit resources and beyond what's taught.

I have shown the good understanding of developing software for controlling Embedded Systems by demonstrating my knowledge in developing C++ software for particle argon an utilize the devices potential by use of PWM, BLE (Bluetooth Low Energy), i2c communication and using sensors. Furthermore, I have demonstrated my knowledge in end-to-end application development by the final project by use of cloud deployable dashboard for embedded system.

Majority of the tasks I have attempted in this unit, I have put careful thought of maintaining robustness of the system, fault tolerance and responsiveness. This has especially been the case of the final project to maintain the end-to-end solution fault free.

I believe the work I have presented is up to HD standard and the evidence I am providing in this portfolio document justifies that.

Reflection

The most important things I learnt:

I have learnt several important concepts that has helped me navigate this unit,

Overall Embedded System Design,

This unit has motivated me to learn embedded system development to a deeper level. I was able to gain knowledge about communication protocols, deeper understanding of sense think, act paradigm, and system design knowledge are some of the important theoretical knowledge I have gained from the system.

PCB Design,

The tasks in this unit motivated me to learn more about PCB design for my embedded systems project. Although I was not able to use a PCB design for my final project, I implemented the system using Proto Board and used the schematics I used for the PCB task. I was able to gain a lot of practical knowledge of soldering and wiring.

The things that helped me most were:

Unit resource,

The unit resources helped me a lot when attempting the tasks. It guided me in the right direction and allowed me to gain a great deal of theoretical and practical knowledge.

Documentation,

Although I was bit skeptical of the Particle IO, I quickly understood why it is a great platform for learning and building. The documentation was very thorough and simple. The board is very robust. The tooling available for development is exceptional. I really enjoyed using particle devices towards the end of the unit and utilized some of the cool features in my final project as well.

I found the following topics particularly challenging:

I found the PCB design and digital communication quite challenging,

PCB Design,

I had a bit of challenging experience while learning PCB design. I had a goal to implement a working PCB for final project. However due to my gaps in knowledge and time constraints I was not able to complete the circuitry as a PCB for the final project. I had to refer to multiple online material to grasp concepts of PCB design.

Digital Communication,

Although there are multiple libraries that simplified the process of digital communication via I2C, my attempts on using Wire.h library for digital communication were rather challenging. I believe the knowledge required for I2C communication via Wire library is scattered and the skills to find and utilizes them effectively is necessary.

I found the following topics particularly interesting:

During my search for wireless and power efficient communication method I came across BLE which is an interesting trend in embedded system development. Recently, our house was fitted with a wireless power monitoring system called PowerPal which allowed us to monitor usage of the power usage wirelessly. It used BLE which advertises the power usage and allowed us to view it within the house. I was intrigued by the technology and used it in my final project.

I feel I learnt these topics, concepts, and/or tools really well:

I believe I learnt developing embedded systems software well. I really enjoyed reading through Particle's extended documentation website and implementing software for tasks in this unit. Prototyping circuits using particle devices was fast due to user friendly design and extensive documentation. I learnt the concepts of connecting sensors properly, logic levels, digital communication well as I have demonstrated them in the tasks.

I still need to work on the following areas:

I believe I need to improve a lot in time management. I had difficulty maintaining the required standards in certain tasks due to constraints in time along with 3 other units. Although I have provided necessary requirements for HD grade, I believe I could do better and provide more impressive results had I been managing my time properly.

I am lacking in research skills necessary finding gaps in research literature to find solutions for gaps in research. Although my intentions were to work on a research problem, I still yet to improve my knowledge and skills to proper problem solving.

My progress in this unit was …:

I have maintained a good progression in unit tasks while gaining the required tasks. I have demonstrated my experience align with the unit learning outcomes.
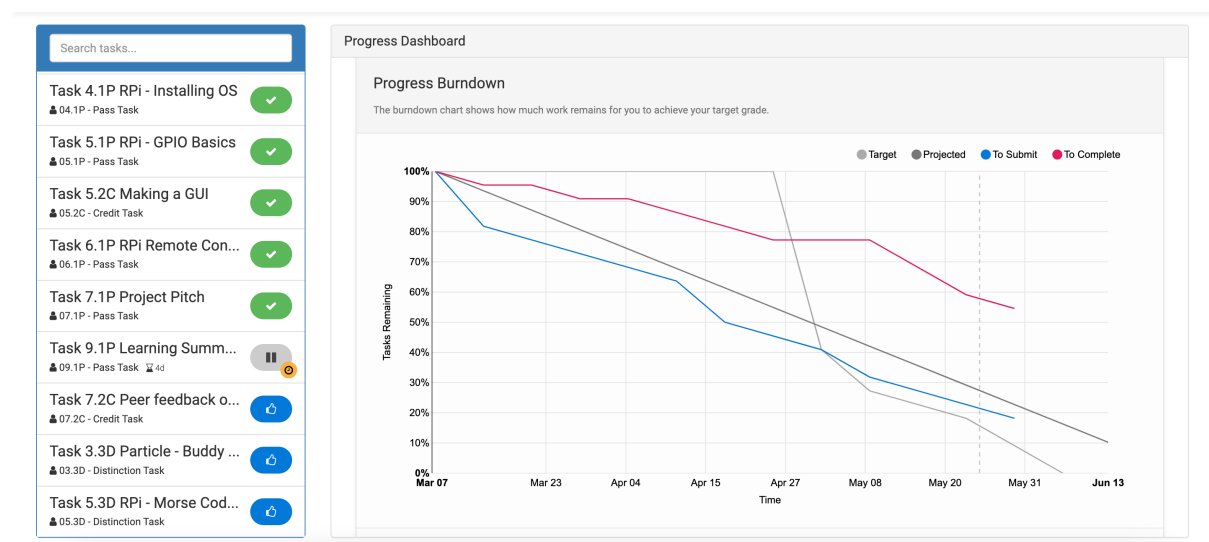
This unit will help me in the future:

This unit will help me immensely to showcase my knowledge in embedded system design while applying for graduate roles. Furthermore, this unit laid a good foundation for me to build up on my experience and improve my knowledge in embedded system design for future project.

If I did this unit again I would do the following things differently:

I would manage my time better to provide a well-designed final project. I believe my final project could be improved greatly by providing more development. I have implemented the basic structure of the prototype, however there is a long way in terms of software development.