A reflection of my role in the group project and application of systems engineering practice

Table of Contents

1579 words excluding the title, references, diagrams, and appendices

Personal contribution to the team project

With the semester 1 group project I think I worked through all the tasks set for me and met the deadline given for each task. I worked on the project risks and issues for the team and the stakeholder analysis. [1] With the semester 2 group project I worked through Risks and Issues with a fellow team member and did my research on robotic arms, line following robots and roller coasters in depth for comparison for the best solution. I contributed with the team problem statement by putting out my own opinion on the problem and analysing my group's opinion on the problem paralleled with mine. I also contributed with the high-level design and record of building activities while working on my subsystems. I worked on one of my team member's system due to her illness after finishing up all the tasks I was given and managed to complete that well within the deadline.

With my research on technologies, I looked at all the important details so we have enough information to make a good choice on which would be the best solution. Some of the topics I looked at for roller coasters was how it works, how the cart is connected to the track and how the tracks are affected by the environment, and advantages and disadvantages of using the roller coaster. Some of the topics I looked at with Line following robots were how it stays in the line, how it works with and without micro controllers and pros and cons of the line following robots. Finally with robot arms I looked at the pros and cons and the applications of the arms. All these combined with research done by other team members helped us pick a solution for the problem given to us.

I also did the research on a specific part of the final part solution, I had to look into how the carriage of the monorail was going to be designed and the seating style inside it and the materials used for the carriage and how it would affect the environment. With the high-level design I worked on a solar energy system which could be used in our solution to reduce cost and integrate with the smart campus. I designed flow charts on how it works and carried out experiments on how much sunlight will be needed and in which part of the year and station it would be most effective.

The solar energy system consists of a solar cell connected to a bread board which has an Arduino and LED connected to it. Since the UK doesn't have a lot of sunlight, I had to work with the system around mid-day and collecting data during a certain interval during that time. Then I used the day and calculated the energy and power it would produce if used in a large scale and plan how it could be used in our solution and if it does go wrong, we have the power from grid as our backup

Personally, I feel like I bonded with the group more as the year went by and managed to engage myself with more work during semester 2 than semester 1. [2]
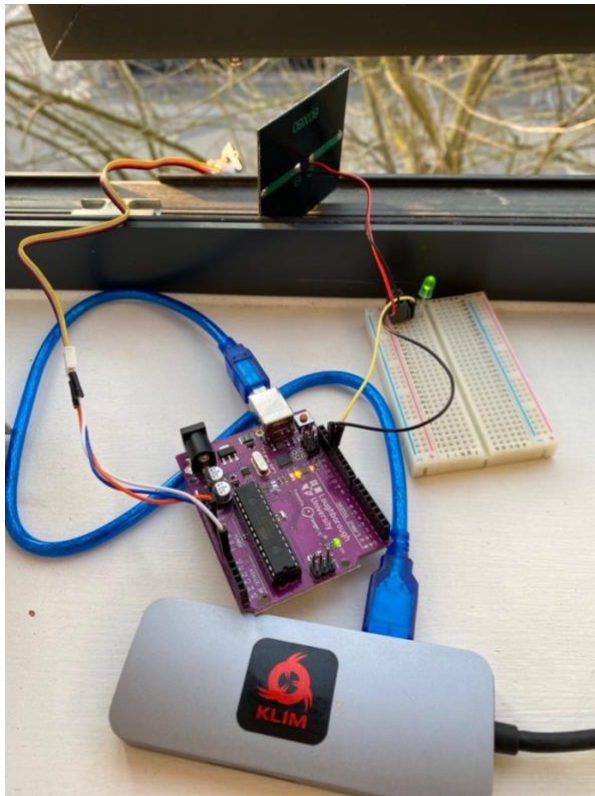
Calculations

⇒ Reading on 24/03/22 at 5:14:07 pm

Intensity of light = 764 lux
Resistance = 3.39 Ω

⇒ Reading on 24/03/22 at 5:35:53 pm

Intensity of light = 752 lux
Resistance = 3.60 Ω

1 solar cell produces 0.5 volts to 0.6 volts
1.0 watts to 1.5 watts

⇒ According to my research loughborough reciever approximately

0.5 kWh from Dec 26 – 19 Feb
1.7 kWh from 20 Feb – 30 June
6.2 kWh from 1 Jul – 187 Aug
5.1 kWh from 18 Aug – 24 Oct
1.7 kWh from 25 Oct – 25 Dec

48 cell panels ⇒ small residential roofs
60 cell panels ⇒ standard size
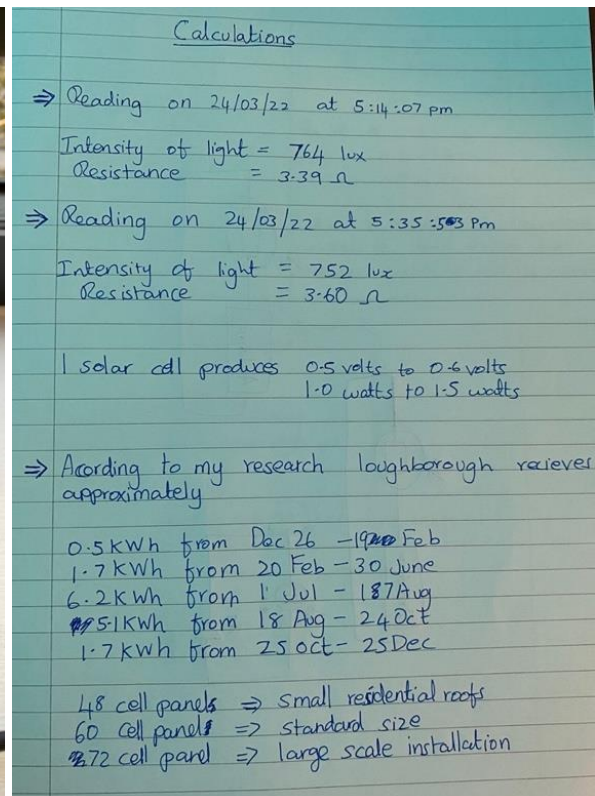72 cell panel ⇒ large scale installation

Figure 1

Figure 2

Engineering and Management Methods used

For our systems engineering approach we took the SI:D^3 field-proven approach by WSP. We tried to follow the main engineering management method in the centre of SI:D^3, collaboration and communication. [3]We had a meeting every week, in-person or teams depending on whether everyone was in university or not and tried to make sure everyone was doing well with the tasks assigned and making sure it wasn't too much for them. We also made sure none of our team members were stuck on the task given and helped them out if they were having problems in any part of the task assigned to them, occasionally switching their tasks so that they are comfortable with it. We also worked closely with our stakeholders and took a lot of what they said into account for this project. Upon having a casual conversation with one of our stakeholders (Operational manager) we identified that transportation of goods in campus is done with a higher standard than the transportation of people around campus. Therefore, we decided to work on transportation of people and spoke to lots of other stakeholders (Students and lecturers) about the situation and asked them about it to identify what the problem was exactly. Once we identified the problem, we looked at different ways of why the problem was being caused and using techniques like mind maps and 5 whys we started creating our solution and making sure it integrates with the smart campus.
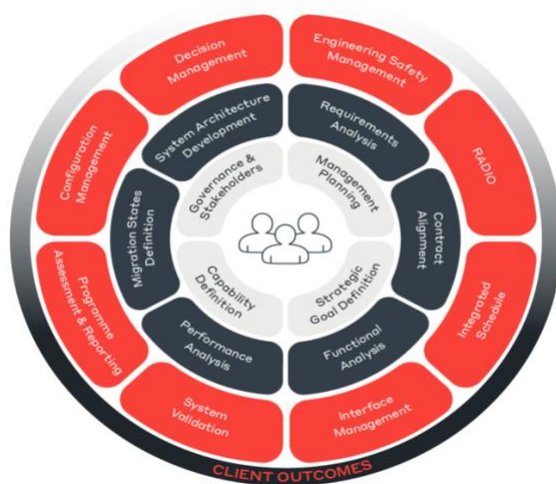
Figure 3

Analysis of team performance

I think our team worked pretty well this semester, we bonded well together over the year and managed to get a lot more work done in a shorter period of time. We didn't manage our time too well in our first group project which led to us doing less things than we wanted to. Tasks were assigned to each of us by the project manager and vice project manager and most of us managed to meet the deadlines. Even though we had some problems with team members getting sick and not being able to handle the work stress, the team members that were done with the tasks assigned to them spent extra time on the project finishing up the work that wasn't completed. The team could have improved if they communicated with each other a bit early instead of trying to finish the work and not managing to finish it a few days before the deadline. We should have tried to meet all the internal deadlines, even though it wasn't a huge problem, it was the only problem that was very likely to happen. If we managed to meet all the internal deadlines, we could have gotten more work done and made sure none of our work had errors.

Analysis of personal performance

During the course of this year, I have learnt that I'm better with working with circuits more than the programming of the system. However, I have gotten better at working with Arduinos and coding them to work with the sensors. The project I worked on in both the semesters involved the use of Arduinos and coding them according to the task in hand. I have learnt how to code an Arduino this year and making code in python. I learnt that I was more interested in playing with the electronical parts than the software designing part in both the group projects. I plan to continue growing my passion for working with circuits and also improve my knowledge with programming so I can work in any area for a project if required. I also learnt a lot about working in a group in a professional standard and making sure the work is done at the end of the day. The personal best was really helpful, especially in the beginning where no one knew each other the collaborative working, and workplace skills really helped each other learn about one another and work together as a team. I had

to reflect on my project from semester 1 using research and critical thinking. One of the main problems I had was not being able to cite sources properly, so I made sure all my work cited to a good accuracy and my research also had more depth than my research in the semester 1 project. The goal setting and planning helped with most of the internal deadlines set for the project, but it can still be improved because I did miss a few of the internal deadlines set for me. The physical wellbeing helped me to get out and relax and do some sports even though the wiki was putting a lot of pressure on us. The community engagement and culture and creativity helped me with joining societies in university and experiencing different cultures and helping out people in different societies. Using the digital citizenship, I have created my LinkedIn profile and I'm working towards polishing up my profile. I also managed to reduce the time I spend in social media and trying to get more work done during the day instead of spending time and getting distracted in social media. Using Digital fluency, I managed to connect with other people in LinkedIn and learn more about my course and growing my interest in control engineering.

Industrial Context

The industry lectures taught me about how to be organized during an important project which you'll be working with others on. Keeping a tab of all my work on a logbook helps me reflect on where I started and where I have reached now. Since I started using a logbook, I have been able to look back and make changes to my system according to what I have learnt from the past and from the group project lectures. As a professional engineer I think the group project really helped me with how I must approach the task given to me. It has taught me how to start and how to finish a project off in a professional way and up to a good standard.

Conclusions

In conclusion this project has helped me with a lot of things, one of the main things being working with a team under pressure. For the future projects I should be able to correct my minor errors that I have made in my current project so that I would be a good asset to my future group and finish the project to perfection.

References

[1] R. 7, "project 1 wiki," 2022. [Online]. Available:

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[2] R. 7, "Project 2 wiki," 2022. [Online]. Available:

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