



Department of Electronic & Telecommunication
Engineering,
University of Moratuwa, Sri Lanka.

Expectations of Group Formation Report

Submitted By:
210031H Amarasinghe A.A.W.L.R. Group B

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1 Introduction

This report focuses on collaborative efforts within our group aimed at achieving our goals through effective teamwork. It is organized according to the learning outcomes of the EDR course module, highlighting the diverse ways in which collaboration enhances our ability to succeed.

2 Achieving Individual Course Outcomes

2.1 Identifying a Suitable Design Model

- Our team's objective is to design a **3D mapping device** capable of providing detailed spatial information for object tracking in various environments and applications.
- Other group is designing an **Industrial Robot End Effector**. It is essential for robotic systems to handle, manipulate, and sense objects

By collaborating, we can integrate various design models to ensure our device meets the requirements for accurate and efficient object tracking while the end effector also meets the requirements. We can provide mapping data we get as input to the end effector.

2.2 Designing Testable PCBs Complying with Industry Standards

Both of our groups have individuals who are skilled at designing PCBs. By collaborating as a larger group, we can:

- **Exchange of Ideas and Expertise:** The teams can come together to share their expertise and brainstorm ideas on how to design PCBs that comply with industry standards and are highly testable. The team working on the 3D mapping device can provide insights into the specific requirements and challenges related to their system, while the group designing the end effector can offer their understanding of PCB design principles and best practices.
- **Joint Design Reviews and Feedback Sessions:** Organizing joint design reviews and feedback sessions allows both teams to review each other's PCB designs and provide constructive feedback. This collaborative approach enables the identification of potential issues early in the design process and facilitates the exchange of ideas for optimizing the testability of the PCBs.

The collaboration of two groups allows us to share expertise in PCB design to ensure the device's PCBs meet industry standards. We can achieve the learning outcomes of the course more efficiently by this method.

2.3 Explaining Testing Methodologies

By collaborating as a larger group, we can

- **Use similar testing methodologies for certain tasks:** we recognize the importance of employing consistent and effective testing methodologies, particularly for tasks such as distance measuring using Time-of-Flight (TOF) sensors, which require precise measurement accuracy. By sharing our knowledge and experience, we can ensure that our testing approaches yield exact distance values and meet the stringent requirements of our products.
- **Design tests aligned with user requirements:** This ensures the device performs optimally under various scenarios. By collaboratively defining user requirements and specifications, we can tailor our testing methodologies to match them. For example, we can standardize testing procedures for the 3D mapping device, encompassing accuracy, reliability, and environmental factors. This ensures that our products meet user expectations and perform reliably across different usage scenarios.

- **Scenario-Based Testing:** Collaboratively developing scenario-based testing approaches enables us to simulate real-world usage scenarios and identify potential points of failure. By brainstorming and defining various usage scenarios, such as different environmental conditions, user behaviors, or edge cases, we can design tests to evaluate how our products perform under these conditions. This proactive approach to testing allows us to uncover potential issues early in the development process and implement necessary improvements to mitigate risks.

By collaborating in these ways, we can improve the quality and functionality of our products, and ensure that they meet the user requirements and expectations. We can also learn from each other and enhance our skills and knowledge in testing methodologies

2.4 Designing Product Enclosures Complying with Standards

By collaborating as a larger group, we would be able to achieve the following with regard to documentation:

- **Pooling of Past Experiences:** By bringing together individuals with diverse backgrounds and past experiences in designing enclosures for various projects, we have a wealth of knowledge to draw upon. Through collaborative discussions and knowledge sharing, we can leverage the lessons learned from past projects to inform our current design efforts.
- **Sharing Ideas for Compliance with Industry Standards:** Designing enclosures that comply with industry standards is paramount to ensuring product safety, reliability, and interoperability. By collaborating as a larger group, we can share ideas and insights on how to align our enclosure designs with relevant industry standards and regulations.

2.5 Preparing Proper Documentation

As a larger group, we would be able to achieve the following about designing enclosures

- **Comprehensive Documentation:** Collaboration allows us to pool together a range of expertise, including mechanical engineering, electrical engineering, and industrial design. With input from various team members, we can produce comprehensive documentation covering all aspects of the enclosure design, including structural integrity, thermal management, ingress protection, and aesthetics.
- **Integration of Different Perspectives:** Each team member brings a unique perspective to the table, contributing valuable insights that ensure the documentation addresses all relevant considerations. By integrating different viewpoints, we can develop a holistic understanding of the enclosure design requirements and capture them effectively in the documentation.

2.6 Applying Knowledge to Commercial Design

Some possible points on how this can be achieved better by working as a group are:

- **Leveraging Diverse Skillsets:** In a group setting, each member can contribute their unique skills and expertise to different aspects of the project. For example, individuals with experience in mechanical engineering can focus on the physical design and structural integrity of the prototype. By leveraging diverse skillsets, the group can ensure that all aspects of the design are addressed effectively.
- **Effective Problem-Solving:** When faced with challenges or technical obstacles during the design process, collaborating as a group allows for more effective problem-solving. Group members can brainstorm solutions together, drawing on their collective knowledge and experience to identify innovative approaches. This collaborative approach can lead to prevent project delays.

3 Conclusion

In conclusion, collaboration within our group is essential for the successful development of the 3D mapping device and industrial end effector. By combining our expertise and working together, we enhance our ability to achieve the goals of the EDR course effectively.