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Instructions for Completing Your Lab Report

**Getting Started**

Make a Duplicate of This Document: Before you begin working on your lab report, make sure to create a duplicate of this Google Doc. This ensures you have your own version to edit and customize for your submission.

**Update the Table of Contents**

After you have completed your report, remember to update the Table of Contents. This can be done by clicking on the Table of Contents and then selecting the refresh/update option to reflect the headings and page numbers accurately.

**Writing Your Report**

Your lab report is structured into several key sections, each designed to guide you through documenting different aspects of your project. Below is what you need to do for each section:

* Introduction
* System Design and Implementation
* Code Structure
* Discussion
* Suggestions
* Conclusions
* References
* Appendices:

**Completing Your Report**

As you complete each section, refer to the provided sample text to guide your writing and ensure you cover all required elements.

Make sure your report is coherent, well-organized, and free of spelling or grammatical errors.

Update the Table of Contents once your report is finalized to ensure it accurately reflects the sections and page numbers.

Lab (#) Report

Authors:

[Name, Student ID#]

[Name, Student ID#]

Date:

Course Quarter Year

[**Introduction 3**](#_gu83ujk97jiq)

[**System Design and Implementation 3**](#_a3fv8019ni8m)

[**Code Structure 3**](#_fje8d61nwge2)

[**Discussion 4**](#_g90esrtioymo)

[**Division of Work 4**](#_87d5sh7vo6nc)

[**Suggestions 4**](#_nb4c982951fc)

[**Conclusions 5**](#_j3481tnk1z2a)

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[Total Number of hours Spent 6](#_anqyq0nhdrqa)

# Introduction

In this section, you should discuss the main programming challenges you aim to solve through your project. Articulate the problems in a way that highlights their complexity and relevance to real-world applications or theoretical concepts. Additionally, clearly state the learning objectives, detailing what skills or knowledge you expect to gain upon completing the assignment.

Sample Text:

"The primary programming challenges I address in this project revolve around implementing a Synchronized Round Robin with Interrupt Service Routine (SRRI) Scheduler on an Arduino platform. This involves mastering task synchronization, efficient interrupt handling, and minimizing the latency in task switching. My learning objectives include …"

# System Design and Implementation

You should describe the design and implementation of your system. Explain your approach, the rationale behind your design decisions, and how these decisions help solve the programming challenges identified.

Sample Text:

"My system design focuses on achieving efficient task management through a SRRI scheduler. The implementation began with configuring a hardware timer on the Arduino to generate periodic interrupts, establishing a foundation for synchronized task execution. Each task is designed to perform a specific function, such as flashing an LED, and is managed by a state machine that transitions between READY, RUNNING, and SLEEPING states based on system timing and task requirements…”

# Code Structure

You should give an overview of how you have structured your code, including the main modules and their roles. This section aims to provide clarity on the organization of your project and how each component contributes to the overall functionality.

Sample Text:

"My code is structured around several key modules to streamline the implementation of the SRRI scheduler. The main modules include the Timer Configuration module, which sets up the hardware timer and interrupt service routine; the Task Management module, responsible for defining and scheduling tasks; and the State Management module, which handles the state transitions of tasks. For example, the Task Management module contains function pointers to different tasks (e.g., LED flashing tasks) and manages their execution based on the current state. This structure not only organizes the code logically but also enhances maintainability and scalability…"

# Discussion

Talk about the challenges (technical difficulties), weird bugs, etc. you faced during the implementation and how you dealt with those challenges. Additionally, you should explain the division of work amongst the team members, detailing how tasks were allocated and how collaboration was managed to achieve the project goals. In this section also be sure to answer any questions highlighted in the lab instructions.

Sample Text:

"In facing challenges like hardware interrupt timing, our team divided tasks to enhance efficiency: one member focused on timer optimization, another on refining interrupts, leading to improved task synchronization. Our collaborative effort extended to code structuring, with each member responsible for different modules, ensuring coherent integration. This project underscored the value of clear communication and leveraging diverse skills, resulting in a more effective solution and highlighting the synergy of our team's problem-solving approaches…"

# Division of Work

This section specifies each team member's contributions and the percentage of work they completed. This clarity ensures all contributions are acknowledged.

Sample Text:

"John was responsible for sections 1.1, 1.2, and 1.3 of the Timer Configuration module, contributing 40% to the project. Jane handled sections 2.1 and 2.2 of the Task Management module, accounting for 40% of the work. Both members collaboratively developed the final report, which constituted 20% of the project. This division of labor optimized our strengths and efficiency."

# Suggestions

In this section, offer recommendations for improving both the project itself and how this assignment could be enhanced for future iterations. These suggestions may stem from the challenges you encountered, limitations within the current project scope, or ideas inspired by your work and feedback on the educational aspects of the assignment.

Sample Text:

"For the project, integrating dynamic priority scheduling could greatly enhance the system's adaptability and response to real-time requirements. Additionally, applying power management strategies would benefit energy efficiency, particularly for battery-operated IoT devices. These technical improvements could make the scheduler more robust and versatile for a broader range of applications…”

# Conclusions

Summarize the key outcomes of your project, emphasizing the achievements and how the project met (or exceeded) the initial objectives. Reflect on the learning experience and the project's contribution to your understanding of the subject matter.

Sample Text:

"This project successfully implemented a SRRI Scheduler on an Arduino platform, demonstrating efficient task management and synchronization using hardware interrupts. Achieving this objective has significantly enhanced my understanding of real-time operating systems and embedded systems programming. The experience has been invaluable, providing practical skills in system design, code optimization, and debugging that will be beneficial in future projects."

# References

List all the resources you referenced or consulted during your project, following a consistent citation style (IEEE preferred). Include books, journal articles, websites (ChatGPT), and any other pertinent information.

Sample Text:

Arduino. "Timer Interrupts on Arduino." Arduino Official Documentation, 2022. https://www.arduino.cc.

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# Appendices

## Total Number of hours Spent

Specify the total number of hours spent (both students combined)