NeoPixel Sunrise Clock

An intelligent bed lamp

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Declaration

1. I know that plagiarism is wrong. Plagiarism is to use another's work and pretend that it is one's own.
2. I have used the IEEE convention for citation and referencing. Each contribution to, and quotation in, this report from the work(s) of other people has been attributed, and has been cited and referenced.
3. This report is my own work.
4. I have not allowed, and will not allow, anyone to copy my work with the intention of passing it off as their own work or part thereof.

Signature: .....
Othniel Konan

Date: .....

Acknowledgments

Abstract

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Chapter 1

Introduction

1.1 Background to the study

The human behavioural and anatomical activities are influenced by several internal cycles. One of these cycles, the **circadian rhythm** has been studies for more than **xx** years and its impacts on the human activity has lead to new interests in regulating these activities. Formally defined as a *"cyclical changes in hormones, body temperature, and other biological processes obver the course of a 24 hour period"* [cite GE, definition], the **Natural Institute of Health** defines it as *"a physical, mental and behavioural changes that follow a roughly 24-hour cycle, reponding primarily to light and darkness in an organism's environment"*

The impact of light is mostly observed in our daily activities which required identification of object throught vision. This has led to human being more activity during the day (presence of natural light) and not active (sleeping) during the night (absence of light). This behavioural relation between the human activities and light is due to the our anatomical structure. Researchs have shown that the human phisiological activities are regulated by internal clocks with one of them named the *circadian rhythm* being affected by the presence of light.

With the recent advance in LED technologies, researches have shown that there is a corolation between the usage of LED technologies at night and sleep deficiency. Blueish light is said to have an huge impact on one of the human internal clock. Sleep deficiency due to inapropriate light exposure and patients with this problem have been cured using

an optimal light exposure.
This study has shown that there is a way to improve the human sleep via light exposure.

1.2 Objectives of this study

1.2.1 Problems to be investigated

Description of the main questions to be investigated in this study.

1.2.2 Purpose of the study

Give the significance of investigating these problems. It must be obvious why you are doing this study and why it is relevant.

1.3 Scope and Limitations

The scope of this project involve the design of an functional embedded system named **NeoPixels Sunrise Clock** aslo known as **NPSC**, capable of producing light of $460nm$ **with an intensity of 30 lux** as mentioned by the paper ***"Action Spectrum for Melatonin Regulation in Humans: Evidence for a Novel Circadian Photoreceptor"***.
The code and design artefact repository and a full documentation including a user manual, for anybody who wants to make use of the code design resources, also need to the delivered. Moreover, a descripion of future use of the device in the study of the effect of light on the circadian rhythm will be required.
This project does not study the effect of light on the users. For ethical reasons, the **NPSC** will not be tested on human subjects in real situations of either waking humans or including lighting to facilitate sleep at night. Instead the system will be tested based on the recommendation from the research literature.
The design and creation of the **NPSC** is subject to several constraints listed below:

- **Time:** The project has a duration of 12 weeks within which the research, design, development, implementation, verification, and report writing need to be done.

- **Money:** The project is allocated a budget of **R1000**
- **Light:**
- **Size:**

1.4 Plan of development

Here you tell the reader how your report has been organised and what is included in each chapter.

I recommend that you write this section last. You can then tailor it to your report.

Chapter 2

Literature Review

Once upon a time engineers and researchers believed... In this area of research, they used the following methods... [2]

Write this section first as it will take you the longest. I suggest you start writing this as soon as you have done your initial research at the beginning of your project. You can then return to it once you have completed your work to edit and adjust it.

A literature review forms the theoretical basis of your project. You need to read a large number of journal papers, sections in books, technical reports etc. relevant to your work at the start of project. This will give you a good idea of the field of research.

When writing your review start of with the general concepts and move to the more specific aspects explaining the necessary theory as you go. This section is NOT a copy and paste from others work or a rewrite-but-change-one-word section. I suggest you read all your material, and then put it down and write this section, referring back to the work only when you need to check something.

See your PCS textbook for more details on how to write a literature review.

If you include a figure or a table in your text please see the example in Fig. 2.1 as to how to caption it. Please make sure that all text in your figures is readable and that you reference your figures if they are from another source.

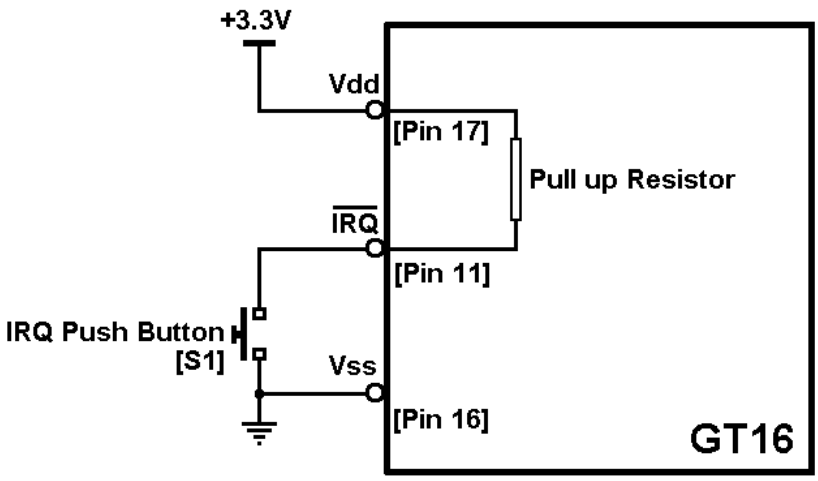

Figure 2.1: A block diagram illustrating the connections to the IRQ pin on the MCS08GT16A microcontroller (Please note that your headings should be short descriptions of what is in the diagram not simply the figure title)

Chapter 3

Methodology

This is what I did to test and confirm my hypothesis.

You may want to split this chapter into sub chapters depending on your design. I suggest you change the title to something more specific to your project.

This is where you describe your design process in detail, from component/device selection to actual design implementation, to how you tested your system. Remember detail is important in technical writing. Do not just write I used a computer give the computer specifications or the oscilloscopes part number. Describe the system in enough detail so that someone else can replicate your design as well as your testing methodology.

If you use or design code for your system, represent it as flow diagrams in text.

Chapter 4

Results

These are the results I found from my investigation.

Present your results in a suitable format using tables and graphs where necessary. Remember to refer to them in text and caption them properly.

4.1 Simulation Results

4.2 Experimental Results

Chapter 5

Discussion

Here is what the results mean and how they tie to existing literature...

Discuss the relevance of your results and how they fit into the theoretical work you described in your literature review.

Chapter 6

Conclusions

These are the conclusions from the investivation and how the investigation changes things in this field or contributes to current knowledge...

Draw suitable and intelligent conclusions from your results and subsequent discussion.

Chapter 7

Recommendations

Make sensible recommendations for further work.

Use the IEEE numbered reference style for referencing your work as shown in your thesis guidelines. Please remember that the majority of your referenced work should be from journal articles, technical reports and books not online sources such as Wikipedia.

Bibliography

[1] M. S. Tsoeu and M. Braae, "Control Systems," *IEEE*, **vol. 34(3)**, pp. 123-129, 2011.

[2] J. C. Tapson, *Instrumentation*, UCT Press, Cape Town, 2010.

Appendix A

Additional Files and Schematics

Add any information here that you would like to have in your project but is not necessary in the main text. Remember to refer to it in the main text. Separate your appendices based on what they are for example. Equation derivations in Appendix A and code in Appendix B etc.

Appendix B

Addenda

B.1 Ethics Forms