



UNIVERSITY OF MORATUWA, SRI LANKA

Faculty of Engineering
Department of Electronic and Telecommunication Engineering
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EN2160 - Electronic Design Realization

Conceptual Design Report

Perera G.L.S.M

200455C

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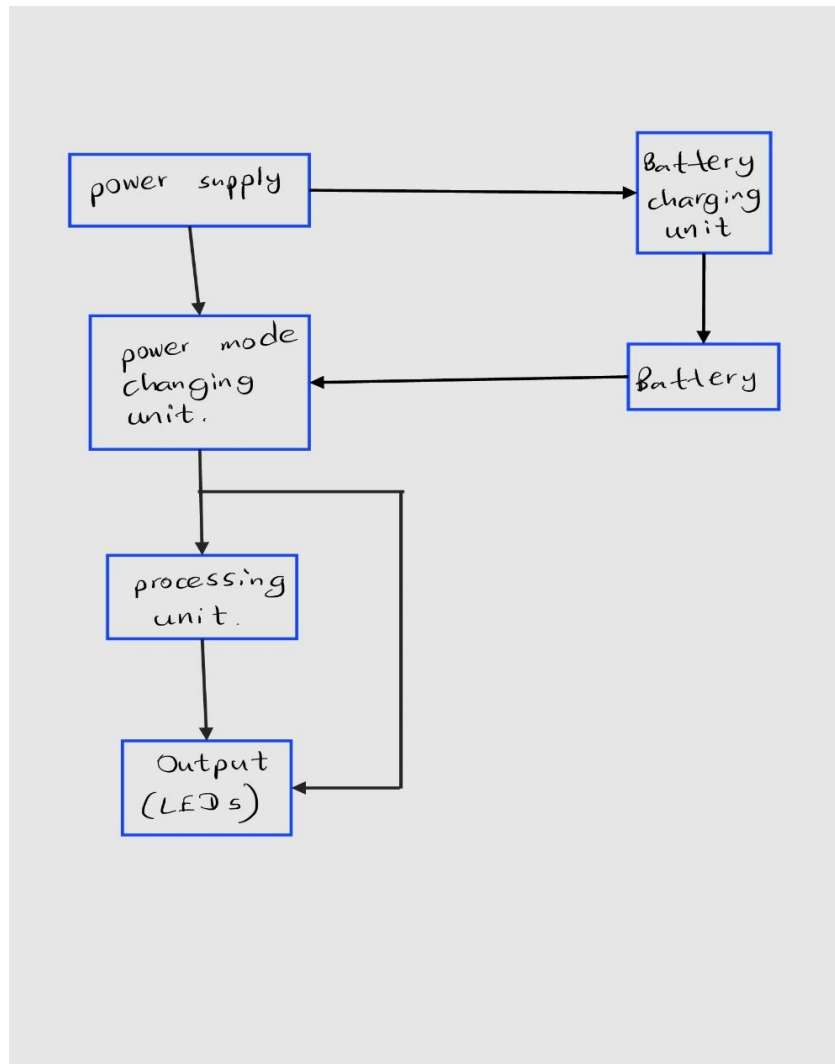
1. Introduction

The purpose of this report is to provide a detailed and comprehensive overview of the conceptual design for a smart emergency bulb with additional features. The design encompasses three potential functional block diagrams and three enclosure designs, which will be carefully assessed and refined based on specific criteria. To gather valuable insights on user preferences, a user survey was conducted, and the feedback will be taken into consideration during the modification of the functional block diagram and enclosure design. The subsequent sections of the report will present the findings, evaluations, and the selection process, considering a comprehensive set of evaluation criteria for both the functional block diagrams and enclosure designs. By following this systematic approach, the most suitable design that meets user requirements and fulfills the functional objectives of the smart emergency bulb will be identified and recommended.

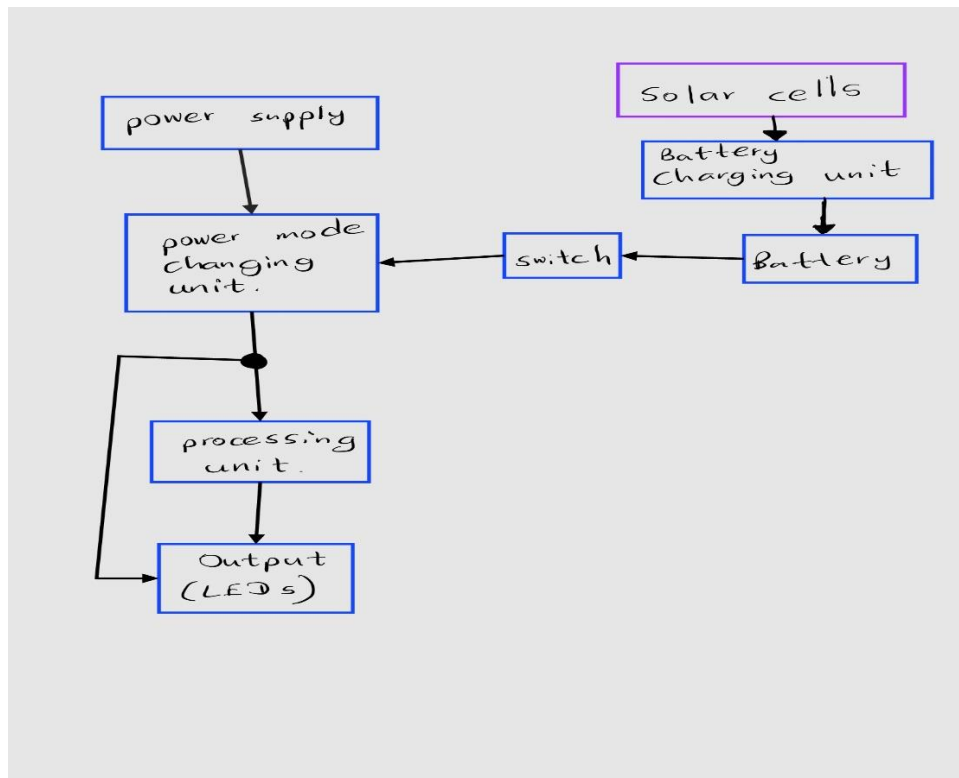
2. Functional Block Diagrams

Functional block diagrams illustrate the high-level functionality and interconnections of various components within a system. Here are three possible functional block diagrams for the Smart emergency bulb, resulting from a brainstorming session.

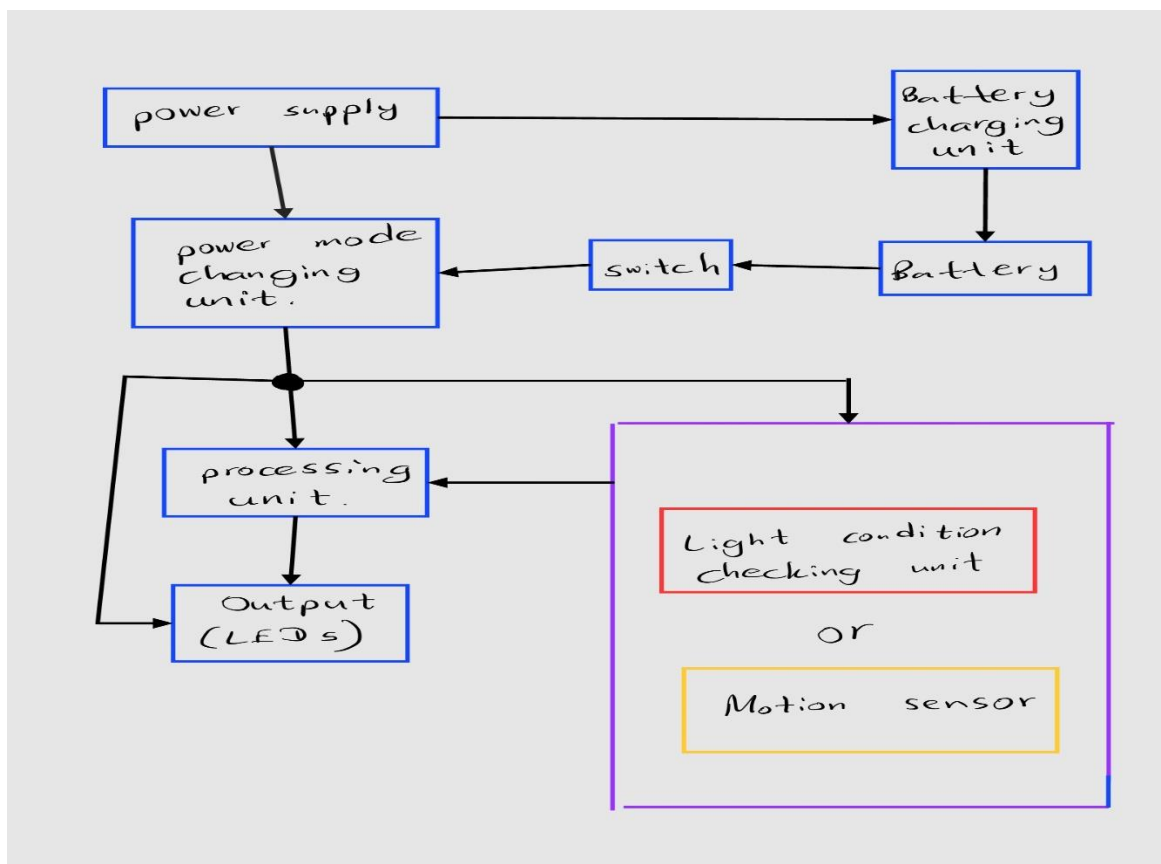
Design 1:



Design 2:



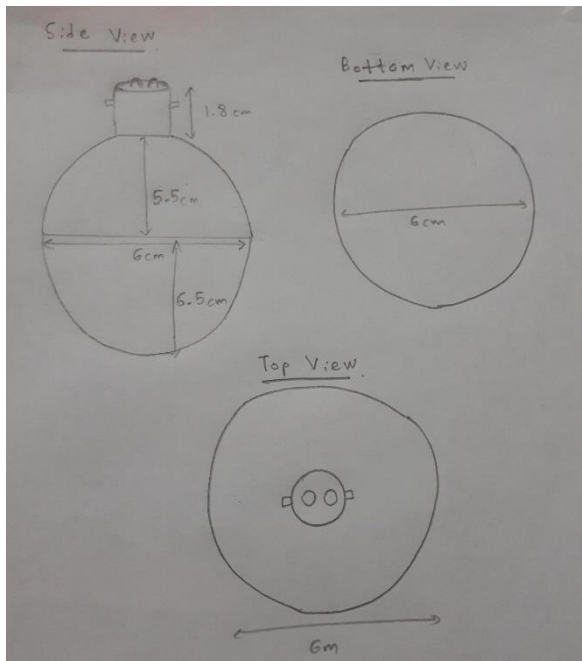
Design 3:



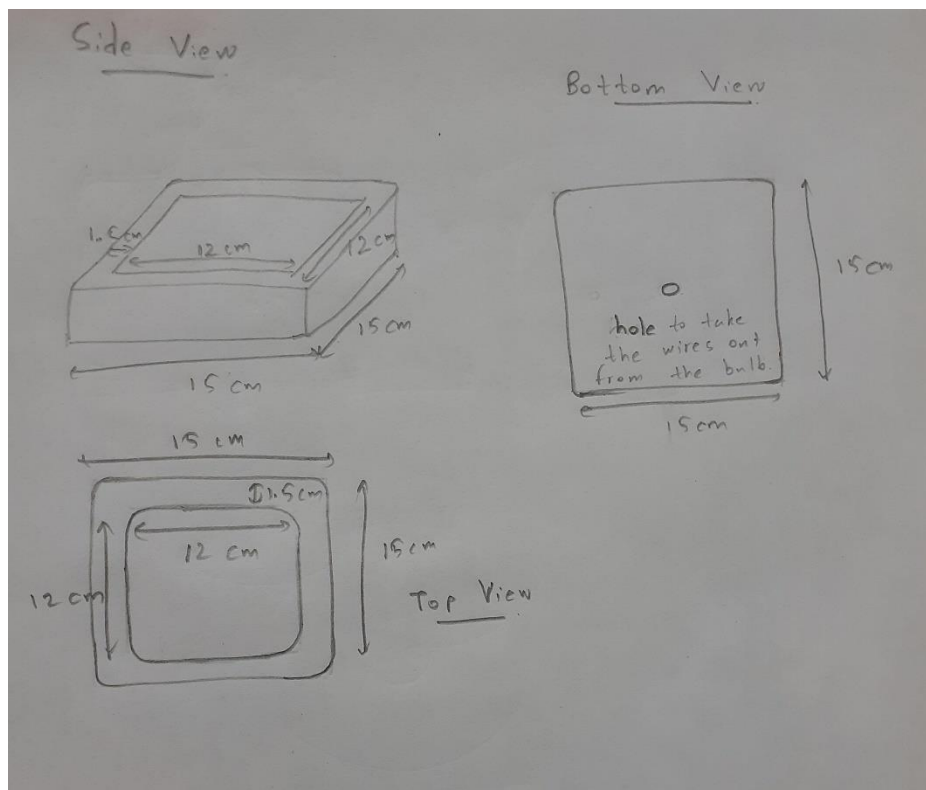
3. Enclosure Designs

Enclosure designs determine the physical appearance and packaging of the Smart emergency bulb. Following are three possible enclosure designs, resulted from the brainstorming session.

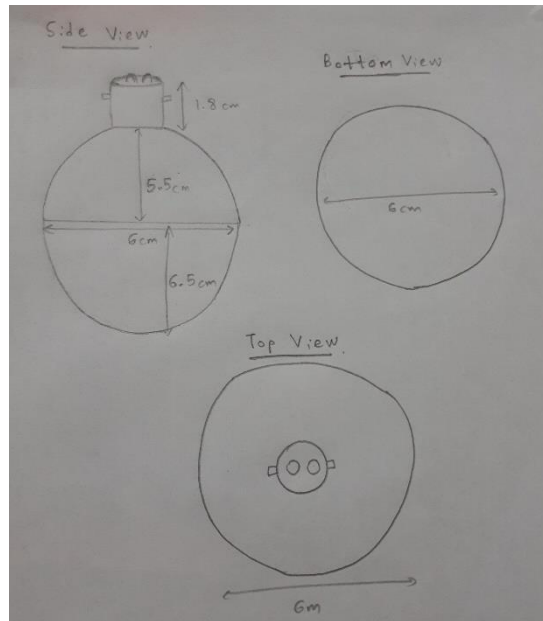
Design 1:



Design 2:



Design 3:



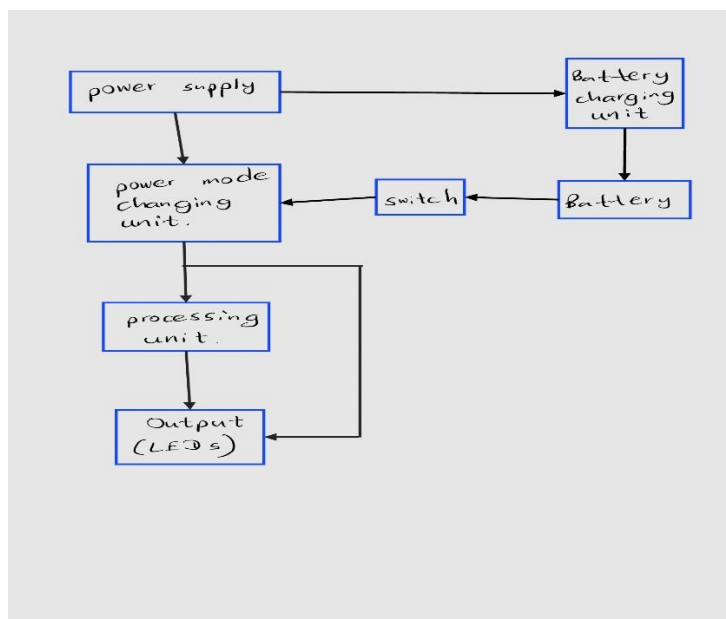
4. User Survey

A user survey was conducted to gather feedback on user preferences for the Smart emergency bulb design. The survey included questions about design aesthetics, usability, durability, display preferences, and additional features.

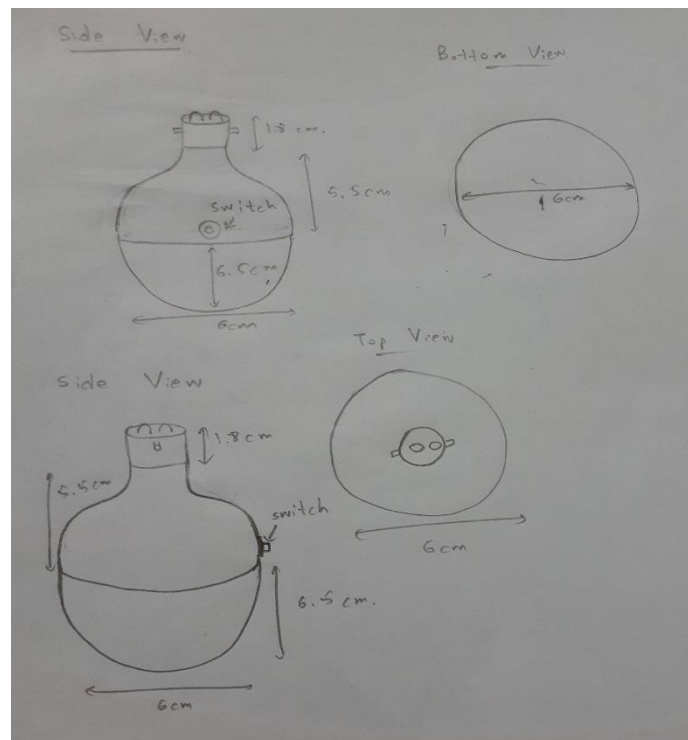
Based on the user survey results, a modified functional block diagram and enclosure design were developed to better align with user preferences.

Modified Functional Block Diagram (Design 4):

Manually controllable switch was added to control the bulb. When the switch is in on state, if the electricity goes down the bulb will turn on automatically. But when the switch is in off state, if the electricity goes down the bulb will not turn on automatically



Modified Enclosure Design (Design 4):



5. Evaluation Criteria

To select the most suitable design, evaluation criteria were established for both the functional block diagram and the enclosure design. The criteria for each aspect are as follows:

Functional Block Diagram Criteria for Smart Emergency Bulb:

1. Illumination Performance: How effectively does the bulb provide sufficient and reliable lighting in emergency situations?
2. Emergency Signaling: How well does the bulb incorporate signaling features to attract attention during emergencies?
3. Battery Life: How long does the bulb's battery last when operating in emergency mode?
4. Connectivity: How seamlessly does the bulb connect with external devices or emergency systems for enhanced functionality?
5. User Interface: How user-friendly is the interface for controlling and adjusting the bulb's emergency features?
6. Compatibility: How well does the bulb integrate with existing emergency infrastructure or systems?
7. Multifunctionality: To what extent does the design offer additional useful features beyond basic emergency lighting?

Enclosure Design Criteria for Smart Emergency Bulb:

1. Durability: How well does the enclosure withstand physical impacts and harsh environmental conditions?
2. Portability: How convenient is it to carry and transport the bulb in emergency situations?
3. Visibility: How visible and easily identifiable is the bulb during emergencies?
4. User Safety: How effectively does the design ensure user safety, such as protection against electrical hazards?
5. Ease of Installation: How straightforward is it to install or mount the bulb in different locations?
6. Energy Efficiency: How efficiently does the enclosure manage power consumption for prolonged battery life?
7. Manufacturing Cost: How economically viable is the design for mass production without compromising quality?

6. Design Evaluation and Selection

Functionality Design:

	Design 1	Design 2	Design 3	Design 4
Criteria 1	7	7	7	9
Criteria 2	0	5	8	9
Criteria 3	8	8	8	8
Criteria 4	3	5	8	10
Criteria 5	9	5	5	6
Criteria 6	6	5	6	8
Criteria 7	5	6	5	5
Total	38	41	47	55

Enclosure Design:

	Design 1	Design 2	Design 3	Design 4
Criteria 1	6	8	9	8
Criteria 2	6	7	6	7
Criteria 3	8	8	8	9
Criteria 4	9	8	8	9
Criteria 5	6	7	5	7
Criteria 6	3	3	6	8
Criteria 7	6	5	4	7
Total	44	46	46	55

Design 4 for the functional block diagram and **Design 4 for the enclosure design** were selected as the most suitable options based on evaluation criteria.

7. Acknowledgment

The following is a list of the names and corresponding index numbers of my team members who made valuable contributions to the conceptual design during the brainstorming session.

A.K. Anuradha	200041E
T.I.R. De Zoysa	200115K
G.I. Deshapriya	200118X
A.D. Upeksha Dilhara	200128D
P.M.I.R.B. Kandegedara	200284B
N.V. Kannangara	200285E
G.L.S.M. Perera	200455C
R.A.R.L. Ranasinghe	200511V
R.D.H.C. Weerasingha	200699C
H.D.K.G. Wijesiri	200728R