UNIVERSITY OF MORATUWA, SRI LANKA

Faculty of Engineering

Department of Electronic and Telecommunication on Engineering

Semester 4 (Intake 2020)

EN2160 - Electronic Design Realization

Automatic Temperature and Humidity Controller

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This report is submitted as a partial fulfillment for the module EN2160 - Electronic Design Realization Department of Electronic and Telecommunication on Engineering, University of Moratuwa.

Introduction

In the initial phase of conceptual design, the primary objective is to generate and explore diverse concepts while creating prototypes for a specific product. This entails the consideration of various circuits, enclosures, and functional components, as well as the integration of different ideas to form a comprehensive solution. The aim is to generate a multitude of options and possibilities.

Once these fundamental ideas have been generated, they are often grouped together and presented through freehand sketches or other visual representations. This visualization and communication of concepts facilitate effective evaluation and further refinement by designers. The ultimate goal is to achieve an optimal solution that satisfies the desired requirements and objectives of the product.

Design-driven innovation, also referred to as radical product innovation, offers an alternative design methodology that enhances creativity in the product development process. Unlike solely addressing existing user demands, design-driven innovation prioritizes the manufacturer's creative vision for the product. This approach aims to introduce groundbreaking concepts to the market, rather than solely focusing on meeting consumer expectations.

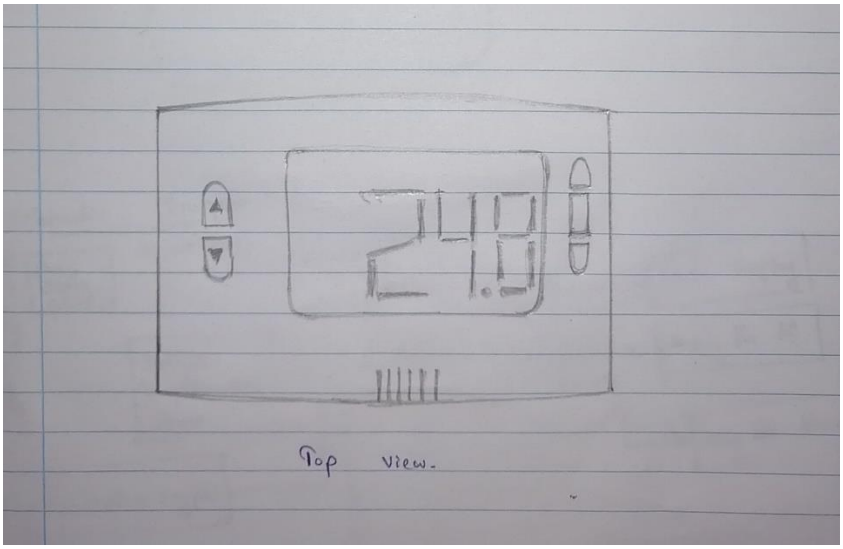
In the implementation of design-driven innovation, an interpreter acts as a mediator between the manufacturer's creative vision and the consumer society. The interpreter helps convey and translate these novel concepts to consumers in a way that is understandable and appealing. By presenting innovative ideas that may not have been explicitly requested by consumers, design-driven innovation has the potential to shape and influence consumer preferences, leading to the creation of new market opportunities.

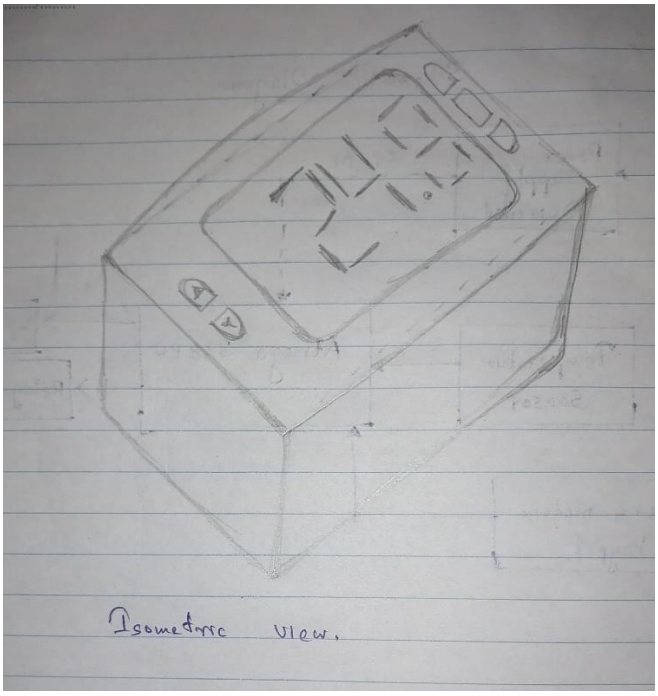
Overall, both the conventional conceptual design stage and design-driven innovation play significant roles in product development. They enable designers and manufacturers to explore a wide range of possibilities and push the boundaries of creativity, aiming to achieve optimal and groundbreaking solutions.

2.Conceptual Designs Drawn by our group Members.

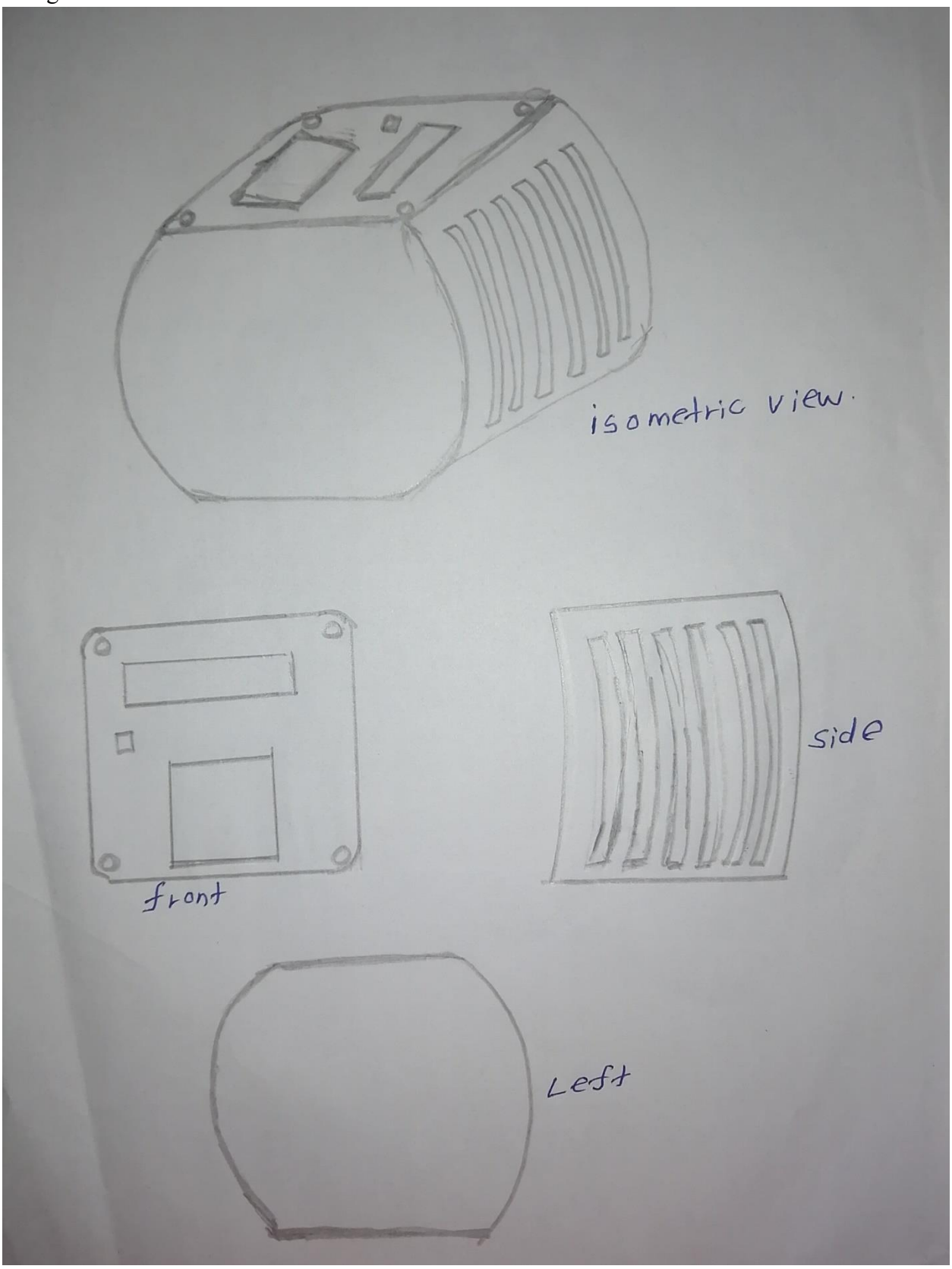
Following multiple brainstorming sessions and conversations with the group and certain individuals, the group members created the following three conceptual designs.

- Design 1

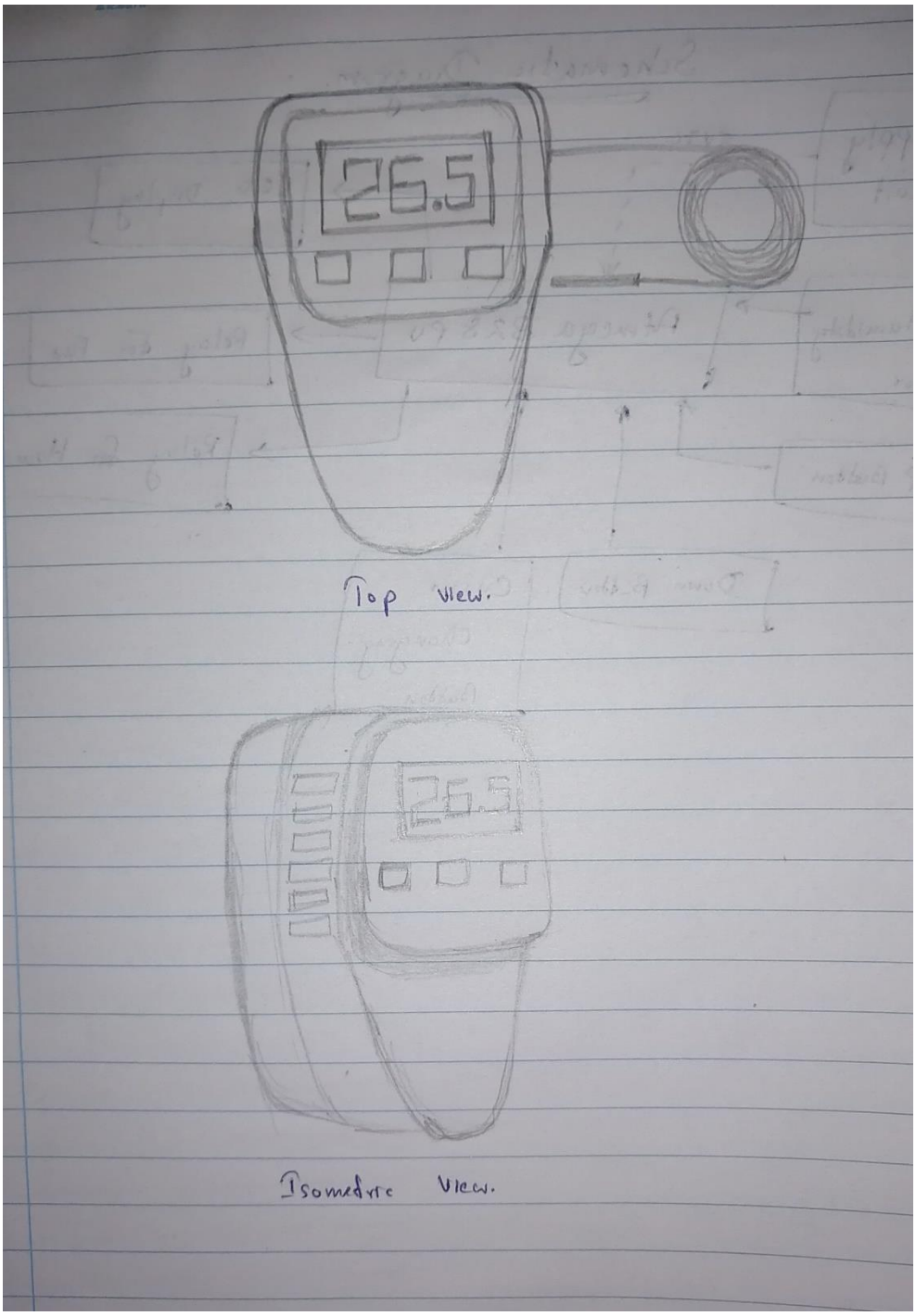




- Design 2



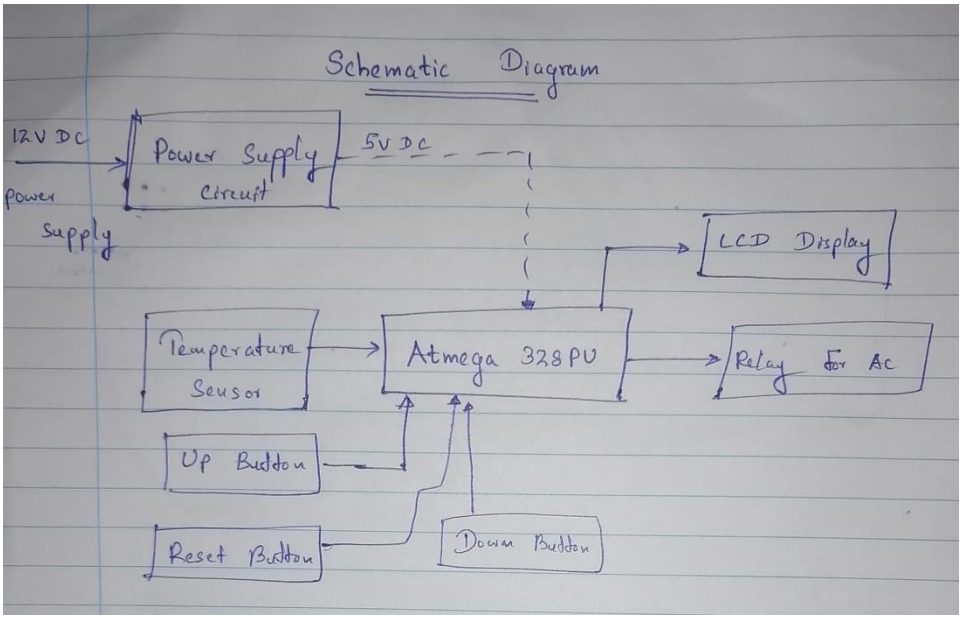
- Design 3



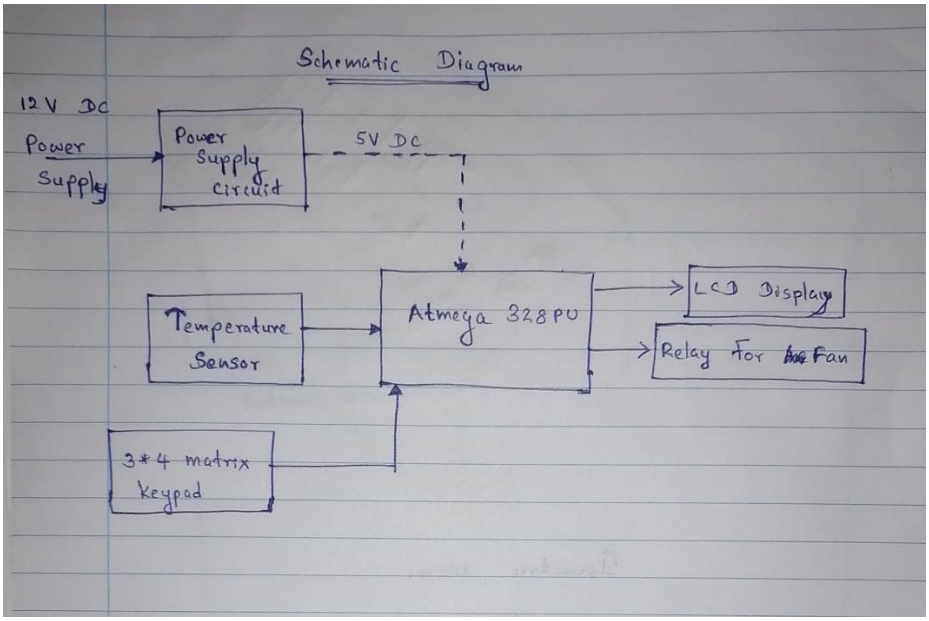
3.Block Diagrams Drawn by our group Members

Based on the product's primary utility, the group members generated these block diagrams to determine an ideal functional design.

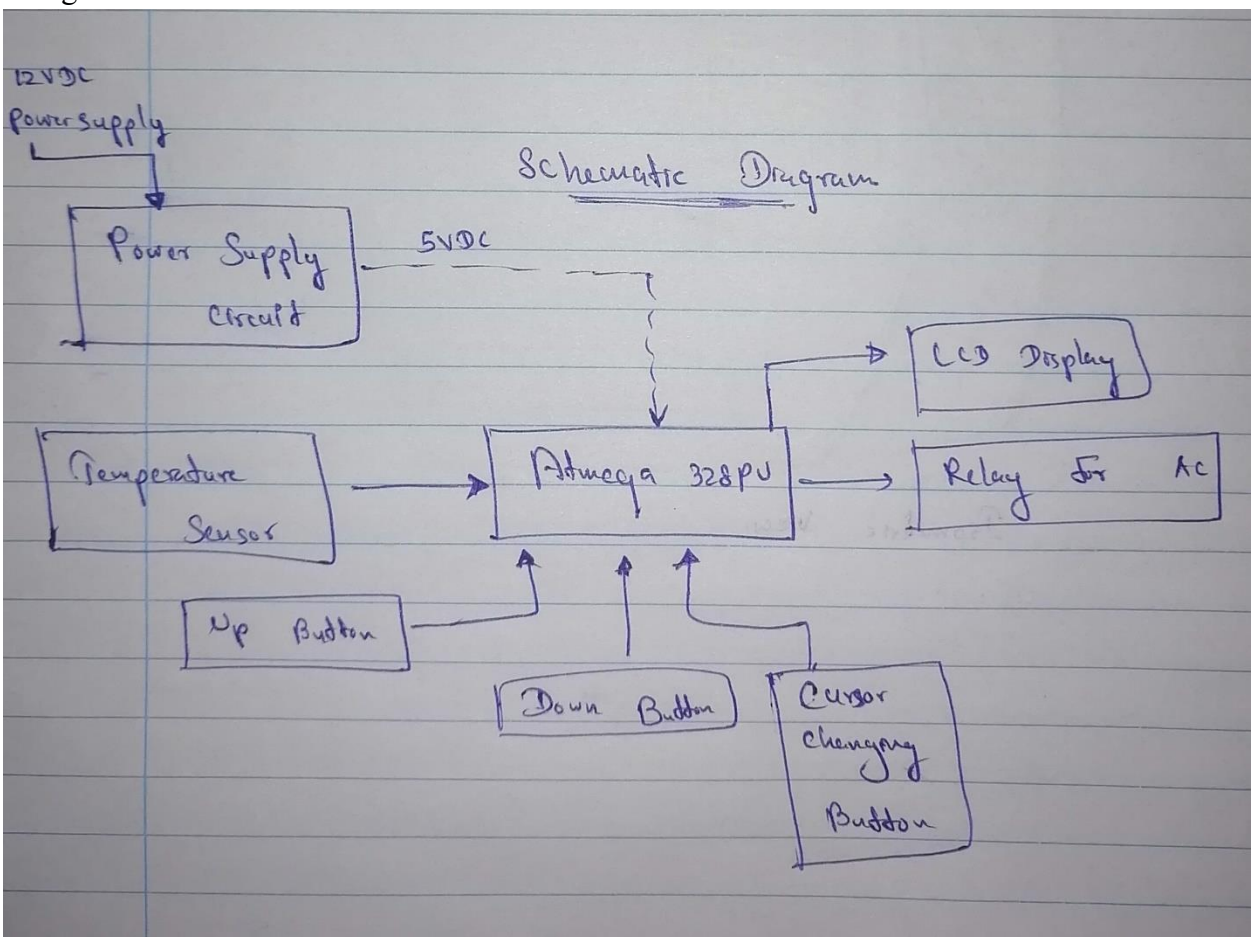
- Design 1



- Design 2

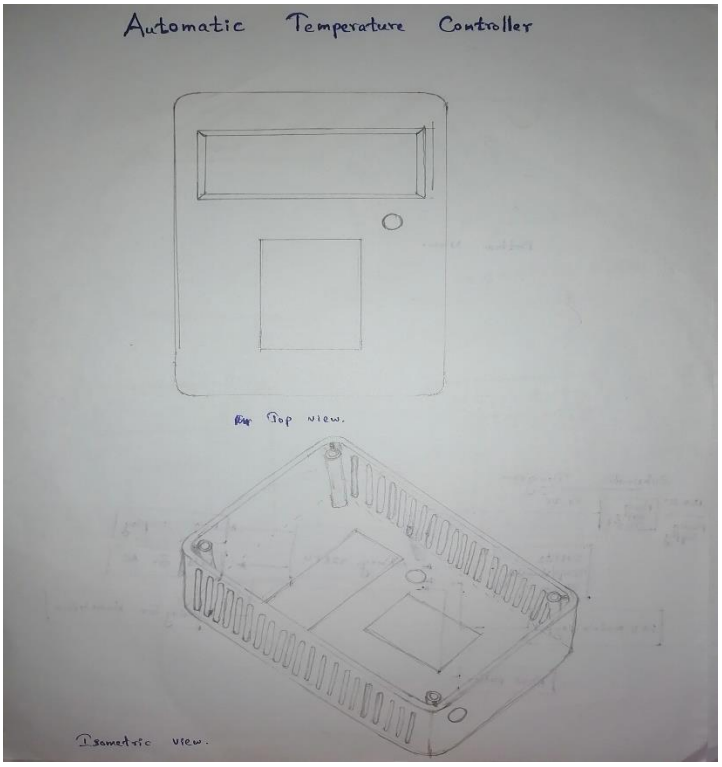


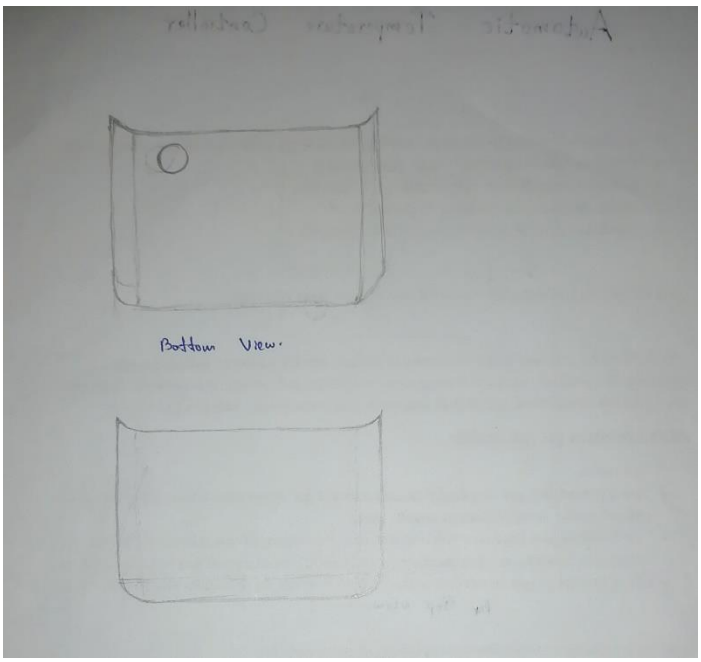
- Design 3


12VDC
Power supply
Schematic Diagram
Power Supply Circuit
5VDC
LCD Display
Temperature Sensor
Atmega 328PU
Relay for AC
Up Button
Down Button
Cursor changing Button

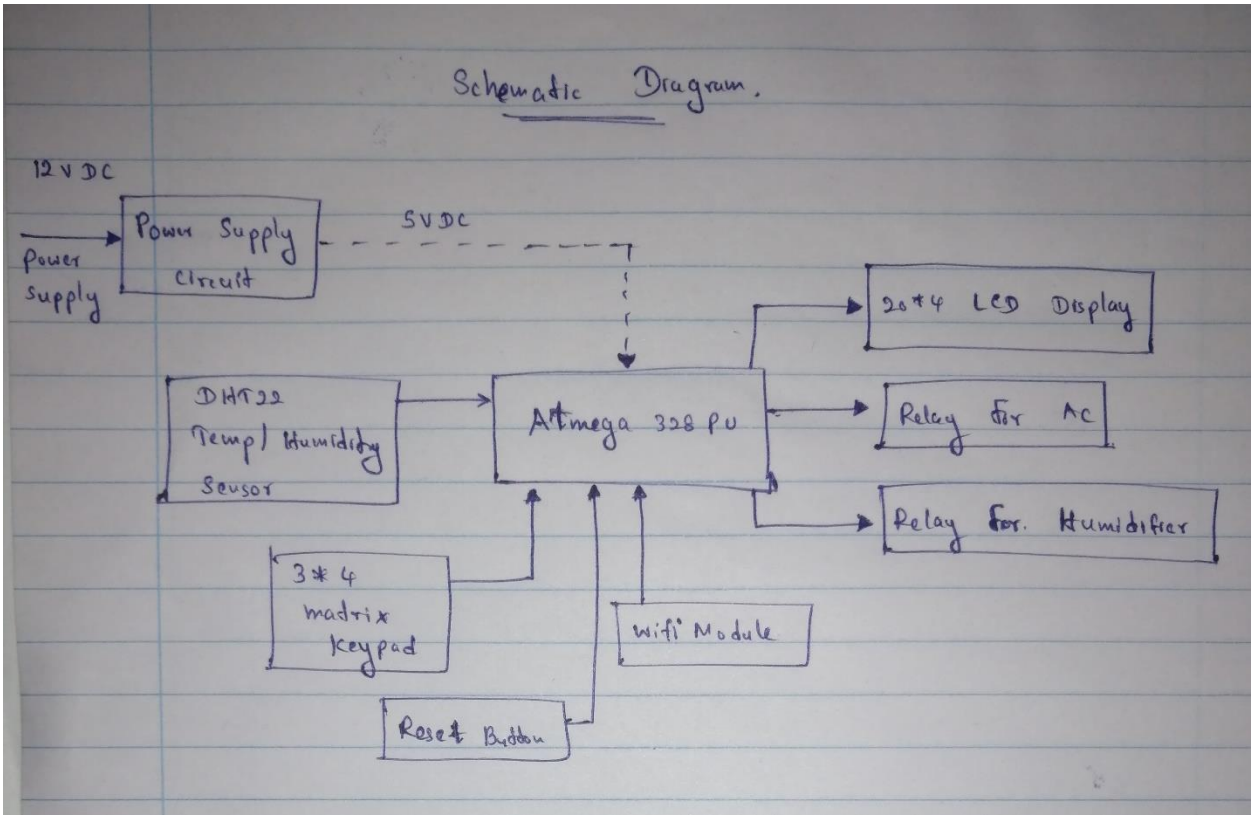
4.User Centered Design

Design 4 – Sketch





Schematic Diagram



5.Evaluation Metrics

- For the conceptual designs.

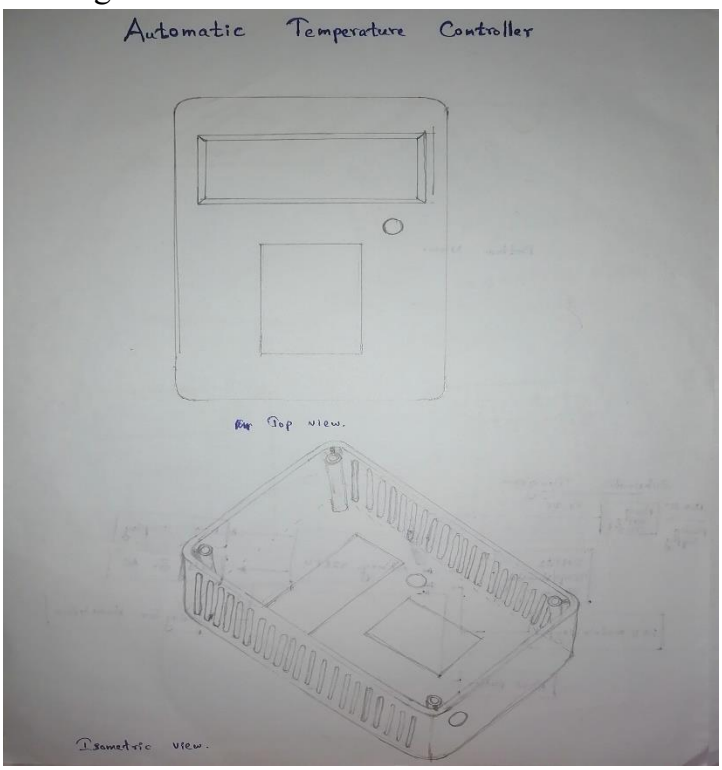
No.	Criterion	Design 1	Design 2	Design 3	Design 4
1	Simplicity	8	5	6	7
2	Manufacturability	6	7	8	6
3	User friendly	7	8	7	8
4	Eco friendliness	7	7	7	7
5	Repairability	7	5	6	8
6	Durability	8	7	8	8
7	Cost-Effectiveness	6	5	5	7
8	Competitiveness with existing products	7	5	8	7
9	Aesthetic view	7	5	8	7
10	Portability	8	7	10	9
	Total marks	71	61	73	74

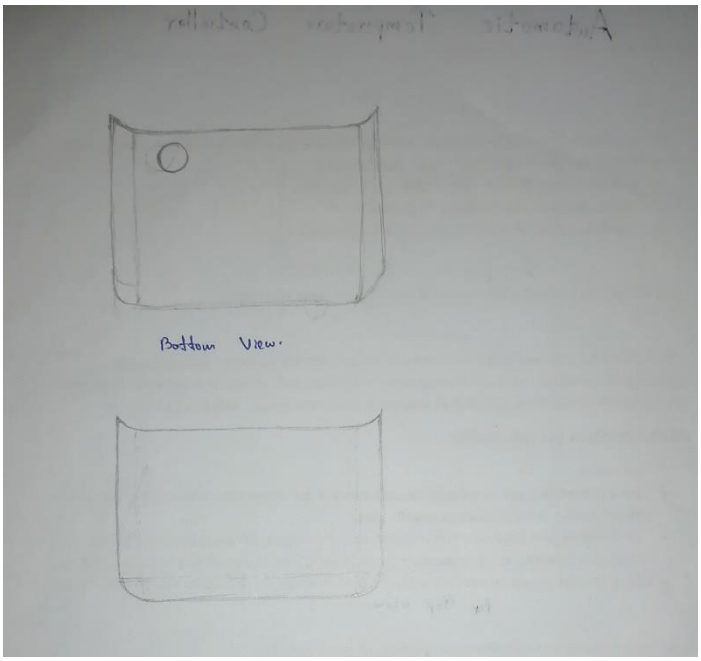
- . For the block diagrams

No	Criterion	Block Diagram 1	Block Diagram 2	Block Diagram 3	Block Diagram 4
1	Simplicity of the Power Source	9	9	9	9
2	Repairability	8	6	6	8
3	Simplicity	7	8	7	7
4	Manufacturability	8	8	8	8
5	User friendliness	7	7	7	8
6	Clarity and Organization	7	5	6	8
7	Adaptability and Flexibility	8	8	8	8
8	Modularity and Scalability	7	5	6	8
9	Ease of Understanding	6	7	7	8
10	Completeness	6	7	7	8
	Total marks	73	70	71	80

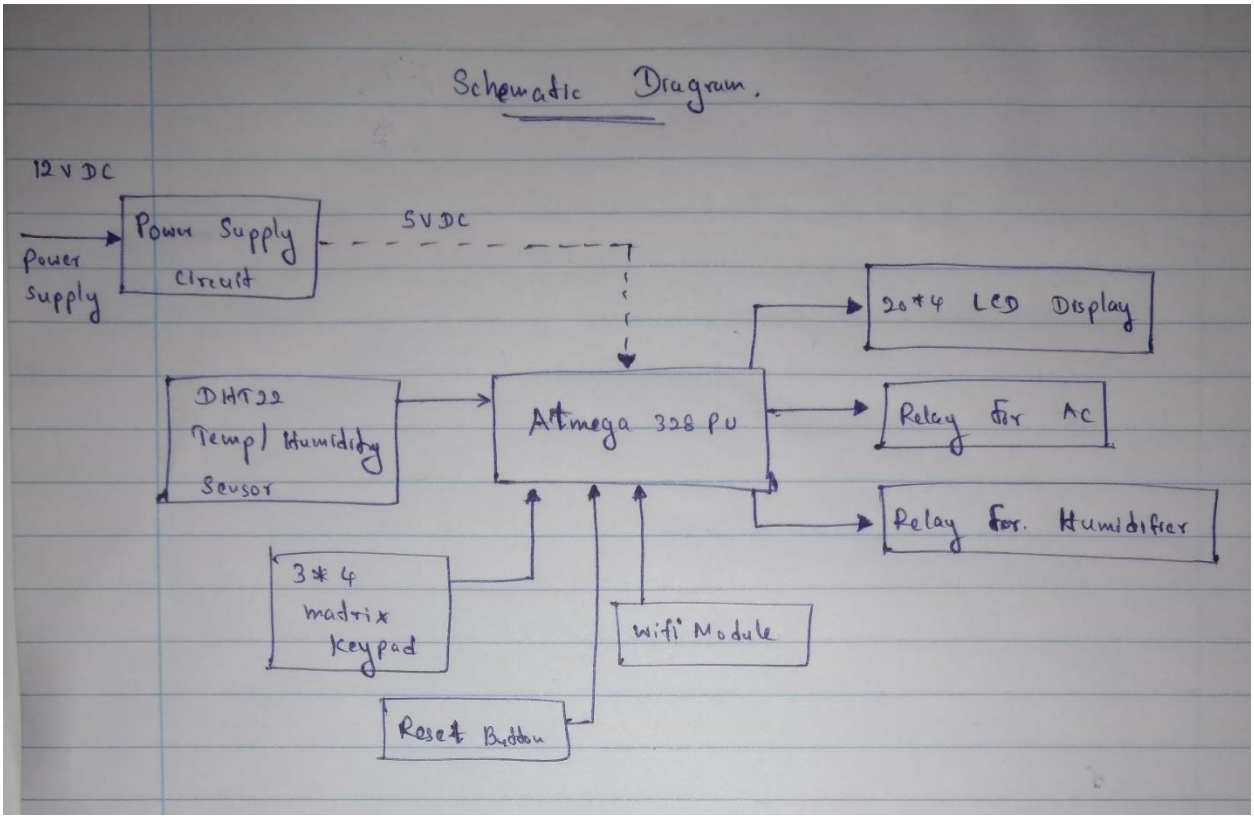
6. Selected Design for the Product

- User Centered Design Sketch





Schematic Diagram



7. Contribution from Group Members

- 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

Index Number	Name	Contribution
200041E	A.K. Anuradha	Criteria for both evaluation matrices
200115K	T.I.R. De Zoysa	Criteria for both evaluation matrices, Conceptual design
200118X	G.I. Deshapriya	Criteria for both evaluation matrices, Conceptual design
200128D	A.D. Upeksha Dilhara	Criteria for both evaluation matrices
200284B	P.M.I.R.B. Kandegedara	Criteria for both evaluation matrices, Conceptual design
200285E	N.V. Kannangara	Criteria for both evaluation matrices, Conceptual design
200455C	G.L.S.M. Perera	Criteria for both evaluation matrices
200511V	R.A.R.L. Ranasinghe	Criteria for both evaluation matrices, Conceptual design
200699C	R.D.H.C. Weerasingha	Criteria for both evaluation matrices, Conceptual design
200728R	H.D.K.G. Wijesiri	Criteria for both evaluation matrices