



The Shower Zone 350

ELET 4308/4108

Senior Project Final Presentation

Nov 28, 2006

Team 7: Roger Fong

Qijun J Huang

Orlando Saenz

Brian Smith

Project Objectives

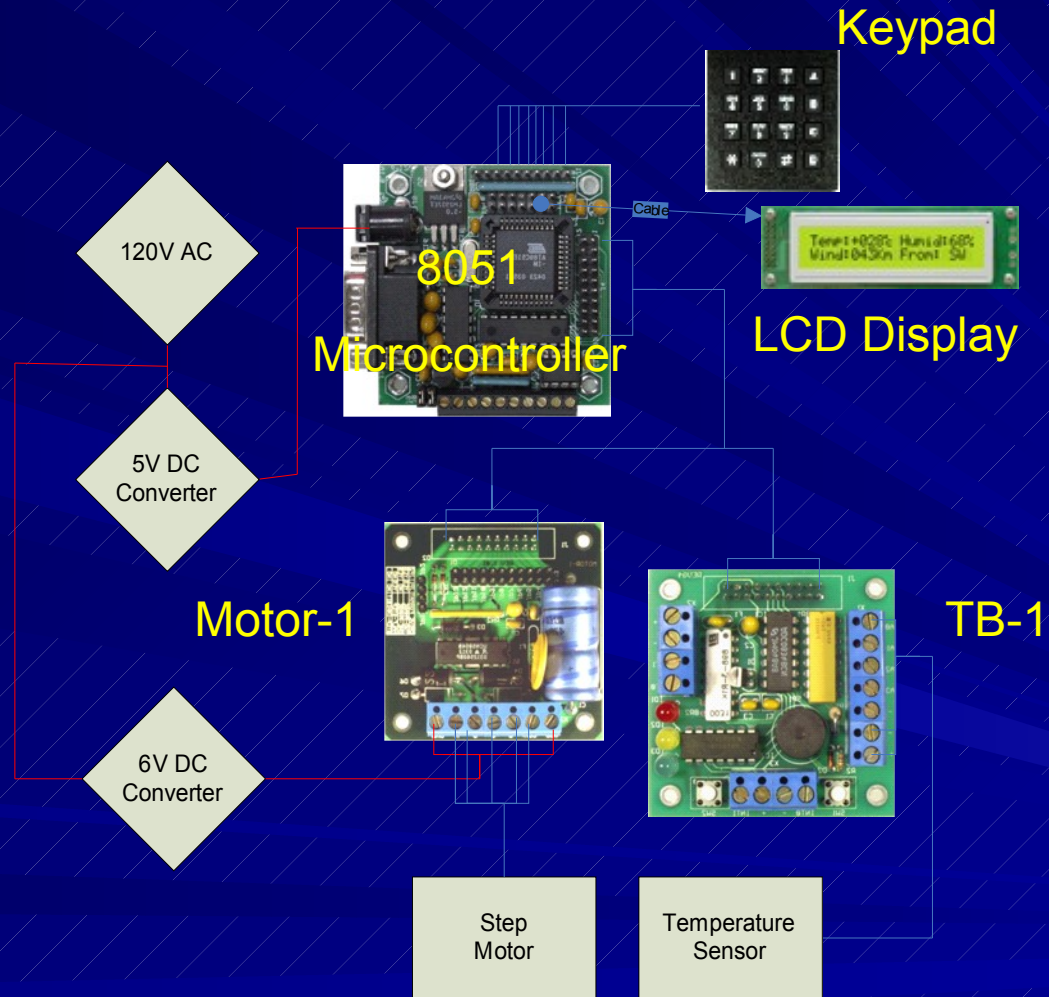
- Create an automated temperature control system to improve shower comfort and safety
- Store user shower temperature data for future use
- To eliminate the need for shower control knobs

Shower Zone Features

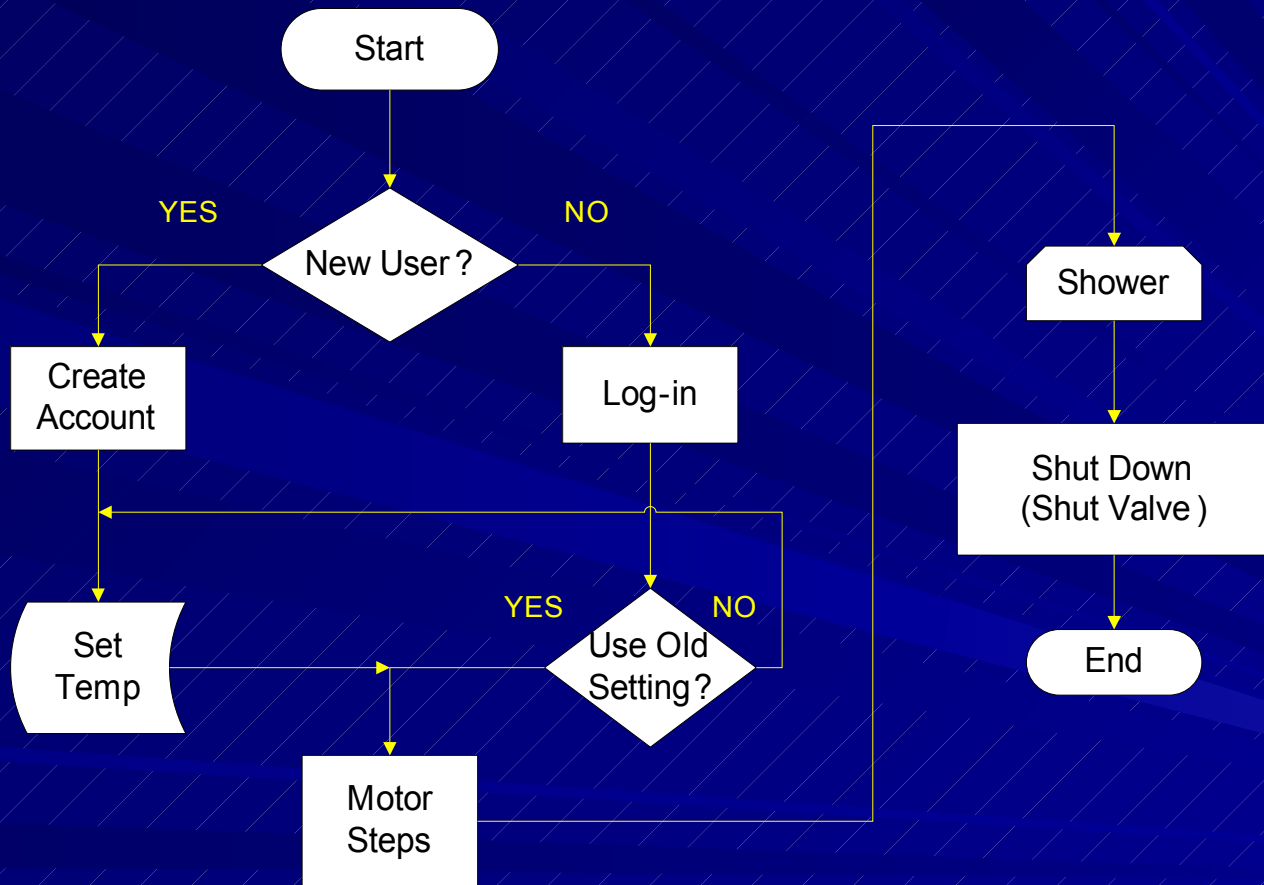
- **Users control shower through keypad and LCD interface**
- **Ability to save up to four user inputs**
- **Step Motor turns water valve on and off**
- **Automatically maintains desired water temperature through constant monitoring of temperature sensor**
- **Adjusts water valve when temperature varies from desired temperature**



Schematic



Program Flowchart



The Shower Zone 350



The Shower Zone 350



Pre Manufacture Additions

- Waterproof to IPX Standards
- Battery Back-up to save user settings during power loss

Cost Analysis

Shower Zone 350 Parts

Parts	Estimated Cost	Actual Cost
Bipom MINI-MAX/51-C2 Microcontroller	85.00	107.95
Bipom Microcontroller ADC Converter	50.00	61.95
Bipom Motor-1 Step Motor Control	39.00	Donated
Key-Pad	12.00	Lab
LCD Display	10.00	6.95
Water Temperature Sensor (with heat shrink)	15.00	4.00
6V Step Motor	20.00	6.95
Wire	5.00	3.00
Electrical Box	10.00	12.00
Water Shower Valve	53.00	53.71
120V AC to 6V DC Converter	5.00	Donated
Wire Cover	3.00	3.00
Pulley System (motor to valve)	10.00	Donated
Total	317.00	259.51

Cost Analysis

Parts Needed For Demonstration

6X6 Tile Beige	10.00	0.58
32X2X4 Sand Pine Plywood	5.00	6.99
1/2" X 10' CPVC Pipe	5.00	2.48
2X4X8 Wood * 3	5.00	5.97
1/2" PVC to Brass Fittings Male Adapter * 3	10.00	10.41
1/2" Valve to Hose *2	10.00	9.06
3/4" X 1/2" PVC L Joint * 4	1.00	2.24
3/4" CPVC STRP	1.00	0.66
1/2" CPVC Female Adapter * 3	5.00	10.41
3/4" PVC L Joint	1.00	0.52
3/4" Ball Valve PVC	5.00	5.38
8oz All Purpose Cement CPVC	5.00	4.49
4oz Primer CPVC	3.00	2.22
Shower Arm W/ Flang Brass	5.00	11.38
Shower Head	5.00	Donated
Total	61.00	72.79
Total Prototype Cost	378.00	332.30

Cost Analysis

Resource Cost

Resources	Estimated Cost	Actual Cost
Lab Usage	\$5,000.00	Free
Workshop Space	\$6,500.00	Donated
Miter Saw	\$200.00	Donated
Jigsaw	\$100.00	Donated
Hammers, screwdrivers	\$50.00	Donated
Drill	\$150.00	Donated
Transportation	\$100.00	Donated
Total	\$12,100.00	\$0.00

Labor Cost

Processes	Estimated. Hours	Actual Hours	Price/per hour	Total
Project Design	35	45	\$23.00	\$1,035.00
Mechanical	50	71	\$25.00	\$1,775.00
Electrical	17	20	\$22.00	\$440.00
Programming	30	40	\$28.00	\$1,120.00
Testing	20	27	\$19.00	\$513.00
Total hrs. per Member	152	203		\$4,883.00
Total for Group	608	812		\$19,532.00

Total Project Cost

\$31,964.30

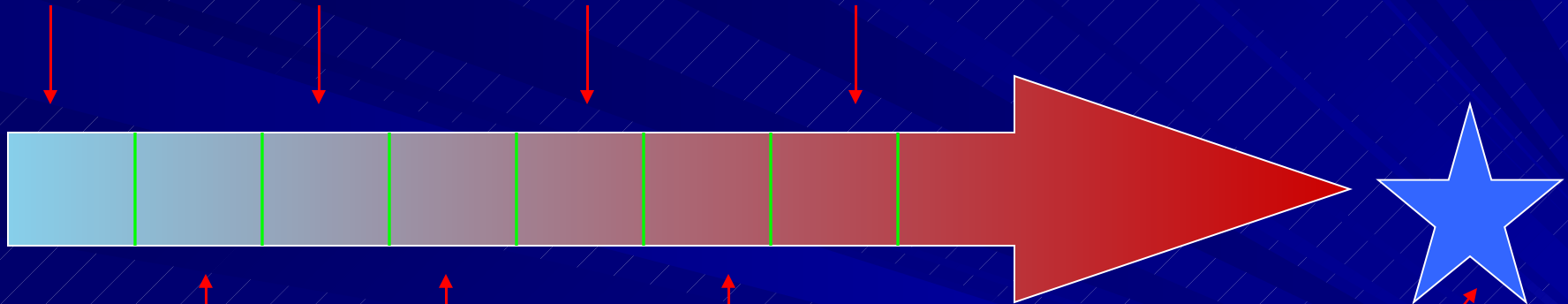
Project Schedule

9/29/06
Purchase
Parts

10/04/06
Develop
Models

10/25/06
Program
Interface

11/25/06
Prepare the group
presentation



10/02/06
Design
Process

10/16/06
Assembly

11/10/06
Test and
Debug

11/29/06
Project
Completion

Questions

