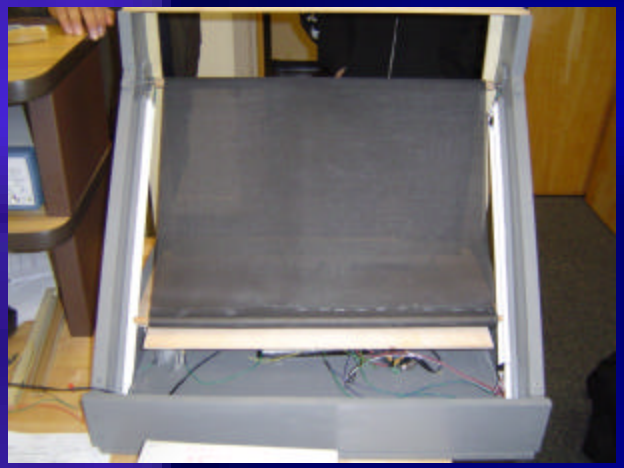
A.C.S.S.

(Automated Car Sunshade System)

UNIVERSITY OF HOUSTON
COLLEGE OF TECHNOLOGY
DEPARTMENT OF ENGINEERING TECHNOLOGY
COMPUTER ENGINEERING TECHNOLOGY PROGRAM

ELET 4308/4108
Senior Project Final Presentation
AUTOMATED CAR SUN SHADE SYSTEM
Fall 2005
December 1, 2005
Team No. 3



Team Members:

Dennise Tellez
Zeida Garza
Rigoberto Munguia
Rolando Lemos

PRESENTATION OUTLINE

- ***Introduction***
- ***Background*** — **Rolando Lemos**
- ***Product Requirements*** — **Dennise Tellez**
- ***Design Specifications***
- ***Design Description/Construction*** — **Rigoberto Munguia**
- ***Program Flow Chart*** — **Zeida Garza**
- ***Costs*** — **Dennise Tellez**

Introduction

- ***Global Warming***
  - ***Hotter summers today than 20 years ago***
  - ***Uncomfortable driving conditions in Houston's hot and humid weather***
- ***Motivation***
- ***protection to the vehicle and comfort to driver and passengers***

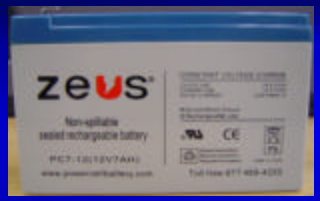
Background (cont'd)

- ***Existing Solutions***
  - ***Find a spot under tree***
  - ***Manual, place windshield sun visor after stopping automobile***
- ***Solution ACSS System***
  - ***Practical: automatic operation, no user interaction necessary***
  - ***Effective: Blocks 80% solar radiation***

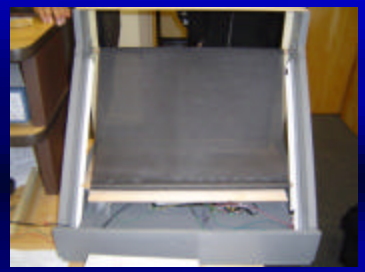
Requirements

- *8051 microcontroller*
  - *System main control*
- *Temperature Sensor*
  - *Precision Fahrenheit Temperature Sensor*

- *12 V battery*
  - *Power source - provided by the vehicle*



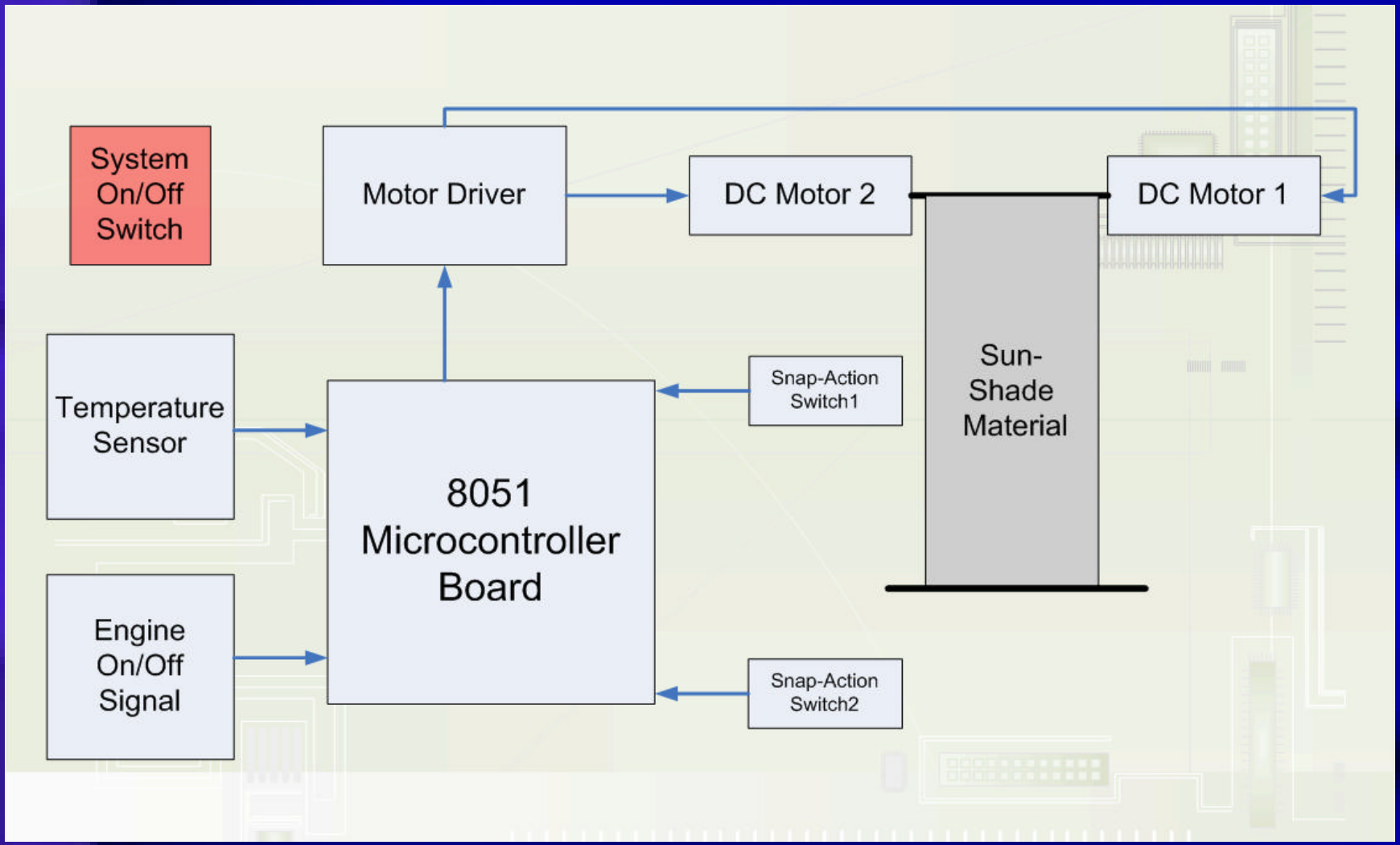
- *Easy Installation*
- *Hands free operation*
  - *no owner intervention required*



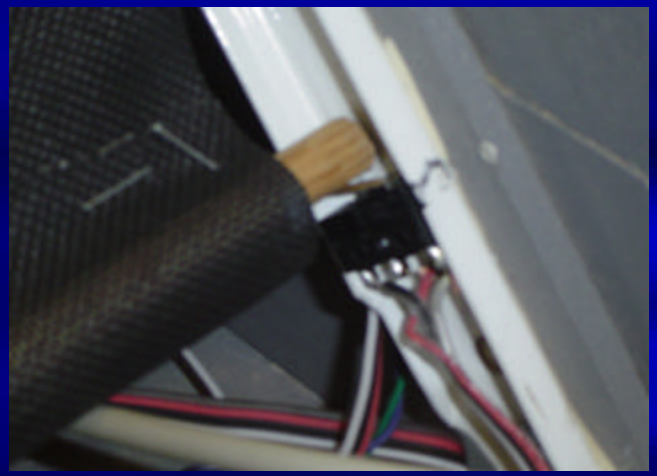
Design Specifications

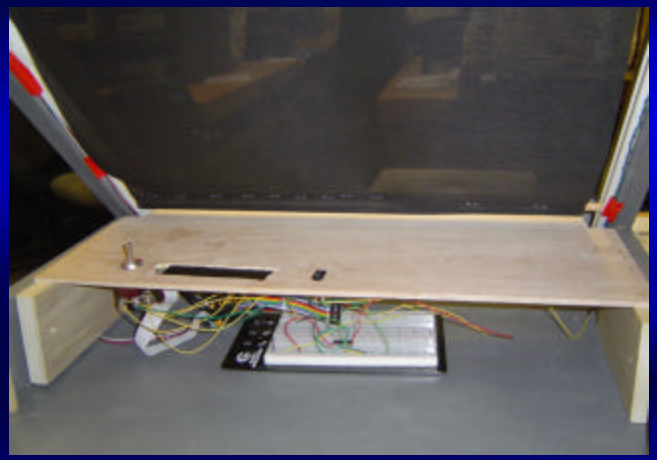
- *The prototype consisted of the following:*
  - *1/3 scale model of automobile front windshield*
  - *2 DC Gear Motors (12V, 21 RPM)*
  - *1 LM34 Temperature Sensor*
  - *LCD Display*
  - *2 Snap-action toggle switches*
  - *1 SN75441 H-bridge*
  - *Sunshade material mounted on roll and guide rails*
  - *Min-Max /51-C2 Microcontroller*

Design – Block Diagram

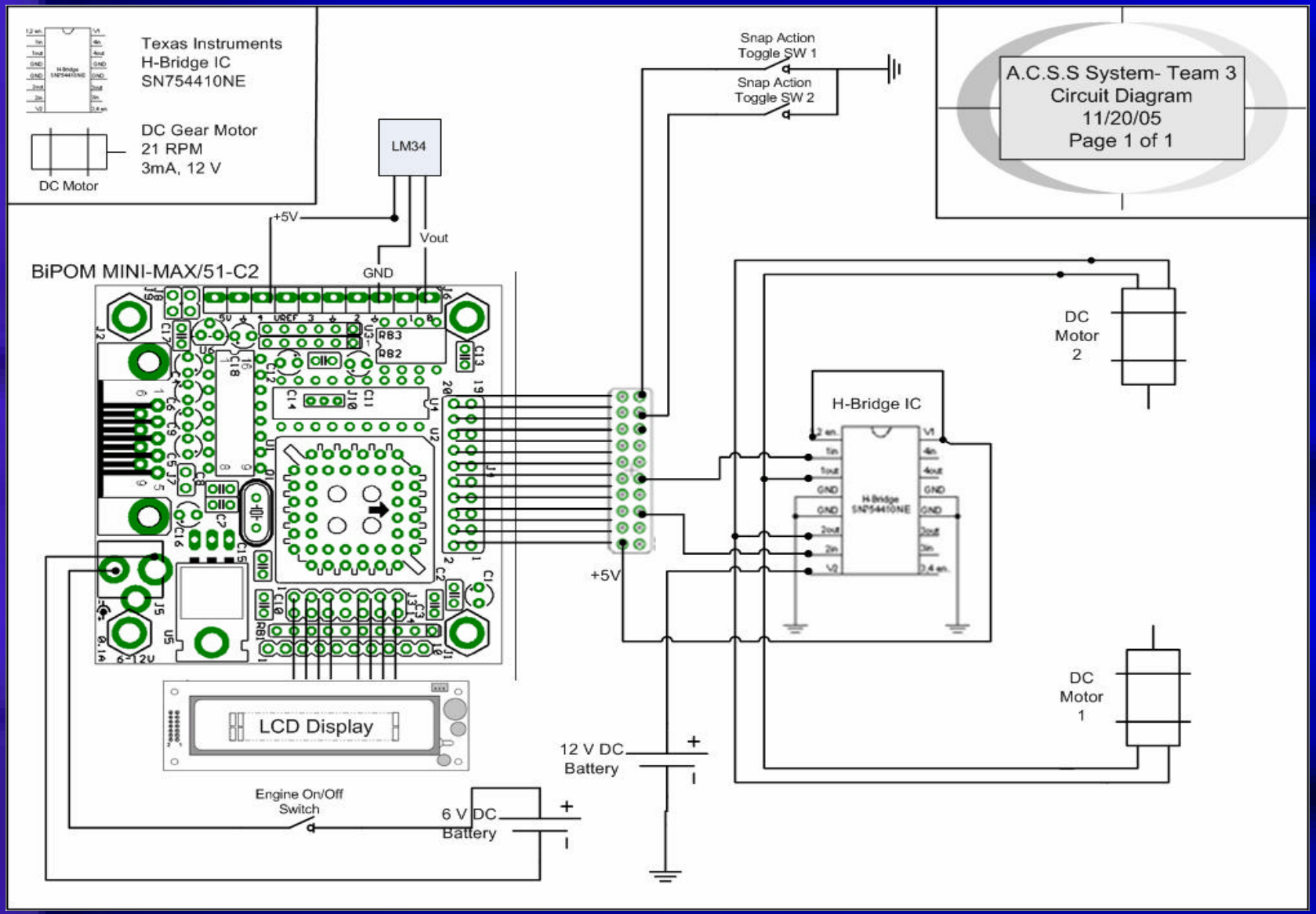


Prototype Construction

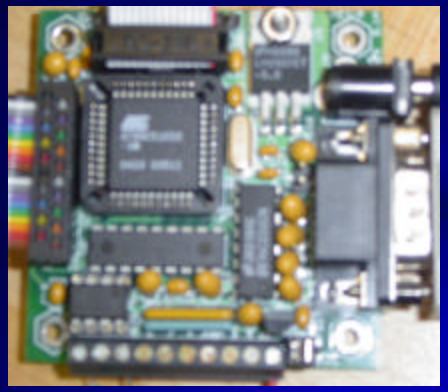


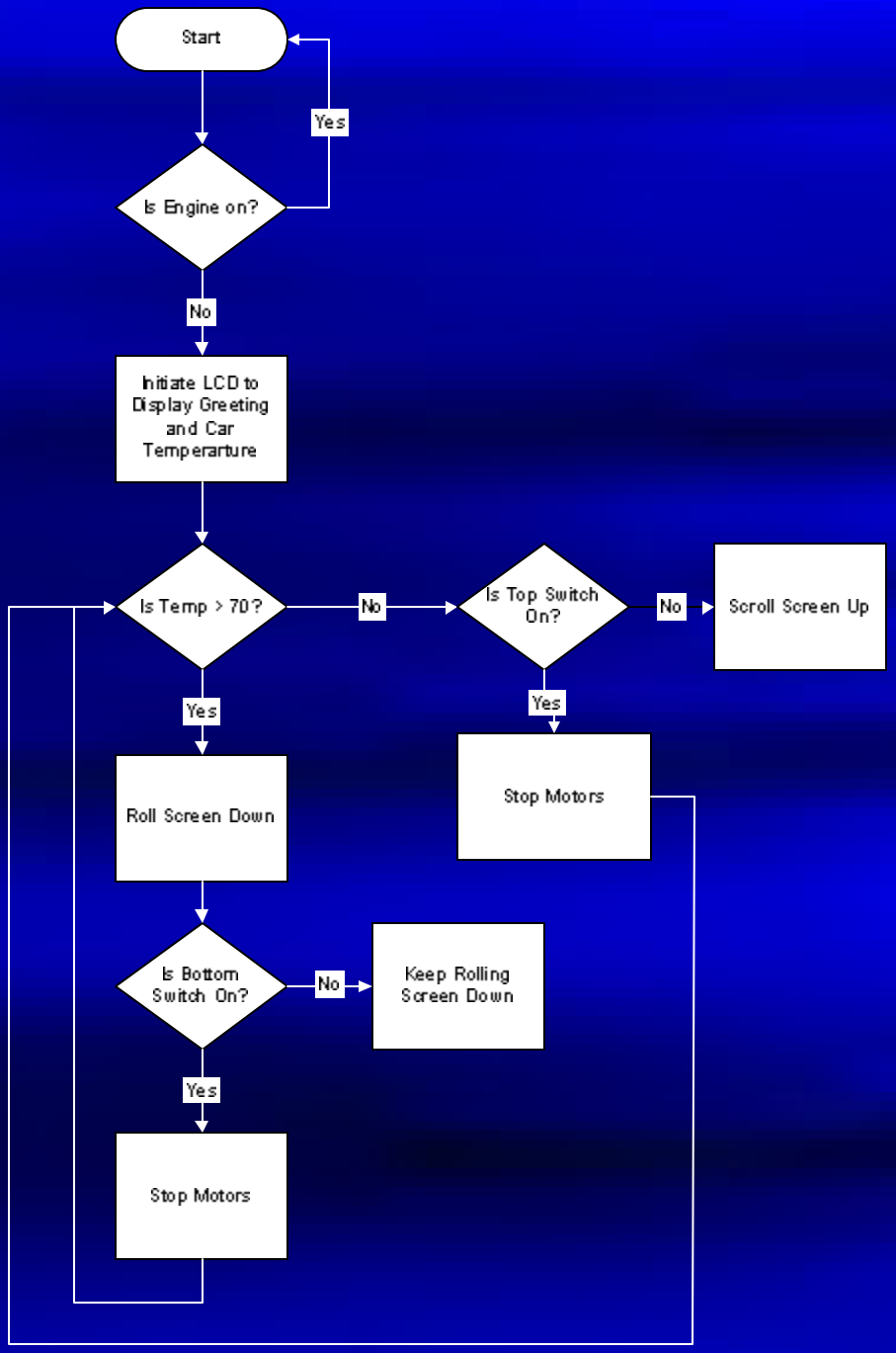


Description – Hardware Design



Program Operation Flowchart

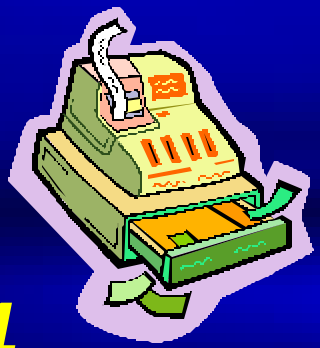




Costs

- ***The actual total costs for A.C.S.S. includes:***
  - ***Components/Parts***
  - ***Laboratory Use***
  - ***Labor***

Costs - Parts



- ***Budget Provided:*** ***$350.00***
- ***Total Part Expenses:*** ***-$229.71***

- - - - - - - - - - - - - - - - - -

- ***Remaining budget:*** ***$120.29***
- ***Project required additional parts and replacement parts.***

Next slide: Table C-1: Cost Analysis of Components

Qty.	Parts	Price(Ea.	Total
2	DC Gear Motor (21 RPM 3mA, 6V-12V)	$ 3.95	$ 7.90
1	Adaptor, DC, 6V, 800mA	$ 12.95	$ 12.95
2	2 contact switches	$ 1.95	$ 3.90
undl	connecting wire	$ 5.95	$ 5.95
2	Brackets	$ 2.00	$ 4.00
1	battery 6v, 4.5 AH	$ 8.95	$ 8.95
1	battery 12V 7AH	$ 16.50	$ 16.50
1	on/off button-engine simulation (tiny roc	$ 2.50	$ 2.50
1	on/off button-system on/off control (tin	$ 2.50	$ 2.50
1	two switch button-lock/unlock simulatior	$ 1.25	$ 1.25
1	two way switch button-deploy/retract op	$ 4.95	$ 4.95
2	H-Bridge IC (SN754410NE) Stepper moto	$ 1.95	$ 1.95
1	temperature sensor (LM34)	$ 1.95	$ 1.95
1	Hamamatsu S8369-Light Sensor	$ 3.00	$ 3.00
1	Cadium Sulfite-Light Sensor	$ 1.00	$ 1.00
1	8051 microcontroller	$ 95.00	$ 95.00
1 pk	Plastic/Metal rails	$ 5.89	$ 5.89
2	22.5” 2x4	donated	donated
2	18” 2x4 – donated	donated	donated
1	3'x2' plywood – donated	donated	donated
1 pk	wood screws & nails – donated	donated	donated
1	visor material or retractable screen (2'10”	$ 13.98	$ 13.98
1	wood rod for shade material (.5” diameter	$ 1.99	$ 1.99
1	metal spools for cable	donated	donated
1	wood rod 3'	$ 2.59	$ 2.59
2	wheel with ball bearings; door roller	$ 4.47	$ 4.47
1	plastic windows (3' x 12”)	$ 6.29	$ 6.29
4	nylon motor gears (40 teeth)	$ 1.25	$ 5.00
1	Super glue	$ 4.25	$ 4.25
1	breadboard	$ 5.00	$ 5.00
1	expansion cable 6"	$ 6.00	$ 6.00
		Total:	$ 229.71

(cont'd) Costs – Lab Use

- $92.00/39 hrs.(lab usage for sem.) = $2.36

- This is the hourly rate for the lab usage

LABORATORY RESOURCES	Est. Cost or Hours	Actual Cost or Hours	Hrly. Lab Cost	Subtotal
Lab Course Fees	$92.00 x 4	$92.00 x 4		$368.00
Use of lab as a group (during scheduled - class time)	40 hrs.	40 hrs.	$ 2.36	$94.40
Use of lab as a group/individ - ually (during non - scheduled class time)	292 hrs.	268 hrs.	$ 2.36	$ 632.48
Total Team Lab Usage Charge	332 hrs.	308 hrs.		$ 1,142.40

Table C-2: Actual Costs of Lab Use

(cont'd) Costs – Labor

The average hourly pay rate for an IT or Engineer profession in TX. is: $25.46

The hourly pay rate set here is $25.00 which is the dream pay rate all members desire.

Employee	Hourly Pay Rate		Est. Working Hours	Actual Hours Worked	Salary
Garza, Zeida	$25	2.5	~ 170	196	$12,250
Lemos, Rolando	$25	2.5	~ 170	139	$8,687.5
Munguia, Rigoberto	$25	2.5	~ 170	160	$10,000
Tellez, Dennise	$25	2.5	~ 170	220	$13,750
		Total:	680	715	$44,687.5

Table C-3: Actual total salaries.

(cont'd) Costs – Project Cost

- The project's actual cost: $46,289.32.
- *A difference of $4,315.80*

Total Project Cost		
	Estimated	*Actual*
Salaries	*$41,000.00*	*$44,687.50*
Parts	*$190.00*	*$229.71*
Lab Use	*$ 783.52*	*$1,372.11*
TOTAL:	*$ 41,973.52*	*$46,289.32*

Table C-4: Total Project Cost

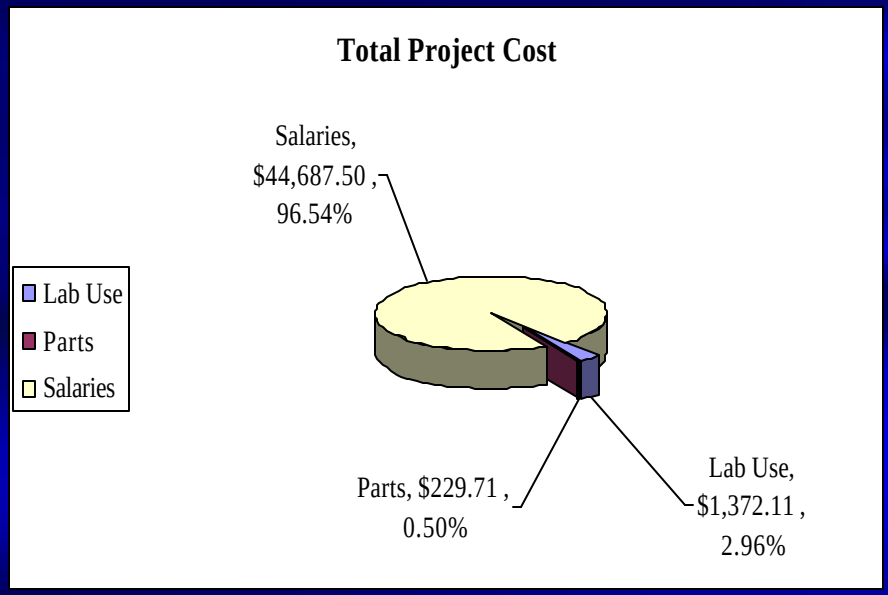


Figure C-1: Pie Chart for Table C-4; total project cost.

References

- *www.salary.com, "IT" and "Engineering". Oct. 2005*
- *http://www.uh.edu/sfs/Fee_Schedule/Fall_2005/BAFFEE_CFWW.htm; University of Houston, Fee Schedule on College Course Fees. Oct. 2005*
- *http://atmel.com/dyn/products/product_card.asp?part_id=3044; Atmel Products. Oct.2005*
- *www.bipom.com*

Any Questions????