TrashTalk

Group 15

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What is TrashTalk?

- Effective system that would make trash management much easier

- Would decrease unnecessary manpower

- Would drastically cut cost

  - Allow for a compilation of usable data for future reference
 - Would make his life a lot easier

Application

- Residential Area such as apartment complexes with outside trash bins
- Theme parks such as Disney or Universal
- Big city parks such as **New York City's** Central Park

Specifications

|	
Trash Levels	Detect 50% & 100%
Battery Life	5600 hours continuously
Output Power	> 1W
Simultaneous Voltage	3V, 5V, 9V
Wireless Mote Range	> 50 feet
Depth Sensor Range	> 1 meter

Block Diagram
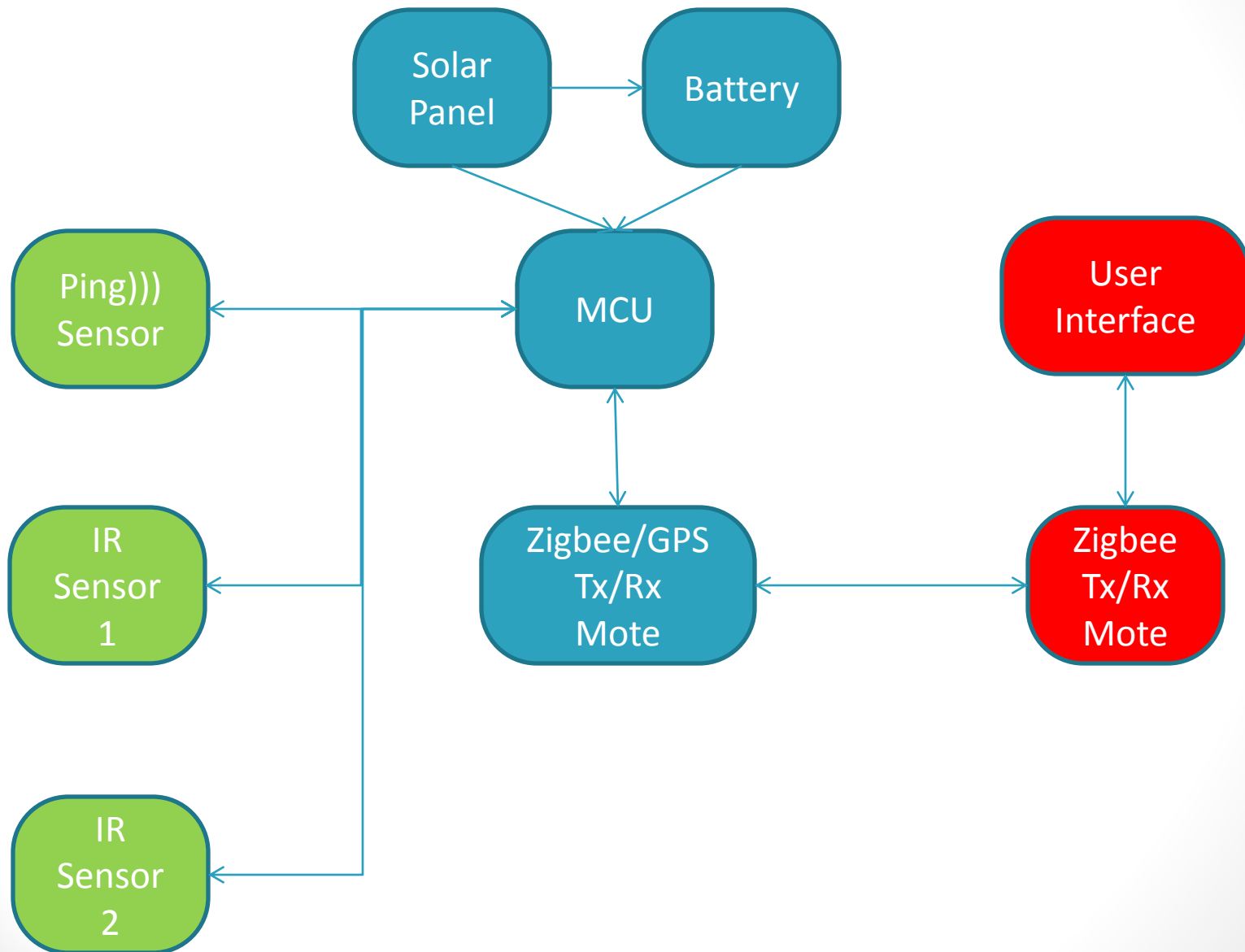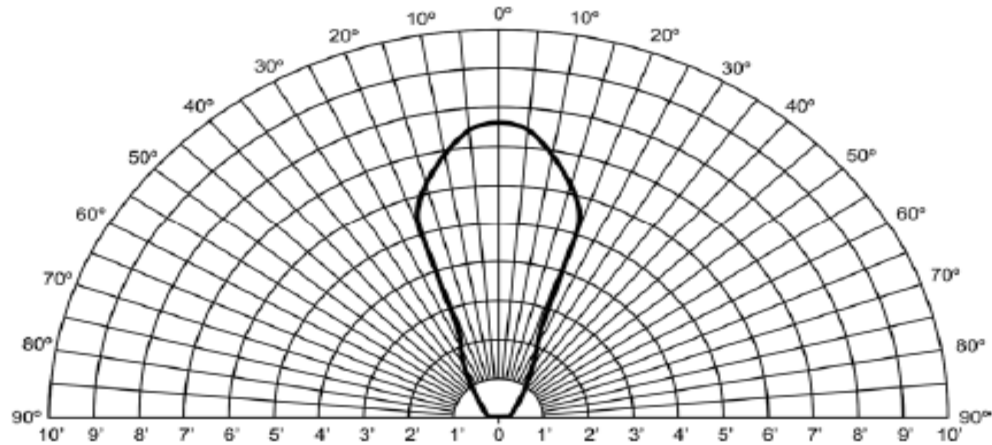
Trash Can

Sensors

- Parallax Ultrasonic Sensor
- Proximity IR Sensor
- Software heavy

Parallax Ultrasonic Sensor

- Inexpensive
- Range and functionality
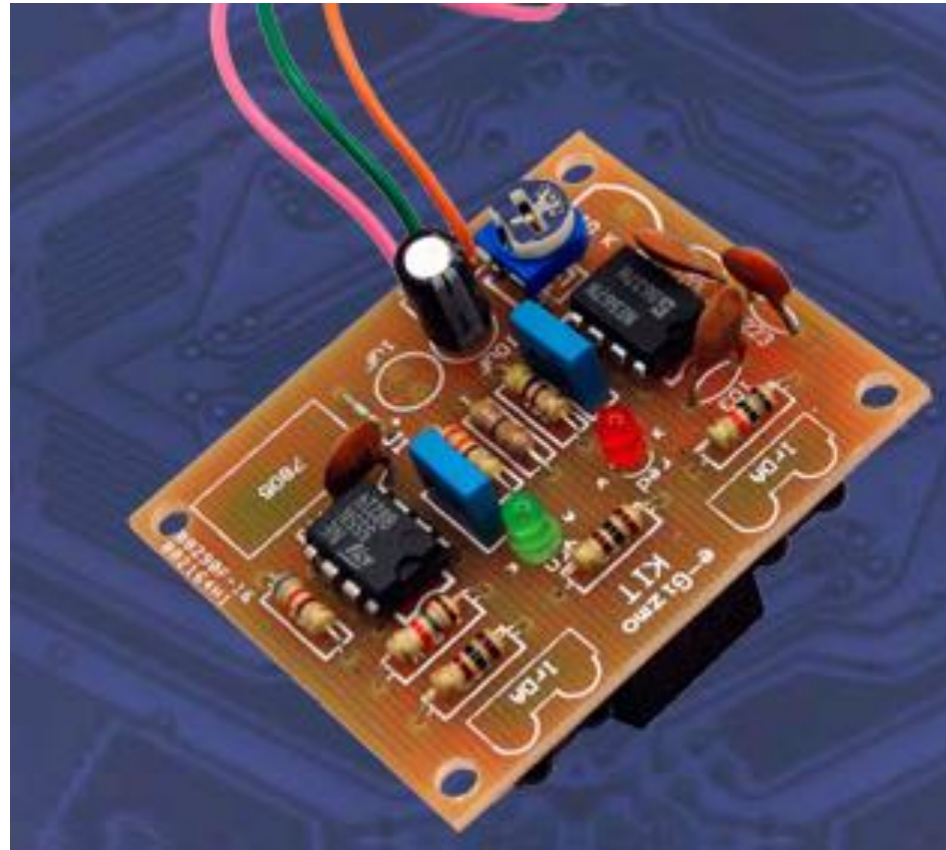- Dimensions (22 x 46 x 16 mm)

Parallax Ultrasonic Sensor Operation
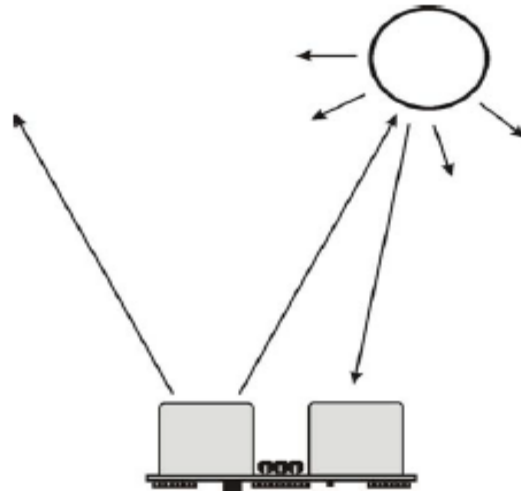
Parallax Sensor Placement

Proximity IR Sensor

- 71 x 75 mm
- 25cm range

Proximity IR Sensor
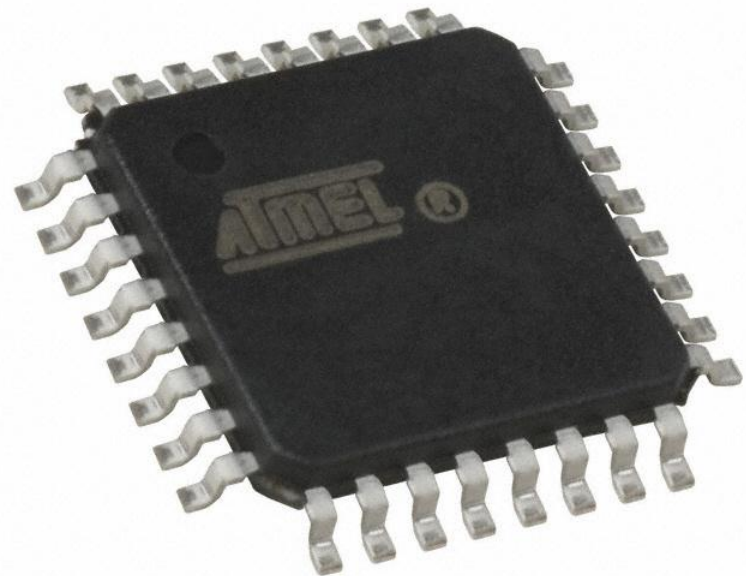
IR Sensor Placement

Errol's Section

- Microcontroller
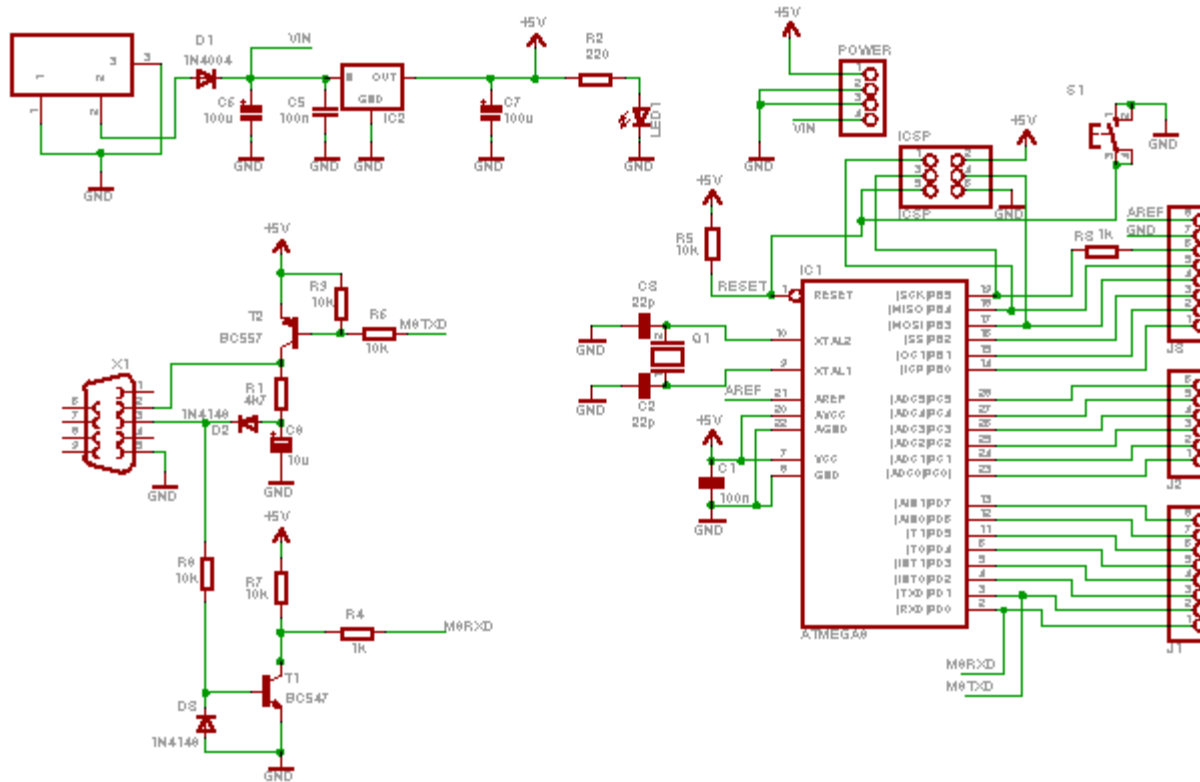- Mesh Network

Microcontroller
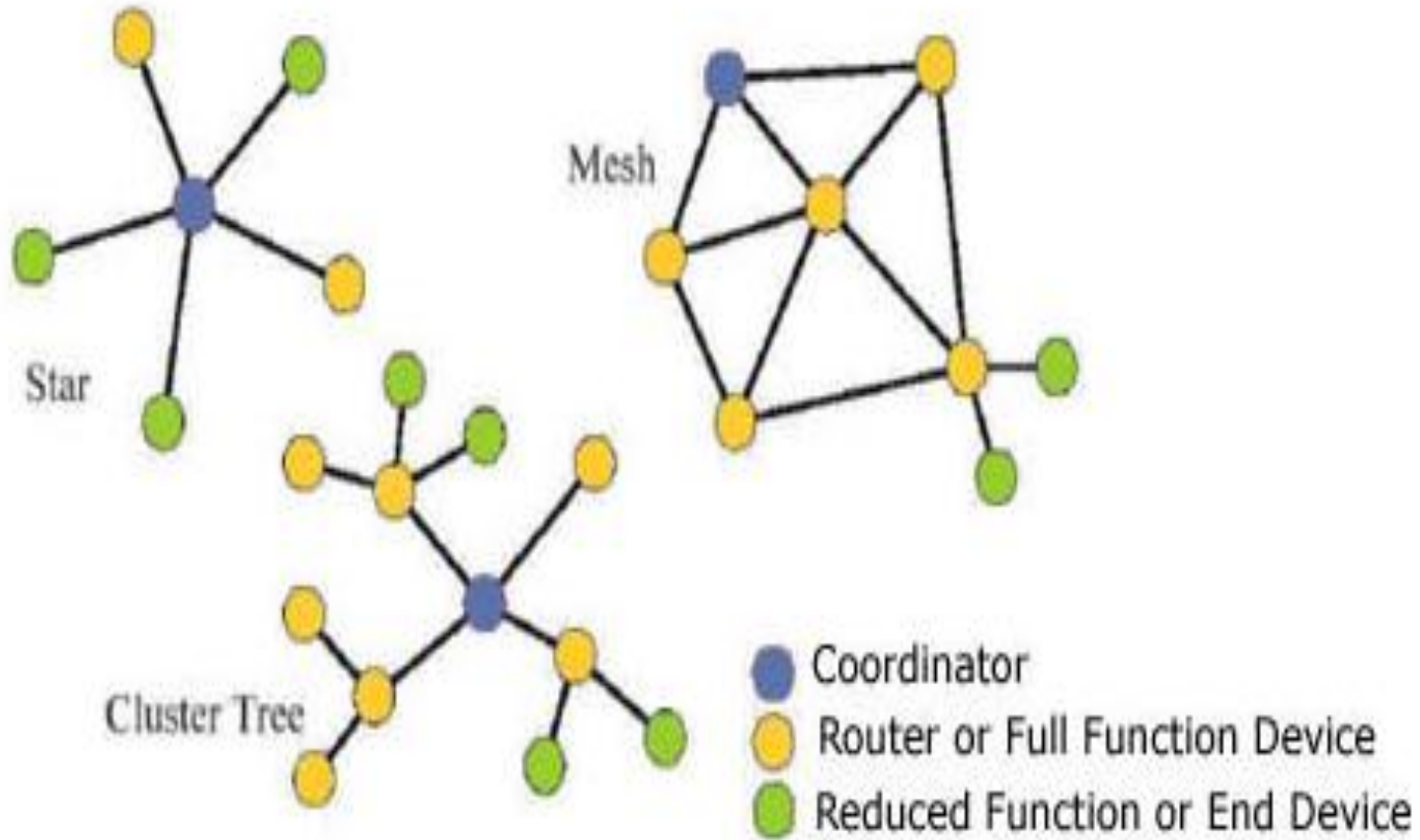
MSP 430
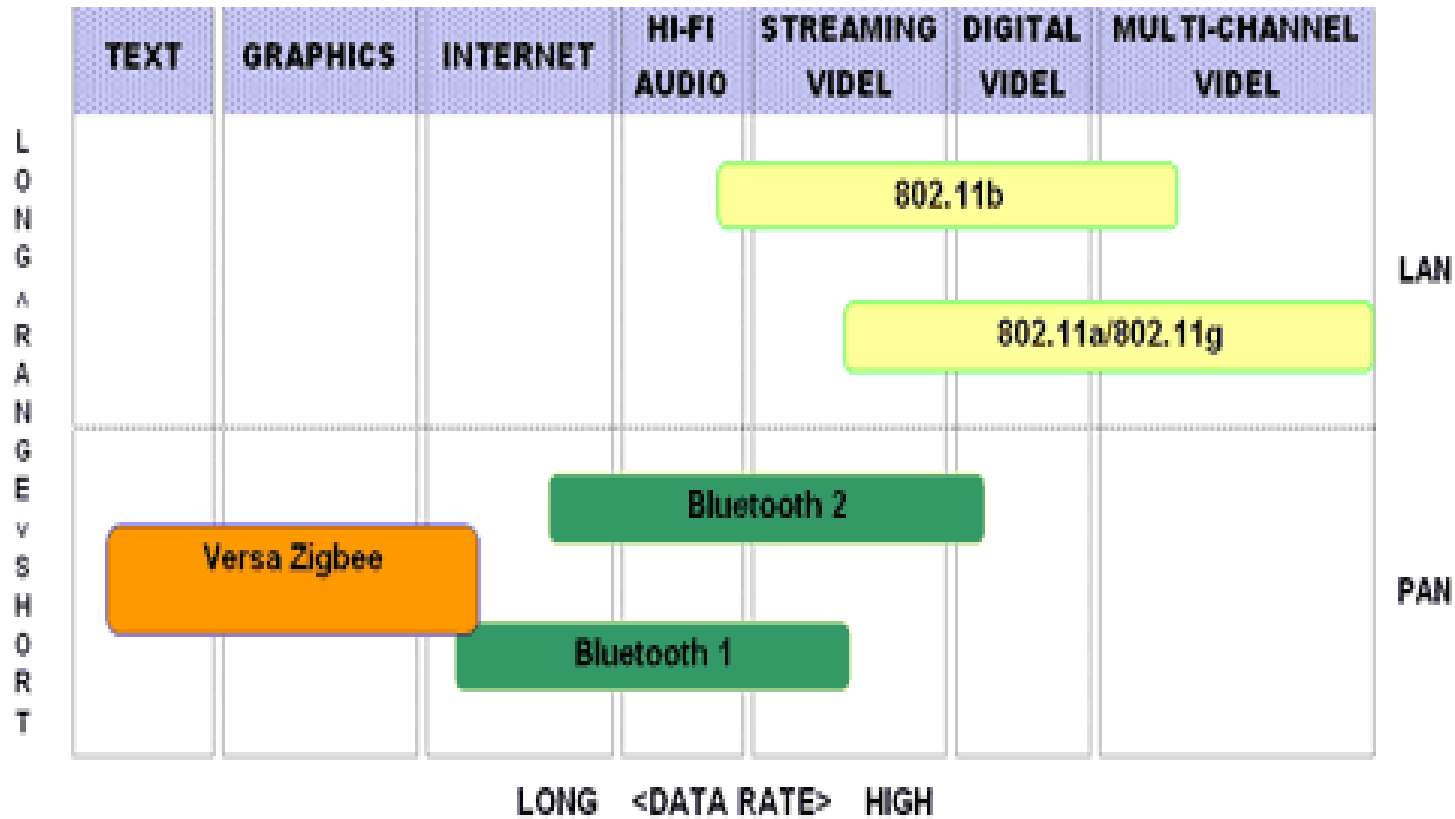
Atmel Atmega328

Atmel Atmega328

Network

Wireless Communication

Wireless Mote

Size(in) : 2.25 x 1.25 x 0.25

- Tiny wireless platform for sensor networks
- Designed specifically for sensor networks
- > 1 year battery life on AA Batteries
- 868/916 MHz multi-channel/ radio frequency

MIB 520

- Allows the setup of a base station
- Allows aggregation of sensor network data onto a PC
- MIB 520 provides an interface for both programming and data communication

Power Supply

Figure 17: A solar panel

- The power supply subsystem will consist of the utilization of power from a solar panel as well as a central battery terminal.

- The battery terminal will efficiently be charged by the solar panel.

- Battery terminal will use Nickel Zinc(NiZn) batteries.

Battery Selection

- Battery selection very important as to ensure the overall design receives consistent adequate amount of power to perform correctly.
- Top 3 batteries as follows with a few specifications provided

	Nickel Zinc(NiZn)	Nickel Cadmium(NiCd)	Lithium-ion(Li-ion)
Output Voltage	1.65V (initially 1.85)	1.22V	1.5V
Output Current	1350-1500mAh	600-1000mAh	2100-3000mAh
Recharge Cycles	300-800	500-2500	50-200
Temperature Range	-4° to 140° F	-22° to 140°F	-40° to 140°F
Performance in High Drain devices	Excellent	Very Poor	Excellent

Overall Capability of the Power system

*Provide between 3V-9V to various different components simultaneously
*Last for More then 8 months without any maintenance
*Monitor itself and make the necessary changes
* In the case of needed maintenance, easily provide quick useful information for the technician
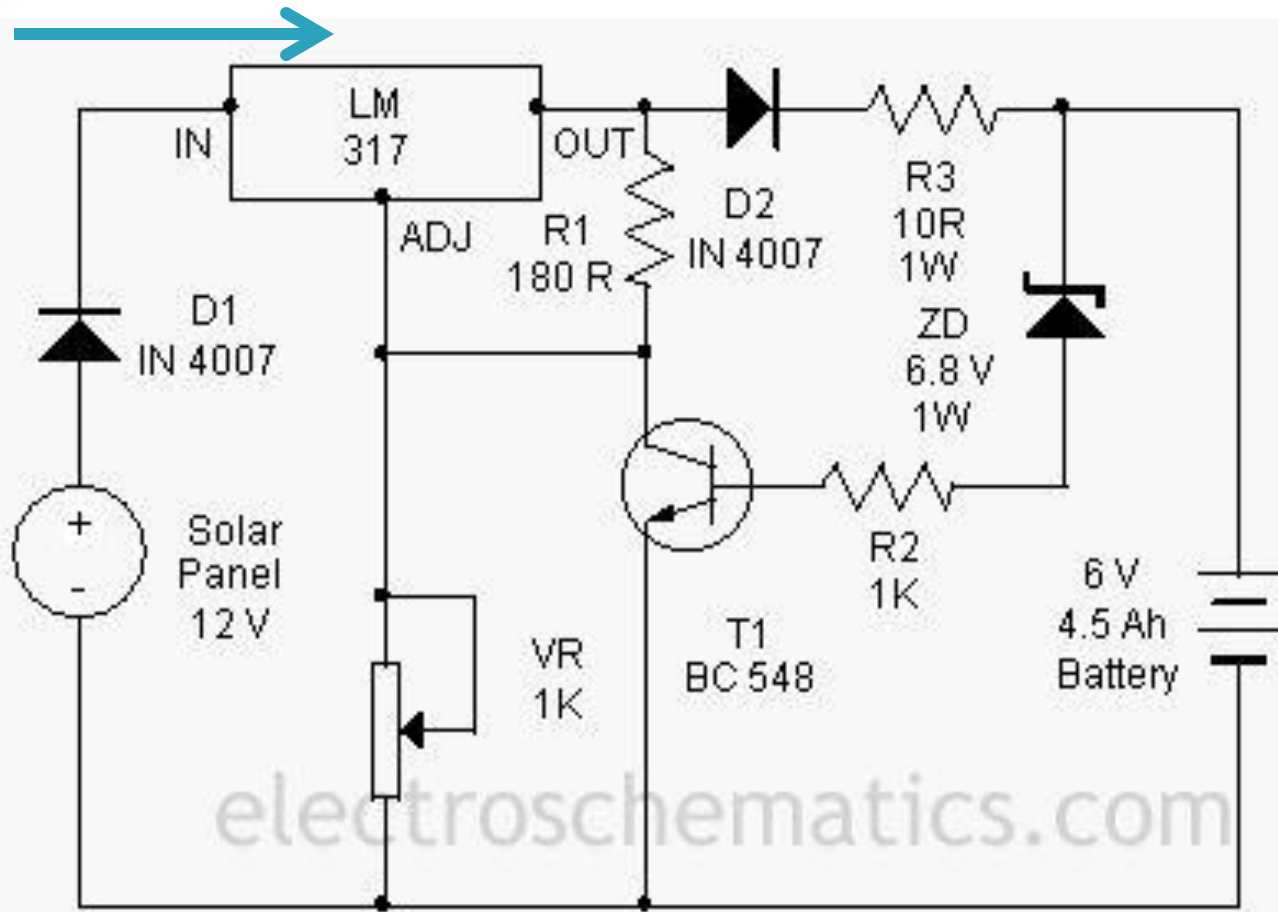
Solar Charger with Current regulation and Cut off

*Solar panel powered automatic charger with automatic cut off reference circuit
*Circuit design concept

- Ordinary operation while charging battery
- Cutoff capability
- Feedback capability while performing correctly

User Interface

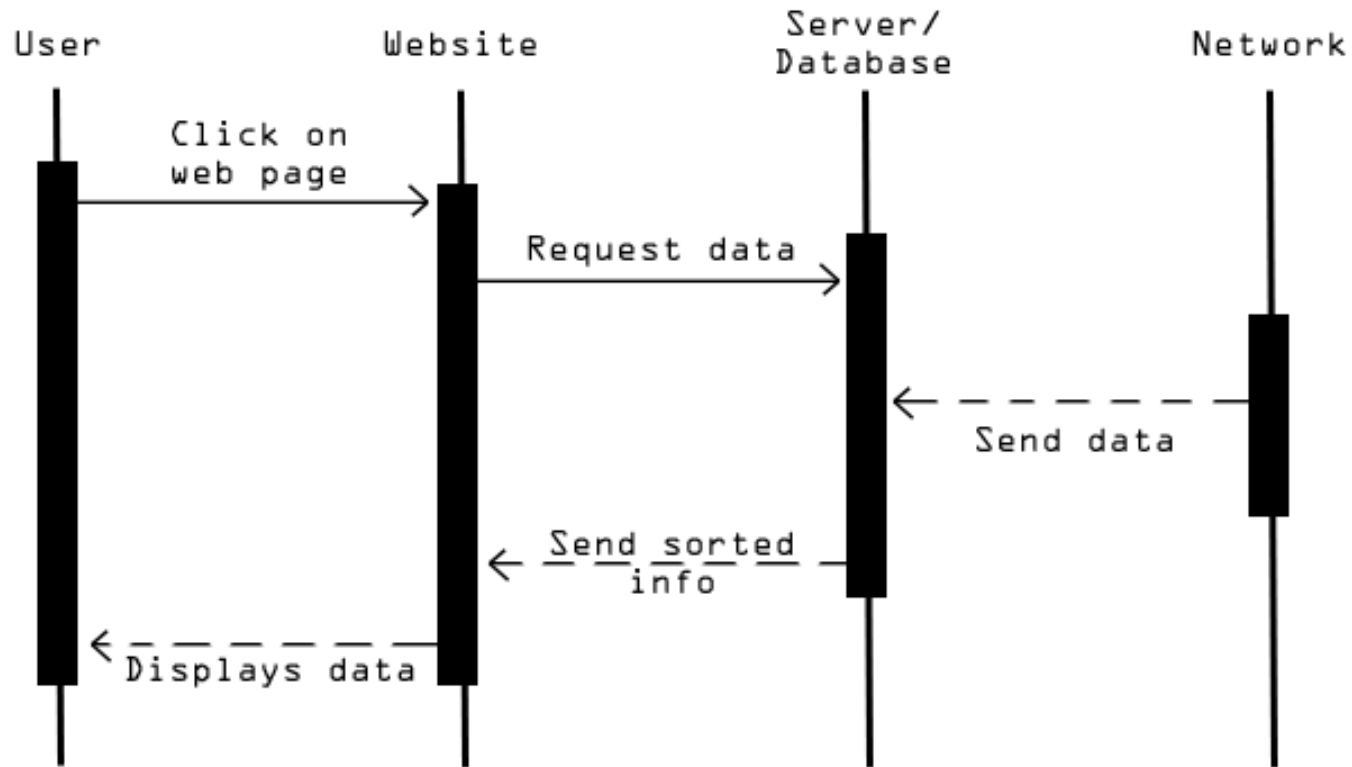Main Components:
- Map
- Status Box
- Map Legend

Links:
- Home
- Administrator

Sequence Diagram

Administrative User

- Trashcan history
- Add a trashcan
- Remove a trashcan
- Change the location of a trashcan
- Logout

Administrative Content

Work Distribution

	Sensors	Wireless Network	User Interface	Power Systems
Errol		✔		
Jaquan				✔
Rahn	✔			
Paula			✔	

Budget

Nomenclature	Cost (each)	Quantity	Total Cost
Depth Measuring Sensor	$30.00	1	$30.00
IR Sensor	$10.00	2	$20.00
Trash Can	$300.00	2	$0.00
Mounting Supplies	$10.00	2	$20.00
Enclosure	$50.00	2	$100.00
Wire	$10.00	3	$30.00
Microcontroller	$65.00	3	$195.00
Wireless Node	$85.00	2	$170.00
Solar Panels	$60.00	2	$120.00
Rechargable Batteries	$15.00	3	$45.00
Power regulator PCB Board	$45.00	2	$90.00
		TOTAL	$820.00

Progress
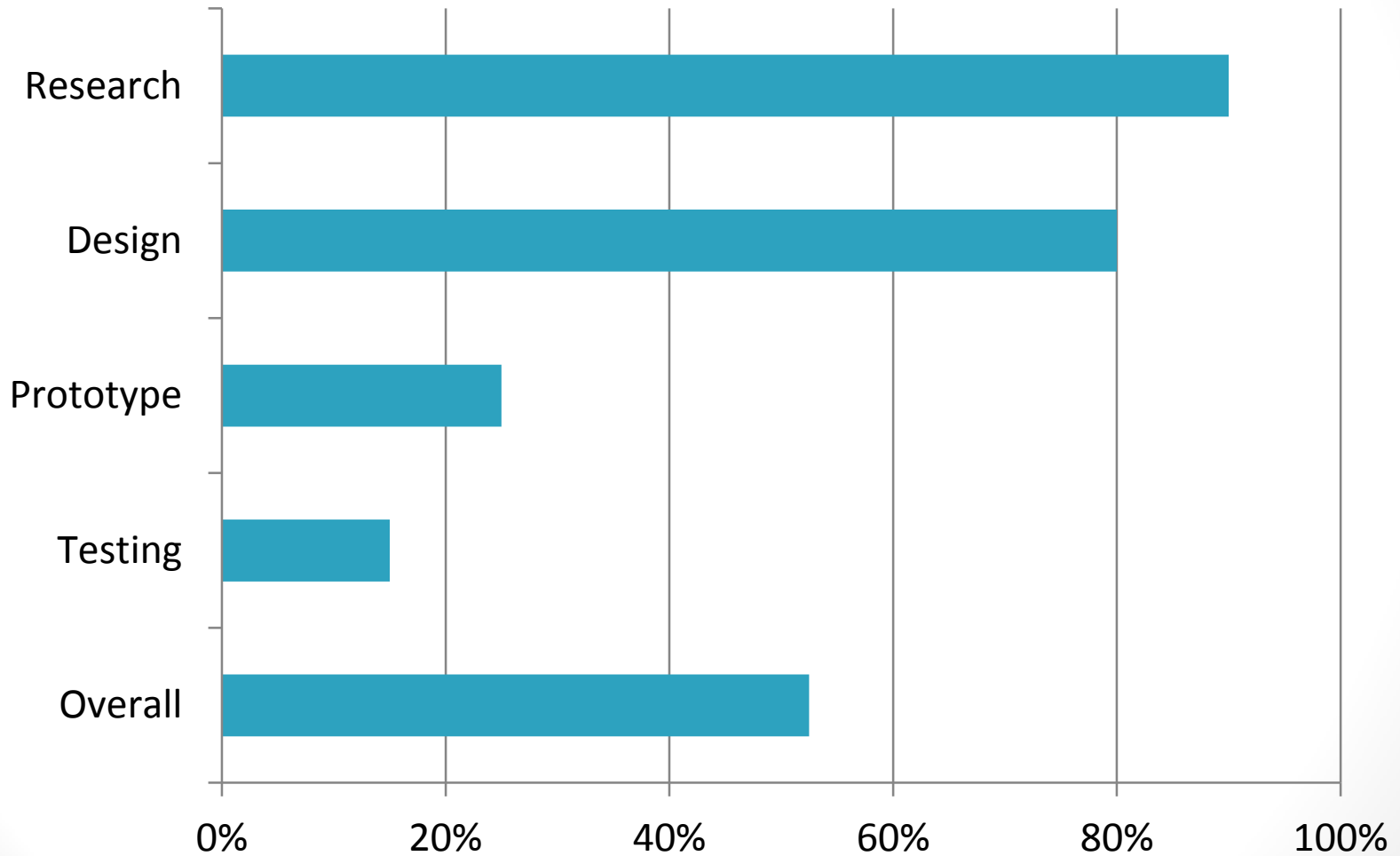
Issues

- PCB design (4PCB.com)
- Parallax sensor does not read small objects well; perform well in wet environments
- Contact with e-gizmo affecting IR sensor production
- Relay for power system

Questions?