IntelliPark System

Team 12
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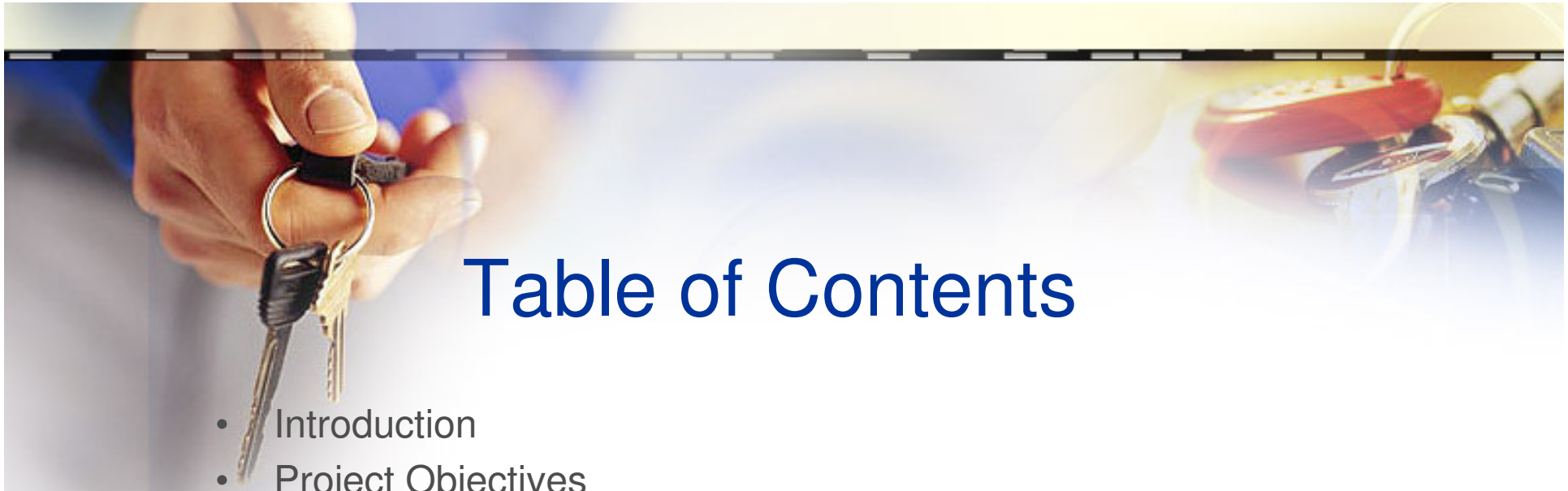
Course/Section: ELET 4308/4208 Section 1
Instructor: Dr. Farrokh Attarzadeh

University of Houston
College of Technology

Semester: Fall 2008
Date: 12/4/2008



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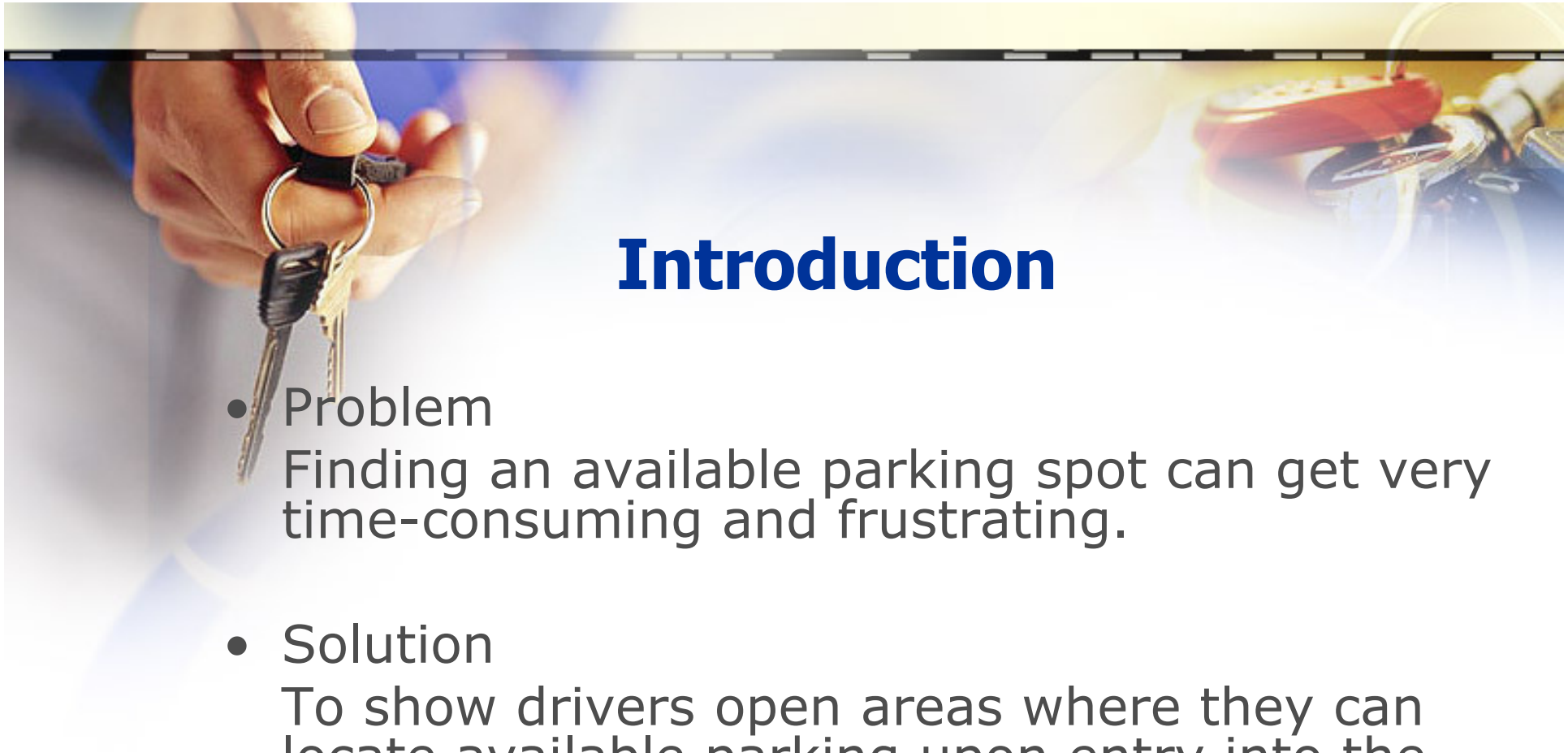


Introduction

- Problem

  Finding an available parking spot can get very time-consuming and frustrating.

- Solution

  To show drivers open areas where they can locate available parking upon entry into the lot using sensors meshed through a wireless network.

- Motivation

  University of Houston parking system

Design Objectives

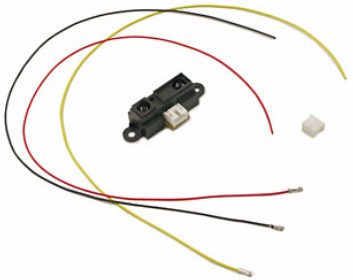
- To design a system to transmit data from sensors to a computer system using infrared proximity sensors

- To allow users access to the entrance of the gate without having to press a button, slide a card, or enter a code using RFID technology

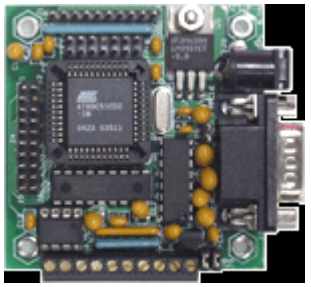
Project Description

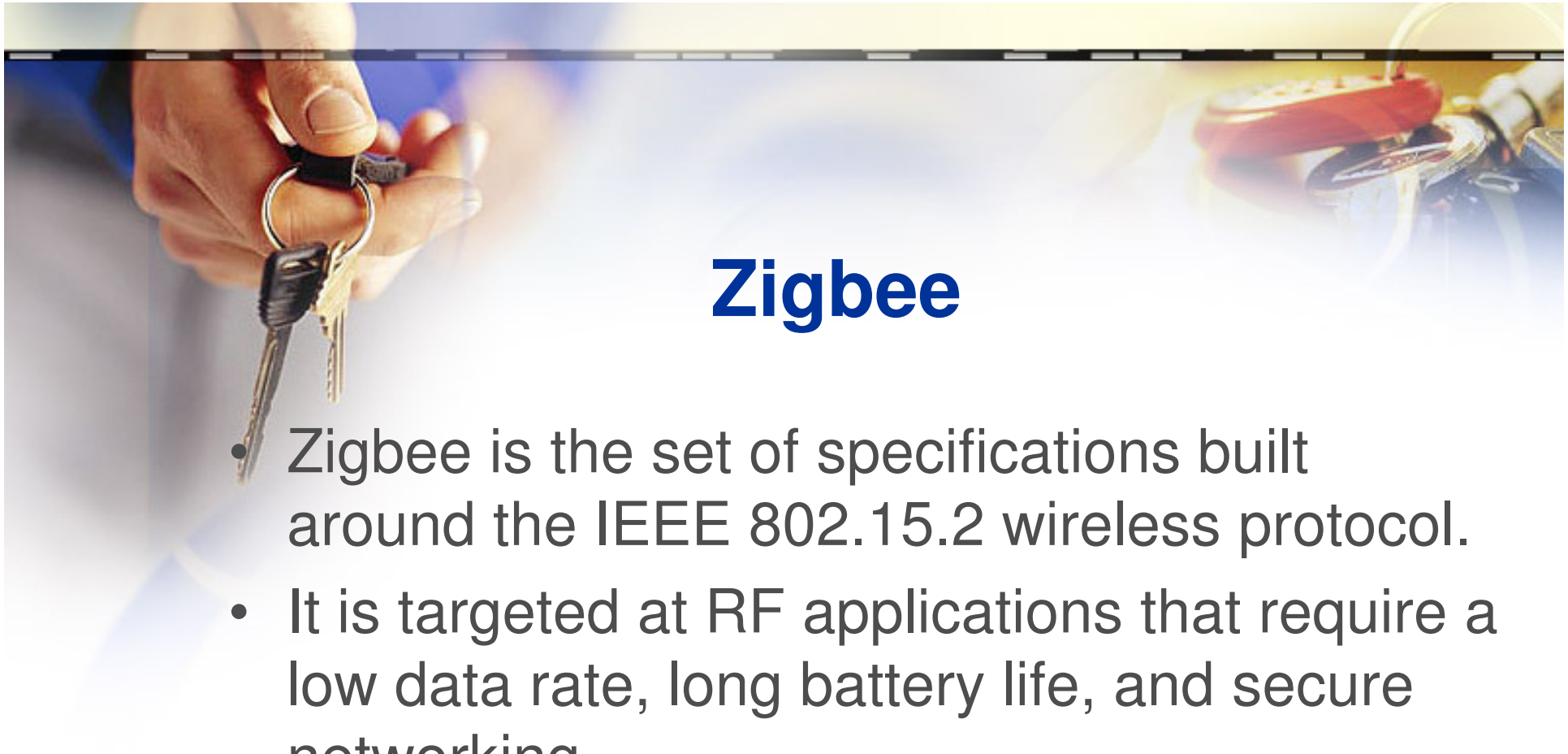
- RFID Reader

- Zigbee
- Proximity Sensor



- Microcontroller

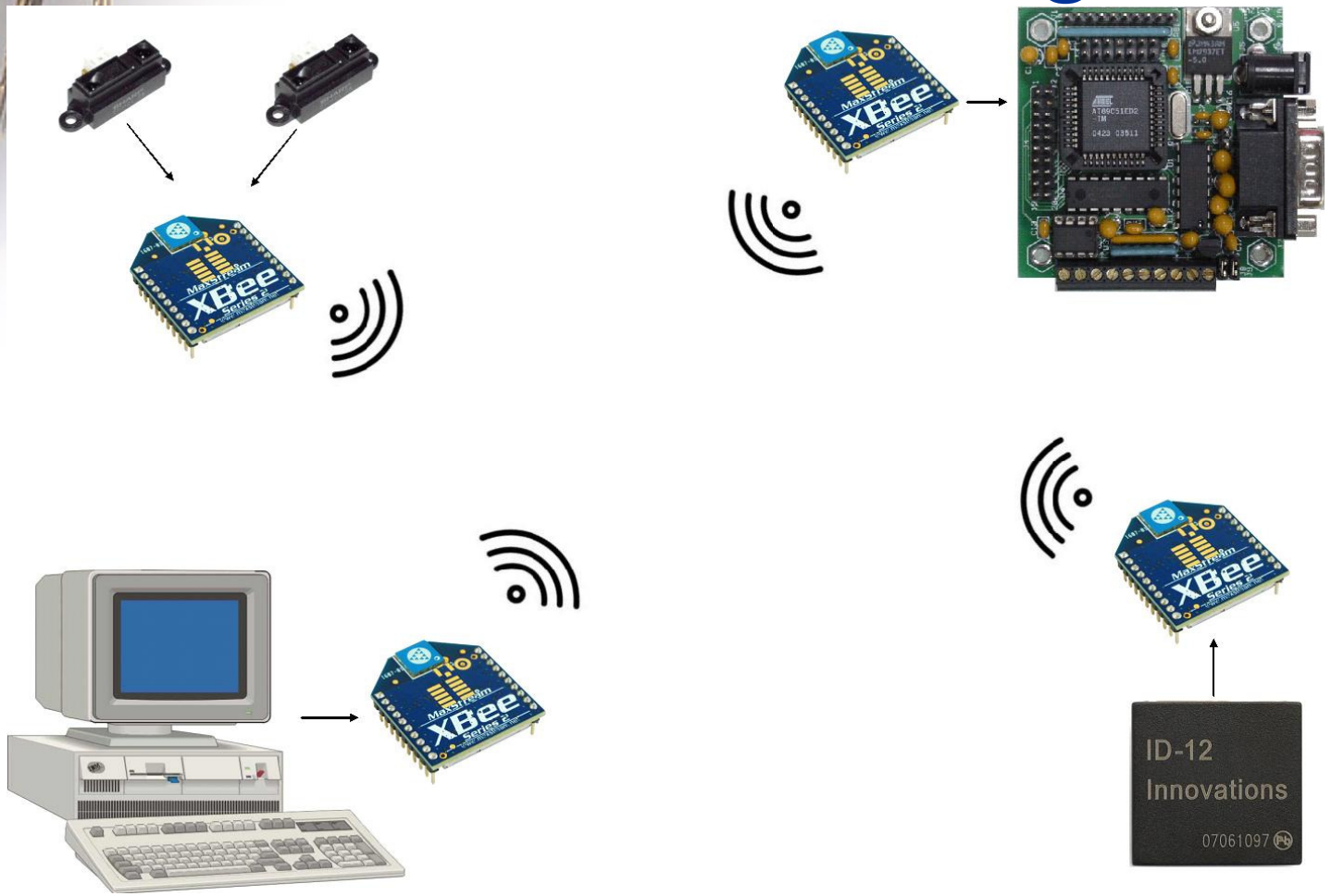




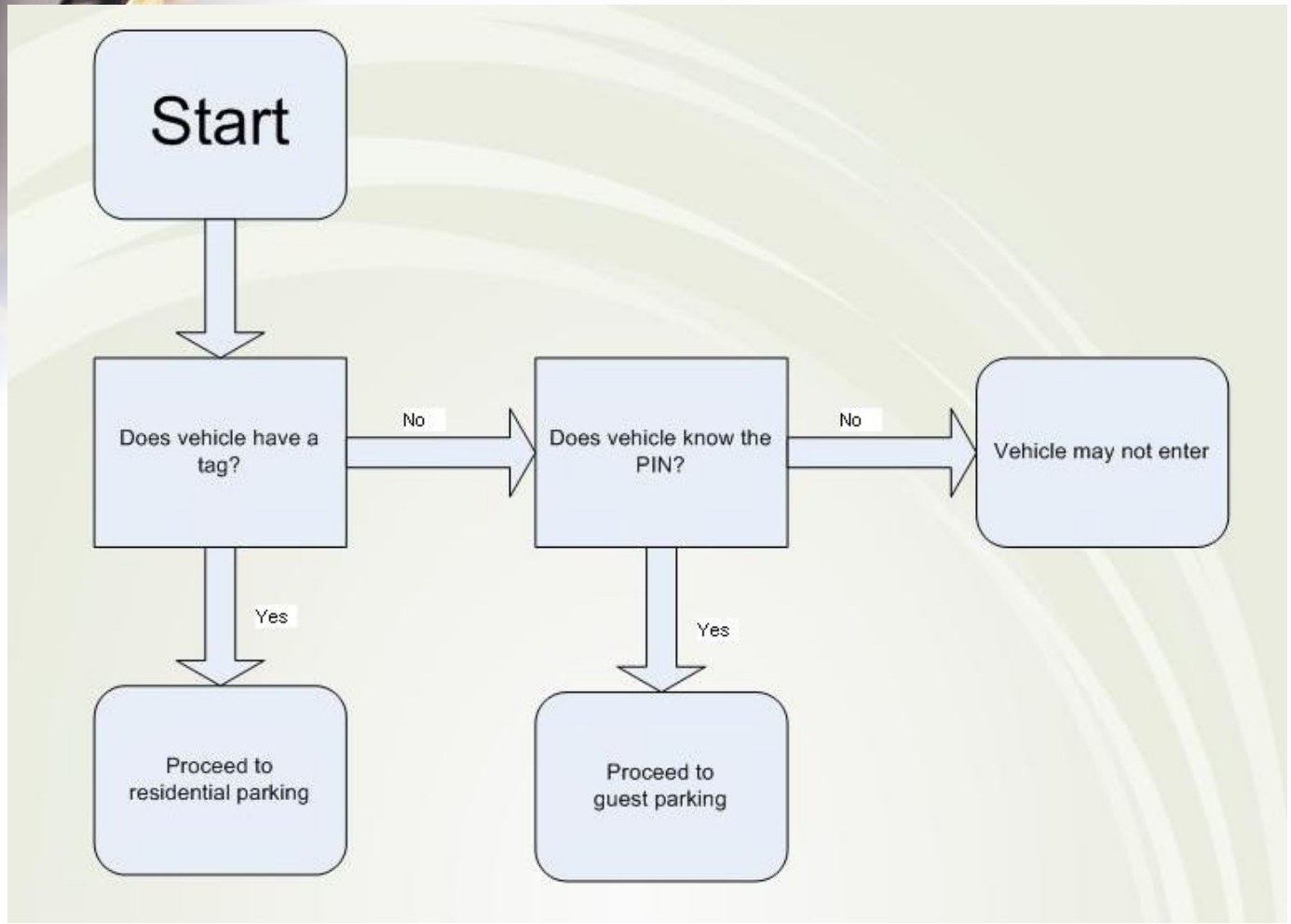
Zigbee

- Zigbee is the set of specifications built around the IEEE 802.15.2 wireless protocol.
- It is targeted at RF applications that require a low data rate, long battery life, and secure networking.
- Our plan was to network our sensors with Zigbee to communicate with the computer.

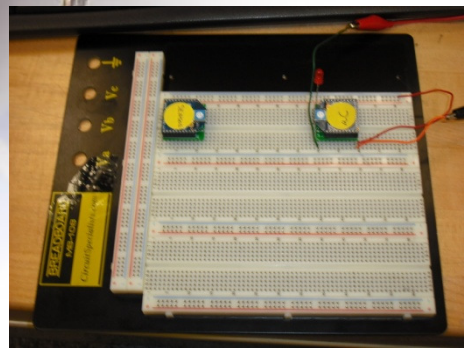
Hardware Block Diagram

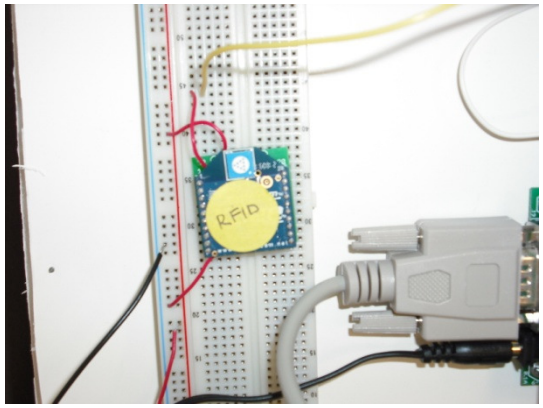


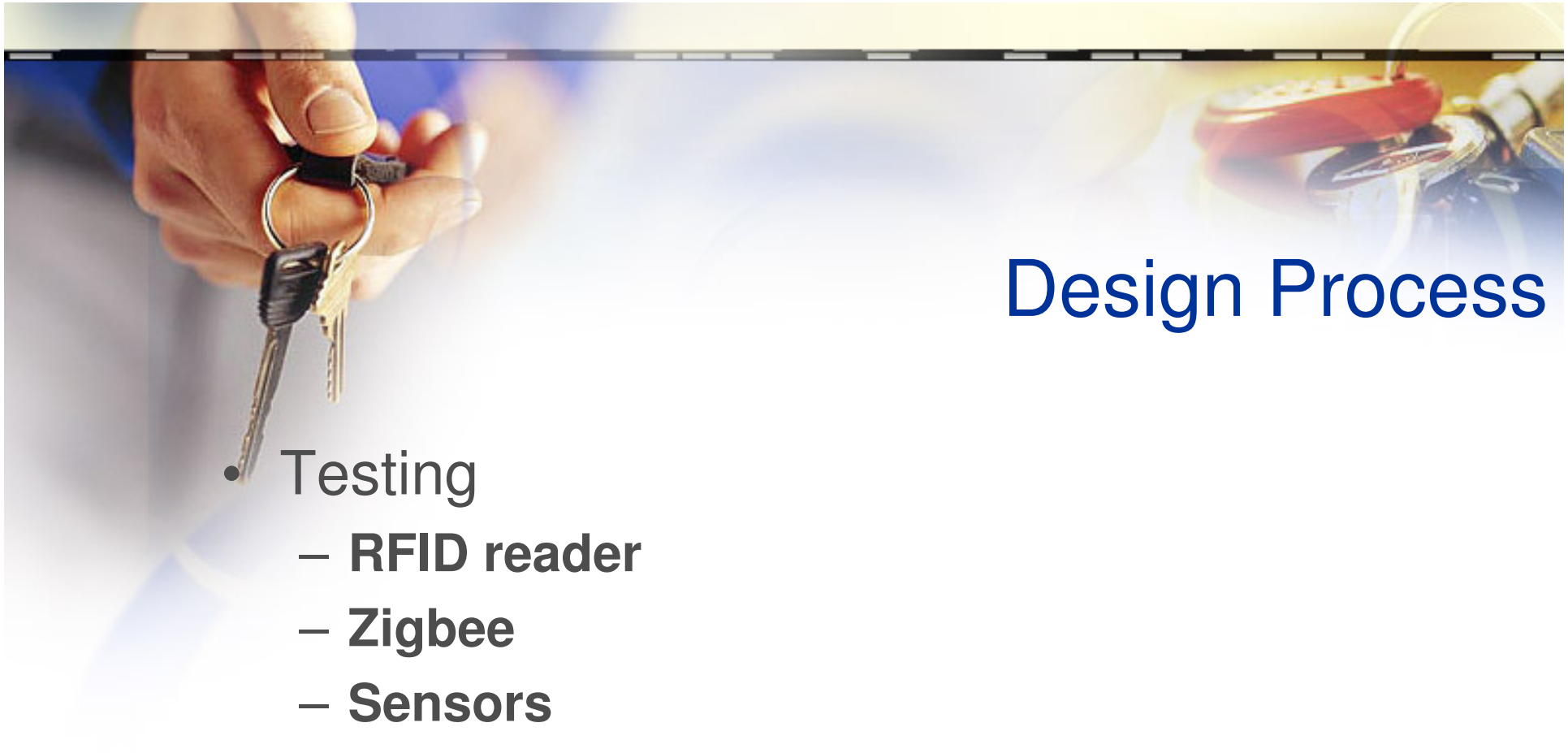
Flowchart


Start
Does vehicle have a tag?
No
Does vehicle know the PIN?
No
Vehicle may not enter
Yes
Yes
Proceed to residential parking
Proceed to guest parking

Actual Zigbee Network



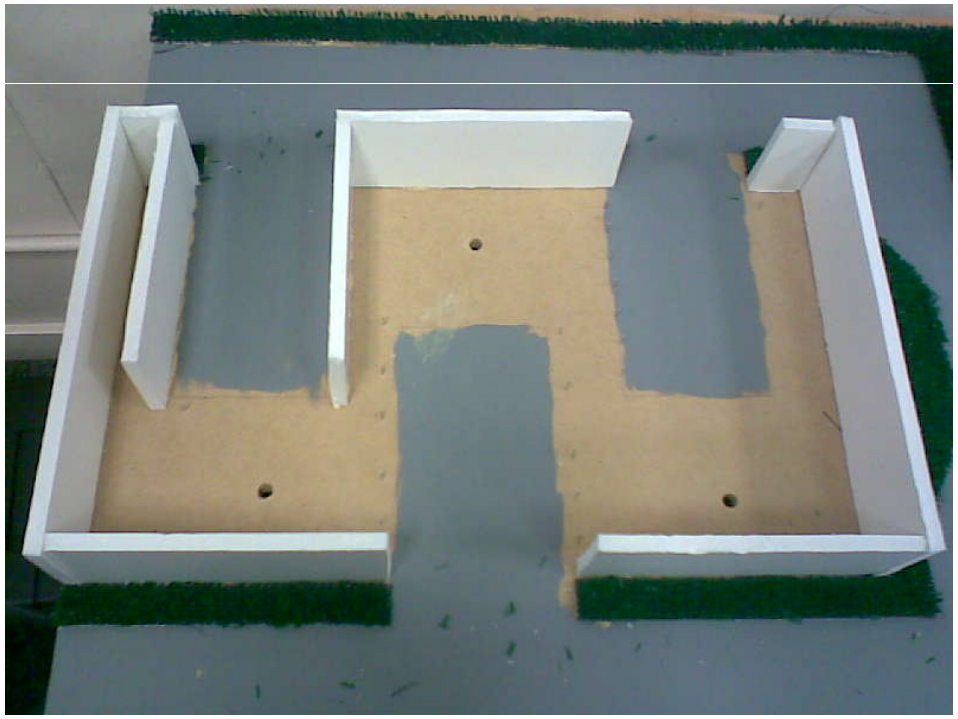




Design Process

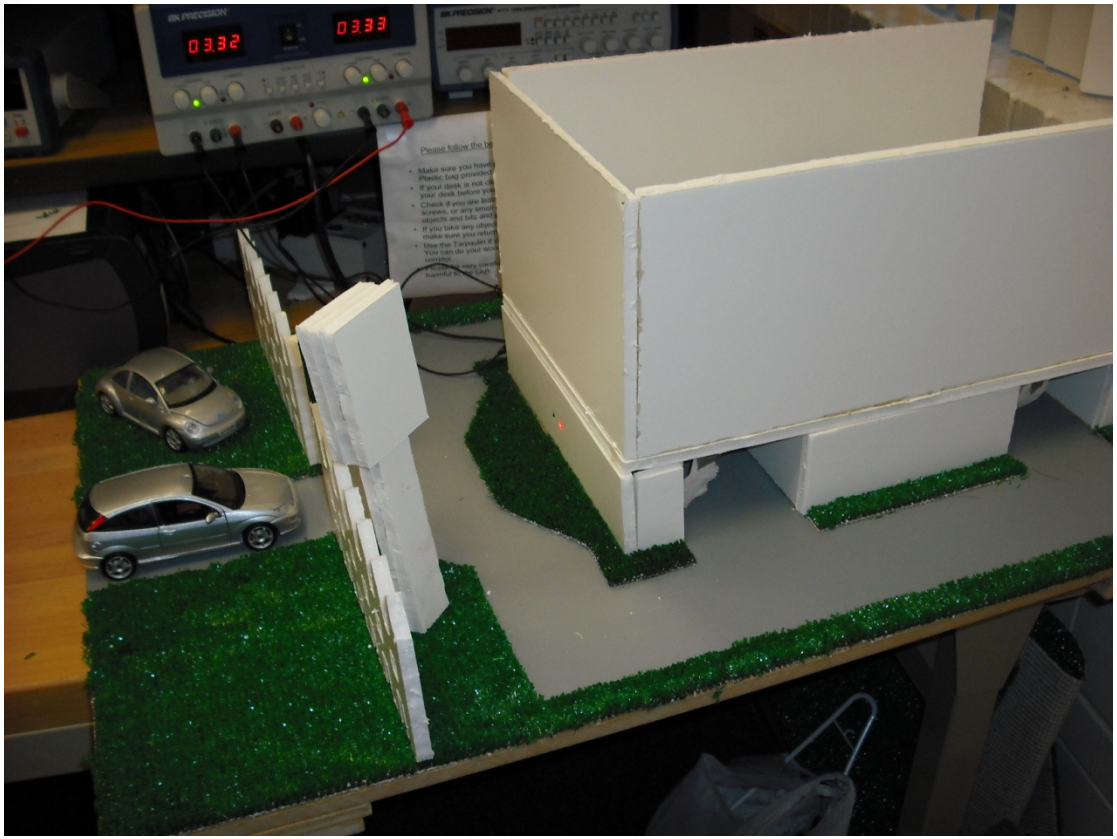
- Testing
  - **RFID reader**
  - **Zigbee**
  - **Sensors**
- Interfacing
  - **RFID reader**
  - **Sensors to Zigbee**

Phase 1

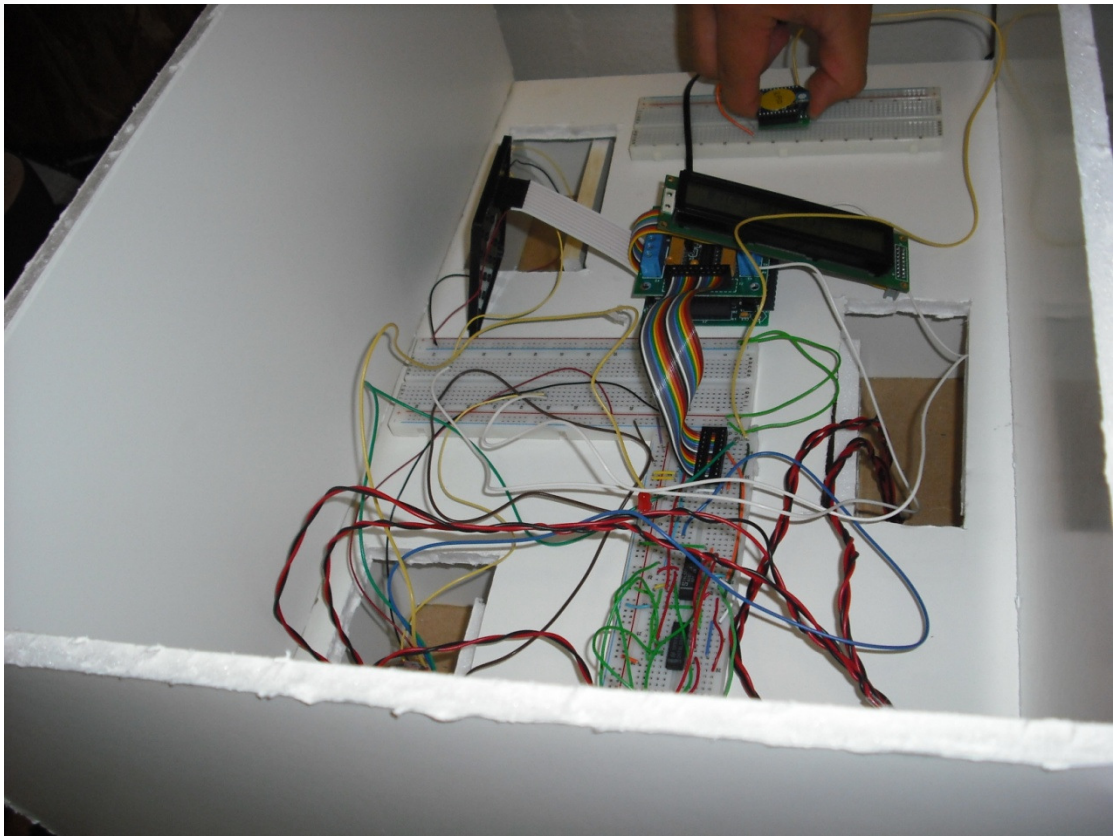


Phase 2

Phase 3



Phase 4

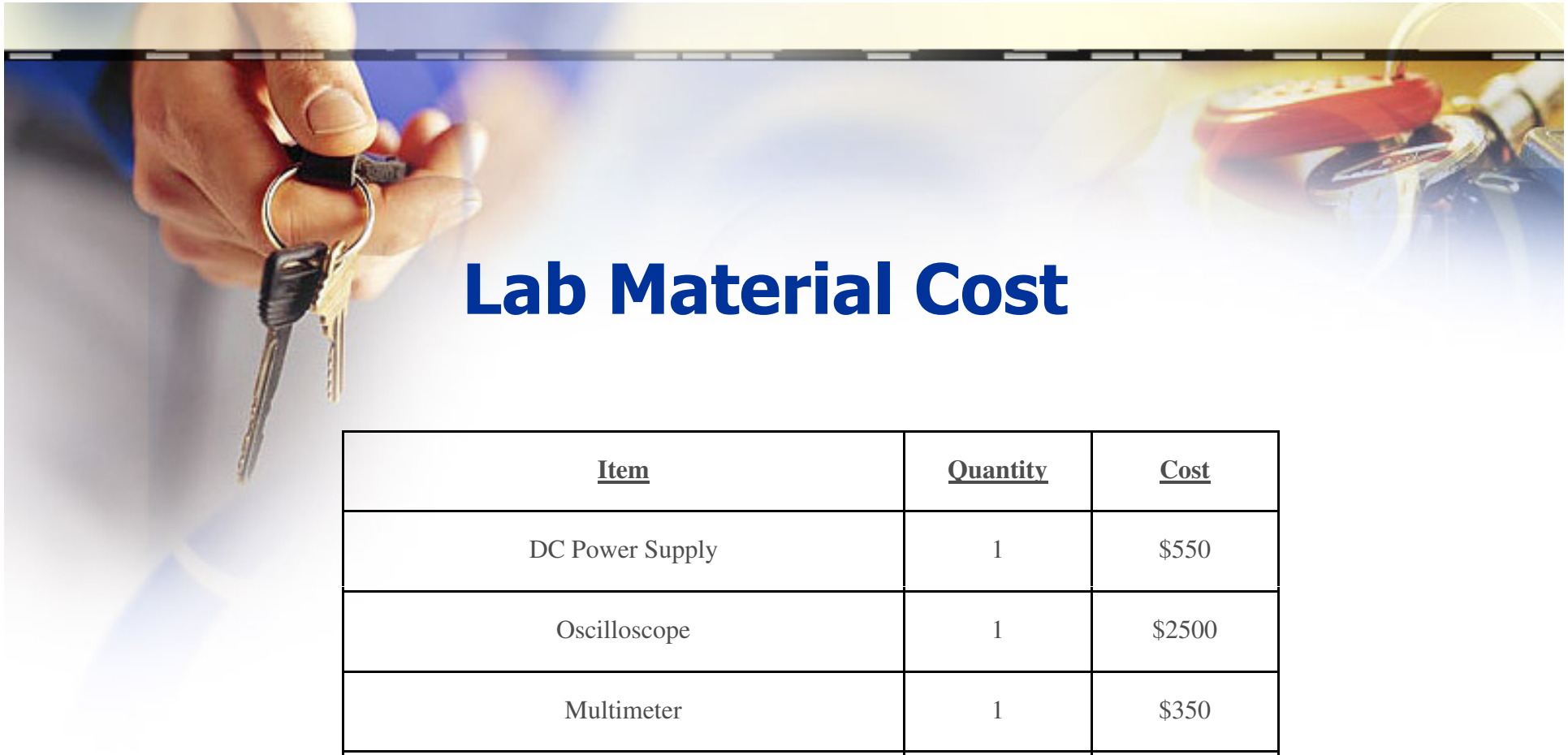


Cost Analysis

- Labor Cost
- Material Cost
- Lab Equipment Cost
- Total Cost

Actual Material Cost

Part	Quantity	Price	Total Price
Sharp GP2D120 IR Sensor	3	$12.50	$45.45
Breakout Board for Xbee Module	3	$2.95	$8.85
RFID Transponders	3	$1.95	$7.80
Break Away Headers-Straight	2	$2.50	$5.00
Xbee Explorer USB	1	$19.95	$19.95
RFID Reader ID-12	2	$29.95	$59.90
RFID Reader Breakout	2	$0.95	$1.90
KIT Mount Wire Strand	1	$10.50	$8.92
Rubber Cement	1	$2.19	$2.19
Wire Brads	1	$1.24	$1.24
Carpet	1.33	$5.85	$12.13
Liquid Nail HD(DONATED)	1	$2.27	$2.27
8 OZ Gorilla Glue(DONATED)	1	$12.97	$12.97
Microcontroller Kit(LCD& KEYPAD)	1	$150.00	$150.00
Xbee Modules	4	$19.00	$76.00
Integrated Circuit	1	$6.95	$6.95
Wood(DONATED)	1	$6.00	$6.00
Female to Male Null Modem	1	$5.95	$5.95
			$433.47



Lab Material Cost

Item	Quantity	Cost
DC Power Supply	1	$550
Oscilloscope	1	$2500
Multimeter	1	$350
Computer	1	$800
Totals	**4**	**$4,200**

Labor Cost

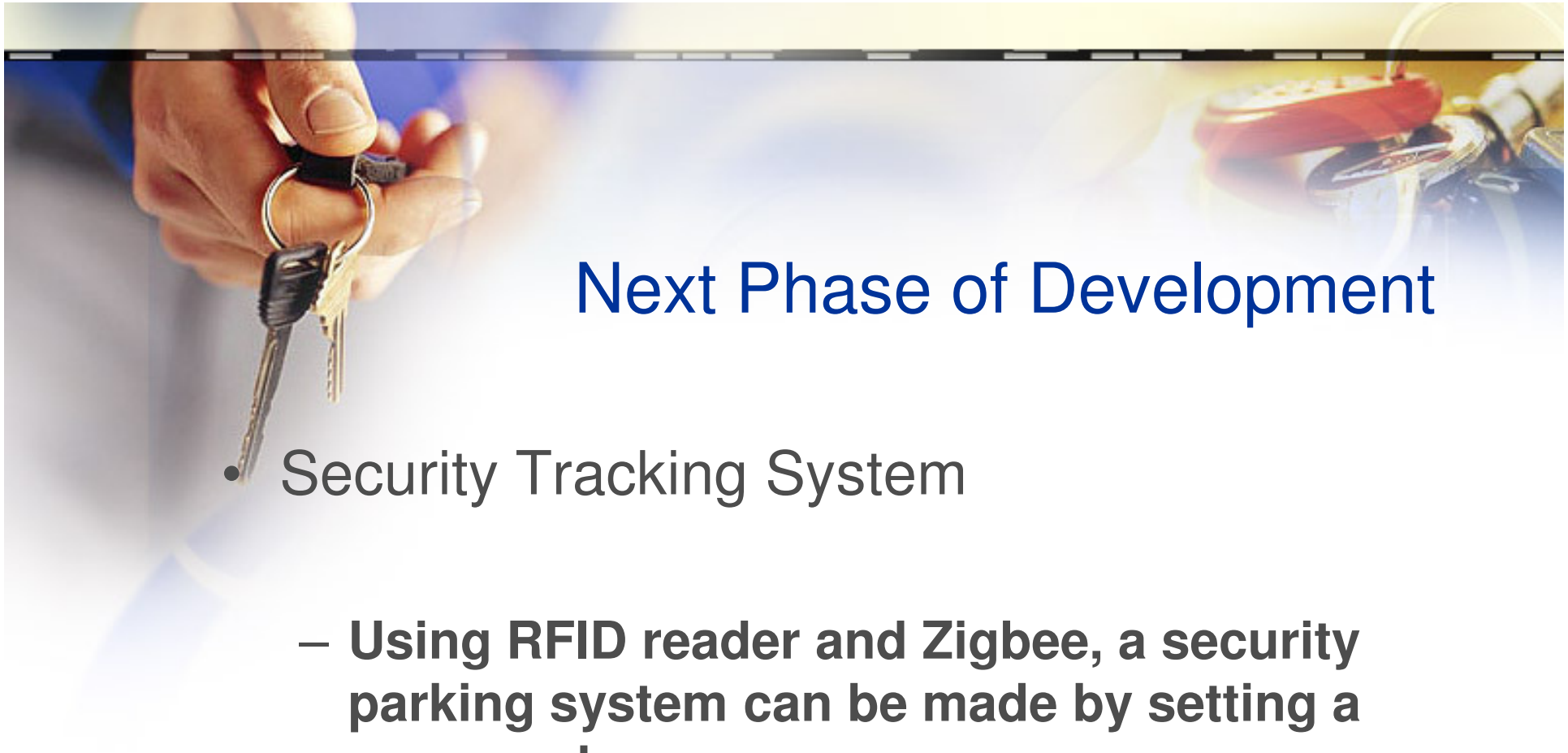
Team Member	Hours Worked	Wage Per Hour	Cost
Brandon Bob	150	$25	$9,375
David Dinh	150	$25	$9,375
Duc Tran	150	$25	$9,375
Marion Williams	150	$25	$9,375
Totals	**600**	**$25**	**$37,500**

Total Cost

Cost Type	Cost
Labor	$37,500
Material	$433.37
Lab Equipment	$4,200
Totals	**$42,133.37**

Project Constraints

- **8051 Microcontroller constraints**
  - **Zigbee**
  - **RFID reader**
- **Time constraints**



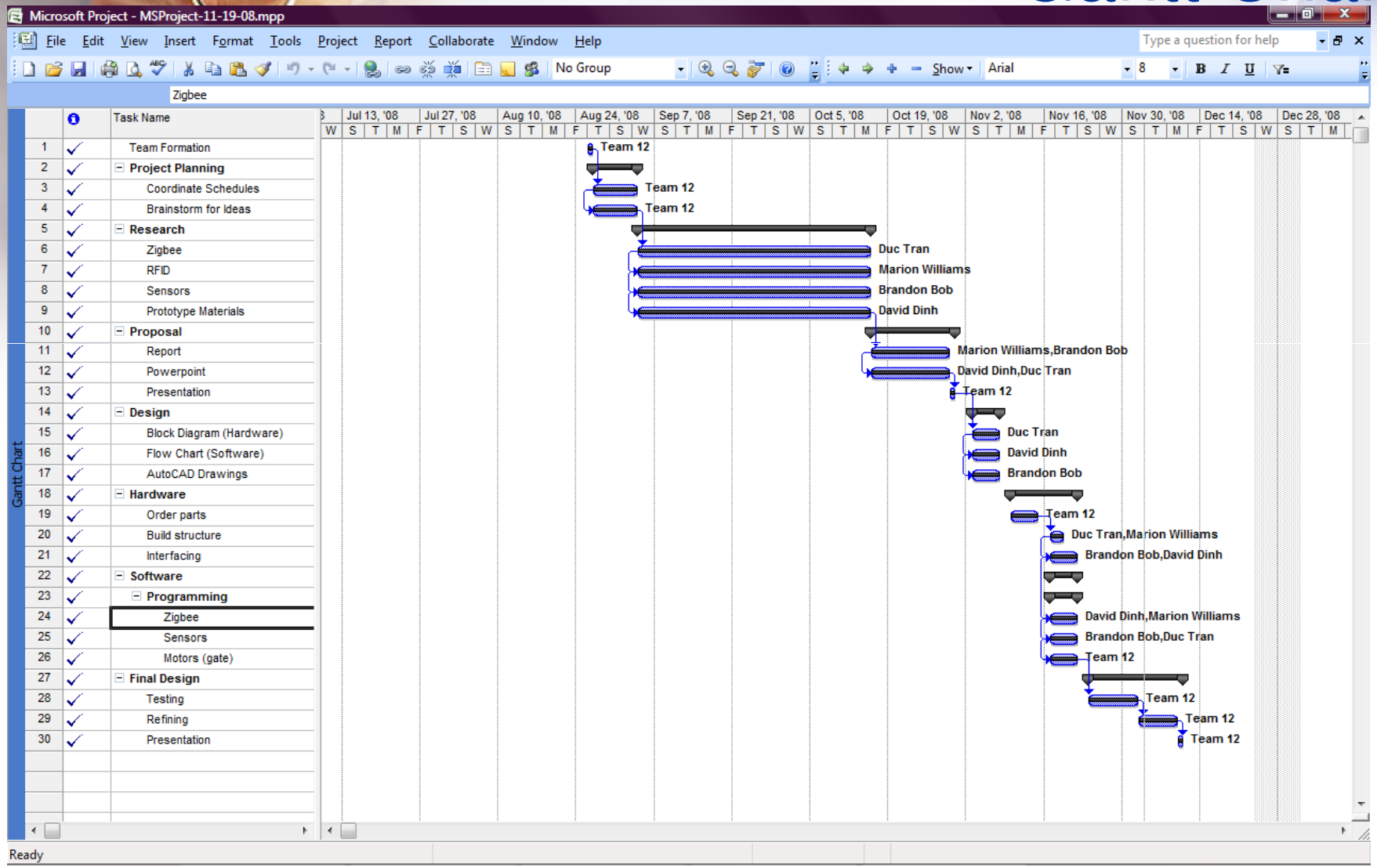
Next Phase of Development

- Security Tracking System
  - **Using RFID reader and Zigbee, a security parking system can be made by setting a password.**

Learning Experiences

- Team 12 Learning Experiences
  - **More experienced Programming Skills**
  - **Design Skills**
  - **Team work**
  - **Organization**

Gantt Chart


Microsoft Project - MSProject-11-19-08.mpp
File Edit View Insert Format Tools Project Report Collaborate Window Help
Type a question for help
No Group
Show
Arial
8
Zigbee
Task Name
Gantt Chart
Jul 13, '08
Jul 27, '08
Aug 10, '08
Aug 24, '08
Sep 7, '08
Sep 21, '08
Oct 5, '08
Oct 19, '08
Nov 2, '08
Nov 16, '08
Nov 30, '08
Dec 14, '08
Dec 28, '08
1 Team Formation
2 Project Planning
3 Coordinate Schedules
4 Brainstorm for Ideas
5 Research
6 Zigbee
7 RFID
8 Sensors
9 Prototype Materials
10 Proposal
11 Report
12 Powerpoint
13 Presentation
14 Design
15 Block Diagram (Hardware)
16 Flow Chart (Software)
17 AutoCAD Drawings
18 Hardware
19 Order parts
20 Build structure
21 Interfacing
22 Software
23 Programming
24 Zigbee
25 Sensors
26 Motors (gate)
27 Final Design
28 Testing
29 Refining
30 Presentation
Team 12
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Duc Tran
Marion Williams
Brandon Bob
David Dinh
Marion Williams,Brandon Bob
David Dinh,Duc Tran
Team 12
Duc Tran
David Dinh
Brandon Bob
Team 12
Duc Tran,Marion Williams
Brandon Bob,David Dinh
David Dinh,Marion Williams
Brandon Bob,Duc Tran
Team 12
Team 12
Team 12
Team 12
Ready

Questions?