Project

- Do a **system** project
- Build/integrate **software/hardware**
- Perform **experiments** on real systems
- Write a **paper**
- **Demo** your project
Project Topics

- **Application**: develop an interesting application.
- **Experimentation**: evaluate and compare techniques.
- **New ideas**
Autonomous UAV

- WUSTL Course Project
  - http://youtu.be/HXEjzmPnPq8

- Quadrotors play the James Bond song
  - http://youtu.be/_sUeGC-8dyk
Bridge Monitoring

- Monitor vibration of bridge
- Detect and locate damage
Bridge Monitoring
Process Management

- Emerson's Smart Wireless Extreme Applications
Smarter Parking

- LA Express Park
  [Link](http://www.youtube.com/watch?v=eYzHRlI-o8Q)

- Smarter Parking, Streetline finds a route
  [Link](http://www.youtube.com/watch?v=kPVwPqBQ71I)
Topic: Smart Home

- **Home Energy Manager**
  - The central nervous system for the net zero energy home helps homeowners optimize energy consumption.

- **Solar Photovoltaic**
  - 3 kW to 4 kW solar array on the roof to meet energy requirements of the home.

- **Small Wind**
  - Supplementary renewable generation.

- **Smart Meter**
  - A communication gateway between the Smart Grid and the home.

- **Geothermal Heat Pumps**
  - Reduces HVAC and water heating energy requirements by 30%.

- **GE Heat Pump Water Heater**
  - Uses less than half the energy of a conventional electric water heater.

- **Energy Efficient Lighting**
  - High efficiency, CFL, LED and OLED lighting.

- **Demand Response Appliances**
  - High efficiency Energy Star Appliances shed load from the grid and help consumers save money during peak demand.

- **Energy Storage**
  - Battery storage for backup power and peak loads.

- **GE Water Filtration**
  - Filters, conditions and monitors home water usage.
Example: Nest

Google Paying $3.2B to Take Home Nest
Projects: Smart Apartment

- Deploy devices at interesting places
  - Appliances: Dish Washer, HVAC, Washer, Dryer
  - Power Meter
  - Actuators

- Form a wireless sensor network
  - TinyOS IPv6 Stack
  - Emulate network communication pattern and events
  - Or powerline?

- Long-term empirical study
  - Can the network maintain reliable communication?
  - Can the network achieve long battery life?
  - Connect your network to the Internet and mobile phones
More Ideas

- **Body sensors**
  - [http://youtu.be/SF88kC89CyM](http://youtu.be/SF88kC89CyM)
  - [http://www.youtube.com/watch?v=r2-54fv90XE](http://www.youtube.com/watch?v=r2-54fv90XE)

- **Trash track**
  - [Http://youtu.be/fvTZc5hWBNY](http://youtu.be/fvTZc5hWBNY)
Steps

1. Identify your favorite topic
2. Form a team
3. Proposal presentation
4. Design and implement your solution
5. Evaluate your solution
6. Midterm demo
7. Final demo
8. Write a technical report
Get Started

• Think about ideas
• Check out devices
  • http://cps.cse.wustl.edu/index.php/Equipment_for_course_projects
  • Your own
• Talk to me, Rahav and classmates
• Put together a team with 2-3 members
• Mailing list: cse467s@cse.wustl.edu
Proposal Presentation

- 2/12, in class
  - Email Rahav the slides by 11:30am.

- 15 min/team (hard limit)
  - Leave 3 min for discussion.
Proposal

- One proposal per team, one page
  - Team members
  - Concise description of project
  - Responsibilities of each member
  - Specific equipment needed

- Written proposal due: 2/12, 11:59pm
  - Email to Rahav
  - Subject: [467S] Proposal: Project Name
Project

- Start *early*!
- Set up a weekly meeting
- Weekly assignment to each team member
Midterm Demo

- 3/26, in class.
- 15 min/team (including 3 min for discussion).
- Must show something real!
- Test and set up your demo in advance.
- Email Rahav a summary of your demo and progress
  - Clearly state the contribution of each team member.
Final Demo

- April 30\textsuperscript{th}, 1pm-4pm
- 20 min per team
- Set up and test your demo in advance
- All expected to attend the whole session
- Return devices to Rahav
- It’ll be fun! 😊
Project Report

- Submit report and materials by **11:59pm May 6th**.
- Email to Rahav

**Report**
- Organization: See conference papers in the reading list.
- Five pages, double column, 10 pts fonts.
- Use templates on the class web page.

**Other materials**
- Slides of your final presentation
- Source code
- Documents: README, INSTALL, HOW-to-RUN
- Video (Youtube is welcome!)
Suggested Report Outline

- Abstract
- Introduction
- Goals
- Design
  - Hardware
  - Software
- Implementation
- Experiments
- Related Works
- Lessons Learned
- Conclusion and Future Works
Peer Review

- For fairness in project evaluation.

- Email me individually by **11:59pm, May 5th**
  - Estimated percentage of contributions of each team member.
  - Brief justification.