Annual Robotics Open House Information and Details

Time and Date: The Final Project concludes each year at the **Annual Robotics Open House** on the Monday before graduation. It is open to the public from 6pm to 7pm. Plan to be present from 5:30 until 7:15. This event is **mandatory** for all robotics students! **Everyone must attend!**

Project Details:

- The project must be approved by your teacher. The best ideas come from you! Follow your passion and let your brain mull it over for a while before settling on a project. Project ideas are due the first day of Term 3. If you are having trouble coming up with an idea for the final project, you can download the document "**Open House Details and Project Ideas**" from Canvas or from my book's website at http://www.pcrduino.com/resources/#handouts.

- You may work with one other student, but the workload must be divisible and the contributions of each student must be clearly evident.

Final Exam Details: The Open House will serve as your Final Exam. It consists of three parts:
1. **Participation in the Robotics Open House**
2. **Creating a PowerPoint**
   a. See PowerPoint Details below.
   b. It is required that the PowerPoint be completed *before* the Open House. The PowerPoint presentation may help you during your Open House presentation.
3. **Lab clean-up**
   a. This takes place during the actual exam period during exam week. Expect to stay 2 hours.

Presentation Details:

- You must display your project's PowerPoint during the Open House. You should work on the PPT throughout the term. Follow the rubric, which is on canvas. The PowerPoint template "**Final Robotics Projects Template.pptx**" can be downloaded via canvas, or from my book's website at http://www.pcrduino.com/resources/#handouts.

- The PowerPoints counts for half of your exam grade and is due by the start of the Robotics Open House. You may *use* your PPT during the show, but you will **not** be making a formal presentation. The presentation will be very informal and fun! Imagine it like this: Bring your project to the Dining Hall and exclaiming, "Hey everybody, look what cool thing I made!" And then spend one or two minutes explaining what you made and showing it off. It's supposed to be fun!

Special needs and considerations – Where will each project be set up? Create the Project Map!

FAQs:
- **Who attends?**
- **Is this a formal presentation?**
- **How long should the "presentation" be?**
- **What is the PowerPoint used for during the Open House?**
- **What is the PowerPoint used for after the Open House?**

Open House Details:
- Eat in the Dining Hall at 5:00
- Arrive in the FISHBOWN no later than 5:30 to set up your project

An In-house Open House:
A time to see each other's projects.

Robot Project Ideas, Sensors, and Devices

Available Sensors for the Teensy

1. Sharp IR Range
2. SR04 Sonic Range
3. Temperature
4. Ambient light
5. Fire/flame/sunlight (IR detector)
6. Gray scale IR (line follower)
7. Color Sensor
8. Microphone (sound and frequency)
9. Joystick with button
10. Button(s)
11. Flex sensor strips
12. Force/pressure
13. Potentiometers
14. Humidity
15. Carbon Monoxide
16. Soil moisture
17. Magnetic field (Hall Effect)
18. Compass
19. Whisker feeler
20. EMG/Muscle sensor
21. GPS

See Patton Robotics/Sparkfun/Jameco/etc for other sensors

Available Devices that can be controlled by the Teensy

1. OneBot wheeled robot
2. Roach walking robot (1)
3. Robosapien (hacked walking robot) (1)
4. Large toy car (1)
5. Quadcopter (1)
6. RC Controller radio
7. Toys that can be hacked
8. ESRA (facial expressive robot)
9. Servomotors (modified and unmodified) (easy, high torque)
10. Stepper motors (precise)
11. DC motors (fast, low torque)
12. RC controller
13. Gripper
14. MP3/audio player
15. Speakers/Piezo Buzzer/Audio Transducer
16. Laser pointer
17. Soup/beverage/water heater
18. Relays (electrical switches)
19. Optical relays (can control ANYTHING that you can plug into a wall)
20. IR Soccer ball
21. LCD display
22. Touchscreen LCD I/O
23. 7-segment display
24. 10 LED bar graph
25. 11x11 LED matrix
26. CO2 dispenser (for fire extinguishing)
27. Flame thrower (propane cannister)
28. Flame producer (laboratory gas)
29. Video camera (passive)
30. Pixy Cam (active)
31. Blue tooth communications
32. RF communications
33. Etched acrylic signs
34. 3D printer

Final Project Ideas (if you can't come up with your own)

1. Check out past Open House teaser videos:
   https://www.youtube.com/playlist?list=PLGlU0977_w8BX14BgkEGgmrcR2HFa7jy9
2. Matching Light Game (robot generates one color using RGB LED, human must match it using pots)
3. Tethered soccer
4. Autonomous soccer
5. Hack-a-Toy
6. Create a speed detector
   a. Using one IR or Ultrasonic Range finders with real-time clock
   b. Using two laser-beam trip wires with real time clock
   c. Using Pixy Cam
7. Automated orchid/plant/garden care
8. Automated seedling starter
9. Animated fluorescent characters (linear and rotational)

10. Use Pixy Cam to follow an object
11. Robotic fabric painters
12. Robot drawing
13. Robotic glass etcher
14. Interactive lighting display
15. ESRA (facial-expressive robot) projects
16. MP3 projects (add audio interactions to a project: E.g., "The room is dark.", "The temperature is 68 degrees.", etc.)
17. Add LCD output to a project
18. Add touchscreen LCD I/O to a project
19. GPS units
20. Physics/Chemistry/Biology Sensors/Experiments suite:
    a. Temperature sensor
    b. Light sensor
    c. Velocity calculator
    d. Pendulum period determiner
    e. Force sensor
    f. Magnetic field sensor
    g. A myriad of physics experiments can be done with the above sensors
21. Car that drives around campus
22. Firefighting robot
23. Robot tour guide
24. Use your muscles to control a robot via EMG/Muscle or Flex sensors
25. Puppet master
26. Quadcopter autonomous flight
27. Pet sweater that squeezes during a thunder and lightning
28. IR Card Swipe
    a. Can be used for security door entry or personal ID reading (can play music for individual people.)
    b. A great 3D-printer opportunity, too!
29. 3D LED Matrix (see https://www.youtube.com/watch?v=6mXM-oGggrM)
30. Compost weight sensor that displays mass of discarded food in the Dining Hall. Display it also as number of people that the food could have fed.
31. Perpetual Dunking Bird refill with sensor
32. Make a chess clock timer. (RTC, push buttons, LCD display)
33. Laser cutter art: LED illuminated etched acrylic
34. Self-balancing 2-wheeled robot
35. Home security alarm
36. Self-leveling robot
37. Bluetooth controlled robots
38. RF communication with robots
39. Scientific data logger

Italics = great for display case project