Path 4 - Final Exam: (Revised 3/10/18)

Final Exam Day 1:

Soon we will begin the Final Project for Electronics / Robotics. Different groups (or individuals) will work on different projects.

Below are listed some projects which were done in the past. These are only suggestions. Do not feel limited by these suggestions:

Gripper
http://parallax.com/product/28202
Problem: Pick something up and deliver it to a particular location.

Tank Treads
http://parallax.com/product/28106
Problem: Navigate over rough terrain.

Crawler
http://www.parallax.com/product/30055
Problem: Make your boebot into an insect and have it navigate a fairly easy course.
Note: This walks like an insect. This is fairly difficult to get working, but the difficulties are mechanical. Too tight and it does not work. Too loose and it does not work. Again, a fairly difficult project.

Line Follower
http://www.parallax.com/product/28108
Problem: Transverse a course by following a line.

Remote Control
http://www.parallax.com/product/29122
Problem: Navigate a course using IR remote control

Joystick Control (Also uses xBee)
http://parallax.com/product/27800
http://learn.parallax.com/project/joystick-controlled-activitybot
Problem: Navigate a course using radio remote control

Ping
(Sensor)
http://www.parallax.com/product/28015
(Bracket)
http://www.parallax.com/product/570-28015
Problem: Navigate a course without touching any barriers.

ANOTHER POSSIBILITY USING Ping:
Pursuit race. You have a race between pairs of robots. This is a tournament with one team being the winner. The "track" is an oval barrier that reflects ultrasonic pings. You will have your Ping units facing the port side (left side) of your robots to detect the distance to this barrier. You program your robot to keep a constant distance from the barrier as you circle it counter-clockwise. More information is available from the teacher. See
http://learn.parallax.com/contest/individual-pursuit-race

Text-to-speech generator
http://www.parallax.com/product/30006
Problem: Demonstrate computer speech.

There are some more project ideas here:
http://www.ionaphysics.org/lobby/robotics/classroom/outline/Extra%20Projects.pdf

Another possibility would be to build a model "smart house" with electronic controls. It would have at the very minimum a door and a window. The door lock could be a servo and might be controlled by something like your school badge. There could also be a burglar alarm and anything else you might think of controlled by, perhaps a SONY remote. Aluminum tape on the window would be part of the burglar alarm system.

(Final Project, Day 1 –Continued)
Here is how you will decide on your project:

1. Check out the following inventory of things available for your use:

Part Number	Description
27400	SumoBot
27977	Serial LCD
27979	LCD 4x20
28015	Ping - Ultrasonic Range finder
28017	Accelerometer
28027	PIR sensor
28106	Tank Tread
28108	Line Follower
28136	Scribbler (older blue)
28136	Scribbler 2 (newer red)
28146	GPS Module
28202	Gripper
28980	Stingray
29122	IR Remote
30006	Text to speech module
30051	CMU Camera
30055	Crawler
30056	Flexiforce
30080	Say It Module
32390	RFID reader and tags
ST-00008	Tilt sensor
28087	OLED display
29126	Fingerprint Reader
28085	RGB LEDs

2. Go to http://parallax.com and type the part number into the search box. That will give you more information about the particular item. Clicking on the item name will probably give you even more information including programming hints, etc. Explore to get ideas.

3. Explore several different items with your partner and decide together what project you want to do.

--- END OF DAY 0 ---

Final Exam Day 2

1. Assuming you have already chosen a project, answer the following questions:

A. What is your first choice for a primary project?

B. What hardware do you need? Give the name and the part number. Also list any other parts you might need which you do not already have.

C. What will you program it to do?

D. How will you measure success?

2 . Email your answers to those questions to me. Make your answers good and complete because I will ultimately decide who gets which hardware. Brief, incomplete answers will move you to the end of the line. Deadline: ASAP but not after midnight tonight.

3. Go to the appropriate page on Parallax.com and find the instructions for your project. Save them on your computer or print them out. Also save any programs which parallax provides.

--- END DAY 1 ---

Final Exam Day 3

1. Assuming you have already chosen a primary project, I now ask you to choose an alternate, in case the hardware for your primary project is not available. Answer the following questions:

A. What is your second choice for a project?

B. What hardware do you need? Give the name and the part number. Also list any other parts you might need which you do not already have.

C. What will you program it to do?

D. How will you measure success?

2. Email your answers to those questions to me. Make your answers good and complete. Be sure to indicate that this is your alternate/secondary choice, not your first choice. Deadline: ASAP, but not after midnight tonight.

---END DAY 3 ---

Final Exam Rest of the marking period

1. I will distribute the hardware you need along with a schedule for submitting progress reports.

2. You will work either as individuals or in groups to develop your project while generating progress reports.

3. During the final few days of the marking period you will make presentations to the class which will be graded. You will also generate a printed report.

4. After your presentation you will disassemble your project and take inventory of the hardware you have accumulated during the semester.

5. Your final exam grade will be a composite of progress report grades, a grade for your presentation, and a grade for the written report.