



E11: Autonomous Vehicles

Fall 2011

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DUE: Tuesday, October 25th by 8 AM

PS 6: Gold Code Detection

Be sure to include this line at top of your file (xx = hours it took you to complete).
// Time to complete program = xx hours

Write a program called `goldcodedetect.pde` that

- (1) uses your phototransistor to detect the Gold Code being transmitted by any beacon on the playing field in the lab (sampling rate is 4 kHz), and
- (2) prints three values to the Serial Monitor: (a) the number of the Gold Code detected, (b) the resulting correlation, and (c) the team color (green or white).

Some Suggestions

Note: this lab is virtually impossible to get right on the first try. So, as usual, test each small step (printing out intermediate results) as you go along. Debug that step until you get it right, and only then move on to the next step. You'll need to do most, if not all, of your programming and testing in the lab. You may complete this program in any way you desire – here are some suggestions to get you started.

1. Place your bot directly in front of a beacon, and detect (using the phototransistor) the Gold Code sequence being transmitted by that beacon. You'll likely want to print out the detected values and do a sanity check on the values – can you detect a difference between 1's and 0's?
2. Convert the detected 31-sample sequence to 1's and 0's by, first, finding the average value of the detected sequence. Compare each sample to the average to convert the sequence to binary.
3. Correlate the detected binary Gold Code with all 8 Gold Codes (using your code from Problem Set 3).
4. Print out which Gold Code was detected given the correlations and print that correlation value. The team color will be green or white, depending on whether the bits are inverted (max correlation of -31) or not (max correlation of 31).

Again, remember to debug and print intermediate results along the way!

Deliverables

You are responsible for turning in one Arduino file:

- `goldcodedetect.pde`