Spring 2021 EECS192 Mechatronics Design Laboratory Oral Presentations v. 1.0

Submit a pdf version of your slides by 500 pm Tues May 4 on BCourses.
Presentations During Dead Week Tues May 4 (in class) and time TBA Wed May 6

The purpose of the oral presentation is to provide you with an opportunity to inform your peers and instructors about what made your car successful. The style should be of a professional technical presentation. Each group's presentation will need to be no more than 10 minutes with one minute left for answering questions. Be sure to practice and time your presentation. Assume that your audience is very familiar with the project. Hence, you do not need to explain how the line camera sensors work or how the program is compiled. Typically, going through ten slides in ten minutes is about right.

If you would like feedback, you may optionally submit a draft version by 5 pm Saturday May 1.

The following items should be addressed during your presentation:

1. Vehicle Hardware and Embedded Peripherals (20%)
a) Show a basic electronic block diagram with major hardware subsystems (improved version from progress report).
b) Show photos of car, including velocity sensor mount.
c) Describe how you used any of the embedded peripherals for generating signals, counting pulses, measuring intervals, generating interrupts, etc. For example PCNT and MCPWM might be used for velocity sensor and line camera respectively.

2. Line Sensor Algorithm (20%)
a) Describe in detail your signal processing algorithms for line detection. Show examples of line tracking error using real data (e.g. from telemetry data). (For an example, see presentation on Piazza from Spring 2019 slide 6,7).
b) How are crossings rejected?

3. Software (20%)
a) Provide an overview block diagram of your software (updated from progress report)..
b) Describe what is unique about your software. For example, do you use auto calibration of sensors, course memorization, automatic determination of gain constants for the controls, GUI, etc.?
c) Note update rates for various processes. Show updated (from progress report) timing diagram (Lee and Seshia Fig 12.10) for task execution.

4. Controls (25%)
a) What kind of stability problems did you have and how did you overcome them? State how you implemented the controller and how you chose the gain constants. What gains were used (radians per meter, radians/(m/sec))? (For an example, see presentation from Spring 2018 slide 7).
b) Include a plot of lateral error vs time for a 15 cm step in the track for real and simulation.
c) Complete the following table for the car (real and simulation) after tuning:

	k_p	k_d	max step err	sensed velocity	command velocity
real					
sim					

d) (If you ran in the Cory Courtyard, plot the lateral error, velocity, steering angle, and line sensor output during your car's best run. Explain from the plots where the control system might allow the car to go faster, or where the car is at some stability or sliding limit.)

5. Lessons learned (10%)
What were your most memorable glitches, failures or debugging issues?
What didn't you know that you needed to know?
Advice for future students?

6. Roles and Contributions (5%)
Briefly describe the role of each team member.