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ECE 350 Project Proposal
March 24, 2019

Idea:

- Remote control car with additional sensors/features allowing for different action patterns and modes of operation.

Tasks:

10 points: easy difficulty, least time consuming

20 points: medium difficulty

30 points: hard difficulty, most time consuming

1. (10 points) Build frame for car
 - Additional hardware to visualize/implement results from the processor outputs
2. (20 points) Movement control (forward and back)
 - Input = button/controller set HIGH or LOW
 - Output = send signal for forward/backward
 - Processor = map button press to signal to be sent to RC car
3. (20 points) Steering control (left and right)
 - Input = button/controller to set left/right and amount
 - Output = send signal for left/right and amount
 - Processor = map button press to signal to be sent to RC car
4. (20 points) Build a controller for movement
 - Additional hardware to provide Inputs
5. (10 points) Warning light (use ultrasonic sensor? To determine if the car is approaching a obstacle)
 - Input = Ultrasonic sensor data from car
 - Output = LED light on/off
 - Processor = Determine if distance to obstacle is less than or equal to a constant
6. (10 points) Prevent forward motion when warning light turns on (stop car)
 - Input = Warning LED light on/off
 - Output = boolean should car move
 - Processor = checks designated DFFE/register for warning light signal to determine movement
7. (30 points) Line following (blue/black tape)
 - Input = data from IR sensor
 - Output = motor values specifying which way to turn
 - Processor = take data from multiple IR sensors to determine new direction
8. (20 points) Video feedback (project image from camera onto screen)
 - Input = camera feed
 - Output = camera feed
 - Processor = read input data and send to screen

9. (10 points) Add servos to control camera angle
 - Input = button/controller to alter camera angle
 - Output = new position/angle
 - Processor = takes input data and current position to update to new position
10. (20 points) Color detection (i.e. traffic lights)
 - Input = data from color sensor
 - Output = Light on LED strip turns on based on color detected
 - Processor = maps input data to LED color to turn on
11. (20 points) Define movement patterns from color detection
 - Input = data from color sensor
 - Output = stop sending movement signal on red, resume on green
 - Processor = determine color and use mux to determine what signal to send
12. (10 points) Speed setting
 - Input = button/controller set using potentiometer
 - Output = send signal for motor speed
 - Processor = map potentiometer data to signal to be sent to RC car
13. (20 points) Gyroscopic sensor to display angle of the car
 - Input = data from gyroscope
 - Output = angle displayed on LCD
 - Processor = map data to segments on LCD
14. (30 points) Mount Nerf gun on top and shoot using button
 - Input = button for trigger
 - Output = signal to servo to pull the trigger
 - Processor = map button to servo signal
15. (20 points) Cliff sensing (doesn't fall down stairs)
 - Input = data from ultrasonic sensor
 - Output = boolean should car move
 - Processor = checks designated DFFE/register for warning light signal to determine movement
16. (30 points) Add IR sensor for light/heat following
 - Input = data from IR sensor
 - Output = signal to motors for new direction
 - Processor = use IR data to determine which way to steer

Timeline:

- March 28th: Come up with a list of needed materials and check if Duke has them or if we need to order them
- April 4th: Complete frame and transmitting
- April 11th: Complete forward/backward, left/right (and speed setting?)
- April 18th: Ultrasonic for cliff sensing/warning light
- April 23rd: Camera feed, Camera angle control, (any additional features?)