

Justin Gao 2020

Independent Project Summer Work

The following pages will outline and describe the project work to be completed by Justin Gao, and ONLY Justin Gao for consideration of additional credit work in Computer Engineering Coursework.

This project was an agreed assignment for Justin to remedy a Q4 grade he was disappointed with in Computer Engineering. As much of the work was of a project nature, we will continue in a similar fashion, using project exploration in this independent work.

Overview:

The major theme of this project is to continue the exploration of microcontroller circuits, such as the Arduino (and Arduino clones, using the AT mega chipset) as well as the NodeMCU, an extension of the ESP8266 chipset controller board.

Tasks

1. **In a narrative style - complete a write-up that will identify the components provided, and develop a small manual that outlines the components provided, use for each, and use case, voltage requirements and/or limits, as well as (about 3-5 pages - 1.5 line spacing)**
2. **Design Two versions of a small robotic car**
 - a. **One - that is an autonomous vehicle, that explores a space, can avoid obstacles and will follow a line**
 - b. **Two - a remote control vehicle that can talk to a SMART phone and move forward, backward and turn left or right.**
3. **Document the two projects, by creating an instructable on how to use the same car body (base, two yellow motors and power supply, as well as wheels for the motors.**
4. **Create a Google Doc folder (shareable with Mr. Twyford) so you can upload as many pictures of all the various components for your identification document, as well as photos for the Instructable steps of each of the two cars, and a video demonstration of the two working, similar to...**
 - a. <https://www.youtube.com/watch?v=2AL7HfiRlp4>
 - b. **NOTE _ music not needed - a voice over or explanation is preferred - no need to worry about super sound quality - you can simply record and talk through the demo...**
5. **Email me with questions**

Implementation

Justin, you may use any number of resources from online, YouTube, etc - but sources must be cited using MLA or Chicago Manual of style. You are encouraged to use elements from our Schoology course, and resources provided earlier.

However - you must have a plan before you begin, be able to document and provide justification for your choices of controller boards, sensors, motor controllers and more.

You have been provided with a number of resources, likely more than you'll need. You may need to search for these items on the internet for Specification Documentation on how to, for example make a bi-directional motor from a two wire motor (that would normally go in one direction.)

Parts / Components Provided

- SMART Robot Car Body, includes
 - Clear acrylic base
 - 2 Plastic wheels with rubber tires
 - 2 Yellow geared motors (I soldered on connectors for you)
 - Caster/Trailing wheel
 - Mounting Hardware (nuts & bolts)
 - Hex Standoffs
- KeyStudio Arduino Clone (Yellow & Black Board)
- NodeMCU Esp8266 Board
- Mini Breadboard
- 480 point BreadBoard
- Micro USB (for ESP8266)
- USB A to B (for Arduino Board)
- 6Volt Battery Pack (Holds 4xAA)
- DF Robot Dual H-Bridge (Black Circuit Board, with Black Heat sink and green connectors)
- L298N (Red Circuit Board with Black heat sink and Blue connectors)
- Jumper Wires, Assorted Set of
 - Male to Male
 - Male to Female
 - Female to Female
- 2 qty IR Sensors (Small blue circuit boards, 4 pin Connectors)
- 3qty Wheel motion discs (1 is a spare)
- 2qty 9g servos
- UltraSonic sensor (Blue circuit board, 2 large round 'eyes')
- On/Off Button
- 1 Hobby Screwdriver (Black Handle, Orange top)
- Double sided tape (for safely mounting parts)
 - You could also use light-adhesive hot glue gun (just not the heavy duty glue)
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