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AI-generated content may be incorrect.**

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| **Course:** | **Computer Design** |
| **Professor:** | **Evan McCarty (36196)** |
| **Team:** | **Ahmad Awaidah (Aawai), Michael Nguyen (mnguy37), Mike Vinanzaca (mvina2),**  **Patrick Thomas (pthom29)** |
| **Final Project Title:** | **Remote Control Car** |

# **Project Documentation**

* **(Overall project Idea Paragraph\_1):** We’re building a remote-controlled car powered by 3-4 Arduinos. It will be two-wheel drive with differential steering, head/brake lights, and a remote control. The goal is to configure the brains of the car with an IR receiver and configure a remote IR controller to control and steer the cars direction (front, back, steer-left, steer-right). Finally, after the electrical circuit of the car is finalized and is working with the remote control. We’ll design a removeable plastic cover designed as the car of our choice to cover the electrical circuit, to simulate a true car’s design.
* **(Description of multiple Arduinos Paragraph\_2) (Input/Output device types 2 devices per person):** Each Arduino will have its own job:
  + **Arduino\_1 (A1):** *(2 Motors)* A1 will use 2 motors for two-wheel drive for the front two wheels with differential steering, implemented through the following dynamic:
    - Turn right: left wheel faster than right wheel
    - Turn left: right wheel faster than left wheel
  + **Arduino\_2 (A2):** *(LED Headlights, LED Brake lights, Light sensor)* A2 will use yellow/white LED lights for the headlights, and red LED lights for the brake lights. Additionally, we’ll investigate configuring the LED lights to turn on when certain metrics are hit.
  + **Arduino\_3 (A3):** *(Joysticks, IR Controller, and Buttons)* A3 will be the remote controller for the remote controller car.
  + **Arduino\_4 (A4):** *(IR Receiver, Speaker, LCD Screen)* A4 will contain the IR Receiver and Speaker or additional components serving as play features for the host.
* **(Communication):** This project will be utilizing a remote control managed by Arduino\_3, sending commands to the car using an infrared transmitter (IR). For communication with the car itself, Arduino\_4 will function as the main controller sending instructions to Arduino\_1(motors) and Arduino\_2(lights) using the Inter-Integrated Circuit Protocol (I2C). Also, All R4 Wi-fi will communicate wirelessly, while the R3 board connects via wires.
* **(Original Work Paragraph\_3):** Original work within this project includes the differential steering, and how we will implement that with the method described above. As well as the plastic cover, how we choose to design it will be completely original. We’ve considered building materials for this car designed cover, which include coke cans, recycled plastic, etc. Finally, the play features we decide to implement, and the IR Receiver and Controller configuration will be original in the method we decide to implement .

# **Programming Language**

* C/C++

# **Integration**

* Arduino IDE

# **In-Scope Hardware**

* IR Controller (x1)
* IR Receiver (x1)
* Motor (x2)
* Arduino UNO R4 Wi-Fi (x3)
* Arduino UNO R3 (x1)
* Wires
* Resistors
* LEDs
* LCD Screen
* Speaker
* Joystick
* Buttons
* PIR Sensor
* Etc …

# **Total Hardware**

* **Main Controller:**
* Arduino UNO R4 Wi-Fi (x1)
* **Display Components**
* I2C LCD 1602 Display (x1)
* OLED Screen (x1)
* 7-segment Display (x1)
* **Sensors**
* Temperature and Humidity Sensor (x1)
* Ultrasonic Module (x1)
* PIR Motion Sensor Module (x1)
* MFRC522 RFID Module (x1)
* MPR121 Module (x1)
* Soil Moisture Module (x1)
* GY-87 10 DOF Module (x1)
* Photoresistor (x1)
* Thermistor (x1)
* **Input/Control Devices:**
* IR Controller (x1)
* IR Receiver (x1)
* Keypad (x1)
* Joystick Module (x1)
* Potentiometer (x1)
* Button (x4)
* Button (x10)
* Tilt Switch (x1)
* **Output Device – Motors:**
* Stepper Motor (x1)
* Stepper Motor Driver (x1)
* 9G Servo (x1)
* Motor (x1)
* Pump (x1)
* Fan (x1)
* **Output Devices – Audio/Visual**
* Speaker (x1)
* Audio Power Amplifier Module (x1)
* Passive Buzzer (x1)
* Active Buzzer (x1)
* Green LED (x5)
* Red LED (x5)
* Yellow LED (x5)
* Blue LED (x5)
* White LED (x1)
* RGB LED (x1)
* WS2812 RGB Strip (x1)
* **Power & Control:**
* Breadboard Power Module with Battery (x1)
* Relay (x1)
* **Electronic Components:**
* TA6586 (x1)
* 74HC595 (x1)
* S8550 Transistor (x1)
* S8050 Transistor (x2)
* 1N4007 Diode (x5)
* Capacitor 104 pF (x5)
* Capacitor 10uF (x5)
* Resistor 10Ω (x10)
* Resistor 100Ω (x10)
* Resistor 220Ω (x30)
* Resistor 330Ω (x10)
* Resistor 1KΩ (x10)
* Resistor 2KΩ (x10)
* Resistor 5.1KΩ (x10)
* Resistor 10KΩ (x10)
* Resistor 100KΩ (x10)
* Resistor 1MΩ (x10)
* **Building Materials:**
* Tube (x1)
* Type-C USB Cable (x1)
* Jump Wire F/M (x20)
* Jump Wire M/M (x65)
* Breadboard (x1)

# **In-Scope Functions**

* AnalogWrite
* AnalogRead
* Map()
* Loop()
* ETC…
* X
* Y
* Z

# **Out-of-Scope Variables**

* XYZ

# **Additional Functionality**

* XYZ

# **Sources**

* <https://www.amazon.com/dp/B0CR6K5WKK?ref=ppx_yo2ov_dt_b_fed_asin_title>