DEMO #2
COOLING SYSTEM

CECS 490B Senior Design

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TEAM MEMBERS

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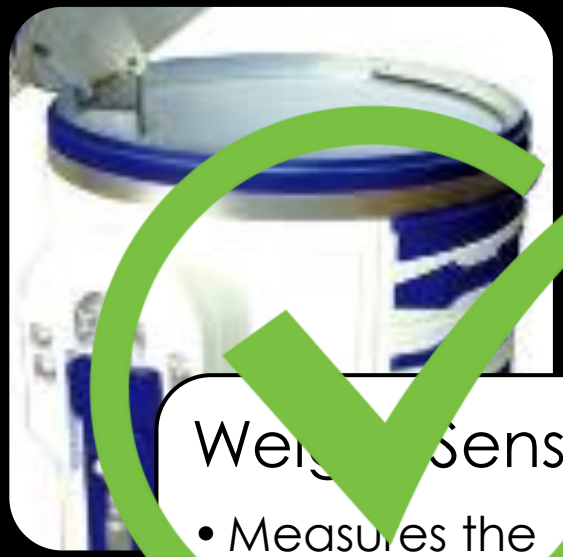
EXECUTIVE SUMMARY

- Name: "R3-Cooler"
- Features:
  - Cooling to keep the drink cold
  - Avoids obstacles
  - Remote-Controlled Motors
  - Monitor Beverage consumption (QR Scanner)
  - Refill Alert
  - LCD Screen
- Extra Features if time permits:
  - Built-in speaker
  - GPS Tracking

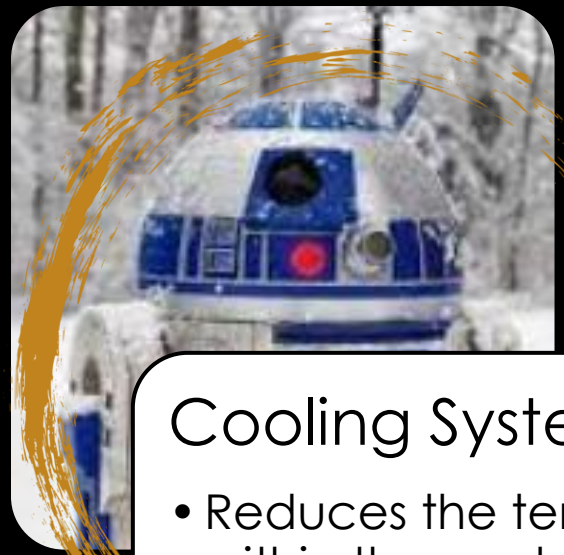
This project will eliminate the problem of guests rummaging through your fridge to find a drink and it will pave new ways to entertain/show off to your guests. We are all looking forward to planning and creating this project to the best of our abilities.

DEMO TIMELINE



Weight Sensing

- Measures the weight of Co[illegible] cooler
- Determines the amount of 12oz and 16oz cans in the cooler



Cooling System

- Reduces the temp within the cooler
- Monitors temp and automatically turns off when the desired temp is reached or vice versa.

Camera System

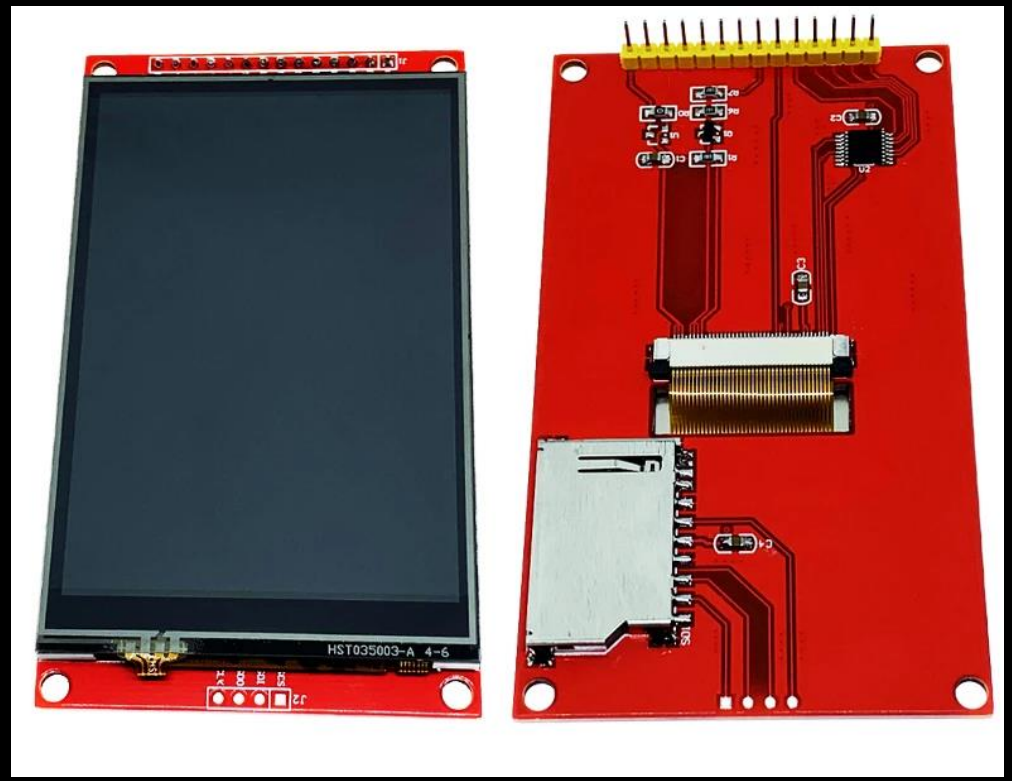
- Scans QR codes
- Validates the QR-code
- Sends a message to the serial monitor if it's a valid QR-code

DEMO #2 – COOLING SYSTEM

- What Will Be Tested?
  - The desired cooling temp is reached - 45 Degrees
  - Ability to save power
  - Self-correction
  - LCD Screen updates every .5 seconds
- How will it be tested?
  - Case #1: cooler reaches 45 Degrees
  - Case #2: Cooler Turns off at 45 Degrees
  - Case #3: Cooler turns back on at 55 degrees
  - ALL While updating LCD Screen
- How will we know it worked?
  - All cases passed

SENSOR & BOARDS

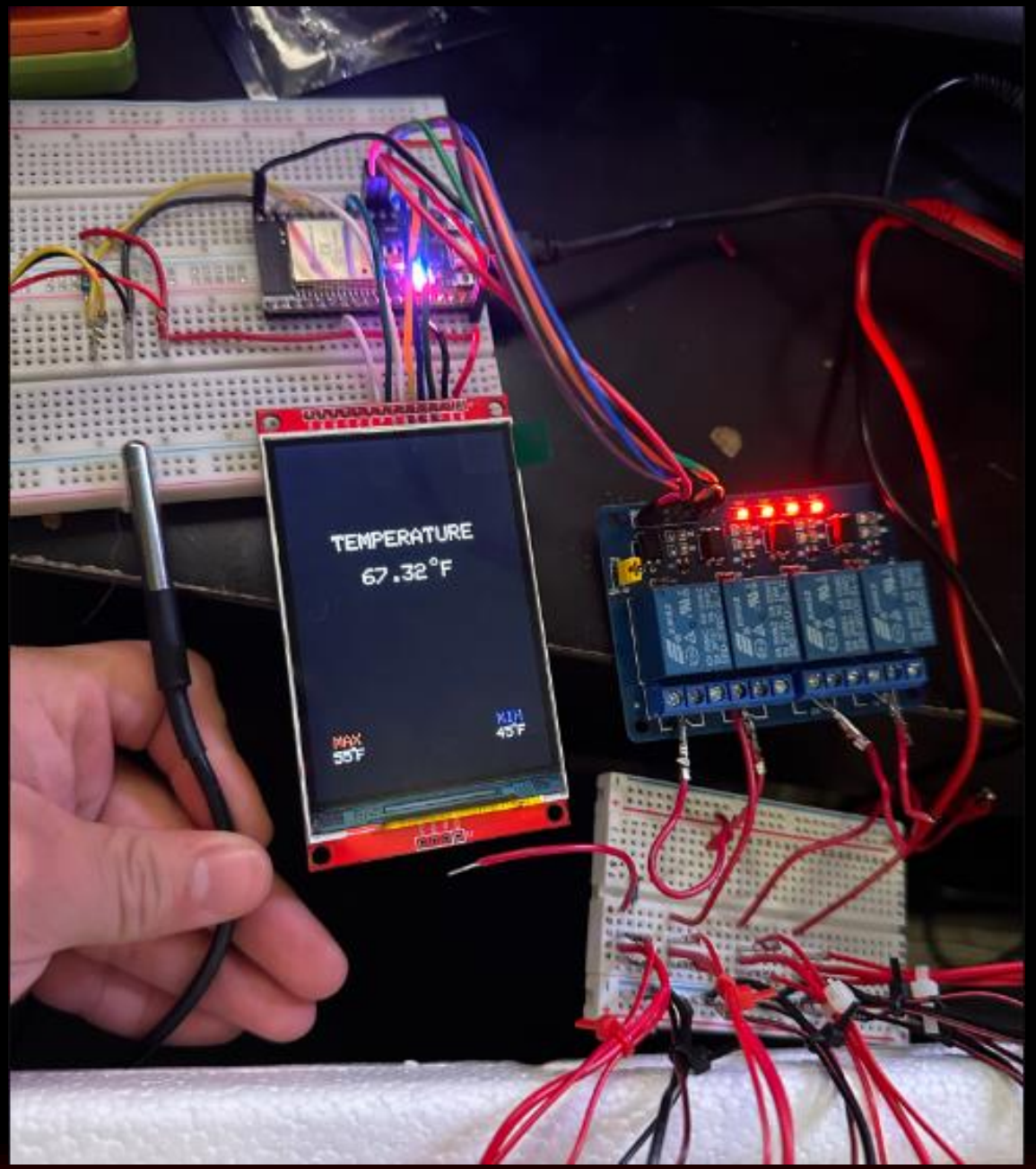
THERMOELECTRIC PELTIER COOLER



LCD SCREEN

PELTIER COOLERS CONNECTED

LCD SCREEN CONNECTED TO COOLERS



CODE EXPLAINED

```
void loop() {
  DS18B20.requestTemperatures();       // send the command to get
temperatures
  tempC = DS18B20.getTempCByIndex(0);  // read temperature in °C
  tempF = tempC * 9 / 5 + 32; // convert °C to °F
  prevTemp = 0;

  Serial.print("Temperature: ");
  Serial.print(tempC);    // print the temperature in °C
  Serial.print(" C");
  Serial.print("  ~  ");  // separator between °C and °F
  Serial.print(tempF);    // print the temperature in °F
  Serial.println(" F");
```

Conversions/Serial Printing

```
  //If temperature is less than 7 C(~45 F) the 2-Channel relay
will turn off
  if(tempC < templow)
  {
    digitalWrite(RELAY_1, HIGH);
    digitalWrite(RELAY_2, HIGH);
    digitalWrite(RELAY_3, HIGH);
    digitalWrite(RELAY_4, HIGH);
  }

  //if temperature is more than 13 C(~45 F) the 2-Channel relay
will turn on
  if(tempC > temphigh)
  {
    digitalWrite(RELAY_1, LOW);
    digitalWrite(RELAY_2, LOW);
    digitalWrite(RELAY_3, LOW);
    digitalWrite(RELAY_4, LOW);

  }
```

Cooling Code

CODE EXPLAINED

```
49  void setup() {
50    Serial.begin(9600); // initialize serial
51    DS18B20.begin();    // initialize the DS18B20 sensor
52
53    //Setting the pins for the relay as output pins
54    pinMode(RELAY_1, OUTPUT);
55    pinMode(RELAY_2, OUTPUT);
56
57    //Draws and positions the label for 'TEMPERATURE'
58    tft.init();
59    tft.setTextSize(2);
60    tft.fillScreen(TFT_BLACK);
61    TextPrint("TEMPERATURE", TFT_WHITE, 60, 130, 3);
62
63    //Displays the static value of the max temp (55 F)
64    TextPrint("MAX", TFT_RED, 30, 400, 2);
65    TextPrint("55", TFT_WHITE, 28, 420, 2);
66    TextPrint("o", TFT_WHITE, 51, 415, 1);
67    TextPrint("F", TFT_WHITE, 57, 420, 2);
68
69    //Displays the static value of the min temp (45 F)
70    TextPrint("MIN", TFT_BLUE, 253, 400, 2);
71    TextPrint("45", TFT_WHITE, 250, 420, 2);
72    TextPrint("o", TFT_WHITE, 273, 415, 1);
73    TextPrint("F", TFT_WHITE, 280, 420, 2);
74
75    //Shuts down 4-channel relay when board starts up
76    digitalWrite(RELAY_1, LOW);
77    digitalWrite(RELAY_2, LOW);
78    digitalWrite(RELAY_3, LOW);
79    digitalWrite(RELAY_4, LOW);
80  }
```

```
138  //Simple function that allows for easier text output LCD
139  void TextPrint(char *text, uint16_t color, int x, int y, int size)
140  {
141    tft.setCursor(x, y);
142    tft.setTextColor(color);
143    tft.setTextSize(size);
144    tft.setTextWrap(true);
145    tft.print(text);
146  }
```

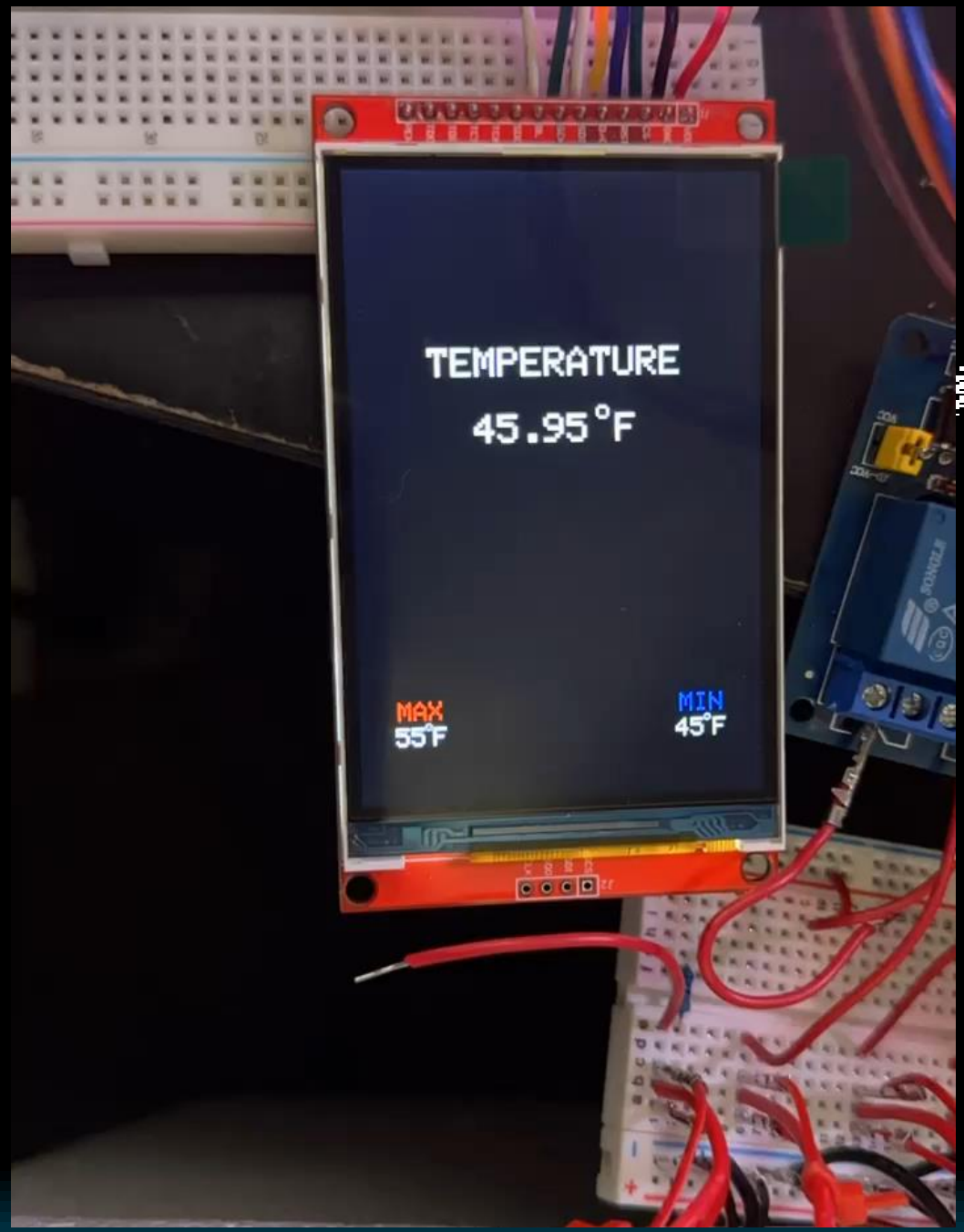
LCD Printing Code

VIDEO DEMO – SETUP

https://youtu.be/om_Ixl81P_E

VIDEO DEMO COOLING TIMELAPSE

https://youtube.com/shorts/kAcP2hTToJA?feature=share



LIVE DEMO

Checklist

- ❑ Case #1: cooler reaches 45 Degrees
- ❑ Case #2: Cooler Turns off at 45 Degrees
- ❑ Case #3: Cooler turns back on at 55 degrees

** LCD Screen should be updating every .5 seconds **

CHALLENGES ENCOUNTERED

- LCD Problems – GPIO ports were difficult to work with.
- Positioning of Cooling system.
- Temporary DC power supply was not sufficient.
- Ring meter issues for the LCD.

NEXT DEMO – CAMERA SYSTEM

- What's Next?
  - Camera being able to read QR Codes
  - Validates QR Code read
  - Sends message to serial monitor if QR Code is Valid

SCAN ME

R3 COOLER

Subscribe

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