

FINAL DEMO

CECS 490B SENIOR DESIGN
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TEAM



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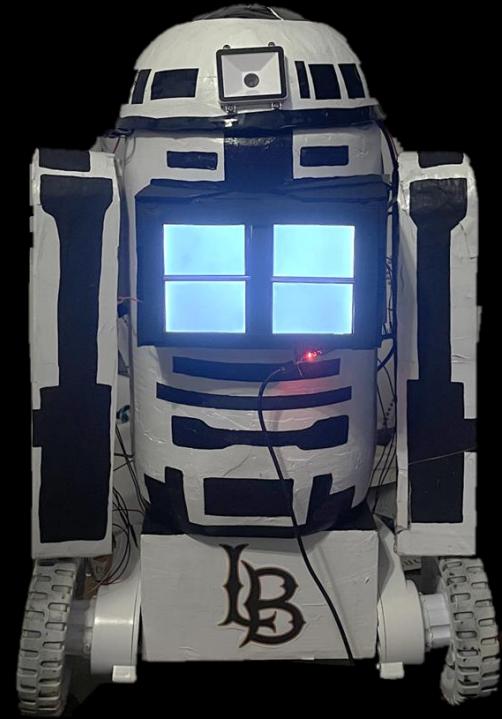


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EXECUTIVE SUMMARY

- NAME: "R3-COOLER"
- FEATURES:
 - COOLING TO KEEP THE DRINK COLD
 - REMOTE-CONTROLLED MOTORS
 - MONITOR BEVERAGE CONSUMPTION (QR SCANNER)
 - REFILL ALERT
 - LCD SCREEN



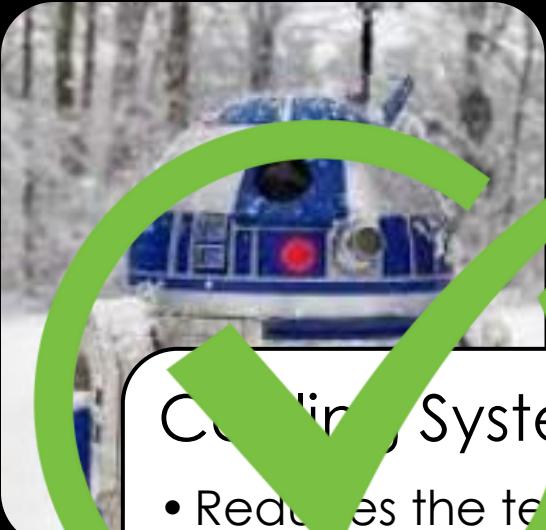
THIS PROJECT WILL ELIMINATE THE PROBLEM OF GUESTS RUMMAGING THROUGH YOUR FRIDGE TO FIND A DRINK AND IT WILL PAVE NEW WAYS TO ENTERTAIN/SHOW OFF TO YOUR GUESTS. WE ARE ALL LOOKING FORWARD TO PLANNING AND CREATING THIS PROJECT TO THE BEST OF OUR ABILITIES.

DEMO TIMELINE



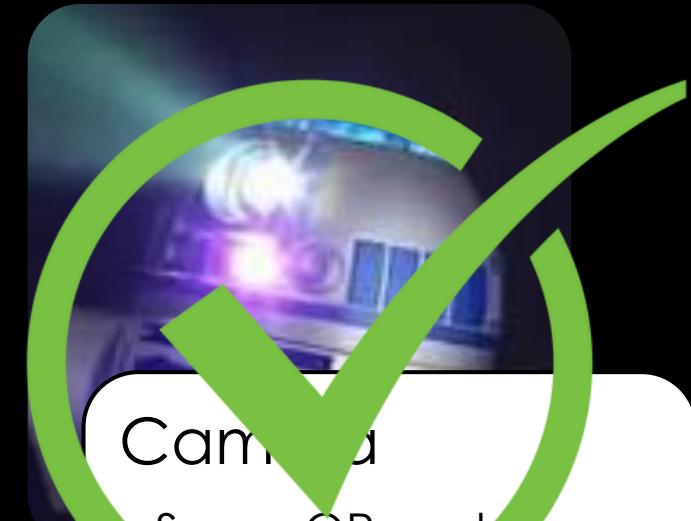
Weight Sensor

- Measures the weight of Cans inside the 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

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

FINAL DEMO

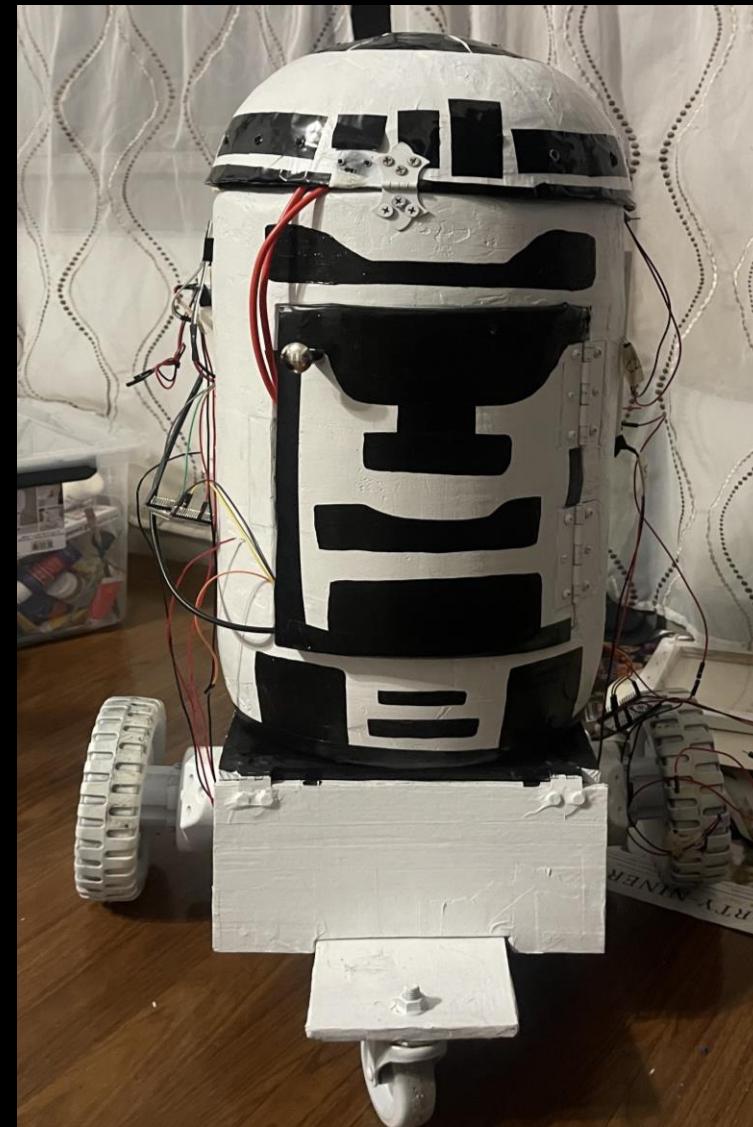
1. REMOTE CONTROL: R3-COOLER MOVES AROUND THE ROOM THROUGH THE MOBILE APP
2. QR CODE AT PARTY: A PERSON AT THE EVENT IS SENT A QR CODE GENERATED THROUGH THE APP
3. LOCK OPENS: THE QR CODE SUCCESSFULLY OPENS THE MAGNETIC LOCK TO THE DRINKS
4. COOLER: BEVERAGES INSIDE THE COOLER ARE CHILLED TO THE TOUCH
5. LCD UPDATES: THE NAME AND THE DRINKS CONSUMED BY THE PERSON WILL BE SHOWN ON THE APP



R3 OUTER SHELL

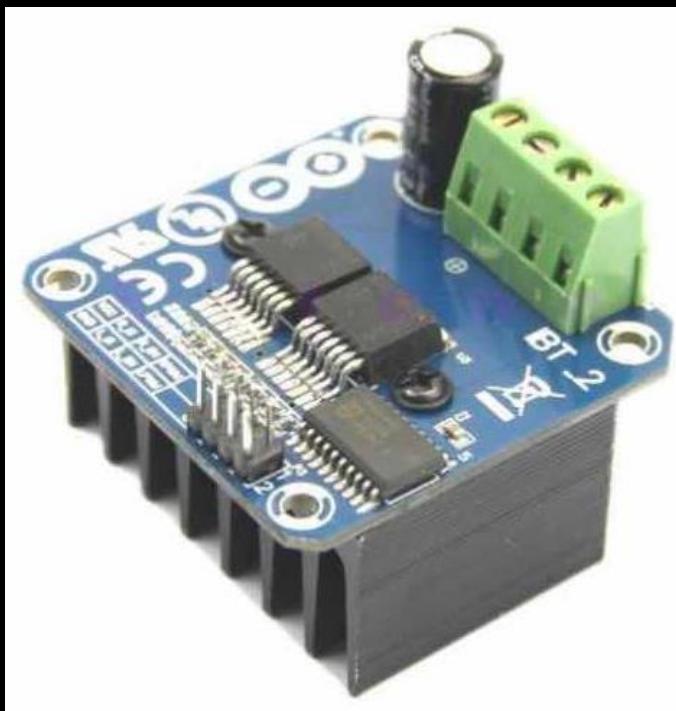


FRONT



BACK

MOTORS



BTS7960

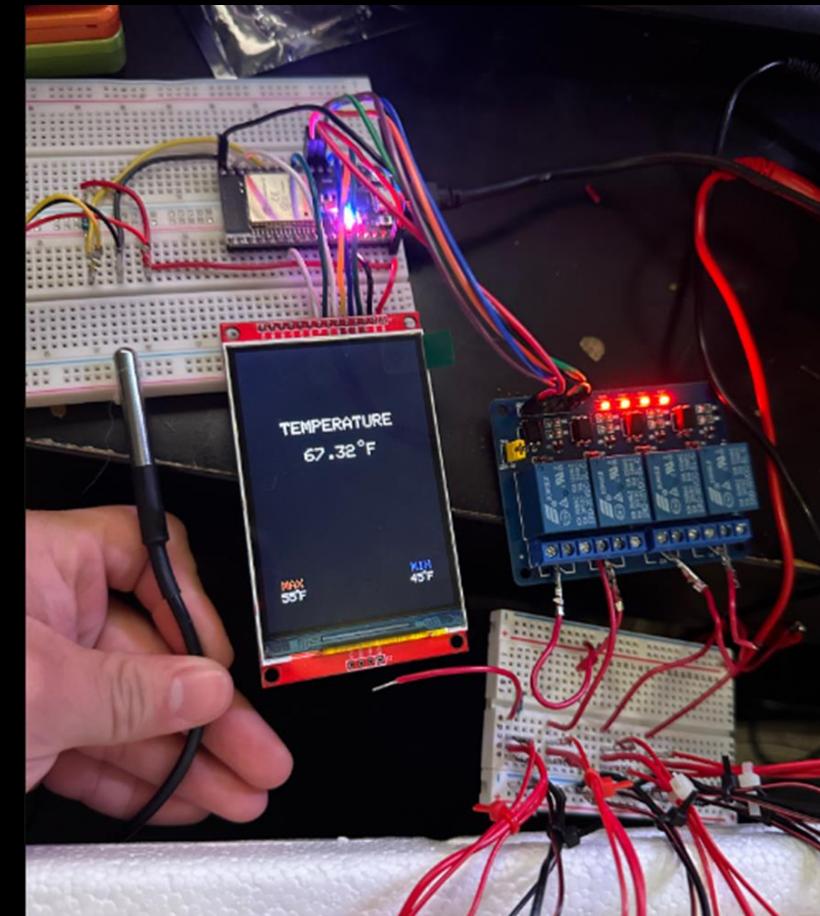


GEARBOX MOTORS



MOTORS IMPLEMENTED

COOLING SYSTEM



POWER SYSTEM



- OUR GOAL WAS TO IMPLEMENT A BUILT FROM SCRATCH POWER SYSTEM
- SPOT-WELDED BATTERY WITH BMS ATTACHED TO IT
- 14.8-16.8V WITH 22.5A WAS THE GOAL FOR THE BATTERY
- PROBLEMS WITH BMS

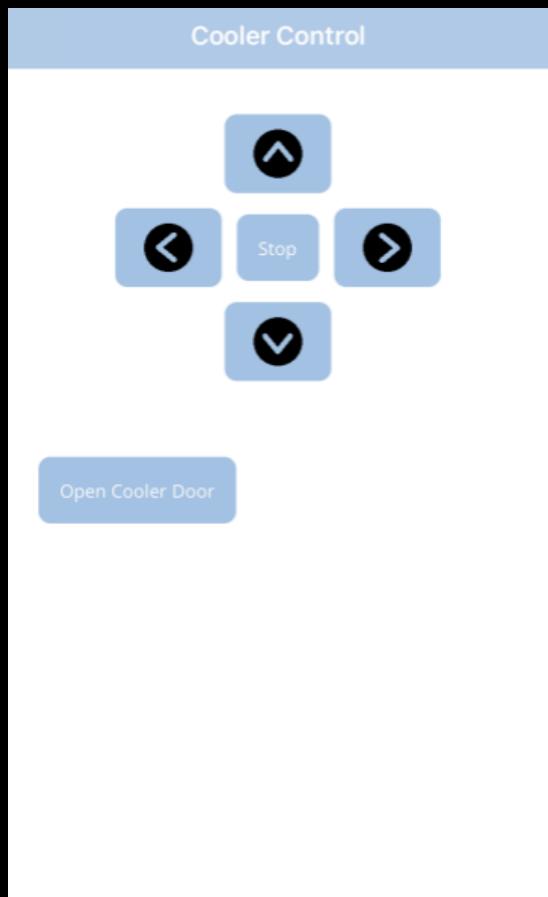
POWER SYSTEM



- CHOSE THIS AS OUR ALTERNATE POWER SOURCE
- IT IS ABLE TO POWER EVERYTHING AS NEEDED
- VOLTAGE: 12V
- AMPS: 3A (12Ah /20 HR)
- GETS THE JOB DONE



REMOTE-CONTROLLED APP DISPLAY



```
0 references
private async void Forward(object sender, EventArgs e)
{
    await service.GetStringAsync(new Uri("http://172.20.10.5/forward"));
}

0 references
private async void TurnLeft(object sender, EventArgs e)
{
    var fromServer= await service.GetStringAsync(new Uri("http://172.20.10.5/turnLeft"));
}

0 references
private async void StopWheels(object sender, EventArgs e)
{
    var fromServer = await service.GetStringAsync(new Uri("http://172.20.10.5/stop"));
}

0 references
private async void TurnRight(object sender, EventArgs e)
{
    var fromServer = await service.GetStringAsync(new Uri("http://172.20.10.5/turnRight"));
}

0 references
private async void Reverse(object sender, EventArgs e)
{
    var fromServer = await service.GetStringAsync(new Uri("http://172.20.10.5/backward"));
}
```

FORWARD

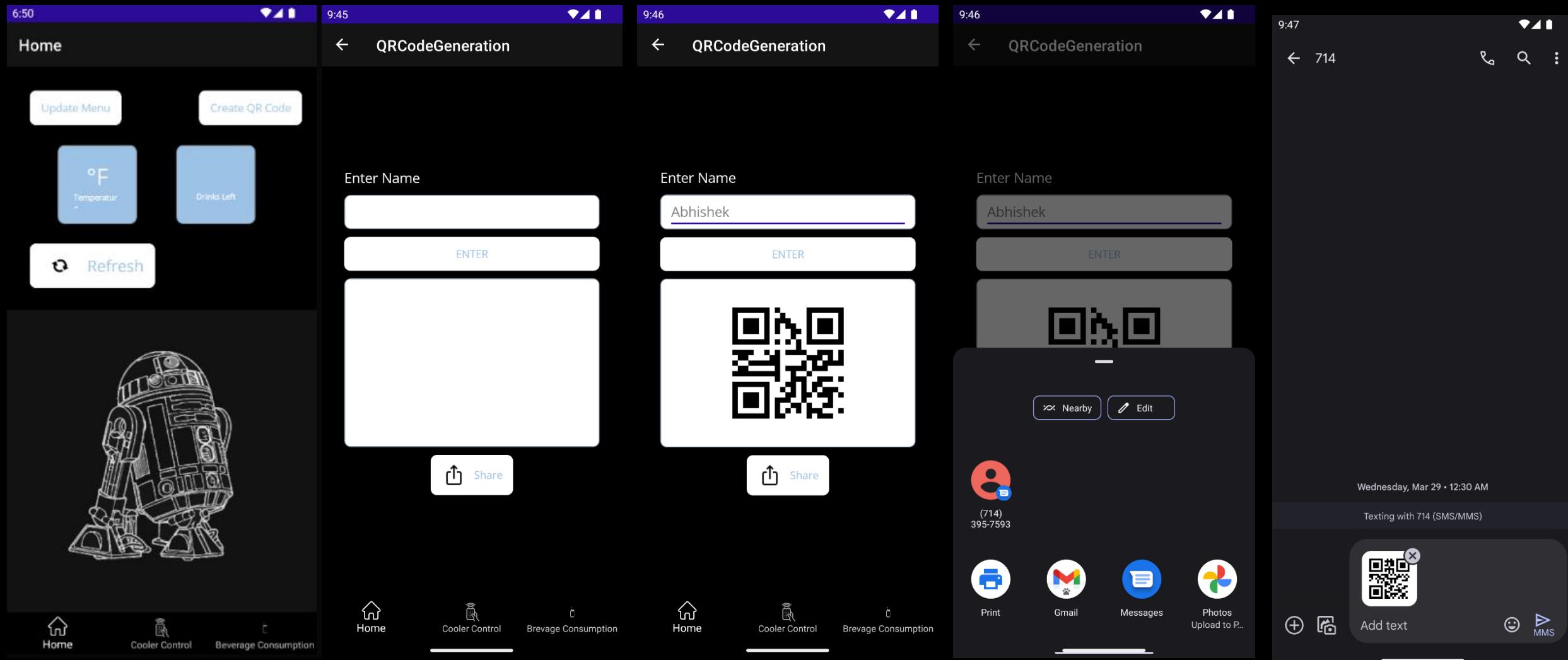
BACKWARD

TURN LEFT

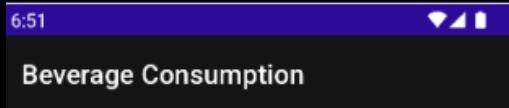
TURN RIGHT

STOP

APP LAYOUT - QR CODE

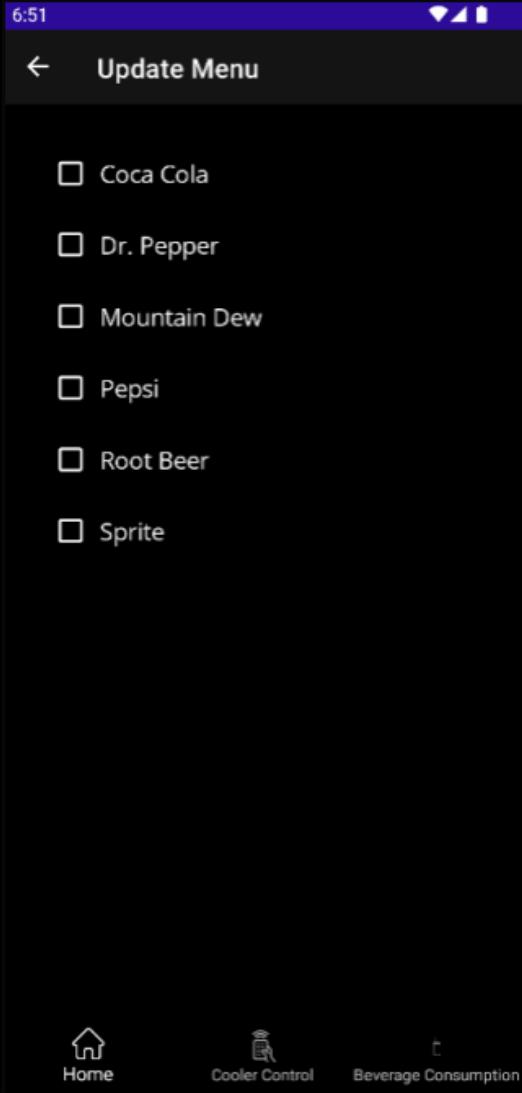


APP LAYOUT



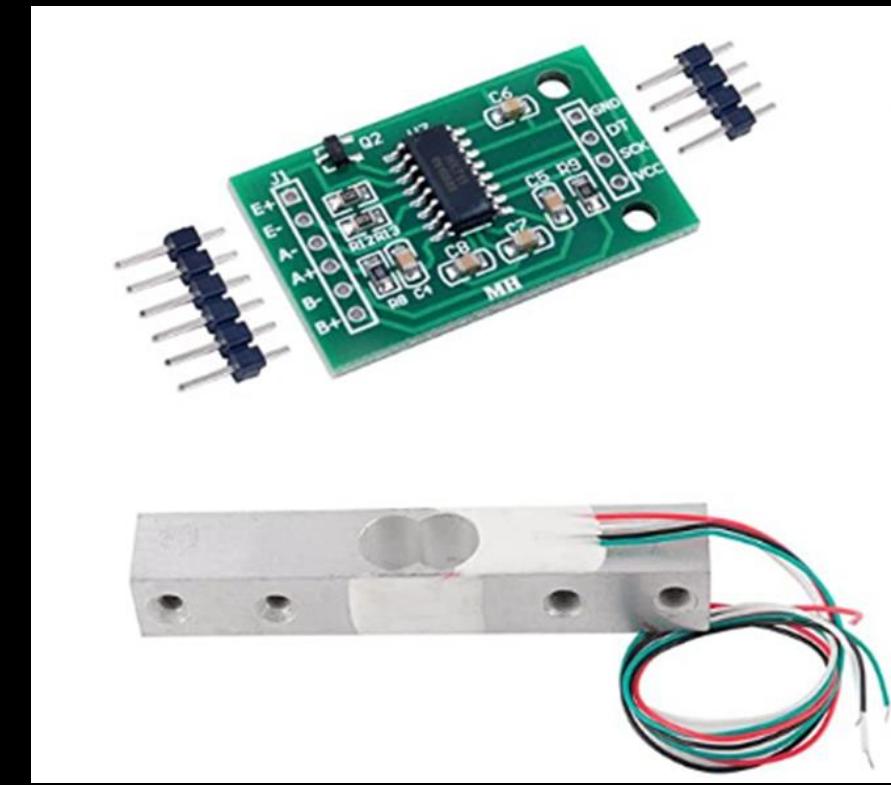
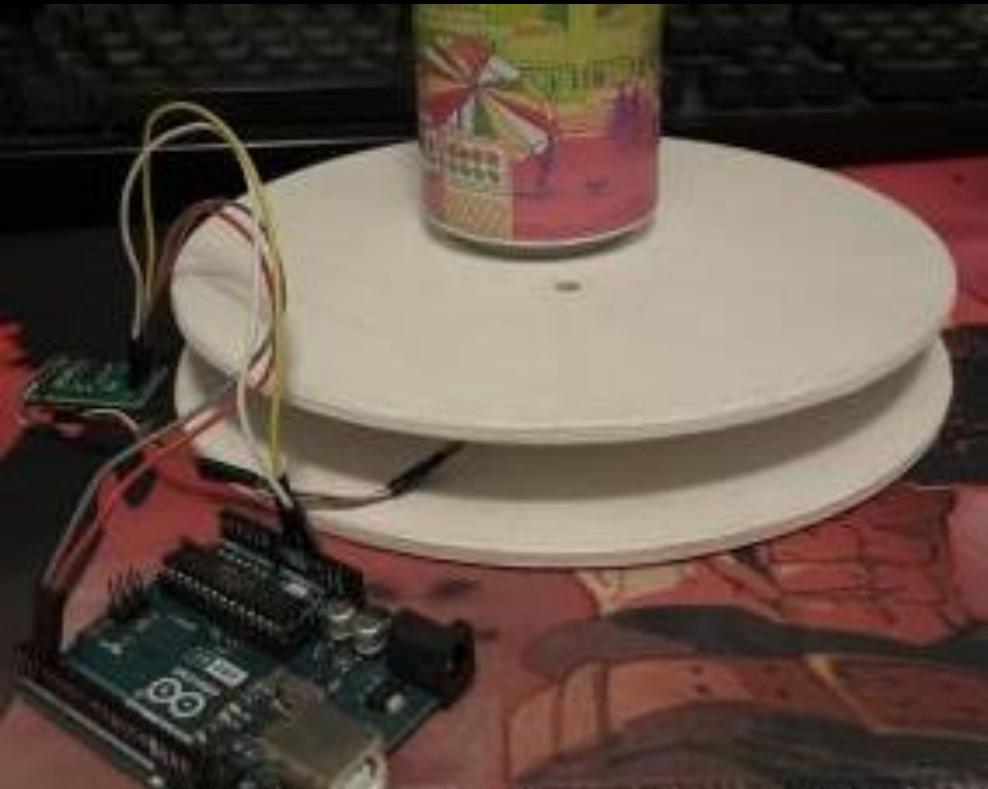
Beverage Consumption

BEVERAGE CONSUMPTION TAB

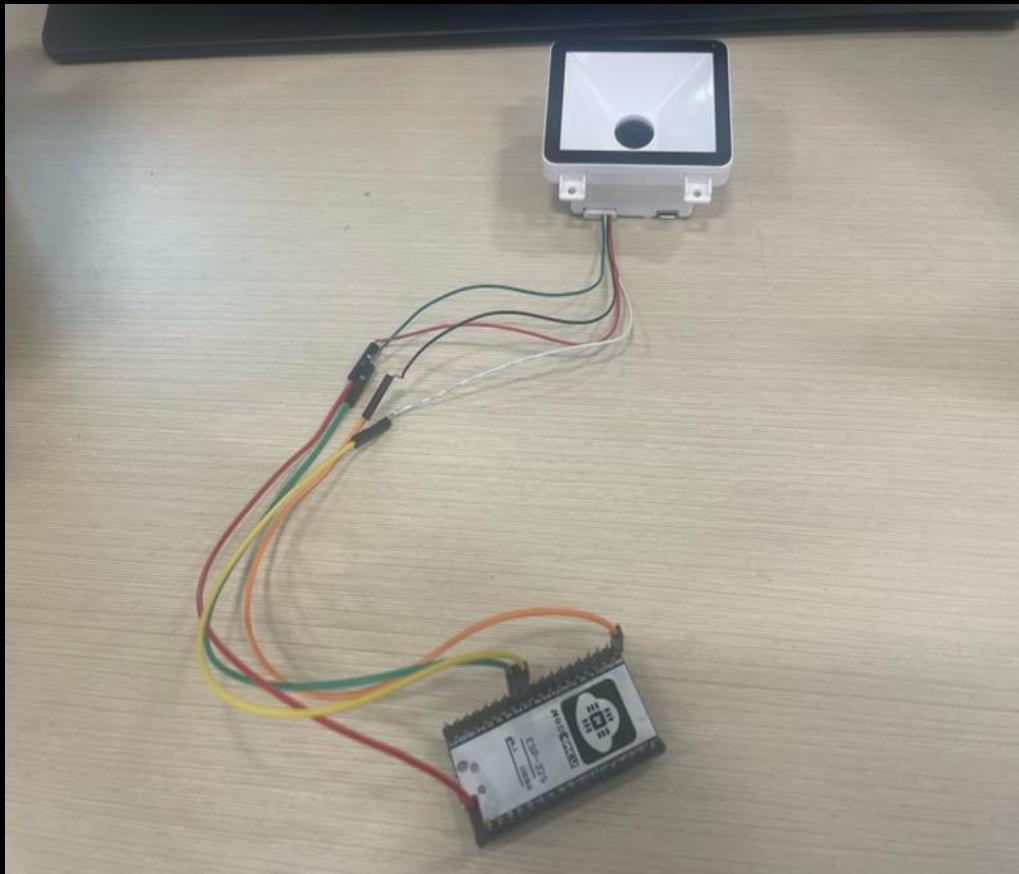


UPDATE MENU TAB

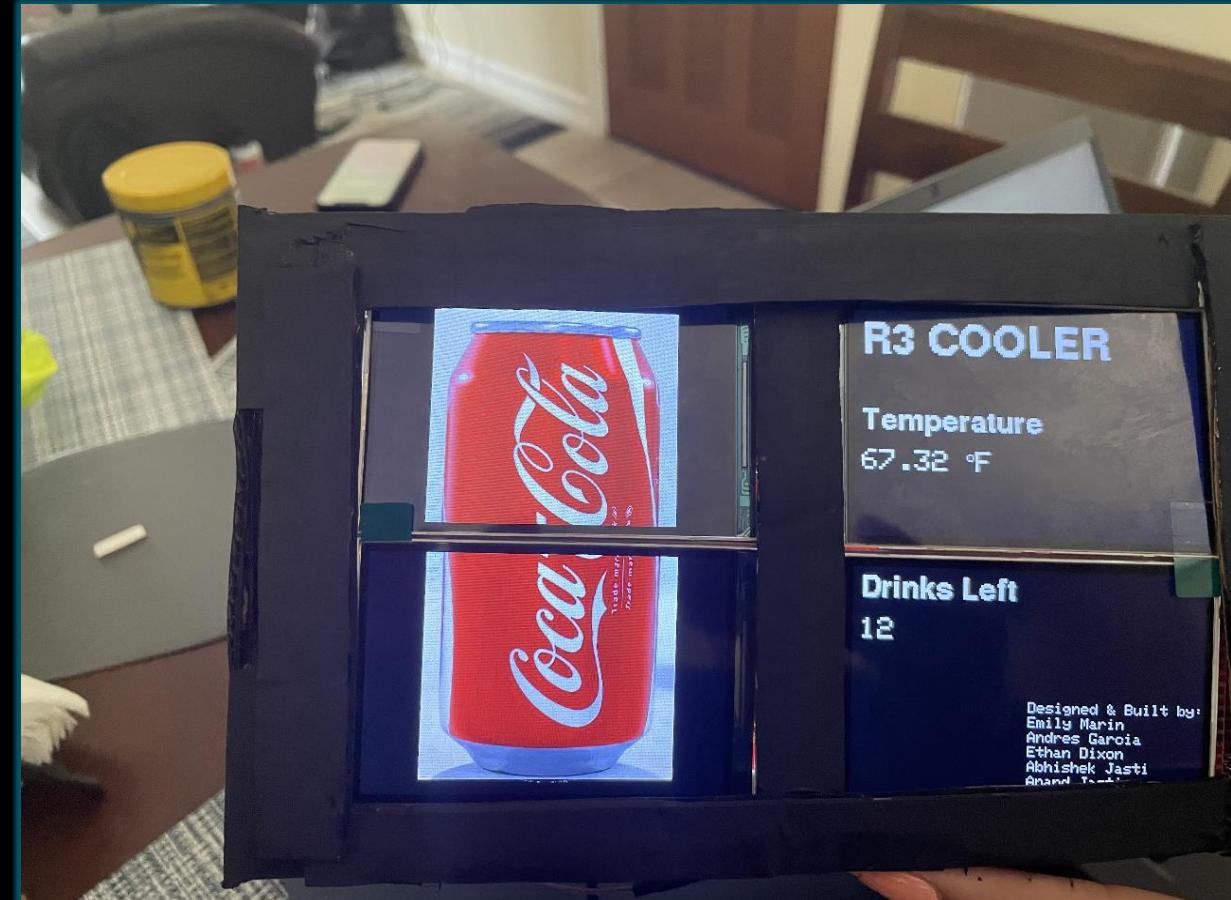
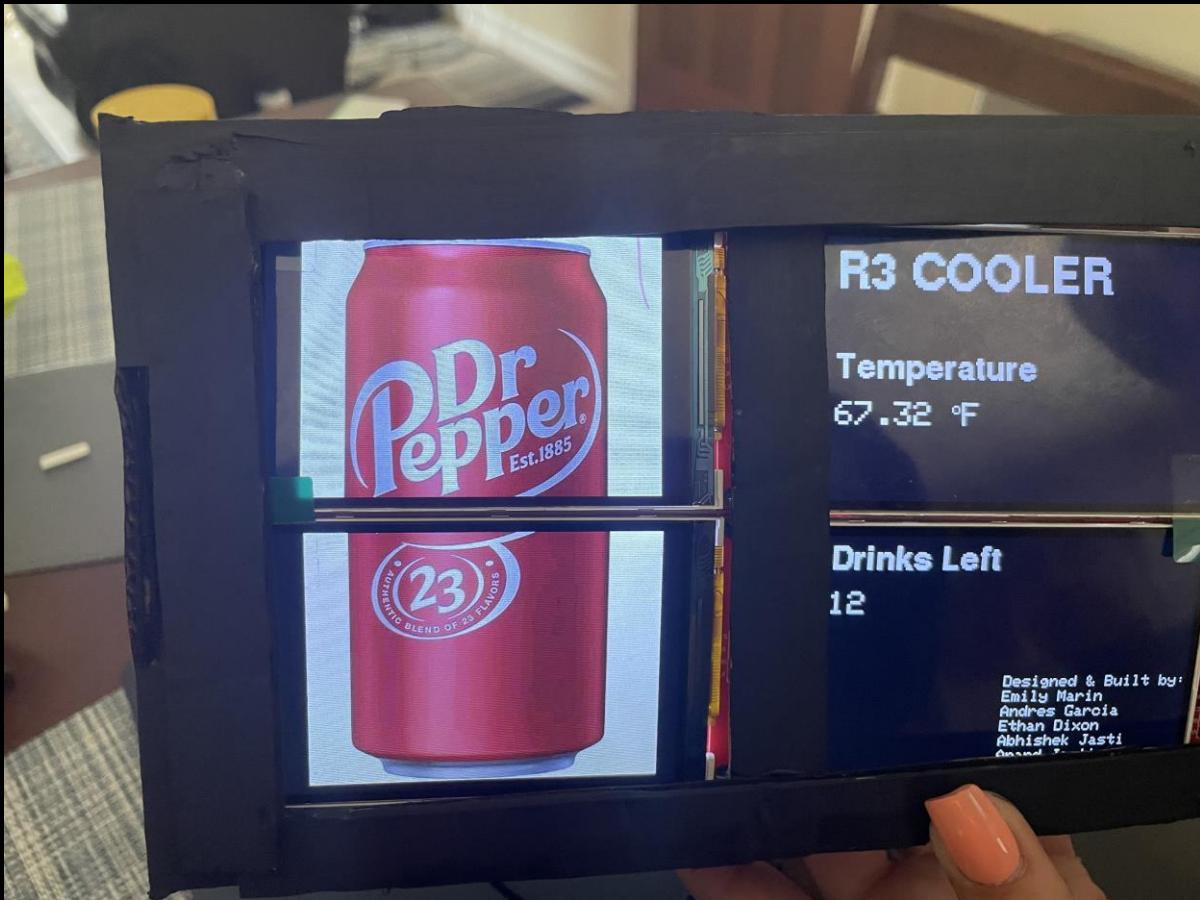
WEIGHT SENSOR



CAMERA SYSTEM



LCD



4 LCDS USED IN SYNCHRONIZATION TO
DISPLAY INFO ABOUT THE COOLER

LCD - CODE

```
digitalWrite(FirstScreenCS,HIGH);
digitalWrite(SecondScreenCS,HIGH);
digitalWrite(ThirdScreenCS,HIGH);
digitalWrite(FourthScreenCS,LOW);
gfx1->fillScreen(BLACK);
gfx1->setRotation(3);
gfx1->setCursor(10, 60);
gfx1->setTextSize(3);
gfx1->setFont(&FreeSansBold10pt7b);
gfx1->print("R3 COOLER");

gfx1->setCursor(10, 170);
gfx1->setTextSize(2);
gfx1->print("Temperature");
gfx1->setCursor(10, 200);
gfx1->setTextSize(4);
gfx1->setFont();
// set temperature here
// gfx1->print("67.32 ");
gfx1->print(httpGETRequest("http://172.20.
gfx1->setTextSize(2);
gfx1->print("o");
gfx1->setTextSize(4);
gfx1->print("F"));
```

PROJECT NAME & TEMPERATURE

```
gfx1->setCursor(10,40);
gfx1->setTextSize(2);
gfx1->setFont(&FreeSansBold10pt7b);
gfx1->print("Drinks Left");
gfx1->setCursor(10, 70);
gfx1->setTextSize(4);
gfx1->setFont();
// set drinks left here
// gfx1->print("12");
gfx1->print(httpGETRequest("http://172.20.10.2/drinksLeft"));
```

```
if(coke){
    // Draw Picture on Screen 1
    digitalWrite(FirstScreenCS,LOW);
    digitalWrite(SecondScreenCS,HIGH);
    digitalWrite(ThirdScreenCS,HIGH);
    digitalWrite(FourthScreenCS,HIGH);
    // gfx1->fillScreen(BLACK);
    gfx1->setRotation(1);
    w = gfx1->width();
    h = gfx1->height();

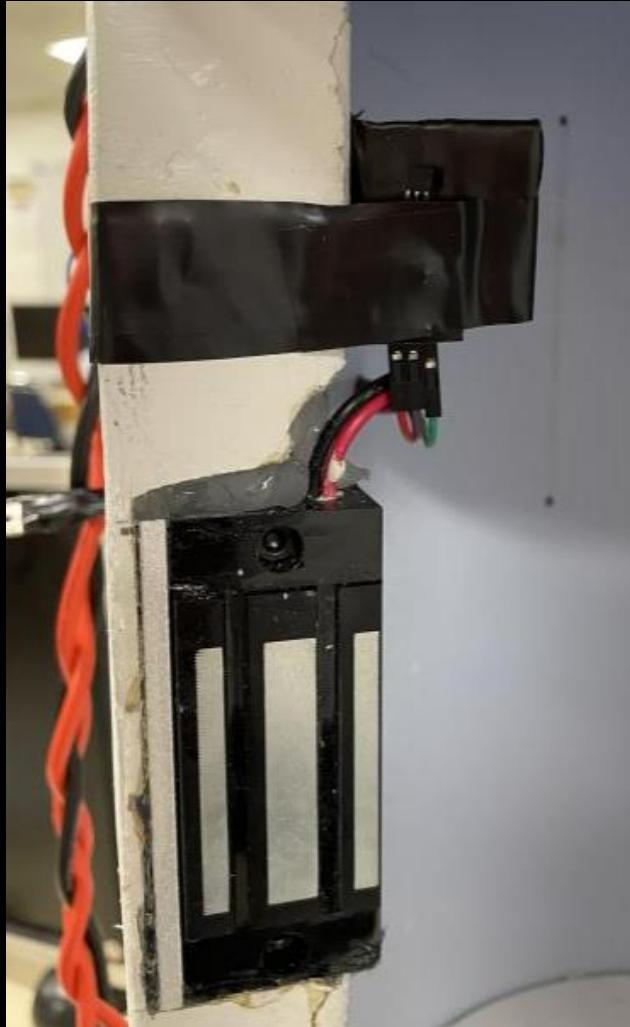
    picture = SD.open("/Coke1.jpg", FILE_READ);
    JpegDec.decodeSdFile(picture);
    pictureWidth = JpegDec.width;
    pictureHeight = JpegDec.height;
```

QUANTITY OF
DRINKS



DRINK DISPLAY

MAGNETIC LOCK



CHALLENGES ENCOUNTERED

- POWER SYSTEM CONSTANTLY TURNING ON AND OFF
- MOTORS HAD INCONSISTENT SPEEDS, FINDING THE CORRECT MOTOR DRIVER (HEATING)
- DELAY FROM THE APP TO THE MOTORS
- LCDs WERE HARD TO SYNC TOGETHER
- COOLING SYSTEM TOOK UP LOTS OF CURRENT TO MAINTAIN, TAKES SOME TIME TO COOL



SENIOR EXPO - COMPLETED



YOUTUBE CHANNEL



Subscribe

GITHUB



[GITHUB - ANANDJ01/R3-COOLER](https://github.com/ANANDJ01/R3-COOLER)

REFERENCES

- *AMAZON.COM: TEYLETEN ROBOT ESP32S ESP32 ESP-WROOM-32 DEVELOPMENT BOARD 2.4GHZ DUAL-CORE WIFI +BLUETOOTH 2 FUNCTION MICROCONTROLLER FOR ARDUINO (ESP32 30P, 3PCS) : ELECTRONICS.* AMAZON.COM: TEYLETEN ROBOT ESP32S ESP32 ESP-WROOM-32 DEVELOPMENT BOARD 2.4GHZ DUAL-CORE WIFI +BLUETOOTH 2 FUNCTION MICROCONTROLLER FOR ARDUINO (ESP32 30P, 3PCS) : ELECTRONICS. (N.D.). RETRIEVED SEPTEMBER 26, 2022, FROM [HTTPS://A.CO/D/DQRGFEZ](https://a.co/d/DQRGFEZ)
- JITHENDRA, SANTOS, R., FRENCH, D., YOUNG, J., BEN-MOSHE, IDAN, GONGORA, E., MICHAEL, S, K., SANTOS, S., FRANKLIN, KEVIN, ROBINBLOOD, GHEORGHE, I., HORTAL, M., SABER, OMEMANTI, SAFALYA, KUMAR, T., TUTTLE, D., ... YODRACK. (2020, JUNE 3). *GETTING STARTED WITH THE ESP32 DEVELOPMENT BOARD*. RANDOM NERD TUTORIALS. RETRIEVED SEPTEMBER 26, 2022, FROM [HTTPS://RANDOMNERDTUTORIALS.COM/GETTING-STARTED-WITH-ESP32/](https://randomnerdtutorials.com/getting-started-with-esp32/)
- YOUTUBE. (2019, MARCH 30). *I2C PART 1 - USING 2 ARDUINOS*. YOUTUBE. RETRIEVED SEPTEMBER 26, 2022, FROM [HTTPS://WWW.YOUTUBE.COM/WATCH?V=PnG4fO5_vU4&t=29s](https://www.youtube.com/watch?v=PnG4fO5_vU4&t=29s)
- YOUTUBE. (2020, APRIL 2). *INTRODUCTION TO ESP32 - GETTING STARTED*. YOUTUBE. RETRIEVED SEPTEMBER 26, 2022, FROM [HTTPS://WWW.YOUTUBE.COM/WATCH?V=xPlN_Tk3VLQ&LIST=WL&INDEX=104](https://www.youtube.com/watch?v=xPlN_Tk3VLQ&list=WL&index=104)
- YOUTUBE. (2017, JULY 28). *HOW TO MAKE TWO ARDUINO MICROCONTROLLERS TALK TO EACH OTHER*. YOUTUBE. RETRIEVED SEPTEMBER 26, 2022, FROM [HTTPS://WWW.YOUTUBE.COM/WATCH?V=3JuUMOnw7L0](https://www.youtube.com/watch?v=3JuUMOnw7L0)

REFERENCES

- VITOR_VS, & INSTRUCTABLES. (2017, DECEMBER 12). HOW TO BUILD: ARDUINO SELF-DRIVING CAR. INSTRUCTABLES. RETRIEVED NOVEMBER 13, 2022, FROM [HTTPS://WWW.INSTRUCTABLES.COM/HOW-TO-BUILD-ARDUINO-SELF-DRIVING-CAR/](https://www.instructables.com/How-to-Build-Arduino-Self-Driving-Car/)
- ZX12RCARL, AND INSTRUCTABLES. “HOW TO MAKE A R2D2 LOW COST FULL SIZE SCRATCH BUILT.” INSTRUCTABLES, INSTRUCTABLES, 22 JULY 2020, [HTTPS://WWW.YOUTUBE.COM/WATCH?V=XPLN_TK3VLQ&LIST=WL&INDEX=104%20](https://www.youtube.com/watch?v=xPlN_Tk3VLQ&list=WL&index=104%20)
- AMAZON.COM: GREARTISAN DC 12V 100RPM GEAR MOTOR HIGH TORQUE ELECTRIC ...
[HTTPS://WWW.AMAZON.COM/GREARTISAN-ELECTRIC-REDUCTION-ECCENTRIC-DIAMETER/DP/B0721T1PXQ](https://www.amazon.com/GREARTISAN-ELECTRIC-REDUCTION-ECCENTRIC-DIAMETER/dp/B0721T1PXQ).
- HALL EFFECT MAGNETIC SENSOR MODULE, 3144EA3144 HALL EFFECT SENSOR KY ...
[HTTPS://WWW.AMAZON.COM/EFFECT-MAGNETIC-SENSOR-ARDUINO-MXRS/DP/B085KVV82D](https://www.amazon.com/EFFECT-MAGNETIC-SENSOR-ARDUINO-MXRS/dp/B085KVV82D).
- “MAGNETIC SENSORS FOR ARDUINO.” YOUTUBE, YOUTUBE, 9 JAN. 2016,
[HTTPS://WWW.YOUTUBE.COM/WATCH?V=DTBPDGKVUIM](https://www.youtube.com/watch?v=DtbpDGKVUIM).
- [HTTPS://A.CO/D/9ENQSM2](https://a.co/d/9enqsm2)

LIVE DEMO

CHECKLIST

- CASE #1: R3 WILL MOVE FORWARD, BACKWARD, LEFT AND RIGHT REMOTELY THROUGH OUR APP
- CASE #2: CORRECT QR CODE UNLOCKS THE LID LOCK FOR THE CORRECT PASSWORD
- CASE #3: DRINK PULLED FROM THE COOLER IS COLD TO THE TOUCH
- CASE #4: DOOR LOCKS AFTER USE
- CASE #5: DRINK COUNT IS UPDATED ON THE APP AND THE LCD