



IDC Weekly Status Update 3 (11/21/19)

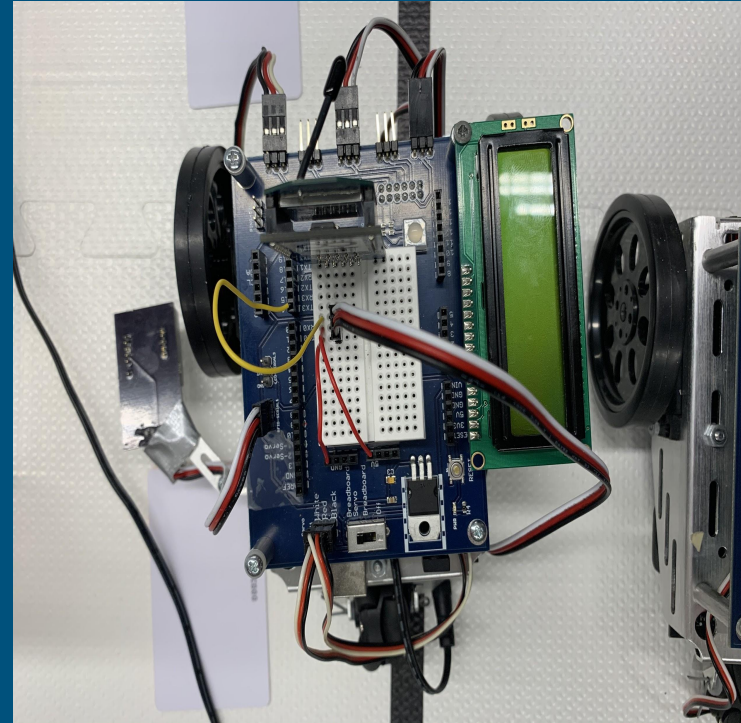


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Progress Summary - Successes

- Successfully implemented LCD
- Able to communicate results with central bot
- Receives data from dinosaur, and correctly displays on LCD



Progress Summary - Challenges

- Bot runs perfectly on wall power, but after a while on battery power, LCD and RFID becomes possessed (displaying random statements, LED lights up randomly...)
 - May be a problem with batteries
 - May be a problem with board/shield
- Spent a lot of time finally getting LCD to display correctly
- Spent a lot of time trying to figure out why LED would light up when there wasn't a tag

Code

```
bool lowerBool = true; //boolean variable ensures LCD screen only prints lowest bot once
bool upperBool = true; //boolean variable ensures LCD screen only prints lowest bot once

void setup() {
  //From communication
  Serial2.begin(9600); //initialize XBEE
  Serial1.begin(9600); // Initialize the RFID serial port
  pinMode(46, OUTPUT); //initialize on-board LED
  digitalWrite(46, HIGH); //Turn onBoard LED off
  Serial3.begin(9600); //initialize LCD screen
  Serial3.write(12);
  Serial3.write(17);
  Serial3.write("Preparing to read"); //print preparing to read
```

Upper: New boolean variables

```
else if(qtiLogic( QTIVaL_L, QTIVaL_M, QTIVaL_R) == 1){ //if qti logic function says 1, stop, then move forward

  servoStop(); //calls stop function
  HashCounter++;
  delay(1000); //wait for 2 seconds
  servoLeft.detach(); //detach servo motors every time bot stops, to conserve power
  servoRight.detach();
  delay(1000);
  while(Serial1.available() > 0) //Loop that waits for a tag to be read
  {

    if (Serial1.available() > 0) // If there are any bytes available to read, then the RFID Reader has probably seen a valid tag
    {
      isThere = true;
      //if (isThere == true) {
      //  Serial3.write("Valid tag detected");
      //}
    }
  }
}
```

Bottom: detaches servos every time bot stops

Code

```
if(isThere && (RFIDpin != rfidData[11])){ //checks last digit of previously counted tag to ensure that it doesn't recount tags
RFIDcounter++;
RFIDpin = rfidData[11];

//delay(1000);
if(isThere) {

    digitalWrite(46, LOW);
    delay(500);
    digitalWrite(46,HIGH);

}

isThere = false;
}
```

```
else{

    //communicate
    //if(shouldPrint == true){
    // Serial3.begin(9600);
    //Serial3.write(12);
    //Serial3.write(17);
    if(SHOULDPRINT < 10){
        if(RFIDcounter == 0) Serial2.print('m'); //Send letter "s" out
        if(RFIDcounter == 1) Serial2.print('n'); //Send letter "s" out
        if(RFIDcounter == 2) Serial2.print('o'); //Send letter "s" out
        if(RFIDcounter == 3) Serial2.print('p'); //Send letter "s" out
        if(RFIDcounter == 4) Serial2.print('q'); //Send letter "s" out
        if(RFIDcounter == 5) Serial2.print('r'); //Send letter "s" out
        //Serial3.write("end");
        //shouldPrint = false;
        SHOULDPRINT +=1; //added counter to print correct letter 10 times
    }
    servoStop();
    servoLeft.detach(); //detach servo motors
    servoRight.detach();
    Serial1.end(); //end RFID reading servo
}
```

Upper: protects against counting same chip twice by ensuring last digits aren't the same

Lower: added counter 'SHOULDPRINT' to only send 10 of the appropriate letters.

LCD display Code pt 2

```
while(Serial2.available()){ //While information is available to read

char incoming = Serial2.read(); //set variable incoming to what is read
Serial.print(incoming); //print on computer serial monitor for debugging purposes

if(incoming == '1' & lowerBool) //if recieving 1, and boolean variable true
{
    Serial3.write("1"); //print 1 on LCD screen
    lowerBool = false; //set lowerBool to false so it only prints this once
}
if(incoming == '2' & lowerBool) //if recieving 2, and boolean variable true
{
    Serial3.write("2"); //print 2 on LCD screen
    lowerBool = false; //set lowerBool to false so it only prints this once
}
if(incoming == '3' & lowerBool) //if recieving 3, and boolean variable true
{
    Serial3.write("3"); //print 3 on LCD screen
    lowerBool = false; //set lowerBool to false so it only prints this once
}
if(incoming == '4' & lowerBool) //if recieving 4, and boolean variable true
{
    Serial3.write("4"); //print 3 on LCD screen
    lowerBool = false; //set lowerBool to false so it only prints this once
}
```

Series of if
statements to check
what is being received
- used boolean
variable to only print
Lowest bot number
on LCD display once

LCD display Code pt 2

```
//if incoming == '5' & upperBool == true
if(incoming == '5' & upperBool)
{
    Serial3.write("Dance");
    upperBool = false;
}
//if incoming == '6' & upperBool == true
if(incoming == '6' & upperBool)
{
    Serial3.write("Lights");
    upperBool = false;
}
//if incoming == '7' & upperBool == true
if(incoming == '7' & upperBool)
{
    Serial3.write("Dino Roar");
    upperBool = false;
}
}
```

Series of if statements to check what is being received - used new boolean variables to only print outcome on LCD display once

[illegible]

Cost of BOT:

- The RFID Module is our only additional sensor as of right now, and costs \$29.95. We have not submitted requests for any other parts yet, and only anticipate using materials from lab, such as a 7-segment display, and LEDs.

Adding up additional parts from our BOE-Bot up to completing communication:

- 2x BOE-Bot plastic wheel with tire (4×2) = \$7.98
- 1x BOE-Bot tail ball wheel = \$3.95
- 1x BOE-Bot Aluminum Chassis = \$24.99
- 1x BOE-Bot Li Ion Power Pack with cable and barrel plug = \$49.99
- 1x Li Ion Cell = \$8.99
- 1x 3/8" x 2" (5.1 x 3.5 cm) solderless breadboard = \$3.49
- 2x Standard Servo Motor (12.99×2) = \$25.99
- 1x Arduino ATMEGA 2560 \$51.91
- 1x Board of Education Shield for Arduino \$39.99
- 1x USB A to B Cable = \$4.99
- 1x 7.5v 1A power supply = \$14.99
- 1x XBee Module = \$22.99
- 1x RFID Module = \$29.95
- 8x 3/8" 4-40 pan head screw (each) (4×0.02) = \$0.16
- 8x nylon washer (screw size #4) (4×0.07) = \$0.56
- 2x LED (1 Red, 1 Green) (2×0.32) = \$0.64
- 1x Push button tact switch = \$0.50
- 2x 220 Ohm 1/4 W resistor (2×0.10) = \$0.20
- 10 kOhm 1/4 W resistor = \$.0.10
- Wire, 22 AWG, solid, 100 ft, Blk (\$0.08/ ft.) / 6 inches used = \$0.04
- Arduino Wiring Kit - \$9.95
- 8x Angle Brackets = \$2.00

Total Estimated Cost To Date: \$284.17

Updated 11/20/19 - Added an additional 4 angle brackets, 4x nylon washers, and 4x 3/8" 4-40 pan head screws increasing the cost from the last update by \$1.36.