Obstacle Avoiding Robot

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Problem Definition

- Obstacle Avoiding Robot
  - Sense nearby objects
  - Should not crash into an object
  - Stop at 10 cm from the object
Required Parts

- Chassis
- Wheels
- Arduino (motherboard + driver)
- Wires
- Batteries (power)
- Nuts and Bolts

- Ultrasonic Sensor
- Software
Methodology

- Binary
  - Converting from decimal
  - The language of computers
- Software
  - The code itself
  - Learning how this works
- Hardware
  - Circuit building
  - How the robot comes together
What is the difference between series and parallel resistors circuits?
(colored bands on the resistors stand for a certain resistance)
Specific LEDs match with binary numbers to help it blink (video)
The Hardware

- Assembled robots from chassis, wires, Arduino, motors....
- We soldered wires to the motor shield, which would be used for controlling the sensor
The Arduino

- The Microcontroller
- The Coding
- Community
Practice Codes

Blink
- 1 or more LEDs
- High/Low

void setup() {
    pinMode(13, OUTPUT);
}

void loop() {
    digitalWrite(13, HIGH
    delay(1000);
    digitalWrite(13, LOW);
    delay(1000);
}

Fade
- Range of brightness
Ultrasonic sensor

- Sonar (Bats)
- 4 pins
- Close-up Picture
Software Examples

- Arduino Syntax
  - Setup
  - Loop
- If, For, While statements
  - Arithmetic code

```c
if (thisByte == 126) {
    while (true) {
        continue;
    }
}
```

```c
for (int fadeValue = 0 ; fadeValue <= 255; 
    fadeValue += 5) {
    analogWrite(ledPin, fadeValue);
    delay(30);
}
```
Motor Shield

- Adafruit Motor Shield (version 1.2)
- We use it to connect with Arduino
- We added wires to the motor shield to connect to other robot components
Robot Control Software

- Library
- Motor Shield Code
- Sensor Code
Problems Encountered

- Motors came with manufacturing problems
- A chip on the Arduino board short circuited
- Battery pack short circuited causing major issues on the actions of the robot
- Wheels’ bolts were sometimes both too loose and too tight
Ethics

- What is open source?
- What does open source allow one to do?
  - Community outreach (sharing)
Future Additions/Ideas

- Increase Speed
- Add LEDs/more décor to chassis
- Turn to avoid obstacles
- Move in all directions
- Create hand-held controller
Photos of Robots
Thank you

Our Third Group Member, Nicolle

Teaching Dr. Balaji how to Dab