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//MSD Robotics Final Code
//By Jason Constant and Zach Maher Rev 5: 04-18-17
#include <Servo.h>
//initialize pins
const int rServoPin = 6;
const int lServoPin = 5;
const int blueLedPin = 12;
const int greenLedPin = 9;
const int dcMotorNegative = 10;
const int dcMotorPositive = 11;
const int buttonPin = 8;

//Servo Inputs
const int rServoClosed = 42;
const int lServoClosed = 189;
const int rServoOpen= 96;
const int lServoOpen = 122;

//Delay Constants
const int oneMotorRotationTime = 8574; //if gear is turned too far reduce
time
const int motorLoadTime = 2850; //total load time is about 6 secs
const int restOfTime = (oneMotorRotationTime - motorLoadTime);
const int servoMoveTime = 1500;

//Misc Vars
int var = 0;
long motorCounter = 0;
const int dcMotorHigh = 255;//normal is 255

//Initialize R and L servos
Servo rServo;
Servo lServo;

void setup() {
  Serial.begin(9600);

  //Assign Sevros to PWN pins
  rServo.attach(rServoPin);
  lServo.attach(lServoPin);

  //Open Servos to Open positions
  rServo.write(rServoOpen);
  lServo.write(lServoOpen);
  delay (servoMoveTime);

  //Set output pins
  pinMode(dcMotorNegative, OUTPUT);
  pinMode(dcMotorPositive, OUTPUT);
  pinMode(blueLedPin, OUTPUT);
  pinMode(greenLedPin, OUTPUT);

  //Set up led states
  digitalWrite(blueLedPin, HIGH);//system is open and ready to catch
  digitalWrite(greenLedPin, LOW);

  //Set up Button

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pinMode(buttonPin, INPUT);
digitalWrite(buttonPin,HIGH);//writes a HIGH to pin all the time, when
//button pressed a LOW is read

}
void loop() {
  while(digitalRead(buttonPin) == HIGH){
    continue;
  }
  if(digitalRead(buttonPin) == LOW){
    if(var == 0){
      catchBall(motorCounter%3==2 ? 450 : 0);
      var = 1;
      digitalWrite(blueLedPin, LOW);
      digitalWrite(greenLedPin, HIGH);//system is closed and ready to fire

    }
    else{
      passBall(0);
      var = 0;
      digitalWrite(blueLedPin, HIGH);//system is open and ready to catch
      digitalWrite(greenLedPin, LOW);
    }
    motorCounter += 1;
  }
  while(digitalRead(buttonPin) == HIGH){
    continue;
  }
}
//Functions
void catchBall(int motorDelay){
  //Close Servos
  rServo.write(rServoClosed);
  //delay(200);//dealy so the arms don't hit eachother
  lServo.write(lServoClosed);

  //Load Springs To "tipping" point
  analogWrite(dcMotorPositive,dcMotorHigh);//Writes the postive side of DC
motor to full power
  analogWrite(dcMotorNegative,0);//No Power to Negative of DC motor

  delay(motorLoadTime+motorDelay);

  //Stop Motor
  analogWrite(dcMotorPositive,0);//Stop DC motor
}

void passBall(int motorDelay){
  //Move arms fully open
  rServo.write(rServoOpen);
  lServo.write(lServoOpen);

  // Move motor to release the rack
  analogWrite(dcMotorPositive,dcMotorHigh);//Writes the postive side of DC
motor to full power
  analogWrite(dcMotorNegative,0);//No Power to Negative of DC motor
}

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delay(restOfTime-motorDelay);  
  
//Stop DC Motor  
analogWrite(dcMotorPositive,0);//Stop DC motor  
  
}
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