RobotArm

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Chapter 1

File Index

1.1 File List

Here is a list of all documented files with brief descriptions:

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Chapter 2

File Documentation

2.1 Source_Code/Final_Demo_Code.ino File Reference

This is the final demo code.

```
#include <Wire.h>
#include <Adafruit_PWMServoDriver.h>
```

Macros

- #define SERVOMINBASE 150

  Minimum rotation in pulse length(pwm) for Servo motors at base.
- #define SERVOMAXBASE 300

  Maximum rotation in pulse length(pwm) for Servo motors at base.
- #define SERVOMINUP 150

  Minimum rotation in pulse length for Servo motors at upperarm and claw.
- #define SERVOMAXUP 250

  Maximum rotation in pulse length for Servo motors at upperarm and claw.

Functions

- void setup ()

  This sets up the Arduino code.
- void sweep (Adafruit_PWMServoDriver pwm, uint8_t channel, uint16_t start, uint16_t stop, uint16_t increment)

  Sweeps a servo a specified distance on a specified channel.
- void loop ()

  This code loops through every cycle.

Variables

- Adafruit_PWMServoDriver pwm = Adafruit_PWMServoDriver()

  Driver for Servo Shield.

2.1.1 Detailed Description

This is the final demo code. We used this in the presentation.

This code sweeps the base of the robot, then the upper arm, then the claw. The code loops infinitely until power is cut from the arduino or the shield.

2.1.2 Function Documentation

2.1.2.1 void loop ( )

This code loops through every cycle.

keeps cycling until power is disconnected.

Calls the sweep function twice for each joint. There are delays in between each loop to ensure that the servo doesn't move too fast and burn out. There are different servo min and maxes based on the physical arcitecture of the arm. We ensured that each part moved within range of the table, etc.

Parameters

void	

Returns

void

2.1.2.2 void setup ( )

This sets up the Arduino code.

Runs only once at the beginning.

Sets up the serial monitor for debugging and initializes the driver for the Servo Shield.

Parameters

void	

Returns

void

2.1.2.3 void sweep (Adafruit_PWMServoDriver *pwm,* uint8_t *channel,* uint16_t *start,* uint16_t *stop,* uint16_t *increment*)

Sweeps a servo a specified distance on a specified channel.

Parameters

pwm	The driver for the Servo Shield.
channel	The channel the Servo is connected to on the Shield.
start	The starting position in pulse length.
stop	The stopping position in pulse length.
increment	The amount to increase/decrease the pulse length every cycle of the loop.

Returns

void

2.1.3 Variable Documentation

2.1.3.1 Adafruit_PWMServoDriver pwm = Adafruit_PWMServoDriver()

Driver for Servo Shield.

It acts as the interface between the Servo Shield and the Arduino

2.2 Source_Code/Full_Robot_Code.ino File Reference

This is the final robot code.

```
#include <Servo.h>
```

Functions

- void setup ()

  The code that runs once at the start.
- void loop ()

  The code that loops repeatedly till power disconnect.

Variables

- Servo rotate

  Servo to rotate at base of arm.
- Servo shoulder

  Servo for elevating lower arm.
- Servo elbow

  Servo for moving upper arm.
- Servo wrist

  Servo for moving claw.
- Servo hand

  Servo for moving opening and closing claw fingers.
- int rotatePin = 0

  Pin attached to rotate potentiometer.
- int shoulderPin = 1

  Pin attached to shoulder potentiometer.
- int elbowPin = 2

  Pin attached to shoulder potentiometer.
- int wristPin = 3

  Pin attached to wrist potentiometer.
- int handPin = 4

  Pin attached to claw pontetiometer.
- int rotateIn = 0

  Values for storing input from rotate potentiometer.
- int shoulderIn = 0

  Values for storing input from shoulder potentiometer.
- int elbowIn = 0

  Values for storing input from elbow potentiometer.
- int wristIn = 0

Values for storing input from wrist potentiometer.

- int handIn = 0

  Values for storing input from hand potentiometer.

2.2.1 Detailed Description

This is the final robot code. This code attaches each of the servos to the pins on the arduino and attaches each of the potentiometers to the input pins. It then routes the output from the potentiometers to the input of the servos to accurately control their movement

2.2.2 Function Documentation

2.2.2.1 void loop ( )

The code that loops repeatedly till power disconnect.

Reads in values from potentiometers, maps them to degrees, and outputs the values to the degrees of rotation for the servos.

Parameters

void	

Returns

void

2.2.2.2 void setup ( )

The code that runs once at the start.

Initializes variables for the program and attaches servos to analog output pins

Parameters

void	

Returns

void

2.3 Source_Code/ServoSweep.ino File Reference

This is code for testing servo functionality.

```
#include <Servo.h>
```

Functions

- void setup ()

  Setup code runs once at start up.

- void loop ()

  Loop code runs repeadtidly to power disconnect.

- void serialInput (int open, int close)

Gets input from Serial monitor and applies to servo.

- void sweep (int start, int end, int t)

  Sweeps the servo to.

Variables

- Servo serv

  Servo for testing.

2.3.1 Detailed Description

This is code for testing servo functionality. A simple program for testing servo functionality. It attaches one servo and rotates it to a certain angle and back repeatedly. Optional functionality to pass command through the serial monitor.

2.3.2 Function Documentation

2.3.2.1 void loop ( )

Loop code runs repeadtidly to power disconnect.

Exectutes main code. Either sweeps servo open and closed or takes open and close command from the serial monitor.

Parameters

void	

Returns

void

2.3.2.2 void serialInput (int *open*, int *close*)

Gets input from Serial monitor and applies to servo.

Gets a command from the serial monitor. If command is 'o' the servo turns to the open state. If the command is 'c' the servo turns to the closed state. Otherwise, it does nothing.

Parameters

open	degrees of rotation for servo to open.
close	degrees of rotation for servo to close.

Returns

void

2.3.2.3 void setup ( )

Setup code runs once at start up.

Attatches test servo to a analog output pin and starts the serial monitor.

Parameters

void	

Returns

void

2.3.2.4 void sweep (int *start*, int *end*, int *t*)

Sweeps the servo to.

Simple function to rotate the servo to a position and back.

Parameters

start	position servo starts at.
end	position servo will move to.
t	time t in milliseconds servo will delay while sweeping. Determines speed of rotation.

Returns

void

2.4 Source_Code/Testing_Orig_Servos.ino File Reference

This is code for running two servos.

```
#include <Servo.h>
```

Functions

- void setup ()

  Sets up the servo.

- void loop ()

  Runs the servos.

Variables

- Servo myservo

  Test servo 1.

- Servo myservo2

  Test servo 2.

2.4.1 Detailed Description

This is code for running two servos. this is a simple program that attaches two servos to the arduino and spins them from 0 to 180 degrees and back to 0.

2.4.2 Function Documentation

2.4.2.1 void loop ( )

Runs the servos.

The loop function runs repeaditly till the power is disconnected. This rotates the motors on both servos at the same time from 0 up to 180 degrees and back to 0.

Parameters

void	

Returns

void

2.4.2.2 void setup ( )

Sets up the servo.

The setup function runs once at the beginning of the program before anything else. This attaches the 2 test servos to output pins on the arduino.

Parameters

void	

Returns

void

2.5 Source_Code/Working_Potentiometer_Code.ino File Reference

This code runs 2 servos off the input of a potentiometer.

```
#include <Servo.h>
```

Functions

- void setup ()
  Code that attaches the servos.
- void loop ()
  Code that runs the servos.

Variables

- Servo serv
  First servo.
- Servo serv1
  Second servo.
- int sensorPin = A0
  Pin that the output from the potentiometer inputs to the Arduino.
- int pinput = 45
  Value for storing input from potentiometer.

2.5.1 Detailed Description

This code runs 2 servos off the input of a potentiometer. This program uses 2 servo motors and one potentiometer. When the user turns the potentiometer, the input goes in to the Arduino and is then routed to the input of the two servos.

2.5.2 Function Documentation

2.5.2.1 void loop ( )

Code that runs the servos.

This code loops repeatidly for the duration that power is running through the arduino. It reads the input from the pot. maps it to 360 degrees of rotation then writes that to both the servos.

Parameters

void	

Returns

void

2.5.2.2 void setup ( )

Code that attaches the servos.

This code is run once at the beginning of the program It just attaches the servos to two of the analog output pins

Parameters

void	

Returns

void

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