Robotic Arm Serial and WIFI Communication Programs

Standard Operating Procedure

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# Project Purpose

The purpose of this program and device set is to control a robotic arm over WIFI. In order to do this, we are using a device to send remote commands to another device that will communicate serially to control the robotic arm.

# Setup

## Hardware

### Connect the Arduino to a Raspberry Pi over USB.

#### The Arduino must be independently powered from the Raspberry Pi.

### Power on both Raspberry Pi’s

### Program the Arduino from the Raspberry Pi.

## Server Program

### Open the terminal and navigate to the file location of the file “server.py”

### Run the command “Python server.py <port\_num>”

#### <port\_num> represents the port number that you want to run the server on.

#### Ex. Python server.py 10000

### The server should be running.

## Client Program (Remote)

### Open the terminal and navigate to the file location of the file “client.py”

### Run the command “Python client.py <ip\_addr> <port\_num>”

#### <port\_num> represents the port number that you want to connect to the server on.

#### <ip\_addr > represents the ip address of the server

#### Ex. Python client.py 127.0.0.1 10000

### The server should be connected now.

## Client Program (Robotic Arm)

### Open the terminal and navigate to the file location of the file “client.py”

### Run the command “Python client\_serial.py <ip\_addr> <port\_num>”

#### <port\_num> represents the port number that you want to connect to the server on.

#### <ip\_addr > represents the ip address of the server

#### Ex. Python client\_serial.py 127.0.0.1 10000

### The server should be connected now and should be communicating with the Arduino and by extension the robotic arm.

# Usage Instructions

## Commands

### The robotic arm can be sent commands on where to move the robotic arm specified by degree positions.

### Each command specifies a position and a servo to move.

### Servos are given values ‘a’ through ‘f’ labelled from bottom to top servo.

### To move the robot, a command has the format “<degrees><servo\_label>

#### Ex. A command that would move servo A to position 85° would be “85a”

### Multiple commands can be sent using commas and spaces.

#### Ex. “45a, 85b, 25c, 89d” etc.

# Device Description

A Raspberry Pi is used remotely to send commands to another Raspberry Pi. The second Raspberry Pi will relay the commands to an Arduino using serial communication. The Arduino has a program that will allow it to process the commands and to control the arm’s movement.

# Program Description

## Server Program

## Client Program (Remote)

## Client Program (Robotic Arm)

# Version

**Version : 0.0.3**

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