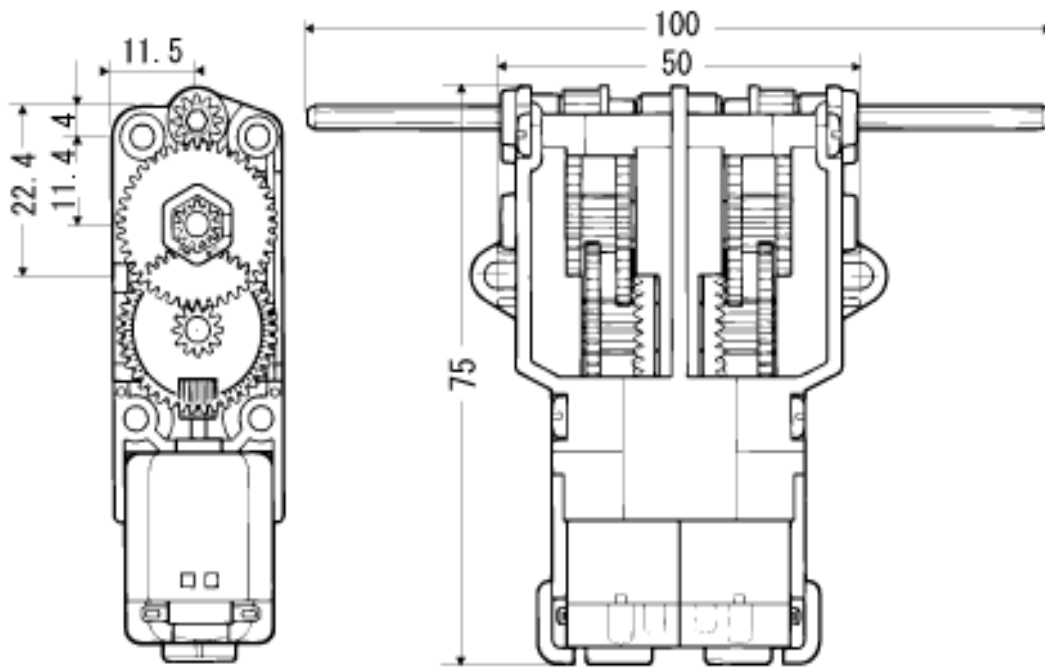# Arm Robot Operations

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Operation

❖ Robot Dimensions

The maximum load the robotic manipulator can lift successfully is determined by the base servo motor from the design analysis made. The robotic base uses two brushed d.c geared-motors, designed to produce high torque while maintain a low output that drive the sprockets of the track and wheel set for motion. The Tamiya twin-motor gearbox used for this design is a small (3-inch long) plastic gearbox. It contains two small brushed DC motors that drive separate 3mm hexagonal output shafts. There are two ways to put the kit together; with a high-speed 58:1 gear ratio or with a slower 203:1 gear ratio. However, the 203:1 configuration is used for this design
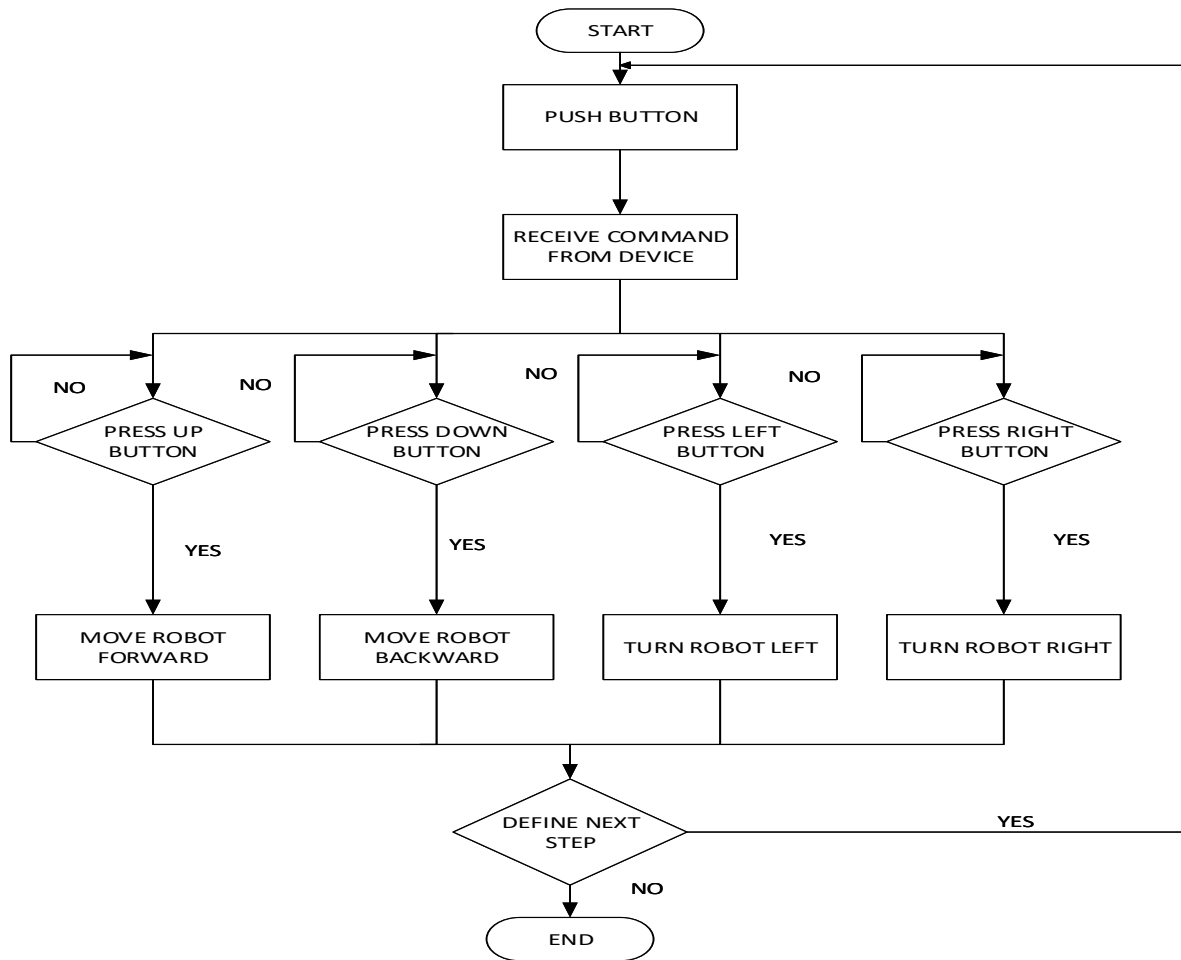
❖   Arm Robot Control Panel Description
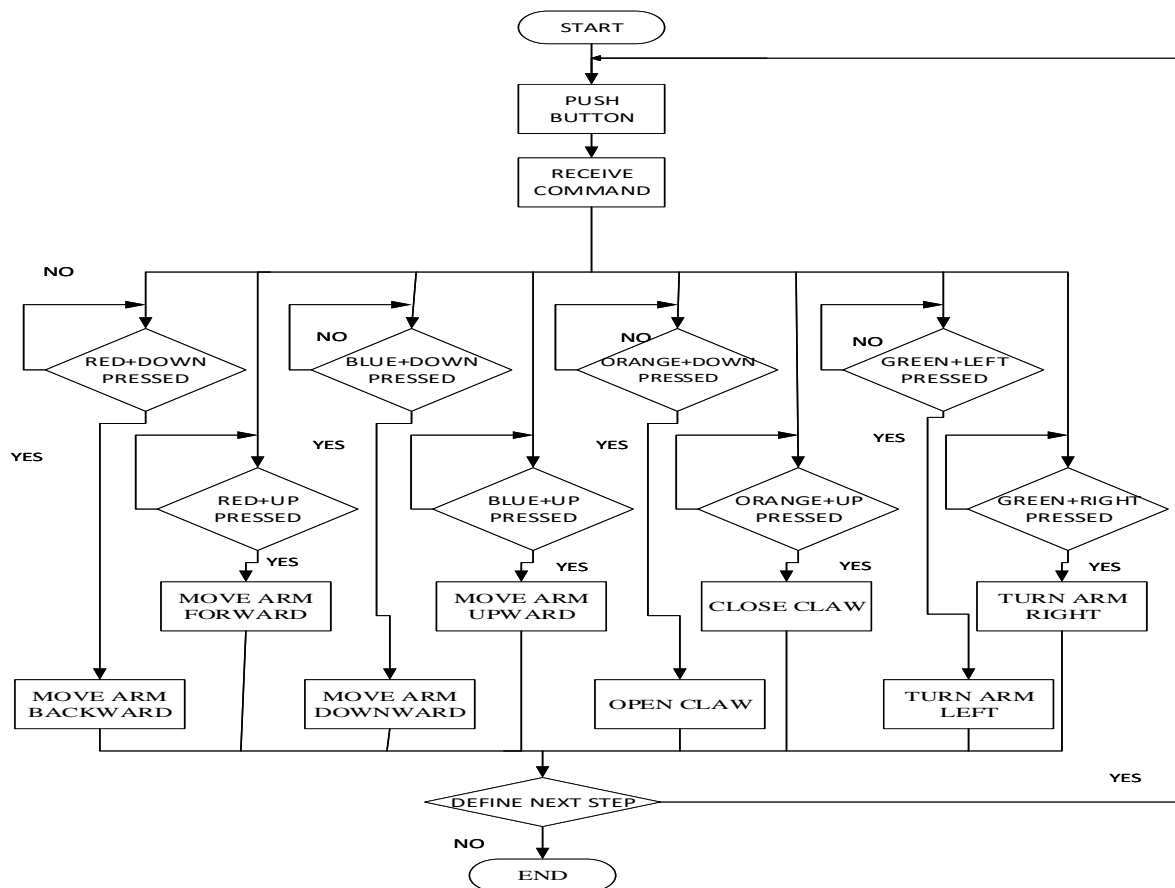
Flowchart for the robot arm

Controller Software Design

The robot uses two Arduino microcontrollers connected in a master/slave configuration. The master controls the robotic arm while the slave controls the robotic base as shown in figures 5 and 6 respectively. The robot software directs and coordinates the entire robot operation when the operator issues a command from the remote control which send signals to the microcontrollers. The code is written within two software, namely, Arduino IDE and Isheeld + APP software. Figures 7 and 8 are flowcharts that describe the software algorithm for the arm and the base.

```
                          ┌─────────┐
                          │  START  │
                          └─────────┘
                               │
                    ┌──────────────────┐
                    │   PUSH BUTTON    │
                    └──────────────────┘
                               │
                    ┌──────────────────┐
                    │ RECEIVE COMMAND  │
                    │   FROM DEVICE    │
                    └──────────────────┘
```

Flowchart for the base

Arduino IDE

  This is the software that runs on a computer and is used to write, edit and upload code to the physical Arduino board. The software can run on Windows, Linux and Mac OS X. This environment was written using java and is open source. The program for the up and down, forward and backward, side to side motion of the arm as well as the opening and closing of the claw (gripper) is fully implemented in the design of this prototype robot.

1Sheeld + APP

  This is the other part of the1Sheeld + package. This is the software platform that oversees the communication between a smartphone device and the 1Sheeld+ shield. The communication shield (1Sheeld+) was stacked on the Arduino Mega. The APP enables the user to select between a variety of shields and makes the capabilities and sensors of the smartphone accessible to the robot.

Expected errors	
<u>Identify the expected error</u>	**<u>Cause of expected error</u>**
raspberry pi does not work	Burning one of the ports
Arduino malfunction	The motherboard burned.
Arm engines don't work.	Burning robot arm engines

❖ REFERENCE

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