

Robotic Arm

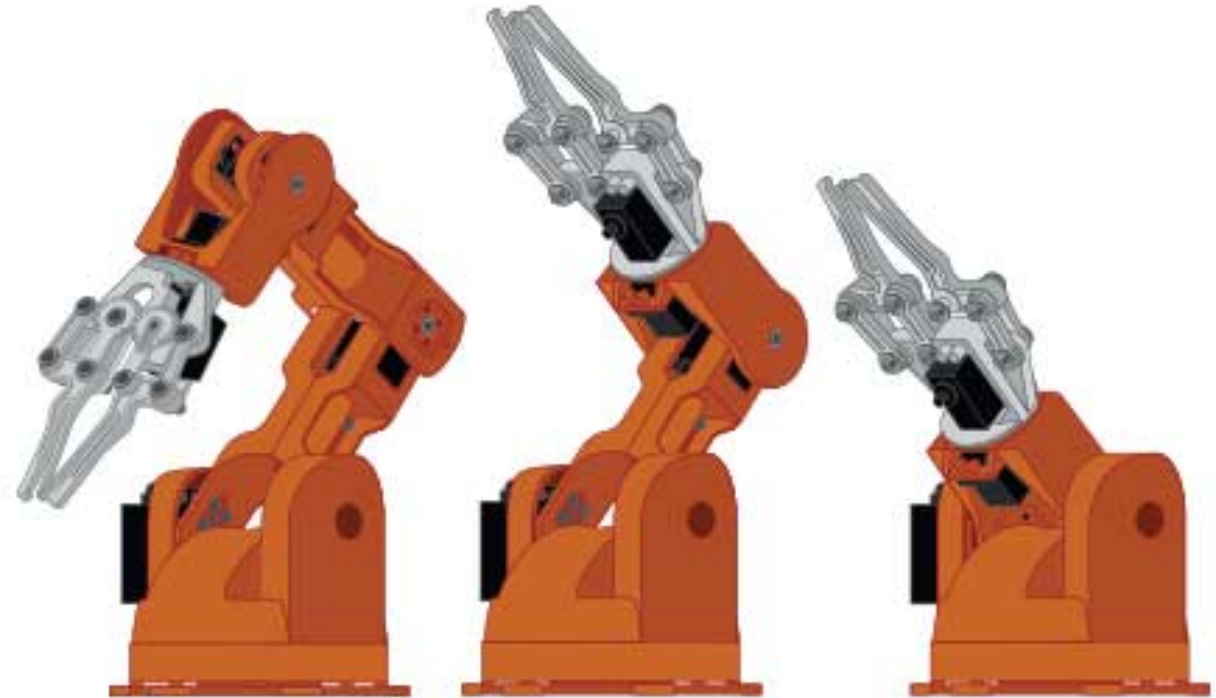
Module Code: GEEN1064

Module Name: Engineering Design and Implementation

Lecturer: Seb Blair BEng(H) PGCAP MIET MIHEEM FHEA

Braccio

Braccio/Braccia [Brattcho/Brattcha] is the Italian word for arm.



Functions you should NOT use

```
void roboticArmBegin();  
void processCommand();  
int whichMotor(String l_Command, String l_Motor);  
void moveServo(Servo &servo, ..., const char *servoName);  
void softStart(int soft_start_level);  
void softwarePWM(int high_time, int low_time);
```

Moving Motors Individually

`stepDelay` : Delay in milliseconds between each step, controlling the speed of movement, between 10 & 30

```
void -moveBase(int stepDelay, int vBase);  
void moveShoulder(int stepDelay, int vShoulder);  
void moveElbow(int stepDelay, int vElbow);  
void moveWrist_Ver(int stepDelay, int vWrist_ver);  
void moveWrist_Rot(int stepDelay, int vWrist_rot);  
void moveGripper(int stepDelay, int vgripper);
```

```
moveBase(10, 180); // move base to 180 degrees
```

Move all motors

Note: This code is one line

```
void roboticArmMovement(int stepDelay, int vBase,\n    int vShoulder, int vElbow, int vWrist_ver, int vWrist_rot, int vgripper)
```

```
//          (SD,  BA,  SH,  EL,  WV,  WR,  GR);\nRoboticArmMovement(20,  180,  30,  10,  60,  90,  73);
```

Robot moves in the following order:

- base -> shoulder -> elbow -> wrist vertical -> wrist rotation -> gripper

Some other useful functions

```
void printPosition() {  
  
    Serial.print("B: ");  
    Serial.print(step_base);  
    Serial.print(" S: ");  
    Serial.print(step_shoulder);  
    Serial.print(" E: ");  
    Serial.print(step_elbow);  
    Serial.print(" V: ");  
    Serial.print(step_wrist_ver);  
    Serial.print(" R: ");  
    Serial.print(step_wrist_rot);  
    Serial.print(" G: ");  
    Serial.println(step_gripper);  
}
```

Some other useful functions

```
void homePosition() {  
    //For each step motor this set up the initial degree  
    base.write(90);  
    shoulder.write(90);  
    elbow.write(180);  
    wrist_ver.write(180);  
    wrist_rot.write(90);  
    gripper.write(10);  
    delay(1000);  
    //Previous step motor position  
    step_base = 90;  
    step_shoulder = 90;  
    step_elbow = 180;  
    step_wrist_ver = 180;  
    step_wrist_rot = 90;  
    step_gripper = 10;  
  
    Serial.println("In Home position: B90 S90 E180 V180 R90 G10");  
}
```

Source code

RoboticArm.ino

```
...

Serial.println("");
Serial.println("First Movement");
                //(SD, BA, SH, EL, WV, WR, GR);
roboticArmMovement(20, 180, 30, 10, 60, 90, 73);
//Wait 2 second recommended for power to discharge from the servos
delay(2000);

Serial.println("");
Serial.println("Second Movement");
Serial.println("");

                //(SD, BA, SH, EL, WV, WR, GR);
roboticArmMovement(20, 0, 120, 10, 100, 10, 10);
// Wait 2 second recommended for power to discharge from the servos
delay(2000);
```


Source code

Robot_Arm_Manual_Instructions_via_serial.ino

```
/*Code here one once during startup*/  
void setup() {  
    initialiseRoboticArm(); // Must be called before using braccio!  
}  
  
/*Code here runs forever!*/  
void loop() {  
    // waits for your commands via the serial monitor and then executes them  
    serialListener();  
}
```