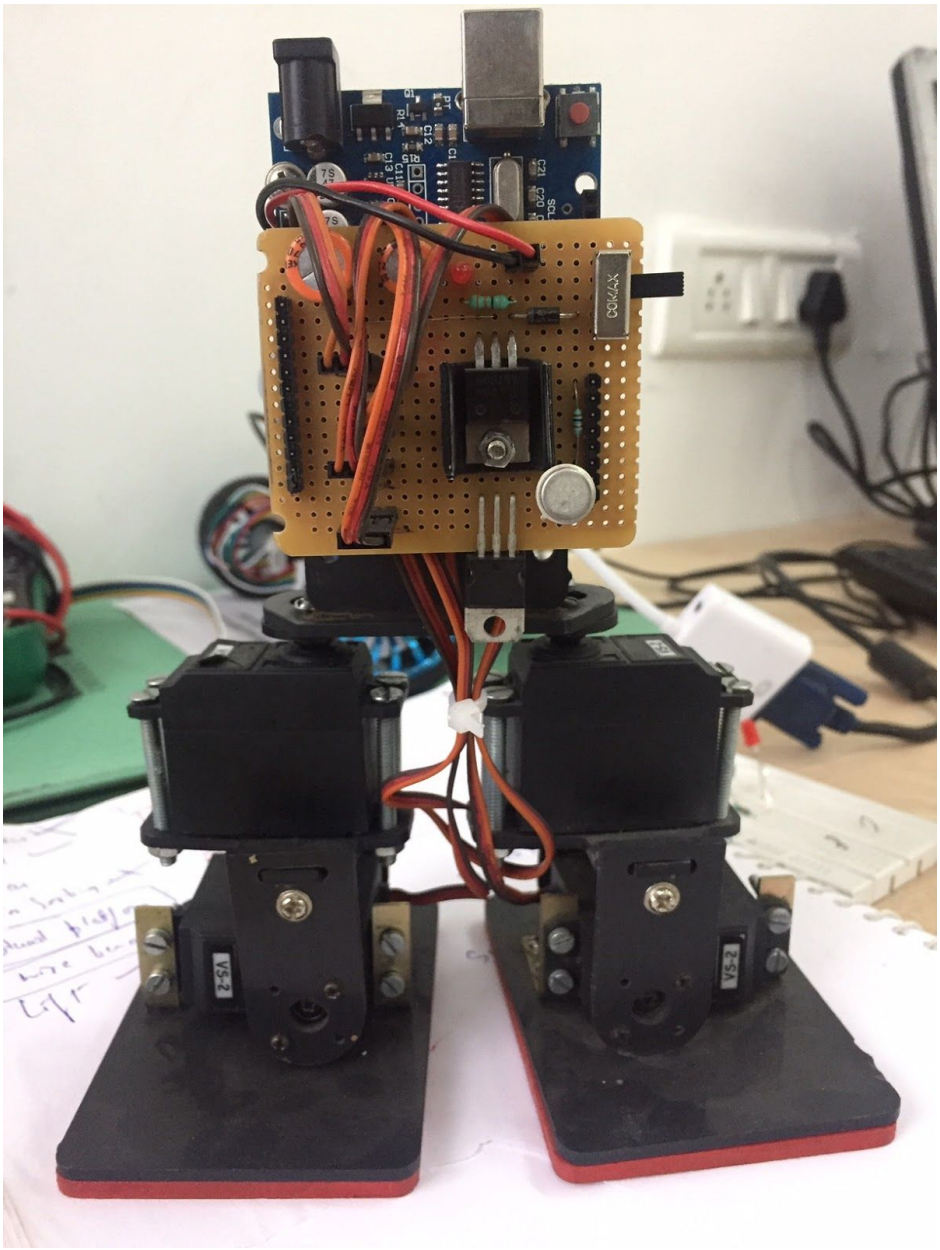
BI-PED



INTRODUCTION:

This 4-DOF Bi-ped robot for is the simplest form of a two-legged walking robot. Using an Arduino Uno board its controller, this robot uses just 4 servo motors to mimic the walking procedure. While two servos are used for the hip joints, the remaining two are used for the ankles. Employing an open-ended design, there is a lot of room for

enhancements like obstacle detection (using IR sensors or Ultrasonic sensors), and additional servos (like knee-joints) for improving the gait. It can also be adapted to receive voice commands.

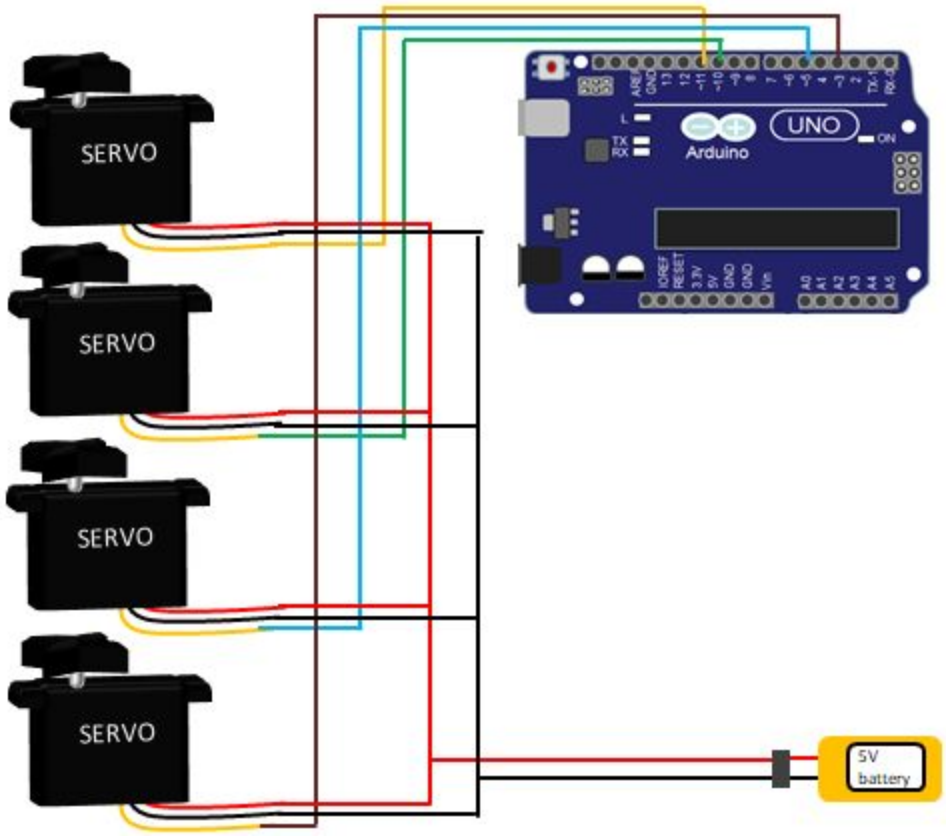
Although running on 5 volts, the Bi-Ped is equipped with an on-board regulator for running on higher-voltage batteries.

COMPONENTS REQUIED:

1. Arduino Uno
2. 5V Battery or larger battery with a 5V regulator

4 servos (MG995R)**R**

Circuit diagram:



Arduino sketch:

```
#include <Servo.h>

Servo myservoA;  // create servo object to control a servo
```

```
Servo myservoB;  // twelve servo objects can be created on most boards
Servo myservoC;
Servo myservoD;

int posA;   // Target servoA position (Left Ankle)
int posB;   // Target servoB position (Left Hip)
int posC;   // Target servoC position (Right Ankle)
int posD;   // Target servoD position (Right Hip)

int posa; // Current servoA position
int posb; // Current servoB position
int posc; // Current servoC position
int posd; // Current servoD position
int count;
void setup()
{
pinMode(7, OUTPUT);
digitalWrite(7, LOW);
 myservoA.attach(5);  // attaches myservoA to pin10
 myservoB.attach(3);   // attaches myservoB to pin12
 myservoC.attach(10);
 myservoD.attach(11);

 count = 0;
}

void loop()
{
digitalWrite(7, HIGH);
  count = (count + 1);
  if (count <= 500) // Stand Erect
  {
    posA = 93; //RA
    posB = 83; //RH
    posC = 95; //LA
    posD = 85; //LH
  }
  else if ((count >500) && (count <= 550)) // Tilt Right
  {
    posA = 138; //RA
    posB = 83;  //RH
    posC = 140; //LA
    posD = 85;  //LH
```

```
}
else if ((count >550) && (count <= 600)) //Right Hip forward
{
  posA = 138; //RA
  posB = 47;  //RH
  posC = 140; //LA
  posD = 55;  //LH
}
else if ((count >600) && (count <= 650)) // Level off
{
  posA = 93; //RA
  posB = 47; //RH
  posC = 95; //LA
  posD = 55; //LH
}
else if ((count >650) && (count <= 700)) // Tilt Left
{
  posA = 48; //RA
  posB = 49; //RH
  posC = 50; //LA
  posD = 55; //LH
}
else if ((count >700) && (count <= 750)) // Left Hip Fprward
{
  posA = 48;  // RA
  posB = 119; //RH
  posC = 50;  //LA
  posD = 115; //LH
}

  else if ((count > 750) && (count <=800)) // Level Off
  {
  posA = 93;  // RA
  posB = 119; //RH
  posC = 95;  //LA
  posD = 115; //LH
  }
  else if (count > 800)
  { count = 500; // repeat entire sequence
  }

  if (posa < posA)
{
```

```
  posa = (posa + 1);     // in steps of 1 degree
}

else if (posa > posA)

{
  posa = (posa - 1);
}

else
{
posa = posA;
}

myservoA.write(posa);
delay(4);

if (posb < posB)

{
  posb = (posb + 1);     // in steps of 1 degree
}

else if (posb > posB)

{
  posb = (posb - 1);
}

else
{
  posb = posB;
}
myservoB.write(posb);
delay(4);

if (posc < posC)

{
  posc = (posc + 1);     // in steps of 1 degree
}

else if (posc > posC)
```

```
  {
    posc = (posc - 1);
  }

  else
  {
    posc = posC;
  }
  myservoC.write(posc);
  delay(4);

  if (posd < posD)

  {
    posd = (posd + 1);     // in steps of 1 degree
  }

  else if (posd > posD)

  {
    posd = (posd - 1);
  }

  else
  {
    posd = posD;
  }
  myservoD.write(posd);
  delay(4);
}
```