*#include* <Arduino.h>

*#include* <ESP32Servo.h>

*#include* <math.h>

*// Servos.*

Servo myservo1;

*#define* PIN\_SERVO1 13

*// 'point\_to\_servoMove' changes the angles of servos when co-ordinate point is given.*

*double* pi = 3.14159265359;

*// dont give (0,0,0) point here then d2 becomes zero.*

*void* point\_to\_servoMove(*double* x = 1, *double* y = 1, *double* z = 1, *double* l = 1) *// x,y,z are the co-ordinates, l is the length of the arm.*

{

*double* d1, d2, a0, a1, a2, a4; *// defining these all are as 'double'.*

*if* (x == 0 && y == 0) *// d1 should not be zero. 0 -> 0.001.*

    {

        d1 = sqrt(pow(0.001, 2) + pow(0.001, 2));

    }

*else*

    {

        d1 = sqrt(pow(x, 2) + pow(y, 2));

    }

    d2 = sqrt(pow(x, 2) + pow(y, 2) + pow(z, 2));

*if* (d2 < 2 \* l) *// if d2 > 2\*l, then 'Out of Range'.*

    {

*// these are the mathematical formulas.*

        a0 = (acos(x / d1)) \* 180 / pi;

        a1 = (acos(d1 / d2) + acos(d2 / (2 \* l))) \* 180 / pi;

        a2 = (pi - 2 \* acos(d2 / (2 \* l))) \* 180 / pi;

        a4 = ((3 \* pi / 2) - a1 - a2) \* 180 / pi;

    }

*else*

    {

*// this is set for default, when point goes to out of range.*

        a0 = 90;

        a1 = 150;

        a2 = 60;

        a4 = 45;

    }

*// the angles are given to the servo motors.*

    myservo1.write(a1);

    Serial.print("Servo Move at angle: ");

    Serial.println(a1);

};

*// Setup function.*

*void* setup()

{ *// Servos.*

    myservo1.attach(PIN\_SERVO1);

*// Serial Moniter.*

    Serial.begin(9600);

}

*int* delay1 = 1000; *// it is used to set the delay time between each moves.*

*// this the main loop function. Program inside it continuesly looping.*

*void* loop()

{

    point\_to\_servoMove(); *// default point of (1,1,1)*

    delay(delay1);

    point\_to\_servoMove(1.46, 1.11, 0.52); *// floating values are also applicable.*

    delay(delay1);

    point\_to\_servoMove(1.46, 1.11, 0.52, 2); *// here the 4th argument is length of the arm.*

    delay(delay1);

    Serial.println("---------------");

    delay(delay1);

}