```
#include <Servo.h>
//variable that receives the command from the python code
int  incomingMessage=0;
//Sets the left side home position
int  leftHomePosition=115;
//Keeps track of the horizontal angle
int horizontalAngleTrack=leftHomePosition;

int downHomePosition=90;
//Keeps track of the vertical angle
int verticalAngleTrack=downHomePosition;
//Sets the increment of the horizontal angle every time the
//move command is called
int  horizontalIncrement=1;
//Sets the increment of the vertical angle every time the move
//command is called
int verticalIncrement=1;

//Declares a servo called horizontal_servo
Servo horizontalServo;
//Declares a servo called vertical_servo
Servo  verticalServo;

void setup()                 {
   //Sets up the sensor in the analog pin A5
  pinMode(A5, INPUT);
  //Initializes the serial port
  Serial.begin(9600);
  //Declares the pin that the servo controlling horizontal
  //angle is connected to
 horizontalServo.attach(7);
  //Declares the pin that the servo controlling vertical
  //angle is connected to
 verticalServo.attach(8);
}

// the loop routine runs over and over again forever:
void loop() {

  //Sends data only when it is received
  if (Serial.available()>0){
    //Waits for a message from the serial port (in this case,
    // from python code)
   incomingMessage=Serial.read();

    //Moves to the right
```

```
if (incomingMessage=='1'){
  //Decrements the horizontal angle by the specified
  //increment to
  //move it to the right
 horizontalAngleTrack=horizontalAngleTrack-horizontalIncrement;
  //writes the new angle to the servo to move it there
  horizontalServo.write(horizontalAngleTrack);
}

//Moves to the left
if (incomingMessage=='2'){
  //Increases the horizontal angle by the specified
  //increment to move
  //it to the left
horizontalAngleTrack=horizontalAngleTrack+horizontalIncrement;
 //writes the new angle to the servo to move it there
  horizontalServo.write(horizontalAngleTrack);
}

//Moves the servo up
if (incomingMessage=='3'){
  //Increases the vertical angle by the specified
  //increment to move it up
 verticalAngleTrack=verticalAngleTrack+verticalIncrement;
 //Writes that angle to the servo to move it there
  verticalServo.write(verticalAngleTrack);
}

//Moves the servo down
if (incomingMessage=='4'){
  //Decreases the vertical angle by the specified increment
  //to move it down
  verticalAngleTrack=verticalAngleTrack-verticalIncrement;
  //Writes that angle to the servo to move it there
  verticalServo.write(verticalAngleTrack);
}

//Moves sensor all the way left
if (incomingMessage=='5'){
  //Sets the horizontal angle to the left_home_position
 horizontalAngleTrack=leftHomePosition;
 //writes that angle to the servo to move it there
  horizontalServo.write(horizontalAngleTrack);
}

//Moves sensor to the lowest possible vertical angle setting
```

```
    if (incomingMessage=='6'){
      //Sets the vertical angle to the down_home_position
      verticalAngleTrack=downHomePosition;
      //Writes that angle to the servo to move it there
      verticalServo.write(verticalAngleTrack);
    }

    //Takes a reading from the sensor
    if (incomingMessage=='7'){
      //Takes a reading from the sensor connected to port A5
      int reading =analogRead(A5);
      //Uses the model we derived to calculate distance from
      //the sensor reading obtained
      float distance=25732.834527*pow(reading,-1.1314581);
      //Prints that distance to the serial port for the python
      //code to receive
      Serial.println(distance);
    }

    //Sends back the current horizontal and vertical angles
    if (incomingMessage=='8'){
      //Packs the current vertical and horizontal angle into a
      //concatenated string to print to serial port
      String anglePacked=String(verticalAngleTrack)+','+String(horizontalAngleT
      Serial.println(anglePacked);//Prints that concatenated
      //string to the serial port for python to receive
    }
}
}
```