**Arduino Code**

#include <SoftwareSerial.h>

#include <Servo.h>

Servo head, left, right;

int degl = 180;

int degr = 0;

boolean obstacle();

char c;

void setup() {

Serial.begin(9600);

pinMode(3, OUTPUT);

pinMode(4, OUTPUT);

pinMode(5, OUTPUT);

pinMode(6, OUTPUT);

pinMode(7, OUTPUT); //Ultrasonic sensor trigPin

pinMode(8, INPUT); //Ultrasonic Sensor echoPin

head.attach(10);

left.attach(11);

right.attach(9);

head.write(90);

left.write(degl);

right.write(degr);

}

//-----------------------------------------------------------------------//

void loop() {

if (Serial.available() > 0) //Check if there is an available byte to read

{

delay(10); //Delay added to make thing stable

c = Serial.read(); //Conduct a serial read

}

Serial.println(c);

if (!obstacle())

{

if(c == 'u') //forward

{

digitalWrite(3, HIGH);

digitalWrite (4, HIGH);

digitalWrite(5,LOW);

digitalWrite(6,LOW);

delay(100);

}

}

if(c == 'd') //reverse

{

digitalWrite(3, LOW);

digitalWrite(4, LOW);

digitalWrite(5, HIGH);

digitalWrite(6,HIGH);

delay(100);

}

else if (c == 'r') //right

{

digitalWrite (3,HIGH);

digitalWrite (4,LOW);

digitalWrite (5,LOW);

digitalWrite (6,LOW);

delay (100);

}

else if ( c == 'l') //left

{

digitalWrite (3, LOW);

digitalWrite (4, HIGH);

digitalWrite (5, LOW);

digitalWrite (6, LOW);

delay (100);

}

else if ( c == '1') //head left

{

head.write(180);

}

else if ( c == '7' ) //head centre

{

head.write(90);

}

else if ( c == '2') //head right

{

head.write(0);

}

else if ( c == '3' && degl > 0 ) //left arm up

{

degl -= 45;

left.write(degl);

}

else if ( c == '4' && degr < 180 ) //right arm up

{

degr += 45;

right.write(degr);

}

else if ( c == '5' && degr > 0 ) //right arm down

{

degr -= 45;

right.write(degr);

}

else if ( c == '6' && degl < 180 ) //left arm down

{

degl += 45;

left.write(degl);

}

else if ( c == 'a' ) //AUTORUN

{

while(c=='0')

{

if(!obstacle()) //forward run

{

digitalWrite(3, HIGH);

digitalWrite (4, HIGH);

digitalWrite(5,LOW);

digitalWrite(6,LOW);

delay(100);

}

else //turn left

{

digitalWrite (3, LOW);

digitalWrite (4, HIGH);

digitalWrite (5, LOW);

digitalWrite (6, LOW);

delay (100);

}

;

if (Serial.available()>0)

{

c=Serial.read();

}

}

}

else if ( c == '0' ) //stop

{

digitalWrite (3, LOW);

digitalWrite (4, LOW);

digitalWrite (5, LOW);

digitalWrite (6, LOW);

delay (100);

}

//reset the variable

}

boolean obstacle()

{

long duration;

int distance;

digitalWrite(7, LOW);

delayMicroseconds(2);

digitalWrite(7, HIGH);

delayMicroseconds(10);

digitalWrite(7, LOW);

duration=pulseIn(8, HIGH);

distance= duration\*0.034/2;

if (distance <= 20)

{

return true;

}

return false;

}