



ELECTRONICA@SRM

ArduBotics Robotics Manual

Project 1: Simple LED Project

Components Required:

1. Arduino UNO Board
2. One Red LED
3. Arduino USB Cable

Steps to Follow:

1. Connect +ve of LED on 13 Pin on Arduino & -ve of LED on GND.
2. Run Arduino Software.
3. Create Sketch/Program for LED Project.
4. Connect the USB cable with Arduino & Computer.
5. Click on Upload Option to download the program in Arduino.

Program

```
void setup() {  
  pinMode(13, OUTPUT);  
}  
void loop() {  
  digitalWrite(13, HIGH);  
}
```

Project 2: LED Blink Project

Components Required:

1. Arduino UNO Board
2. One Red LED
3. Arduino USB Cable

Steps to Follow:

1. Connect +ve of LED on 13 Pin on Arduino & -ve of LED on GND.
2. Run Arduino Software.
3. Create Sketch/Program for LED Blink Project.
4. Connect the USB cable with Arduino & Computer.
5. Click on Upload Option to download the program in Arduino.

Program

```
void setup() {  
  pinMode(13, OUTPUT);  
}  
void loop() {  
  digitalWrite(13, HIGH);  
}
```

```
delay(2000);  
digitalWrite(13, LOW);  
delay(2000);  
}
```

Autonomous Robot (Line Follower)

Components Required:

1. Arduino UNO Board
2. Arduino USB Cable
3. Mini-Breadboard
4. 2 IR Sensors
5. L293D Motor Driver Module
6. Robotics Kit Part: Robo Chasis, 2 DC Motor, Clamps, Screw Sets, Screw Driver, Nut Driver, 2 Wheels.
7. Jumper Wires M-M & M-F.

Steps to Follow:

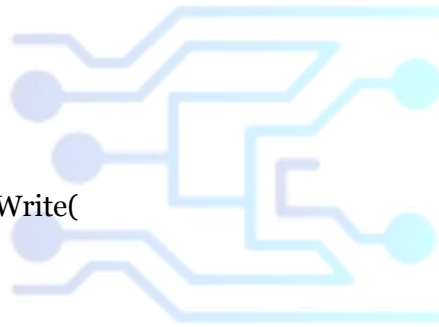
1. Please assemble the Robot as instructed by Instructor.
2. Connect Vout of Left Sensor to Pin 8 on Arduino.
3. Connect Vcc of Left Sensor to +ve (5V) Common Terminal on Breadboard.
4. Connect GND of Left Sensor to **-ve** Terminal of Bread Board (GND) on Breadboard.
5. Connect Vout of Right Sensor to Pin 9 on Arduino.
6. Connect Vcc of Right Sensor to +ve (5V) Common Terminal on Breadboard.
7. Connect GND of Right Sensor to **-ve** Terminal of Bread Board (GND) on Breadboard.
8. Connect 5v from L293D Motor driver Module to +ve (5V) Common Terminal on Breadboard.
9. Connect GND of Motor Driver to **-ve** Terminal of Bread Board (GND) Terminal on Breadboard
10. Connect 12v from L293D Motor driver Module to +ve (5V) Common Terminal on Breadboard.
11. Connect M1-A/Pin 1 from Motor Driver Module to Pin 13 on Arduino.
12. Connect M1-B/Pin 2 from Motor Driver Module to Pin 12 on Arduino. 13. Connect M2-A/Pin 3 from Motor Driver Module to Pin 11 on Arduino.
14. Connect M2-B/Pin 4 from Motor Driver Module to Pin 10 on Arduino.
15. Connect Left Motor Red & Black Wire on R & B M1 Terminal on Motor Driver Module.
16. Connect Right Motor Red & Black Wire on R & B M2 Terminal on Motor Driver Module.
17. Connect a Jumper Wire from Arduino GND to Bread Board **-ve** (GND) Terminal Strip.
18. Connect a Jumper Wire from Arduino +5V to Bread Board **+ve** (5V) Terminal Strip.
19. Create Sketch/Program for Line Follower Robot Project.
20. Connect the USB cable with Arduino & Computer.
21. Click on Upload Option to download the program in Arduino.

22. Disconnect USB cable from Arduino & Connect 9V DC Battery to Arduino by using battery connector and then check your robot.

Program

```
void setup()
{
  pinMode( 11 , OUTPUT);
  pinMode( 8 , INPUT); pinMode(
  9 , INPUT); pinMode( 10 ,
  OUTPUT); pinMode( 12 ,
  OUTPUT); pinMode( 13 ,
  OUTPUT);
}

void loop()
{
  if (digitalRead( 8))
  {
    digitalWrite( 13 , HIGH );
    digitalWrite( 12 , LOW );
  } else
  {
    digitalWrite( 13 , LOW ); digitalWrite(
    12 , LOW );
  }
  if (digitalRead( 9))
  {
    digitalWrite( 11 , HIGH );
    digitalWrite( 10 , LOW );
  } else
  {
    digitalWrite( 11 , LOW );
    digitalWrite( 10 , LOW );
  }
}
```



Obstacle Avoider Robot

Components Required:

1. Arduino UNO Board
2. Arduino USB Cable
3. Mini-Breadboard
4. 2 IR Sensors
5. L293D Motor Driver Module
6. Robotics Kit Part: Robo Chasis, 2 DC Motor, Clamps, Screw Sets, Screw Driver, Nut Driver, 2 Wheels.
7. Jumper Wires M-M & M-F.

Steps to Follow:

1. Please assemble the Robot as instructed by Instructor.
2. Please follow the same Steps from **Step 1 to Step 18** of **Line Follower Robot**.

3. Create Sketch/Program for Obstacle Avoider Project.
4. Connect the USB cable with Arduino & Computer.
5. Click on Upload Option to download the program in Arduino.
6. Disconnect USB cable from Arduino & Connect 9V DC Battery to Arduino by using battery connector and then check your robot.

Program

```
void setup()
{
  pinMode( 11 , OUTPUT);
  pinMode( 8 , INPUT);
  pinMode( 9 , INPUT); pinMode(
  10 , OUTPUT); pinMode( 12 ,
  OUTPUT); pinMode( 13 ,
  OUTPUT);
}

void loop()
{
  if (((digitalRead( 9)==1) && (digitalRead( 8)==0))
  {
    digitalWrite( 13 , HIGH );
    digitalWrite( 12 , LOW );
    digitalWrite( 11 , LOW );
    digitalWrite( 10 , LOW );
  }

  else if (((digitalRead( 8)==1) && (digitalRead( 9)==0))
  {
    digitalWrite( 11 , HIGH );
    digitalWrite( 10 , LOW );
    digitalWrite( 13 , LOW );
    digitalWrite( 12 , LOW );
  }

  else if (((digitalRead( 8)==1) && (digitalRead( 9)==1))
  {
    digitalWrite( 13 , LOW );
    digitalWrite( 12 , LOW );
    digitalWrite( 11 , LOW );
    digitalWrite( 10 , LOW );
  }
  else if (((digitalRead( 8)==0) && (digitalRead( 9)==0))
  {
    digitalWrite( 13 , HIGH );
    digitalWrite( 12 , LOW );
    digitalWrite( 11 , HIGH );
    digitalWrite( 10 , LOW );
  }
}
```

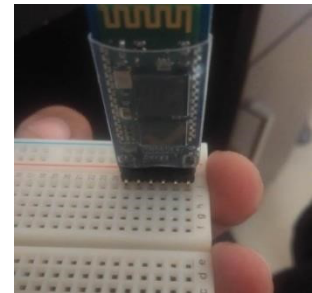
Voice Controlled Robot

Components Required:

- Arduino UNO Board
- Arduino USB Cable
- Breadboard
- HC-05 Bluetooth Module
- L293D Motor Driver Module
- Robotics Kit Part: Robo Chasis, 2 DC Motor, Clamps, Screw Sets, Screw Driver, Nut Driver, 2 Wheels.
- Jumper Wires M-M & M-F.

Steps to Follow:

1. Please assemble the Robot as instructed by Instructor.
2. Please follow the same Steps from **Step 8 to Step 18** of **Line Follower Robot**.
3. Mount the HC-05 Bluetooth Module between J25 to J30 wherein STATE Pin on J25 & EN Pin on J30.
4. Connect a Jumper Wire between breadboard –ve Terminal of Bread Board (GND) to G28.
5. Connect a Jumper between G27 to Rx (Pin 0) on Arduino.
6. Connect a Jumper between G26 to Tx (Pin 1) on Arduino.
7. Connect a Jumper Wire between G29 to +ve (5V) Common Terminal on Breadboard.
8. Open the Sketch/Program for **Voice-Controlled-Robot** Program.
9. Connect the USB cable with Arduino & Computer.
10. Click on Upload Option to download the program in Arduino. **Note:** While downloading the program please disconnect the Rx & Tx Jumper wire from Arduino Board. Once you finish with the download then re connect the Rx & Tx Jumper Wire.
11. Disconnect USB cable from Arduino & Connect 9V DC Battery to Arduino by using battery connector.
12. Run the AMR_Voice App in your Android Smartphone.
13. App will ask you to enable the Bluetooth. Allow It.
14. Search for your Bluetooth Device HC-05-(Group No). Once Connected Red Led on Bluetooth module will blink once per second instead of fast blinking.
15. Then control the devices from your Voice Commands on AMR_Voice App.
16. Voice Commands to be used: **forward, backward, left, right, stop.**



Gesture Controlled Robot

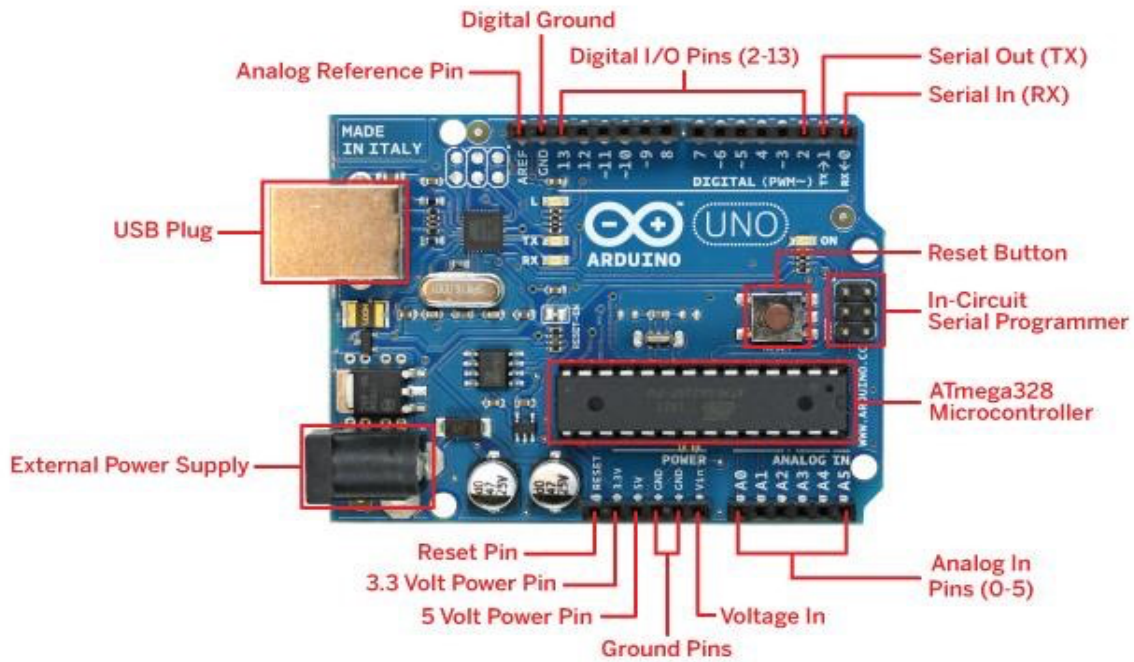
Components Required:

Same as Project No: Voice Controlled Robot

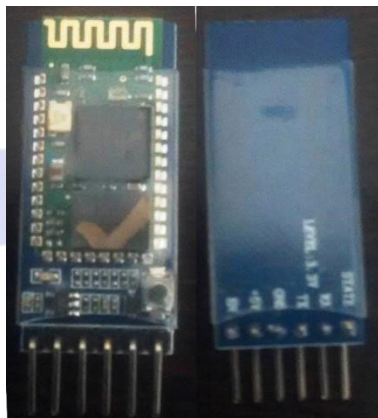
Steps to Follow:

- Connection & Program will be same as Voice Controlled Robot except.
- Run the **AMR_Gesture App** in your Android Smartphone for controlling your robot by using Gesture. Follow video tutorial for creating gesture & using this app.

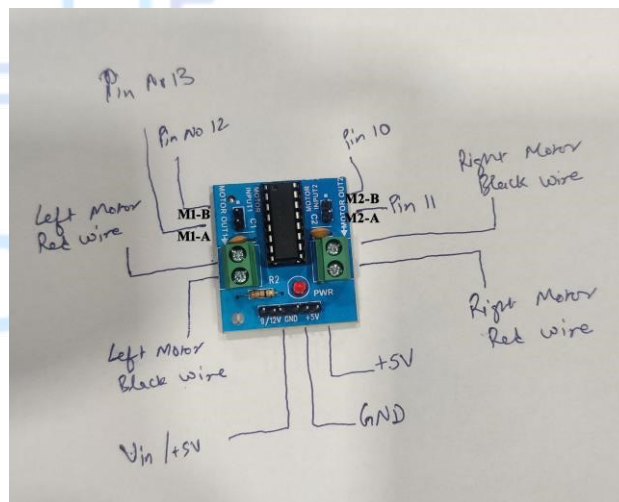
Major Electronics Components Images



Arduino Uno



HC-05 Bluetooth Module



L293D Motor Driver Module