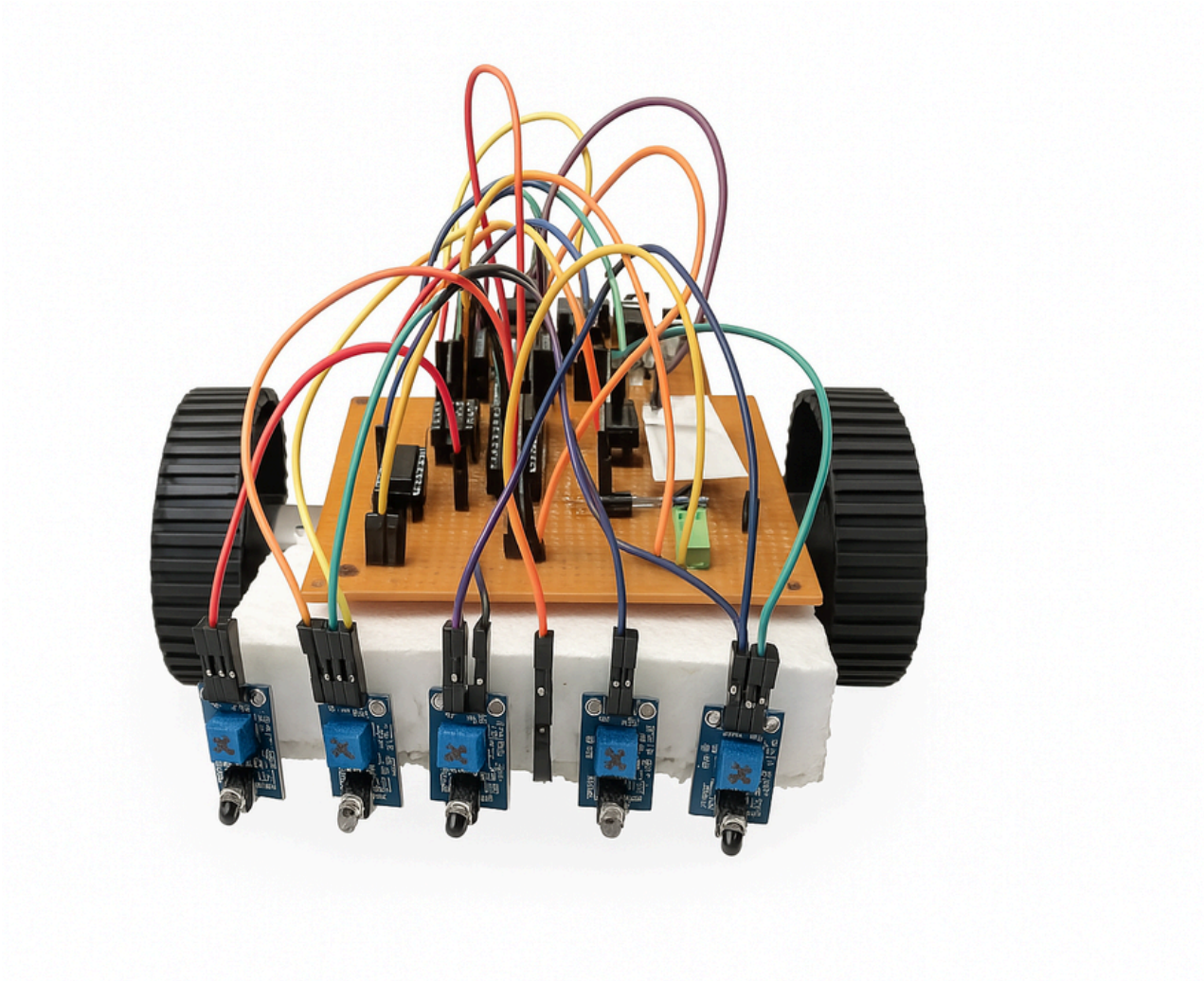
LINE FOLLOWER

DRISHTI
A Revolutionary Concept

TEAM Titanium Tech



8799165323|9586364504

drishti@svnit.ac.in

LINE FOLLOWER

Components Required

Sr. No	Components	Quant it y(min)	Cost(approx.)(perpiece)
1	Solderwire GCB(6”x4”)	1roll	70
2	Screw	1	40
3	Connector	3	5
4	Maleandfemaleheader	2stripsofeach	20
5	Led (Red, Green, Blue)	6	4
6	Resistor (330ohm)	5	2
7	Sliding Switch or Push button switch	1	20
8	IR Sensor	5	50
9	Arduino Uno board +Cable	1	550
10	LM7805Voltageregulator	3	20
11	Lithium ion battery (11.1V)	1	350
12	BatterychargerforLi-Ion battery with connector	1	120
13	Jumperwire(femaletomale, female to female,male to male)	20+20+20	2
1	Singlestrand wire	1	3
4	L293D(motordriver)ICwith bed	1	0
16	Castorwheel (size 12Vmotor(200-300rpm)	1	25
17	Chassis	2	160
18	(readymade or self-made)	1	60
19	Wheels	2	30
20	Solder Iron	1	150
21	LClampformotor(incaseof self-made chassis)	2	15
22	Diode(1N4007) Capacitor (1uFand 10uF)	2	2
23		2	3

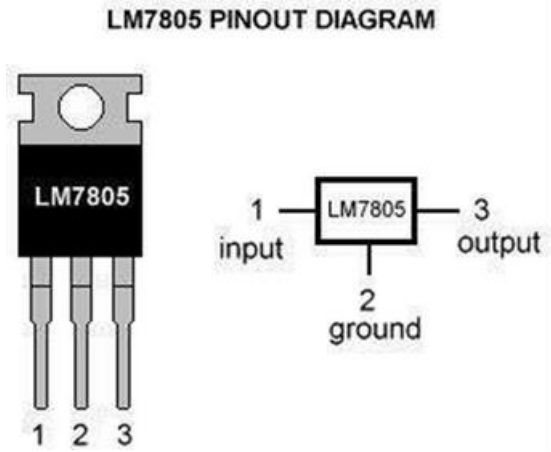
8799165323|9586364504
drishti@svnit.ac.in
Drishti - ARevolutionary Concept
drishti.svnit

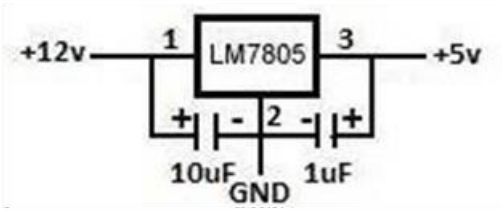
Tech Specifications of Arduino UNO R3

Board	**Name**	**Arduino UNO R3**
	SKU	**A000066**
Microcontroller		ATmega328P
USBconnector		USB-B
Pins	Built-inLEDPin	13
	DigitalI/O Pins	14
	Analoginput pins	6
	PWMpins	6
Communication	UART	Yes
	I2C	Yes
	SPI	Yes
Power	I/OVoltage	5V
	Input voltage (Nominal)	7-12V
	DCCurrent per I/OPin	20 mA
	PowerSupply	
	Connector	Barrel Plug
Clock speed	MainProcessor	ATmega328P 16 MHz
	USB-SerialProcessor	ATmega16U2 16 MHz
Memory	ATmega328P	2KB SRAM, 32KB FLASH, 1KB EEPROM
Dimension	Weight	25 g
	Width	53.4 mm
	Length	68.6 mm

Hardware Implementation

- **Voltage Regulator**



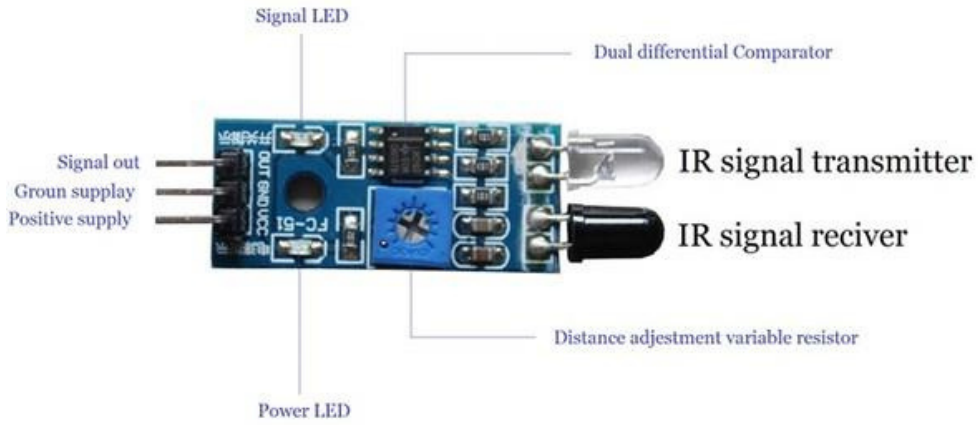


All 78xx IC are used to convert higher voltages to lower voltage of value “xx” as name of IC. Where, xx will be from 05 to 12. Input voltage should be from 7V to 35V. You will be using 7805 IC as you need 5V supply for microcontroller and other ICs. This IC is used to get regulated voltage supply of 5V. It is used in a circuit to convert 12V power supply to 5V. PIN1 will be connected to 12v or 9v input, PIN2 will be connected to GND. We will get regulated 5V output on PIN3. Capacitors can be connected between Input and GND and between Output and GND to filter out the AC component if any. Values of these capacitors should be in ratio 1:10 where lower valued capacitor will be connected between output and ground and the one with higher value will be connected between input and ground as shown.

LINE FOLLOWER

- **IR SENSOR**

A line sensor is an Infra-Red or IR sensor which consists of an IR emitter and an IR receiver. The emitter is simply IR led and the detector is simply photodiode. Resistances and output voltages change in proportion to the magnitude of IR light received. The IR reflected back from the surface is received by the IR receiver if surface is light in colour. If transmitted IR signal is received back, this sensor gives a 5v (logic 1) output or 0v (logic 0) output depending on IR circuitry and vice versa for no detection.

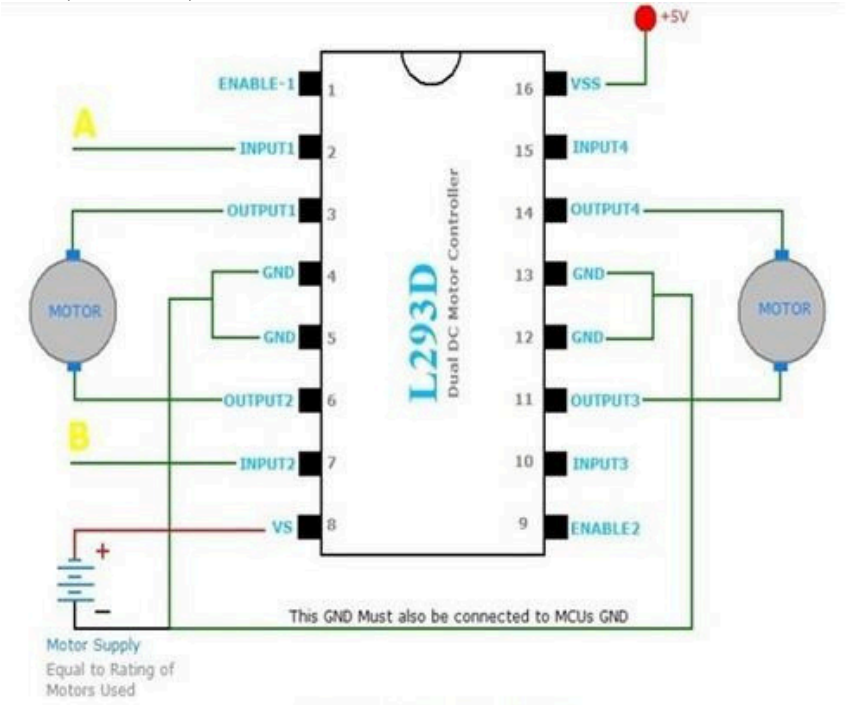


- 5VorVCCpinshouldbe given5vinputto switchthesensoron.
- Groundshouldbe connected toground.
- OUT pin will give logic 1 or 0 depending on IR when it detects a surface bright in color.
- Componentshaped“plus”inabovediagramisapotentiometerwhichisusedtocalibrateIRsensor according to right conditions of surroundings.

ThissensorwillactasinputforourMicrocontrollertodetectwhetherweareonwhitelineorsomewhat deviated.

LINE FOLLOWER

- **Motor Driver (L293D)**



Motor Controller Using L293D

- MotordriveristheICused tocontrolmotor.
- Enable 1,2andEnable3,4 areusedtoactivatecorrespondingsides.
- Input1,2,3 and4areusedtogivedirectionsignalstoL239D.
- Output1,2,3and4 areusedtoconnectmotorstoL239D.
- Vcc1isgiven5Vsignalw.r.tGND totheICL293Dtoactivateit.
- Vcc2isgiven12V supplyw.r.tGND torunmotors
- All4 GNDpinsareconnected to thecommongroundofcircuit.
- Voltage outputfrommicrocontrollerwillgo toinputpinsofL293D.
- Enable1(PIN1)andEnable2(PIN9)willbeconnectedto5vtoactivatethemotordriver circuit
- Vs(12Volts)(PIN8)willbeprovidedtodrivemotor.Vss(PIN16)isconnectedto5v required toswitchonIC.

8799165323|9586364504
drishti@svnit.ac.in

LINE FOLLOWER

- **Capacitor**

  Capacitors (originally called electrical condensers) are analog electrical components that can collect and store electrical energy. As a direct current flows into a capacitor, it charges with energy and releases an alternating current flow back into the circuit.

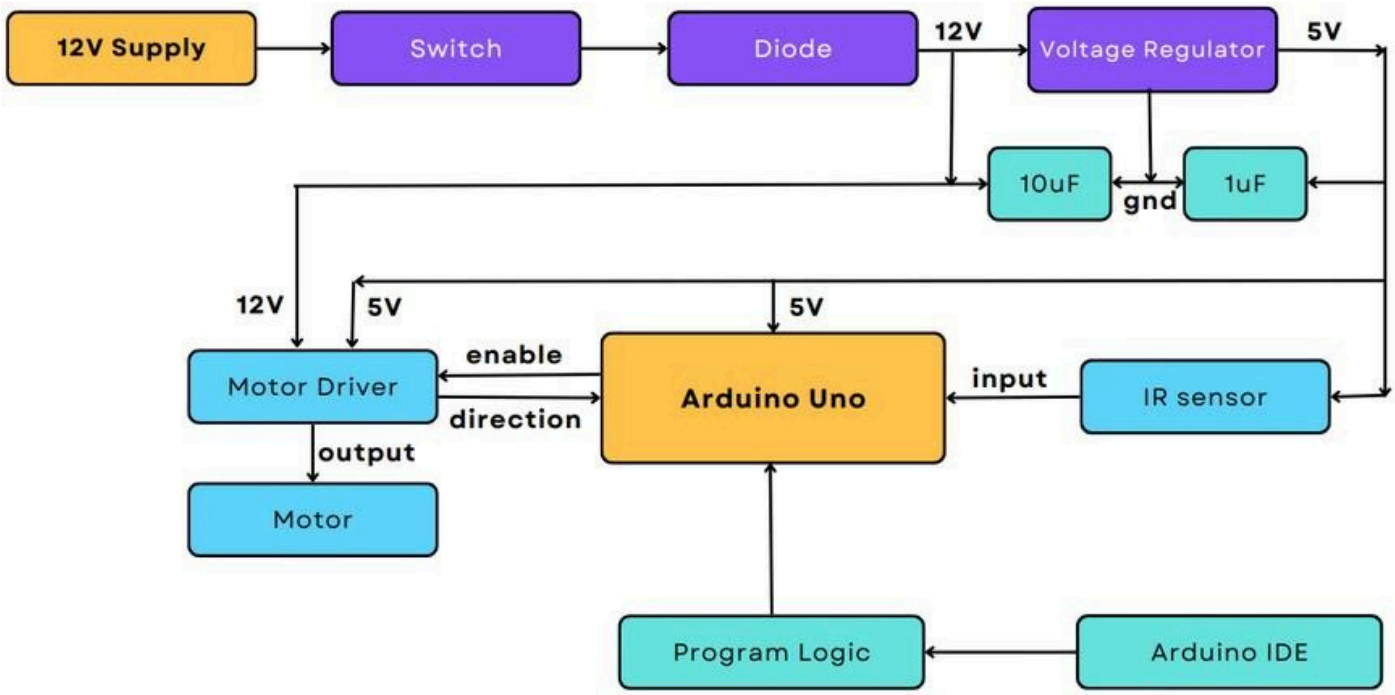
- **Diode**

  1N4007 belongs to the silicon family of1N400X series. It is a general-purpose rectifying diode that serves its purpose of converting alternating current signals(AC) to direct current signals (DC) in electronic products.

- **InterfacingArdiunoWith TheComputer**

  YouneedtoinstalltheArduinoIDE(Version1.8.19)fromthegivenlinkbelow
  Download Link :- https://www.arduino.cc/en/software

CompleteSchematic ofLineFollower



8799165323|9586364504
drishti@svnit.ac.in

LINE FOLLOWER

Reference Link

Thesearesomereference linksfortheprogrammingofArduinoboard.

- https://docs.arduino.cc/tutorials/uno-rev3/Blink
- https://docs.arduino.cc/tutorials/uno-rev3/AnalogReadSerial
- https://docs.arduino.cc/tutorials/uno-rev3/DigitalReadSerial

Note: For safety purpose buy Capacitors (1uF and 10uF)

Miscellaneous Items:

1. Digital Multimeter
2. Double sided tape
3. Stripper
4. Insulation Tape
5. Screw Driver (small)

Precautions

- DONOTsolderanymicrocontrollerorICdirectlyontheGCB,alwaysuseanIC bedormake one withfemaleheaders.
- DONOT shortpositiveandnegativeterminalsofsupplywitheachother.
- NEVERSUPPLYVOLTAGEWITHREVERSEPOLARITYTO YOURCIRCUIT,itwill costyou alot.
- MakesureyourmicrocontrollerandotherICsget5V from7805circuitwherever needed. DONOT GIVE 12VTOANYCOMPONENTUNLESSITISMENTIONED.
- Usediodeson12vsupplyonpositiveterminalasreversepolarityprotection
- Add an insulation below your circuit board to avoid shorting.
- Alwaysmarkpolaritiesonconnectors.IdealconventionisLeftsidepositiveand Rightside negative.
- IRsensorsdetectinfraredradiationsotheywillNOT workasexpectedinsunlight.
- Make common groundforallICpresentonyourGCB.
- Alwayscheck theorientationofyourICs beforeplacingthemintheirbeds.
- Try to minimize jumps when you design your circuit.

8799165323|9586364504
drishti@svnit.ac.in