



# United International University

*QUEST FOR EXCELLENCE*

Department of Electrical and Electronic Engineering

## Project Proposal : Digital Thermometer

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Submitted To

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**Course Code:** EEE 2104

**Course Title:** Electronics Laboratory

**Section:** A

## Introduction:

A robot vacuum, often referred to as an obstacle vacuum cleaner, is a cutting-edge cleaning tool created to automatically explore and clean floors without the assistance of a human. These machines can alter their cleaning patterns based on the structure of the area and utilize sensors and artificial intelligence to recognize and avoid obstructions like furniture, walls, and stairs. Due to their convenience and time-saving features, obstacle vacuum cleaners are becoming more and more popular since they enable homeowners to maintain their floors without using manual labor. Obstacle vacuum cleaners have become commonplace in many houses in this day and age, when technology is always developing, and they are still revolutionizing how we clean our homes.

Two infrared

(IR) sensors, an L293D motor driver IC, a voltage converter, and a gear DC motor make up the system. There are two IR sensors employed, one on the right and one on the left.

The robot identifies an object and travels backward when the intensity of both sensors is low.

The robot travels backward and then make a right turn if it notices low

intensity in the right sensor. The robot advances until it encounters a barrier, if no object is spotted.

## Apparatus:

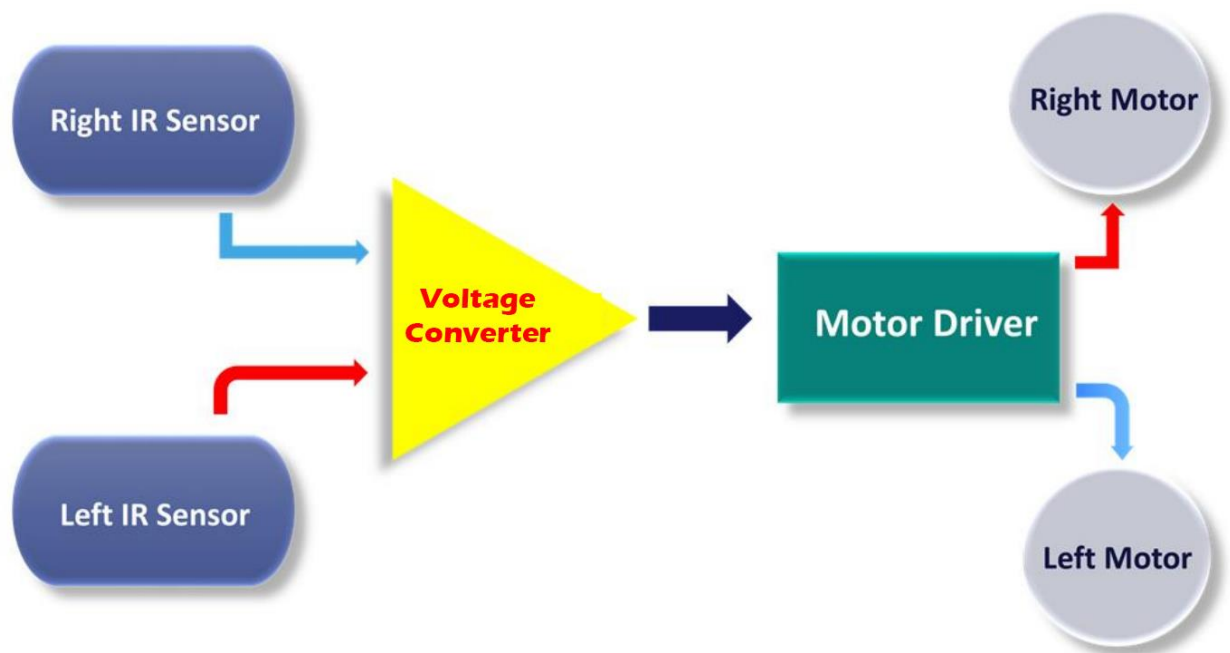
1. IR Sensor x2
2. Breadboard
3. Motor Driver IC LN293D
4. 10 mf capacitor
5. Voltage Regulator IC 7805
6. 100k ohm resistor x2
7. 10k ohm resistor x2
8. 6v DC motor
9. Plastic Fan



## Description of the project:

An obstacle vacuum cleaner is a compact, self-contained cleaning tool made to vacuum floors without the assistance of a person. These gadgets have sensors that let them detect and steer clear of obstructions like walls, furniture, and stairs while still maneuvering around other things. They vacuum up dirt, dust, and other particles from a variety of surfaces, including hardwood floors, carpets, and tiles, using a combination of suction and revolving brushes.

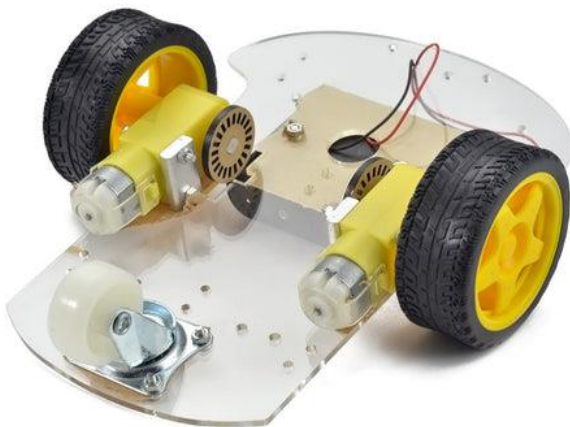
## FLOW CHART:



## About Parts:

### i) Robotic Casing:

Robotic casing is the practice of encasing a robot or robotic system in a durable outer shell. The robot's internal components are shielded from harm by this case, which also provides a smooth and aesthetically beautiful exterior surface and protects the robot from environmental elements including moisture, dust, and severe temperatures.



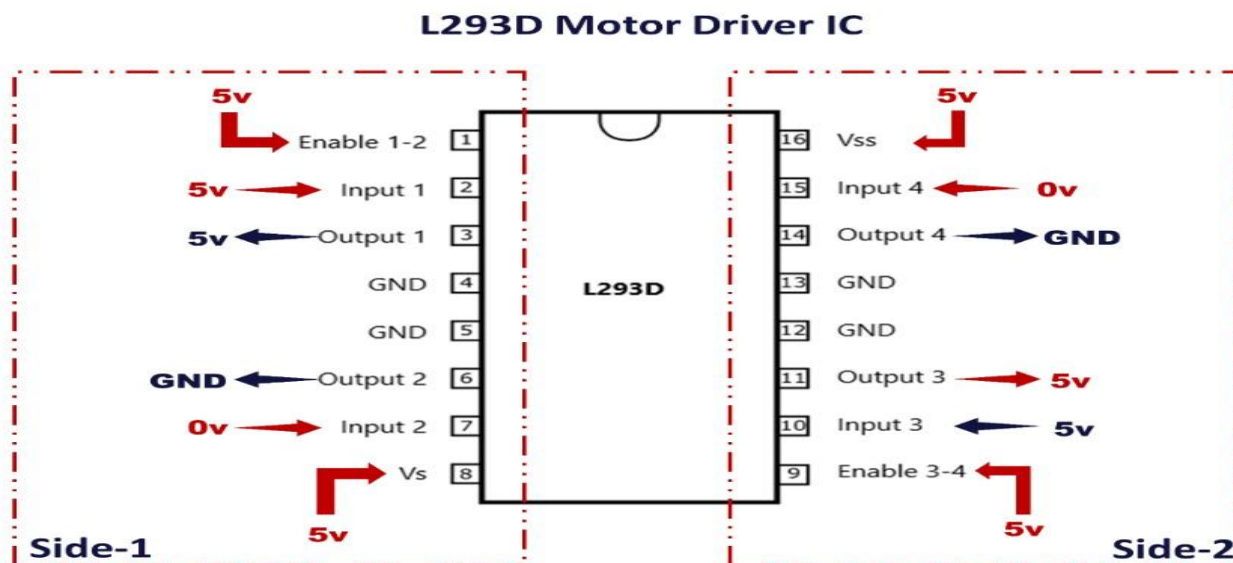
## ii) Power Supply:

We chose 9 volts for our project. An 18650 battery is a lithium-ion rechargeable battery, as can be seen from the above photo. Each of these battery straps has a voltage of 3.7 volts. We have two parallel battery cells, two parallel units connected in series, and we receive about 9 volts.

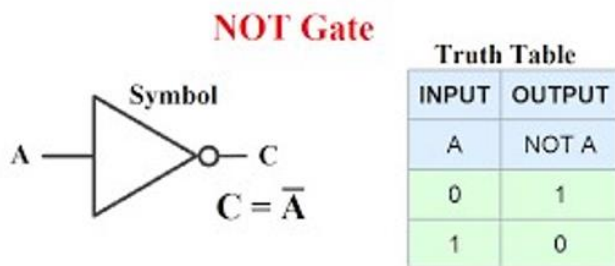


## iii) Motor Driver IC LN293D:

The L293D basic motor driver integrated chip (IC) allows us to drive a DC motor in either direction while also controlling the motor's speed. The L293D is a 16-pin IC with 8 pins on each side that enables us to control the motor. It implies that we can operate up to two DC motors with a single L293D.



#### iv) Working on NOT Gate:



#### Making a NOT Gate with a Single Transistor

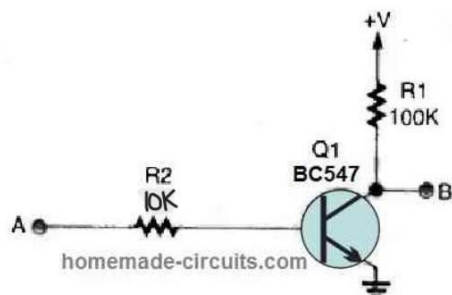


Fig. 1. Here is a picture of one of the simplest transistor applications. The BJT switch, which can be seen typically open, can be employed as an inverter.

#### v) Working of L293D Motor Driver IC:

The motor speed is controlled by the enable pins 1-2 and 3-4.

The motor will turn on and reach its maximum speed if this pin is connected to +5 V.

Pin Number	Pin Name	Description
1	Enable-1-2	Motor A's speed is controlled by the Enable-A pin. This pin must be connected to +5 V in order to enable the motor and cause Motor A to rotate at its fastest rate. If we connect this pin to the microcontroller's PWM input, So, we have some control over Motor A's speed. The motor A will not run if we connect this pin to ground.

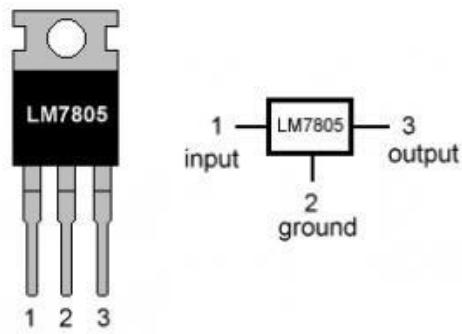
2,7	INPUT-1 & INPUT-2	<p>These pins are Motor A's input pins.</p> <p>These are used to regulate the way that Motor A rotates.</p> <p>Motor A will begin to rotate in a specific direction when one of them is high and the other is low. Motor A will halt if both inputs are either high or low.</p>
4, 5, 12, 13	GND	<p>GND stands for ground pin.</p> <p>It must be linked to the ground (negative) of the power source.</p>
3, 6	OUTPUT-1 & OUTPUT-2	This Pin will provide the output for <b>Motor A</b> .
8	VSS2	Connected to Power supply positive pin for running motors (4.5V to 36V)
9	Enable-3-4	<p>Motor B's speed is controlled by the Enable-B pin.</p> <p>This pin must be connected to +5 V in order to enable the motor and cause Motor B to rotate at its fastest rate.</p>
10, 15	INPUT-3 & INPUT-4	<p>Motor B input pins, such as these ones. These regulate the direction in which Motor B rotates.</p> <p>Motor B will begin to spin in a specific direction when one of them is high and the other is low. Motor B will come to a complete stop if both inputs are high or low.</p>
11, 14	OUTPUT-3 & OUTPUT-4	This Pin will provide the output for <b>Motor B</b> .
16	VSS1	5V supply for the functioning of the IC.

## IC 7805 Voltage Regulator:

1. Minimum Input voltage is 7V
2. Maximum Input Voltage is 35V
3. Current rating  $I_c = 1A$
4. Maximum Output Voltage  $V_{Max}=5.2V$
5. Minimum Output Voltage  $V_{Min}=4.8V$



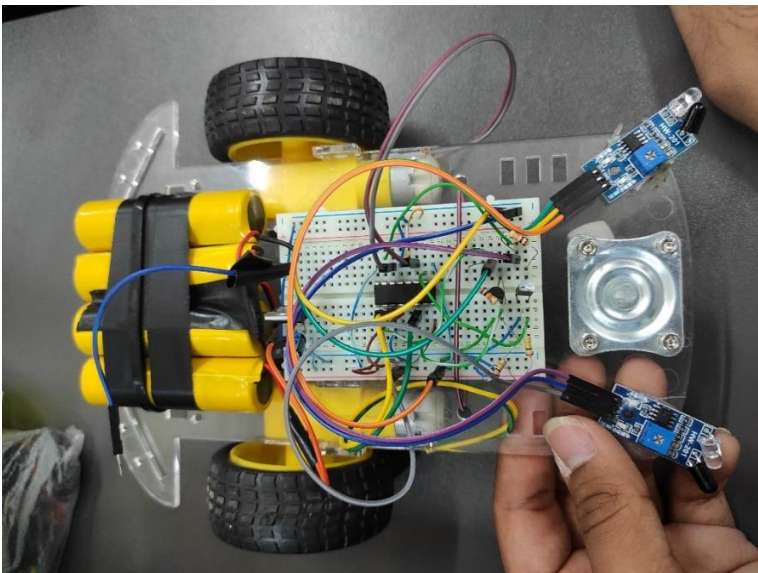
LM7805 PINOUT DIAGRAM



## Hardware Implementation

### i) Breadboard Implementation:

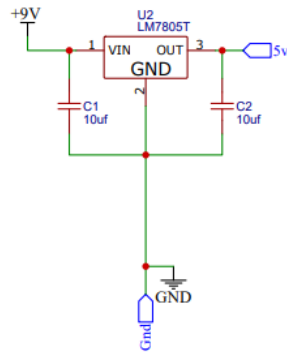
At first we implement all Components on breadboard and testing our project and run successfully.



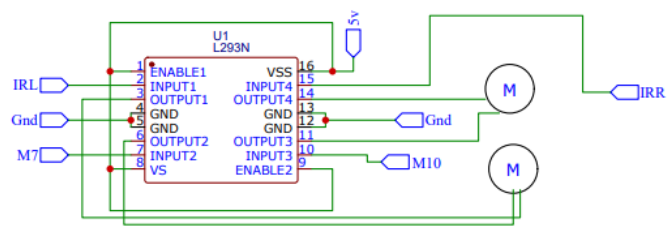
### Full Circuit Diagram:

An inverting integrator is a type of operational amplifier (op-amp) circuit that produces an output voltage proportional to the integral of the input voltage with respect to time, but with an inverted polarity. It is commonly used in analog signal processing applications, such as in audio and instrumentation circuits.

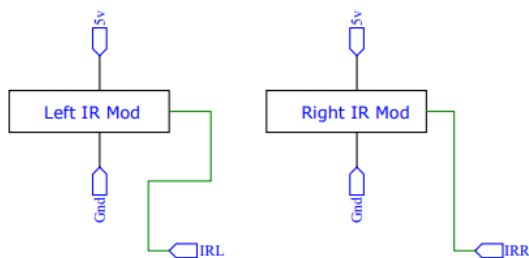
## Power supply



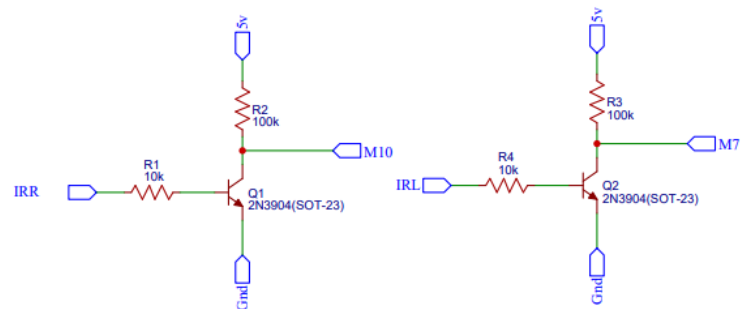
## Motor Driver



## IR Sensors



## RTL Inverter



TITLE: Sheet_1		REV: 1.0
Company: Your Company		Sheet: 1/1
Date: 2023-05-02		Drawn By:

## Results:

1. IR Sensor cannot sense any black object
2. It can sense any object the distance of 10cm
3. The robot can sense minimum 3cm height's object from the ground
4. The robot being stopped when 45 degree occur to the corner
5. At full charge the robot can run about 0.72m per minute
6. Without obstacle it gives 0v as output
7. With obstacle it gives 3.5v as output



## Real Life Application

### **Robot vacuum :**

In order to avoid absorbing dust in its chamber, this robot automatically senses and avoids impediments (persons, walls, chairs, tables, etc.) along its path.

### **Self-Driving Car:**

This car autonomously detects what is in front of it and around it, diverts off its path any vehicles, people, or other objects on the road, and steers clear of them . For instance, it has a Tesla car integrated into it.

## Conclusion:

This study described a straightforward, reasonably priced robot for detecting obstacles.

Obstacles in the path of the mobile robot were detected using single pairs of IR sensors. A level of precision and a low failure probability were attained.

According to the examination of the autonomous system, it is able to avoid obstacles, prevent collisions, and adjust its location.

It is clear that this architecture allows for the addition of more functionality to execute a variety of tasks with little to no human involvement.

The country's defense, security, and hostile environment industries will benefit from this effort.