Inspiring Excellence

PROJECT : CSE260

THE MAZE SOLVING ROBOT

LAB SECTION: 07 **THEORY SECTION: 07** **GROUP: 05**

Student ID	Name	G-suit ID
21301416	ASHRAFUL ALAM PATWARY	ashraful.alam.patwary@g.bracu.ac.bd
21101010	KAMRAN HASSAN SHOMRAT	kamran.hassan.shomrat@g.bracu.ac.bd
19201110	MAHJABIN CHOWDHURY	mahjabin.chowdhury@g.bracu.ac.bd
21101063	RAYHAN SHARIF SADIF	rayhan.sharif.sadif@g.bracu.ac.bd

INTRODUCTION:

This is a small project created by our group as the project of Digital Logic Design course.The concept is based on a robot that will take the best feasible path out of the many options in the maze. Decision-making algorithms are the foundation of this area.The main objective of this project is to create a smart machine that can navigate through any maze with basic logic functions.

PROPOSED MODEL/SYSTEM:

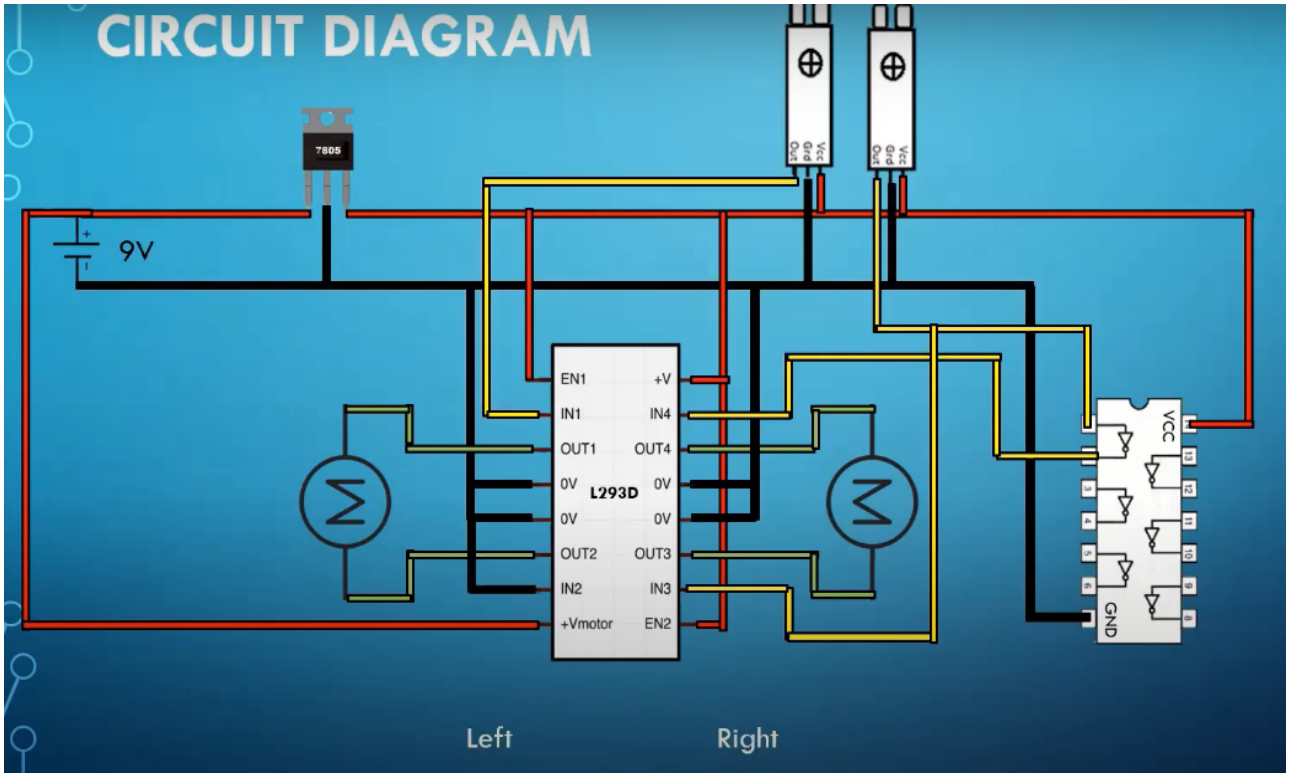
The maze-solving robot has been built to navigate its way around without colliding with the barriers and efficiently reaching from point “A” to point “B” for this project. It is a two-stage procedure, with the first phase being to drive through the maze and discover the end, and the second step being to optimize the path via which the robot can travel through the maze without hitting any dead ends with the assistance of IR-sensors. We have chosen a two wheel robotic car for this project as it includes only two IR-sensors, resulting in two way input. Thus, the robot moves forward and backward as it requires.

EXPERIMENTAL SETUP:

Components

a. Bread Board
b. IC-7805
c. IC- L293D (Motor control IC)
d. IC- 74LS04 (Not gate IC)
e. Jumper cable
f. 2-wheel robotic chassis
g. 2 (4v) rechargeable battery
h. 2 - bidirectional motor
i. 2 - Infrared Sensor Module

Circuit Diagram



RESULTS & ANALYSIS:

Truth table

F	L	R_f	R_b	L_f	L_b
0	0	1	0	0	0
0	1	1	0	1	0
1	0	0	1	0	0
1	1	0	1	1	0

K-Maps

R_f :

F / L	0	1
0	1	1
1	0	0

R_b :

F / L	0	1
0	0	0
1	1	1

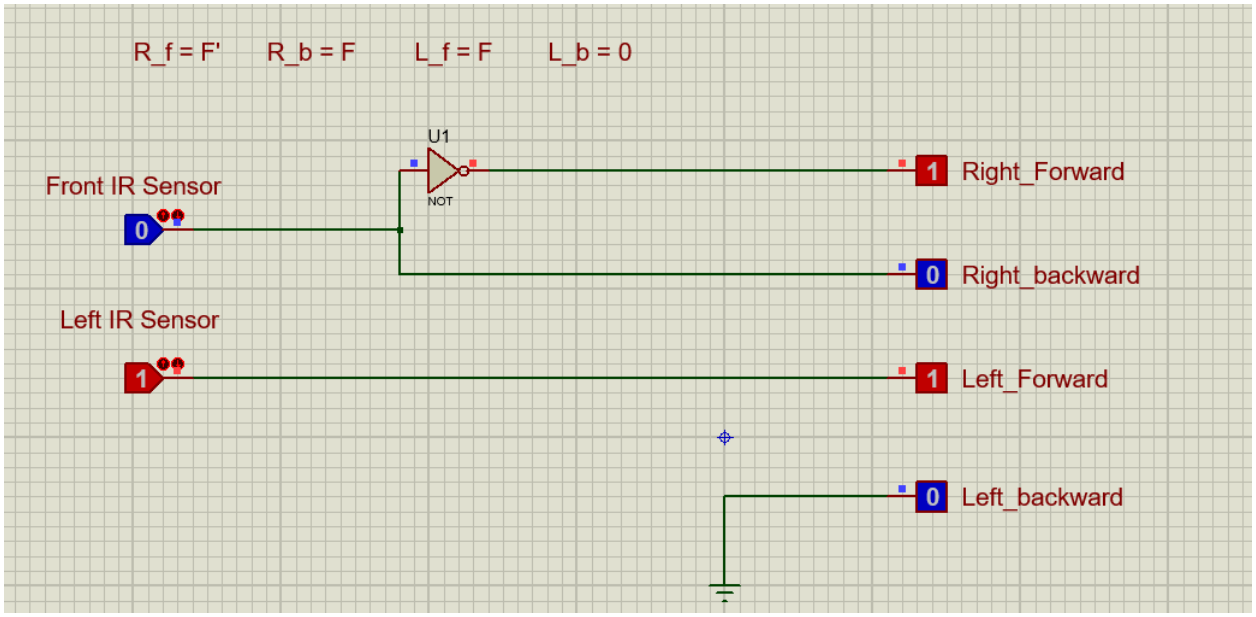
L_f :

F / L	0	1
0	0	1
1	0	1

L_b :

F / L	0	1
0	0	0
1	0	0

Logic Diagram



Analysis:

From the truth table and K-Map stated above, we derive the equations for the stated project. To begin with, using the derived equation R_f , which denotes Right forward movement, we take the front IR-sensor's output and insert in the motor driver IC(L293D), which connects in the IN4 input of the given IC as R_f = F', Therefore, we will take the output of the forward IR-sensor and pass it through the NOT gate(IC-7404) and then connect the output of NOT Gate in IN4 of our motor control IC.
For R_b, here, R_b = F is the Right backward movement, which directly connects to IN3 of the motor control IC. Similarly, we will connect IN1 with the output of the Left sensor which is L_f . Here, L_f stands for Left forward movement, and since L_f = L, therefore, the output of the Left sensor will directly connect through IN1. Finally, as L_b = 0 which denotes Left backward, so the IN2 will connect with the ground.

CONCLUSION:

Limitation:

Due to its greater size compared to the one shown in the project tutorial, it appreciated with couple of drawbacks. Firstly, the use of 2 sensors was the most significant among the drawbacks. As a result, during cornering, or moving through an angle, the robot goes off track, which results in a back and forth motion. To tackle this, we come-up with a circular barrier in the left side of the so that it stays on course. Besides, the large size also needs more power. Therefore, we needed to use 2 huge sized rechargeable batteries while ensuring the correct speed of the motor.