End Project Report on

VOTING SYSTEM

Course Code: EC256

Submitted for end project of IC Lab:

V.Meghana 22ECB0C34
V.B.S.Vedha 22ECB0C31

Department of Electronics and

Communication Engineering

National Institute of Technology, Warangal

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COMPONENTS USED:

MAIN PROJECT

IC7404—NOT GATE

IC7447—SEVEN SEGMENT DECODER/DRIVER

IC7490—DECADE COUNTER

555 TIMER IC

SEVEN SEGMENT DISPLAY—COMMON ANODE

RESISTORS: 1K,1M

CAPACITORS: 0.01uF,10nF

SWITCH

CONNECTING WIRES

PCB

IC BASES

POWER SUPPLY

STEP DOWN TRANSFORMER-9V,500mA

DIODES-IN4007

CAPACITOR

VOLTAGE REGULATOR IC-7405

CONNECTING WIRES

COST OF COMPONENTS:

S.NO	COMPONENT	COST1
1	IC'S : 7490 7447 7404 555 TIMER	60X4=240
2	Seven segment display	30
3	IC bases	4x10=40
4	Connecting wires-2m	50
5	PCB	80
6	switch	5
7	resistors	30
8	Capacitors	30
9	transformer	90
10	Voltage regulator IC	20
11	diodes	5

TOTAL COST: 620

INTRODUCTION:

A **voting system** is a set of rules that determine how elections and referendums are conducted and how their results are determined. Electoral systems are used in politics to elect governments, while non-political elections may take place in business non-profit organisations and informal organisations. These rules govern all aspects of the voting process: when elections occur, who is allowed to vote, who can stand as a candidate, how ballots are marked and cast, how the ballots are counted, how votes translate into the election outcome, limits on campaign spending, and other factors that can affect the result.

In designing a voting system for a project with two candidates, several theoretical considerations come into play to ensure fairness, transparency, and efficiency. One fundamental aspect is the principle of one person, one vote, ensuring that each participant has an equal opportunity to influence the outcome. This principle underpins democratic processes, emphasizing the importance of individual agency and the equitable distribution of political power.

Central to our design is the utilization of switches as the interface for casting votes. This intuitive input method allows voters to express their choices with ease and clarity. Whether it's a physical switch or a touch-sensitive panel, the simplicity of the interface ensures that individuals of all ages and backgrounds can participate confidently in the electoral process.

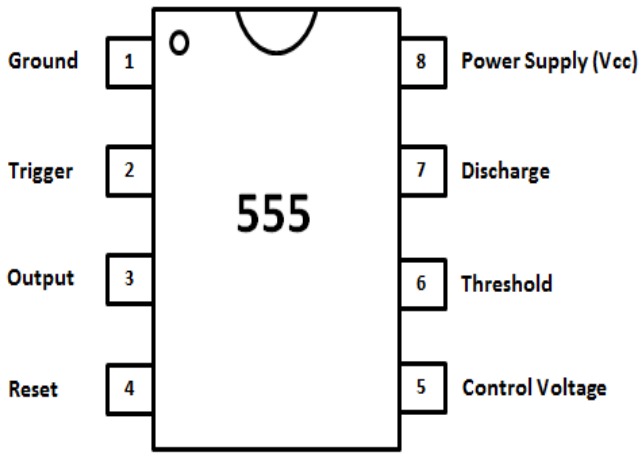
At the heart of our project lies a bespoke hardware setup utilizing ICs meticulously programmed to handle the intricacies of the voting process. Key to the functionality of our system is the integration of switches as the primary means of vote input. Each switch represents a vote cast, with its state signaling the candidate preference of the voter.

In this project we have two types of circuits. One is voltage supply and the other one is the main circuit which consists of 555 timer , which uses switch as trigger and produces clock .next to 555 timer ,we have IC 7490 which is a decade counter and then we have 7 segment display IC which converts binary to decimal and then finally we have 7 segment display to display the number of votes.This is the basic idea of our project.

555 TIMER:

555 timer is used in almost every electronic circuit today. A 555 timer works as flip-flop or as a multi-vibrator, it has a particular set of configurations. Some of the major features of the 555 timers would be,

- It operates from a wide range of power ranging from +5 Volts to +18 Volts supply voltage.
- The external components should be selected properly so that the timing intervals can be made into several minutes along with the frequencies exceeding several hundred kilohertz.
- The duty cycle of the timer is adjustable.
- Also, the maximum power dissipation per package is 600 mW, and its trigger pulse and reset inputs have logic compatibility.



PIN DIAGRAM OF 555 TIMER IC

PIN DESCRIPTION:

Pin 1: GND Pin

Ground pin directly connected to the negative terminal of the power source. It is suggested that it should not be connected using any resistor because all the IC will heat up due to stray voltage (it is the occurrence of electrical potential between any two objects that ideally should not have any voltage difference between them at all) in it.

Pin 2: Trigger Pin

A trigger pin is used to activate the IC's timing cycle for operating. It is a low signal pin and the timer is triggered when the voltage is below one-third of the supply voltage (1/3 V). It is connected to the Inverting input of the comparator inside the IC and accepts negative signals for the operation.

Pin 3: Output Pin

It is the output pin. As the IC triggered the output pin goes high depending on the duration of the timing cycle provided to it. In the case of logic zero o/p; it is a sinking current with voltage greater than zero (0 V). Whereas, in the case of logic high output, it is sourcing current with the output voltage lesser than Vcc.

Pin 4: Reset Pin

The reset pin is used to reset. It should be connected to the positive terminal to work the IC properly. If this pin is grounded, the IC won't work at all. The required reset voltage is 0.7 volts at a current rating of 0.1mA to work.

Pin 5: Control Voltage

It is used for reliable operation. When not in use, it should be connected to the ground through a capacitor; otherwise, the IC will show erratic responses (deviating from the desired value).

Pin 6: Threshold Pin

It detects when the voltage on the timing capacitor rises above 0.66Vcc. The timing cycle is only completed when the voltage on this particular pin is equal to or greater than 2/3 of Vcc.

Pin 7: Discharge pin

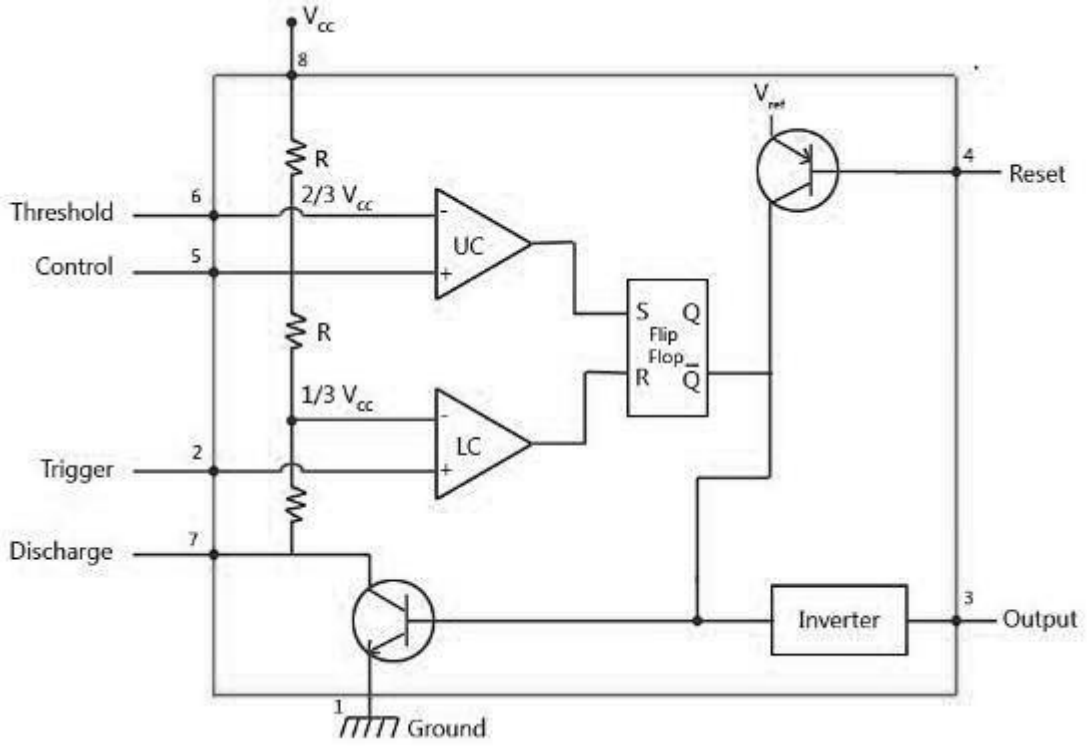
It is used to provide a discharge path from the timing capacitor to the ground when the output is low. The discharging current should be less than 50 mA in order to prevent it from damaged.

Pin 8: Supply Terminal

It is a positive (+ve) terminal that is connected to the positive terminal of the power

supply in order to power up. It is used to take power supply voltage from the power source for operating.

INTERNAL CIRCUIT DIAGRAM OF 555 TIMER:



The 555 timer operates in 2 modes

1.Astable mode

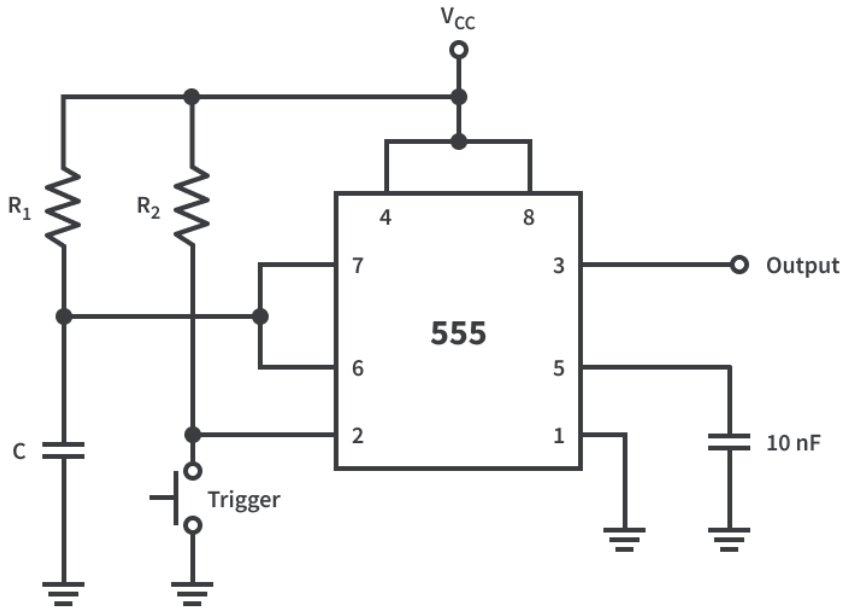
2.Monostable mode

In our project we are using monostable mode in 555 timer.

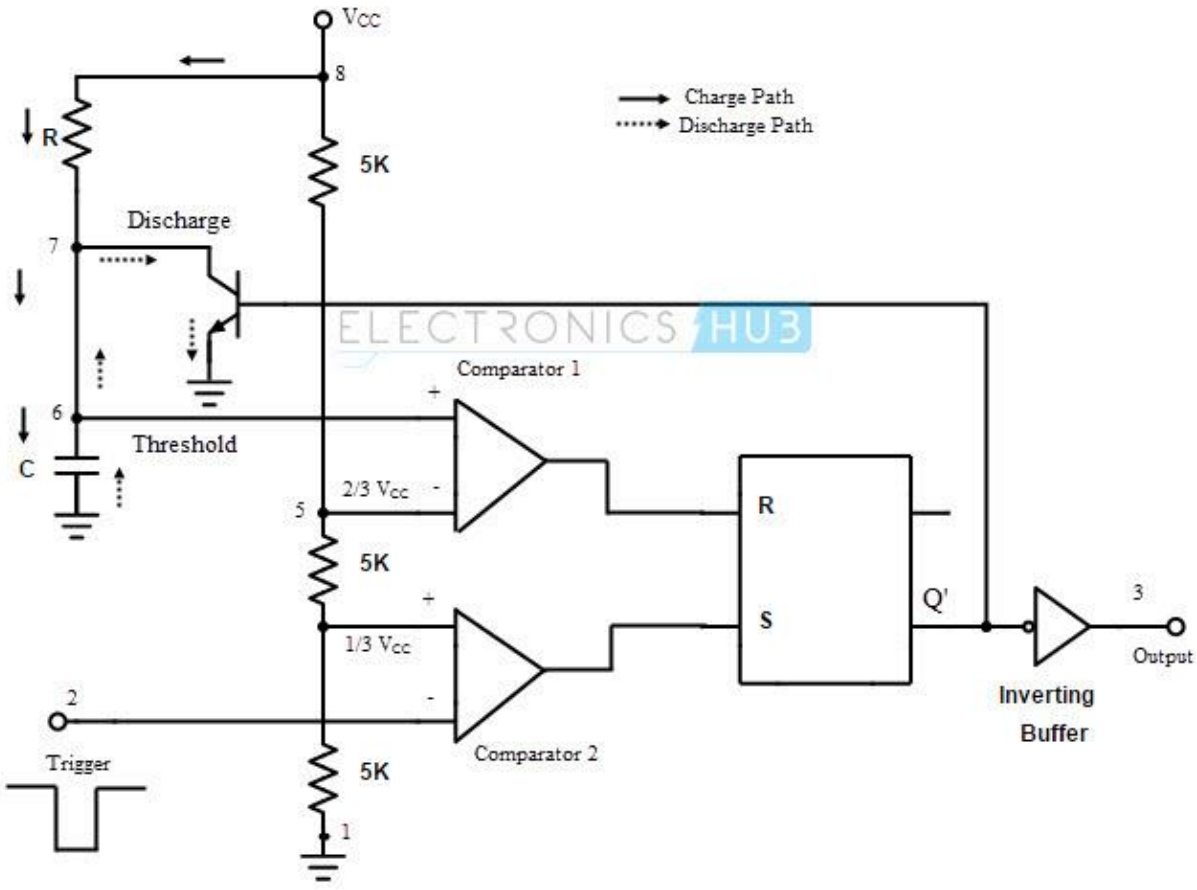
This configuration consists of one stable and one unstable state. The stable state can be chosen as either high or low by the user. If the stable output is set at high (1), the output of the timer is high (1).

At the application of an interrupt, the timer output turns low (0). Since the low state is unstable it goes to high (1) automatically after the interrupt passes. Similar is the case for a low stable monostable mode.

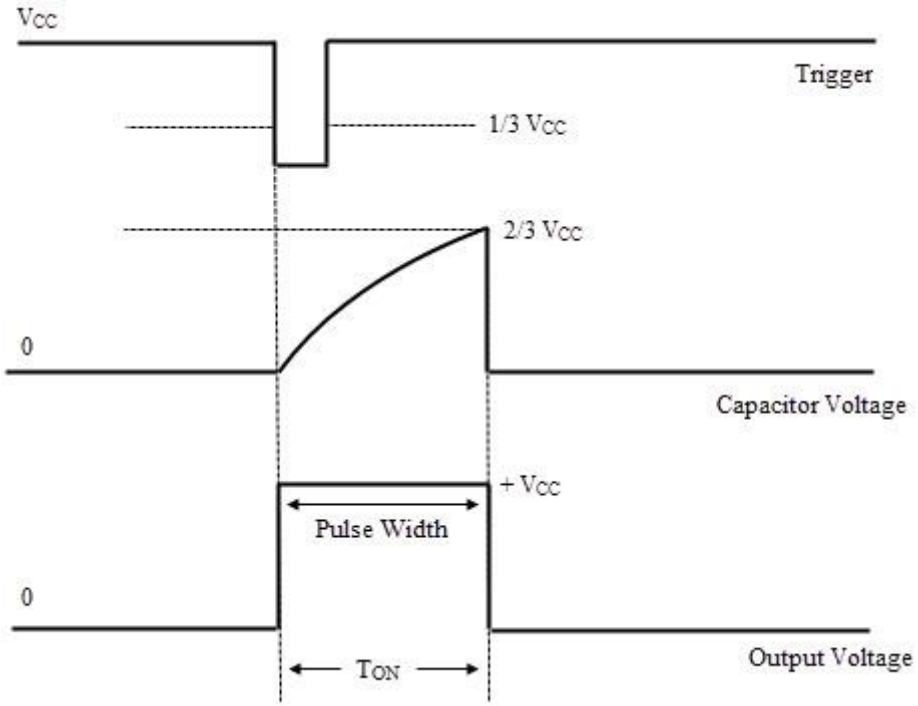
MONOSTABLE CONFIGURATION



INTERNAL CIRCUIT:



TRIGGER SIGNAL:



The width of the monostable output pulse period in which the output is HIGH is given as: 1.1RC seconds where R is in ohms and C is in farads.

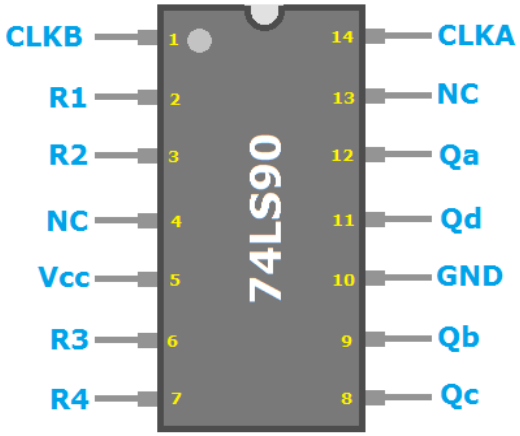
When the switch is on : To trigger the 555, pin 2 must momentarily go to less than 1/3Vcc, the duration of the trigger pulse must not be longer than that of the output pulse, and with short output periods or long duration input (trigger) pulses, some conditioning of the trigger pulse may be needed to keep its duration short.

When the switch is off: there will be no trigger signal passed.

IC 7490:

It is a decade counter which counts 0 to 9. It has two clock inputs and four outputs which are in binary form. IC 7490 can count the binary numbers from 0000 to 1001. After 1001 it gets reset and again starts counting. As the IC 7490 gets reset after counting ten numbers, it is called MOD-10 Decade Counter. is a 4-bit asynchronous, negative edge-triggered decade counter with asynchronous clear and present inputs for programmable counter applications. The 74LS90 counts only in an

ascending sequence. The IC actually consists of two separate counters that can be configured for three different modes of operation.



PIN DIAGRAM OF IC7490

PIN DESCRIPTION :

Pin No. 1: CLKB - There are two clock input pins in IC 7490. It is one of them.

Pin No. 2: R1 - It is the reset pin to reset the circuit to start the counting again.

Pin No. 3: R2 - It is also the reset pin.

Pin No. 4: NC - It is not connected to the circuit.

Pin No. 5: Vcc - It is the positive power supply pin.

Pin No. 6: R3 - It is the Reset Pin.

Pin No. 7: R4 - It is also Reset Pin.

Pin No. 8: Qc - Output Pin 3

Pin No. 9: Qb - Output Pin 2

Pin No. 10: GND - It is the Negative power supply Pin.

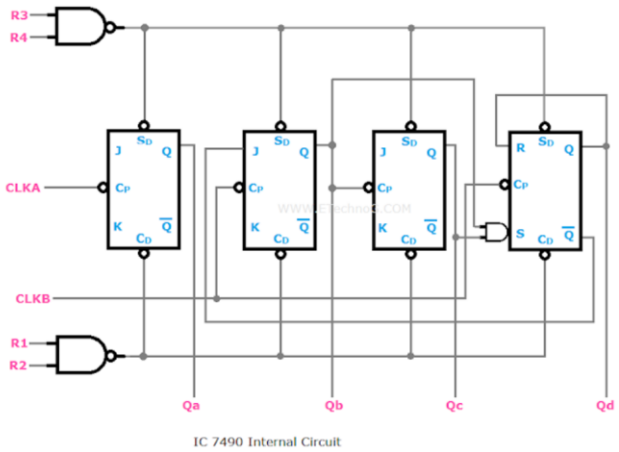
Pin No. 11: Qd - Output Pin 4

Pin No. 12: Qa - Output Pin 1

Pin No. 13: NC - Not connected to the Circuit.

Pin No. 14: Clock input pin 1

INTERNAL CIRCUIT DIAGRAM:



IC 7490 Internal Circuit

TRUTH TABLE OF IC7490

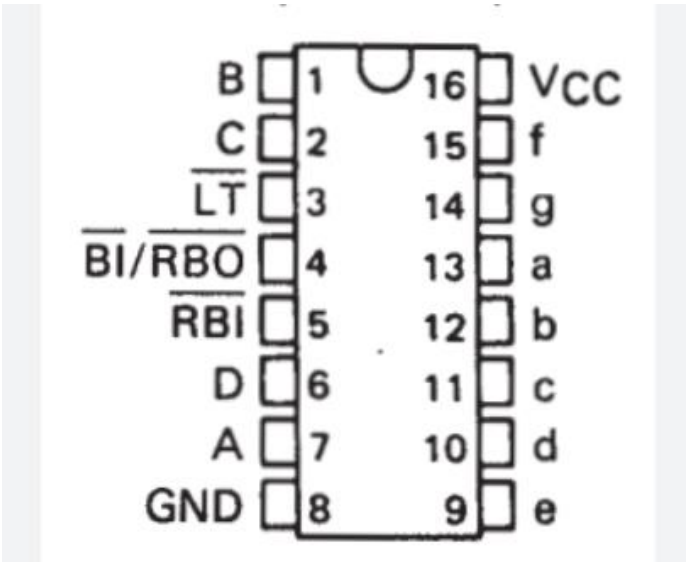
Count	Qd	Qc	Qb	Qa
(Start) 0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
(New Cycle) 10	0	0	0	0

In our project we connected 12th pin to 1st pin and output of 555 timer is given to 14th pin of counter.here 5th pin is connected to VCC and 10th pin is connected to

ground.The outputs are taken from pins 12,9,8,11. The internal circuit of IC 7490. It consists of four numbers of Master-Slave JK flip-flops that are internally connected

IC 7447:

It is a seven segment display IC which converts binary number into decimal form .The outputs of the counter are given as the inputs of the seven segment display IC so that it gives the number in the decimal form which has 7 bits which is later displayed using seven segment display . 7447 IC accepts a binary coded decimal as input and converts it into a pattern to drive a seven-segment for displaying digits 0 to 9. Binary coded decimal (BCD) is an encoding method in which each digit of a number is represented by its own binary sequence (usually of four bits). It accepts four lines of BCD (8421) input data and generates their complements internally. The data is decoded with seven AND/OR gates to drive indicator LEDs of the seven segment display directly. The outputs correspond to common anode (CA) configuration of seven segment. The pin out diagram and the pin description for IC7447 are shown below.

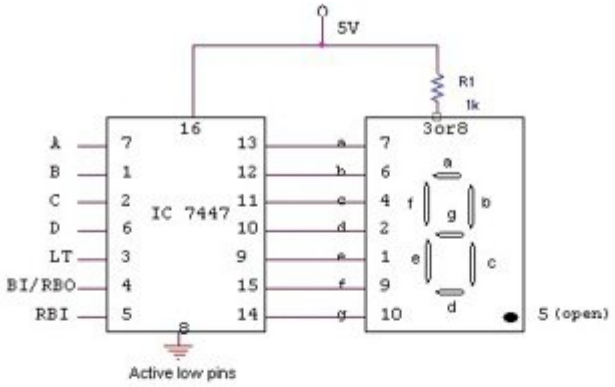


In the above pin diagram A,B,C,D represents the inputs in the binary form and 3,4,5 pins are outputs of a not gate IC whose input is connected to ground .a,b,c,d,e,f,g represents the outputs of this IC which are of total 7 bits.

Pin Number	Description
1	BCD B Input
2	BCD C Input
3	Lamp Test
4	RB Output
5	RB Input
6	BCD D Input
7	BCD A Input
8	Ground
9	7-Segment e Output
10	7-Segment d Output
11	7-Segment c Output
12	7-Segment b Output
13	7-Segment a Output
14	7-Segment g Output
15	7-Segment f Output
16	Vcc - Positive Supply

Basic Setup:

- Link Vcc (Pin 16), LT (Pin 3), BI/RBO (Pin 4), and RBI(Pin 5) to a 5V power source.
- Attach Gnd (Pin 8) to a 0V ground line.
- Wire the DCBA inputs (Pins 1, 2, 6, and 7) to the corresponding DCBA outputs from your counter.
- Finally, make connections from (Pins 9 through 15) to the abcdefg segments on your common anode 7-segment display.



TRUTH TABLE:

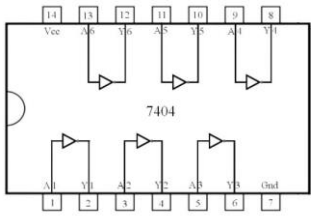
BCD Inputs				Output Logic Levels from IC 7447 to 7-segments							Decimal number display
D	C	B	A	a	b	c	d	e	f	g	
0	0	0	0	0	0	0	0	0	0	1	0
0	0	0	1	1	0	0	1	1	1	1	1
0	0	1	0	0	0	1	0	0	1	0	2
0	0	1	1	0	0	0	0	1	1	0	3
0	1	0	0	1	0	0	1	1	0	0	4
0	1	0	1	0	1	0	0	1	0	0	5
0	1	1	0	1	1	0	0	0	0	0	6
0	1	1	1	0	0	0	1	1	1	1	7
1	0	0	0	0	0	0	0	0	0	0	8
1	0	0	1	0	0	0	1	1	0	0	9

IC 7404 :

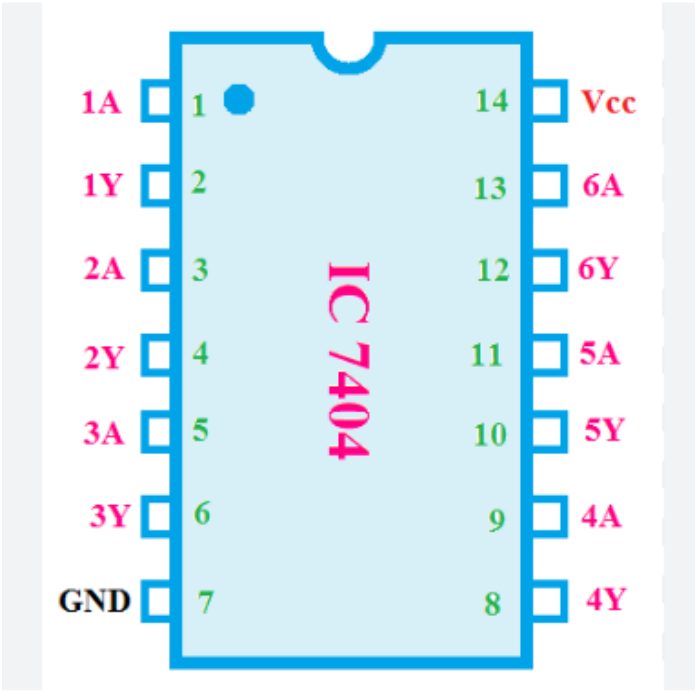
7404 is a NOT gate IC. It consists of six inverters which perform logical invert action. The output of an inverter is the complement of its input logic state, i.e. when input is low , its output is high and when the input is high , the output is low and vice versa . The pin diagram of this ic is as follows :

NOT Gate

Input	Input	Output
A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0



PIN DIAGRAM OF 7404 IC:



SEVEN SEGMENT DISPLAY :

A seven-segment LED is a digital display module specialized to display numerical information. Light-emitting diodes (LEDs) arranged in the shape of numbers offer an easily visible display. They are sometimes called "seven-segment displays" or "seven-segment indicators." Seven segment displays are the output display device that provides a way to display information in the form of images or text or decimal

numbers which is an alternative to the more complex dot matrix displays. It is widely used in digital clocks, basic calculators, electronic meters, and other electronic devices that display numerical information. It consists of seven segments of light-emitting diodes (LEDs) which are assembled like numerical 8.

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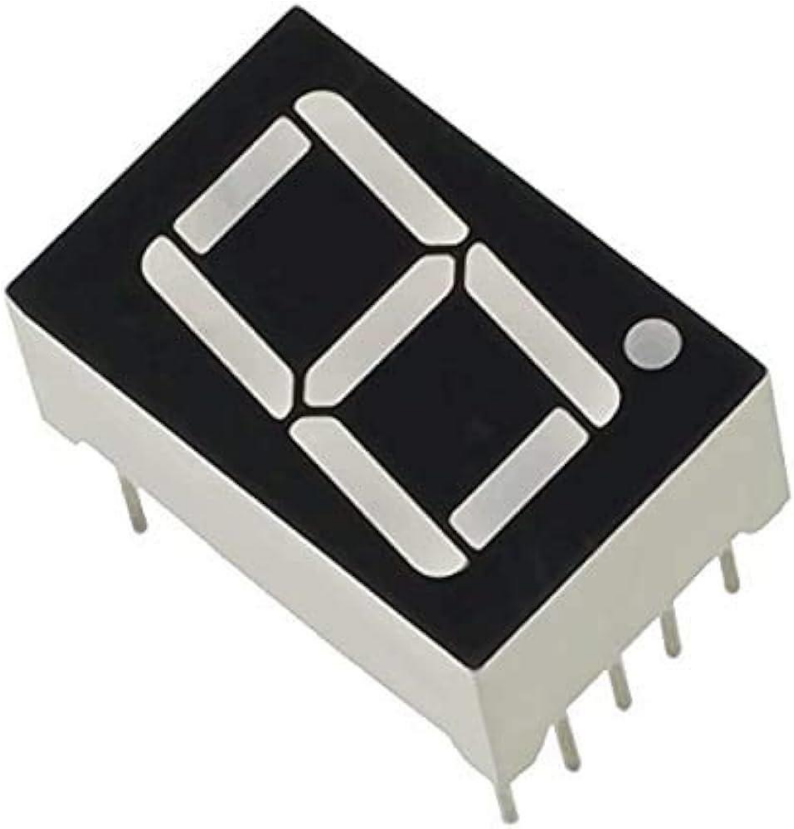
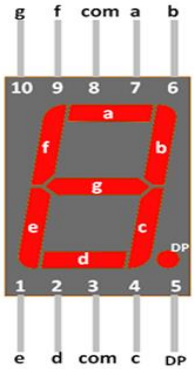
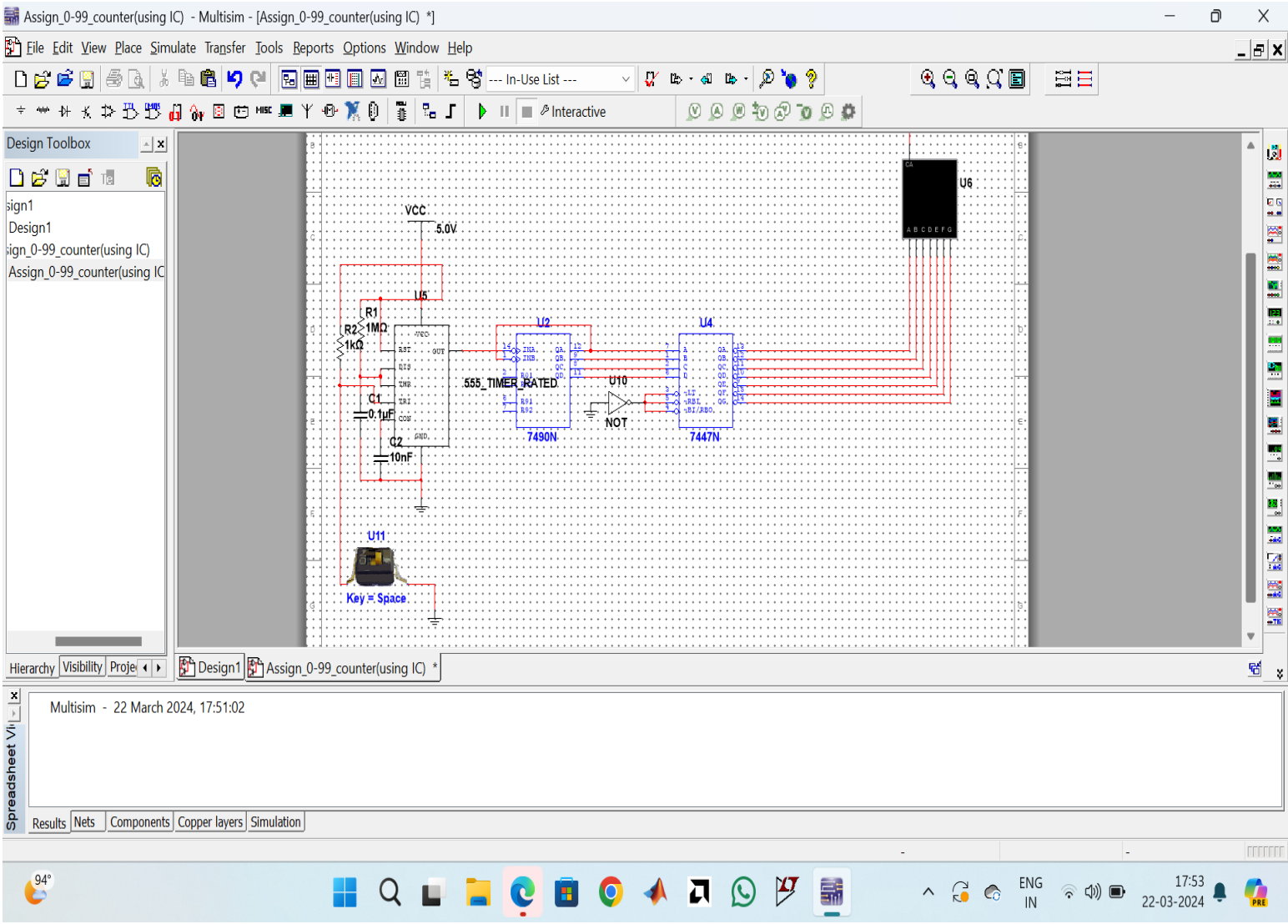


In our project this seven segment display is of common anode type where the common pins 3,8 are connected to output of not gate whose input is connected to ground.remaining pins are connected to the output of 7447 IC .

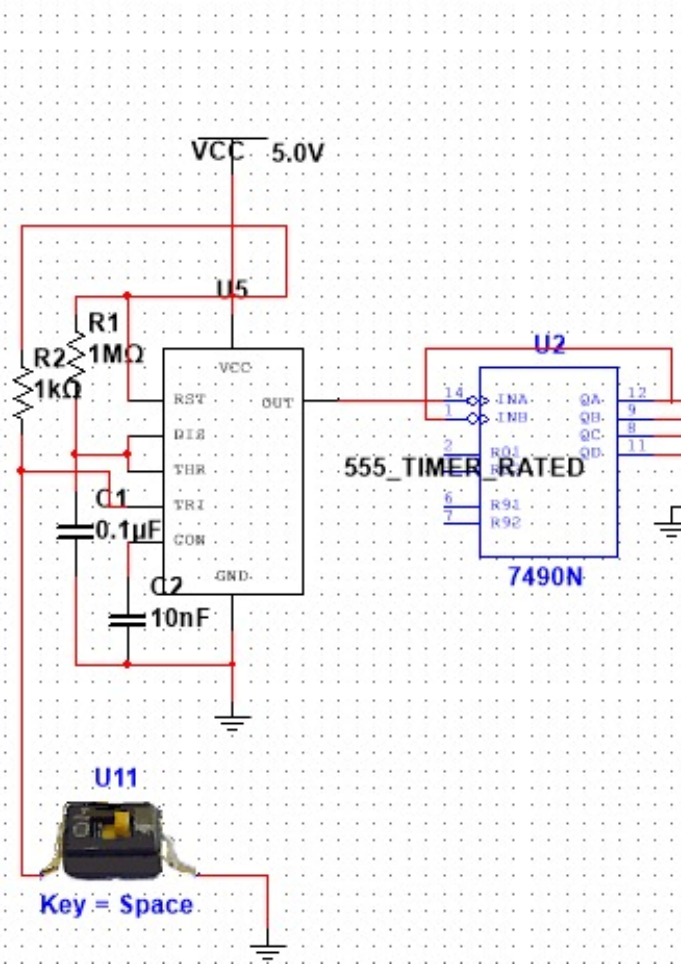


CIRCUIT DIAGRAM:



Multisim is the software we used to make connections and verify our project before soldering it on PCB.This circuit represents all the connections between IC'S. here we can use switch for representing a candidates vote and then the counter should count from 0-9,since it is a decade counter and the count should be displayed on seven segment display.

CONNECTIONS BETWEEN 555 TIMER AND COUNTER :



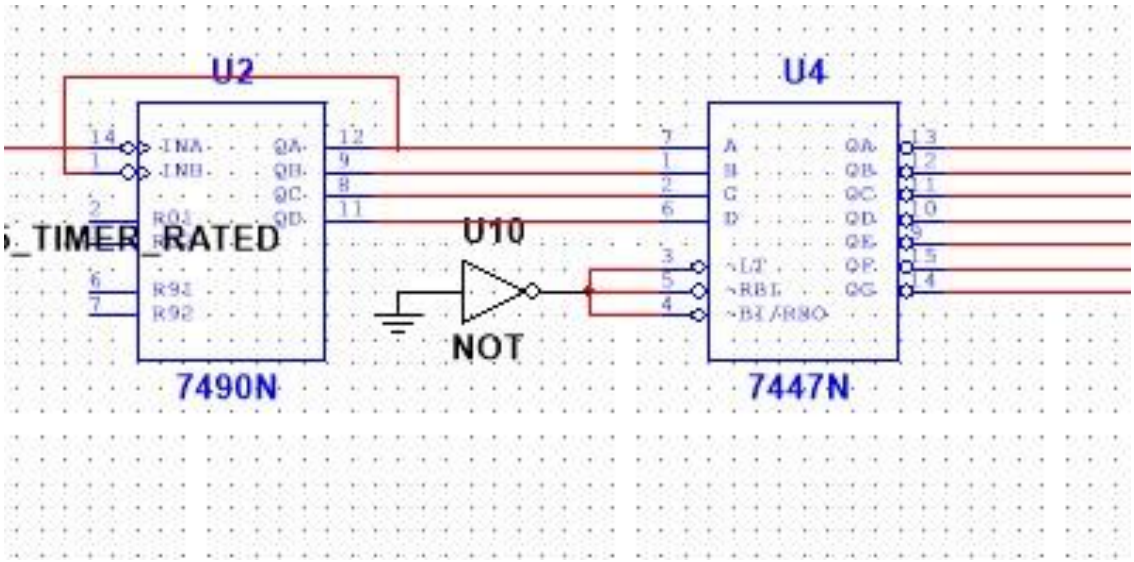
In monostable mode of 555 timer ,

R=1M ohm, C=0.1uF

555 TIMER	IC 7490
3rd pin – Output	14th pin – Input A

- 12th pin and 1st pin of IC 7490 are shorted (QA and Input B).
- Switch has two terminals in which one of the terminals is connected to ground and the other is connected to trigger (2nd pin) of the 555 Timer.
- When switch is on , it is connected to ground – there will be trigger signal since the voltage is less than 1/3rd of the VCC.
- When the switch is off , it is connected to VCC – there will be no trigger signal.

CONNECTIONS BETWEEN IC7490 AND IC7447 :



IC 7490	IC 7447
12th pin (QA)	7th pin (A)
9th pin (QB)	1st pin (B)
8th pin (QC)	2nd pin (C)
11th pin (QD)	6th pin (D)

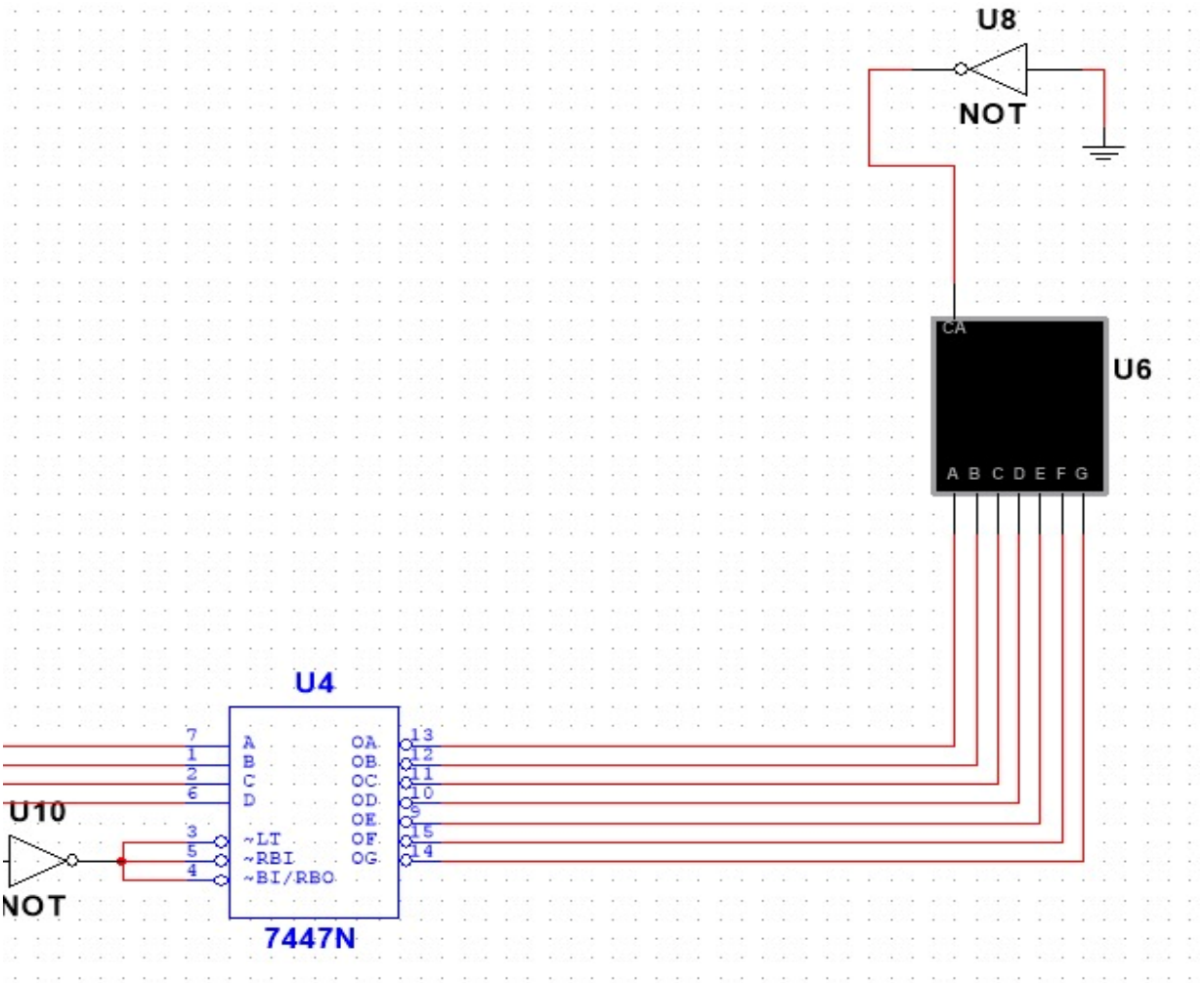
- 3rd , 4th ,5th pins of IC 7490 are connected to the output of the NOT gate whose input is ground .

CONNECTIONS BETWEEN IC 7447 AND SEVEN SEGMENT DISPLAY :

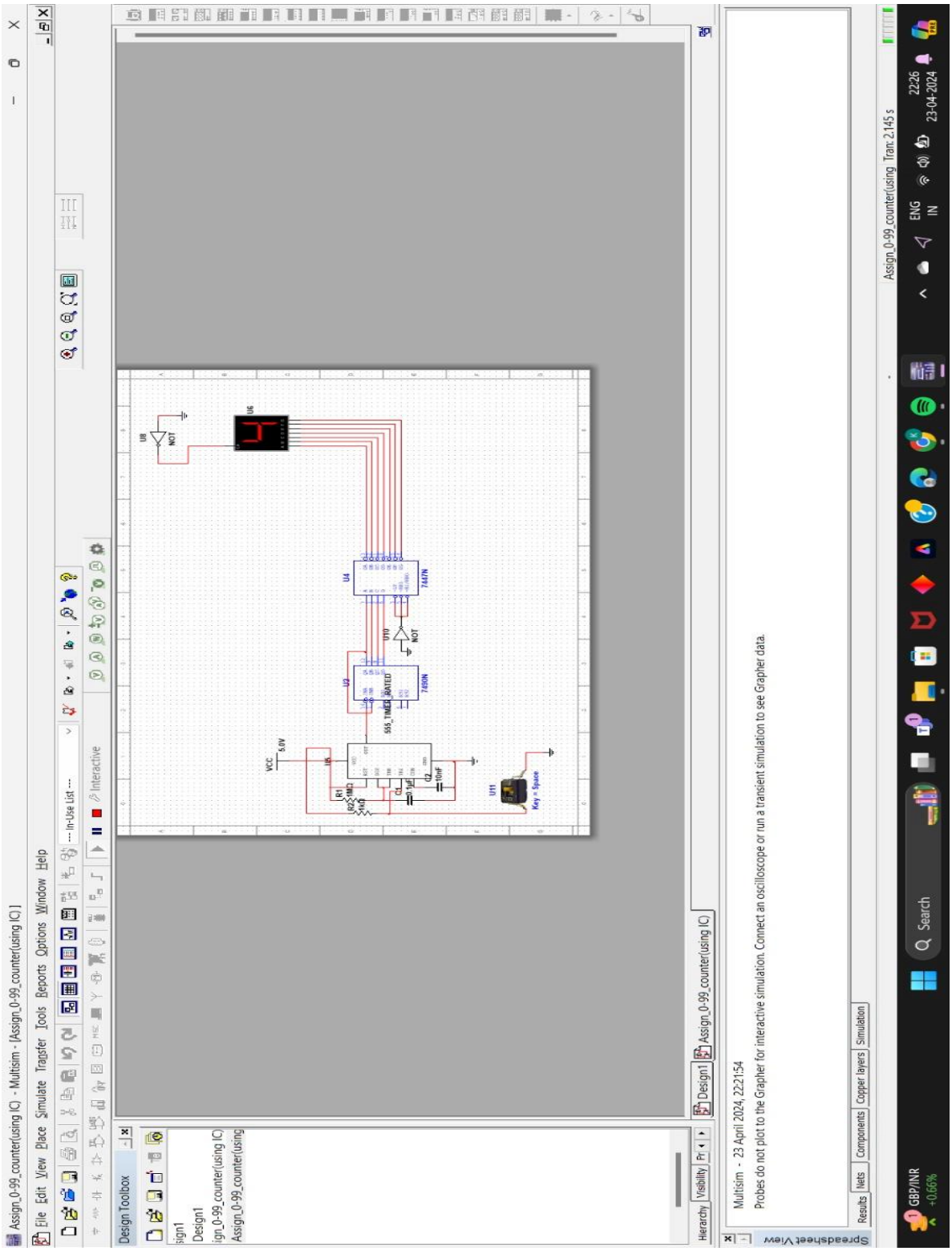
IC 7447	7 SEGMENT DISPLAY
13th pin (QA)	7th pin (A)
12th pin (QB)	6th pin (B)
11th pin (QC)	4th pin (C)
10th pin (QD)	2nd pin (D)

9th pin (QE)	1st pin (E)
15th pin (QF)	9th pin (F)
14th pin (QG)	10th pin (G)

- 3 and 8 pins of seven segment display are shorted and given to the output of NOT gate whose input is connected to ground.



INTERNAL WORKING OF THE CIRCUIT:



VOLTAGE SUPPLY:

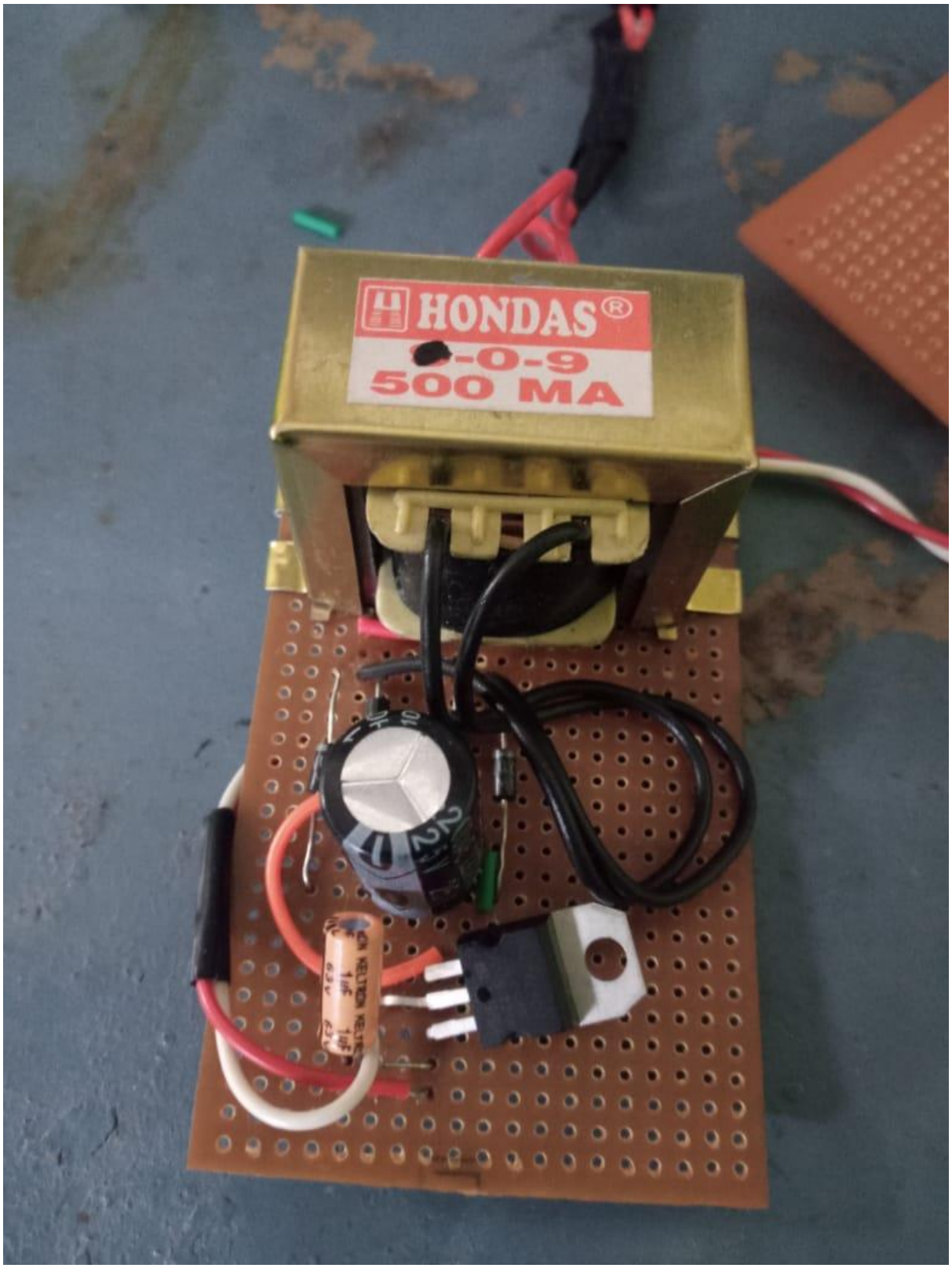
We used voltage supply circuit to provide 5volts to the components in our circuit.we made this voltage supply circuit using

- 9volts,500mA transformer
- 4 diodes -IN4007
- Voltage regulator IC7805
- capacitor

The four diodes are connected in the form of bridge circuit.

A single Phase Bridge Rectifier is constructed using four Diodes D1, D2, D3, and D4, connected in a closed loop configuration that forms a bridge. The diodes are arranged in a manner that they conduct in pairs during positive half cycles.The input AC voltage is applied through a transformer across the Diagonal C of the bridge. The load resistor RL is connected between Diagonal C and D.The output rectified DC voltage is obtained across the load from Diagonal D.

Now the 9volts from the transformer is converted to 5v supply using the voltage regulator IC.One terminal of bridge rectifier is connected to the input of IC 7805 and the other terminal is connected as common terminal to IC.now the output terminal and the common terminal are connected to the capacitor 1uF.Now we can measure the voltage across the capacitor and it shows 5volts.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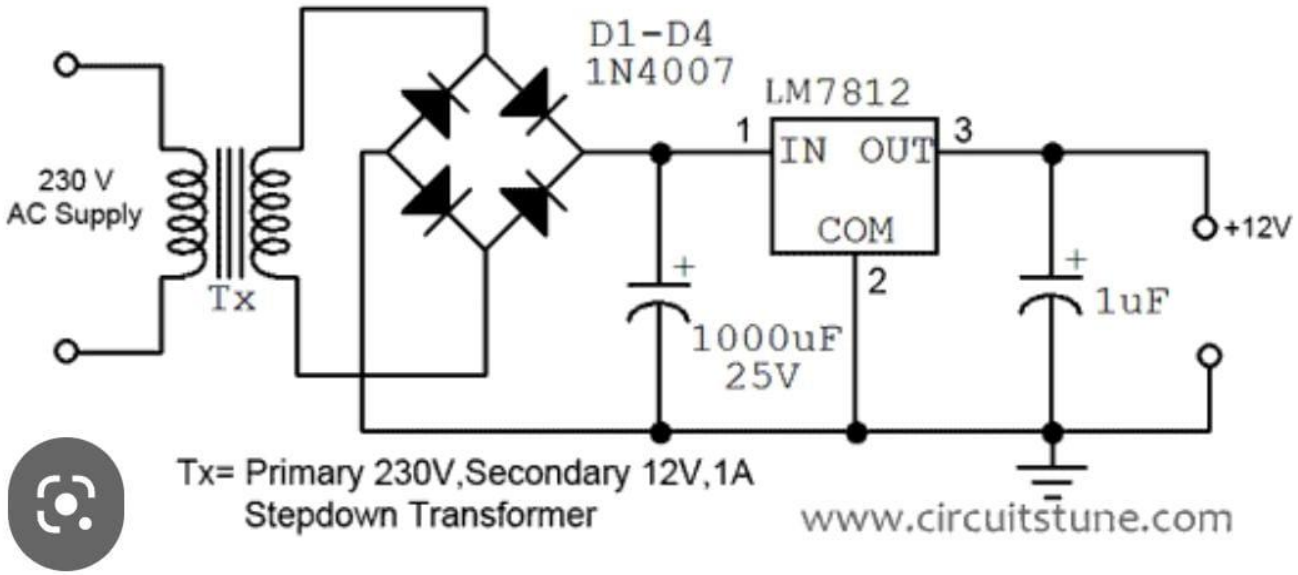


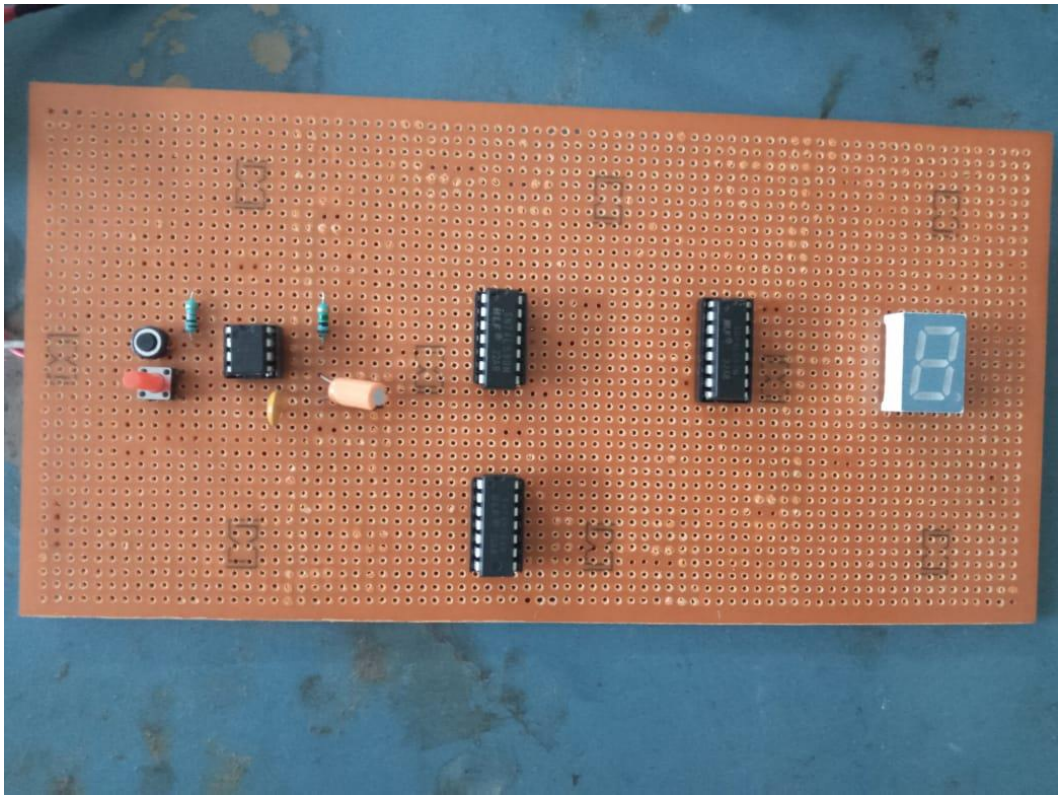
This voltage of 5V is given to the counter vcc(5th pin) and vcc of seven segment display IC(16th pin) and vcc of not gate(14th pin) and it is also used as supply voltage for 555 timer.

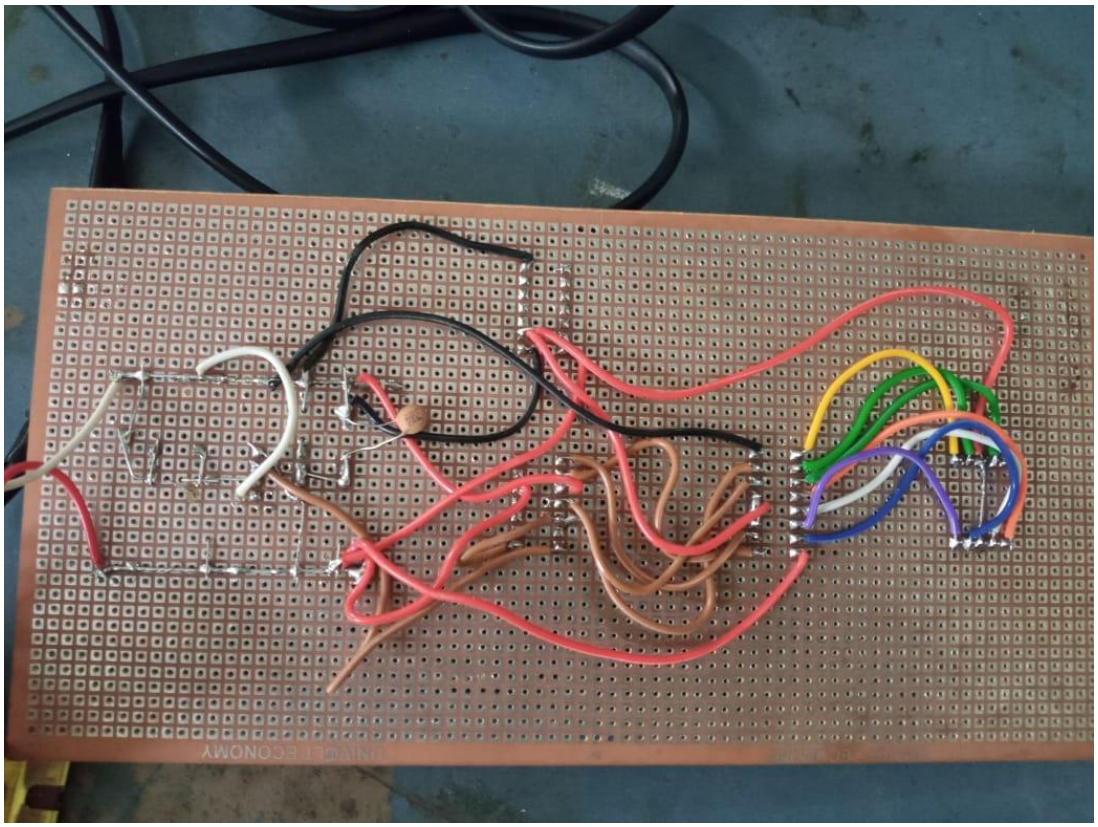
EXPLANATION OF PROJECT:

The idea of our project is to design a voting system using IC'S (555 timer,7490,7447,7404).basically the vote is counted by using a switch.whenever a person presses the switch,a trigger signal is generated which is given as input of 555 timer at 2nd pin.The 555 timer is operated at monostable mode to generate clock pulses.The output of 555 timer(3rd pin) is given as the input to the counter (14th pin) and remaining connections of IC7490 are connected as per the circuit diagram.The output of counter (decade counter) is given as input to the IC7447 ,which is binary to seven segment converter. So as the name suggests this IC converts the output of counter which is a binary value into a decimal value and then these outputs are connected to seven segment display using connecting wires.the seven segment display dispalys the count (i.e number of votes that a candidate gets) .the number of votes are counted from 0 to 9 as we used a single seven segment display and we can also extend it to 0 to 99 if we use two seven segment displays.

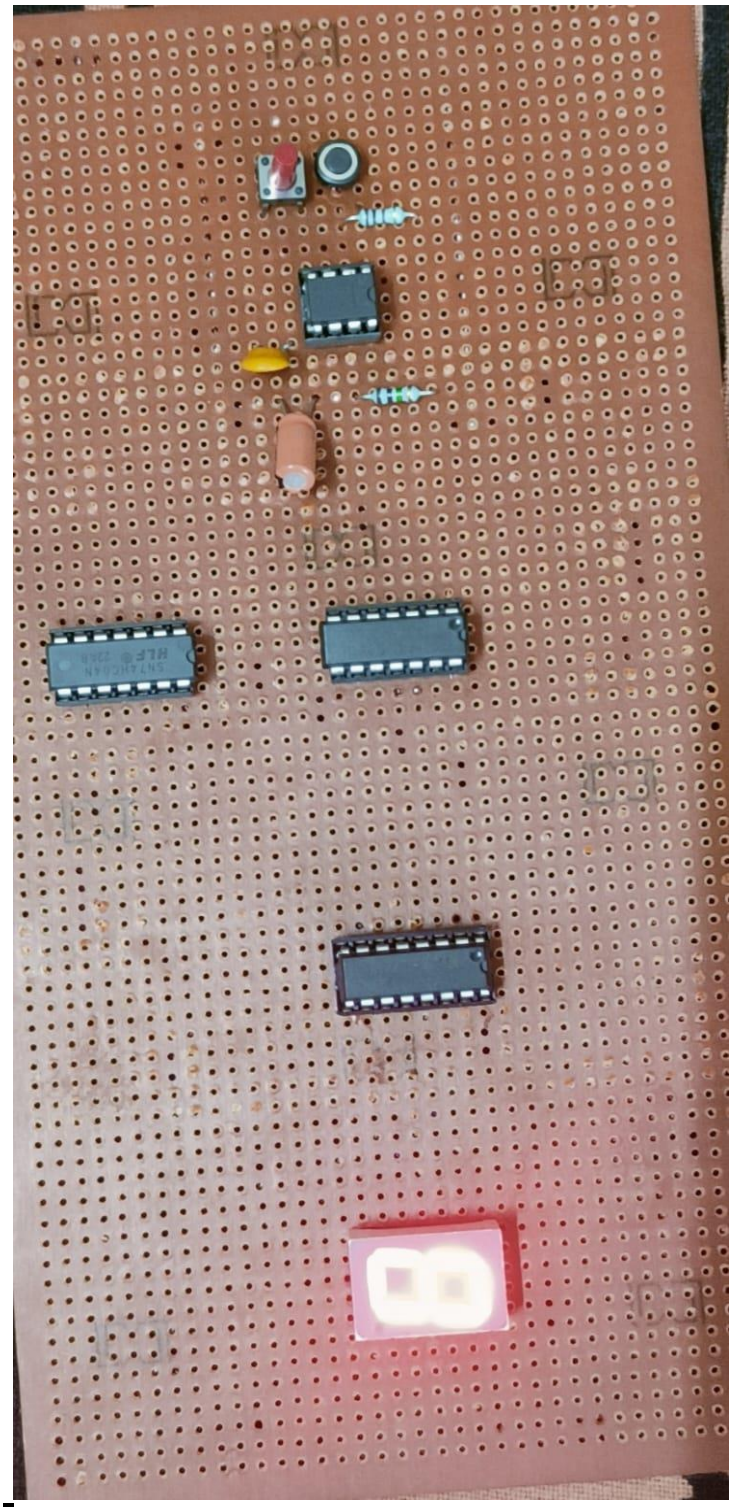
Whenever the switch is pressed the 555 timer should give a certain clock pulse to the counter so that it counts only one vote .otherwise it counts till 9 .so we are connecting the 555 timer in monostable mode.6th and 7th pins which are known as threshold and discharge pins are shorted and given to vcc via resistor and ground via capacitor.The reset pin is connected to VCC.control pin is connected to ground via capacitor.

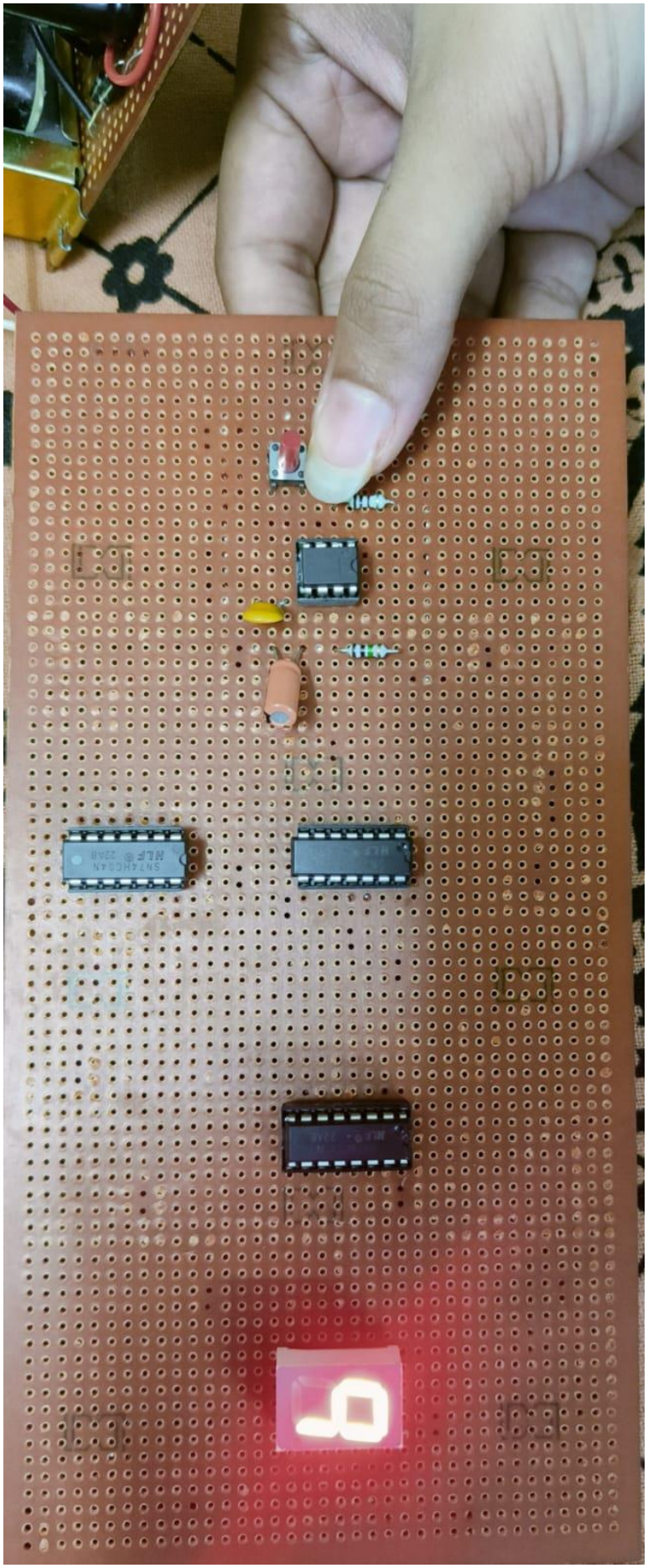
The IC 7490 is a decade counter which counts from 0 to 9 in binary form.for this we have to connect 12th pin to the 1st pin and outputs are driven at 12,11,9,8 pins.now these pins are connected to 7447 which converts these binary values into decimal form and finally gives to seven segment display ,which displays the results.





OBSERVATIONS:

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