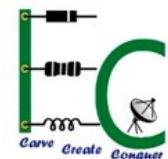




THE NATIONAL INSTITUTE OF
ENGINEERING
MYSURU – 570008



DEPARTMENT OF ELECTRONICS AND COMMUNICATION
ENGINEERING

Course Project [EC3C02] – III Semester

Synopsis on

PARKING ENTRY PROTOTYPE

under the guidance of

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2019-20

ABSTRACT

Parking spaces are commonly seen in places like shopping malls, flats, apartments, etc. Vehicles enter and leave the area. Sometimes the parking lot will be full if the place is crowded.

This project is to demonstrate a modified parking entry prototype which keeps the count of the number of vehicles entering the parking lot and indicates if the parking lot is full.

CONTENTS

Abstract 2

Introduction 4

Hardware 5

Software 6

Working 7

Application 8

Limitations 8

Future enhancement 8

Bibliography 9

Appendices 10

INTRODUCTION

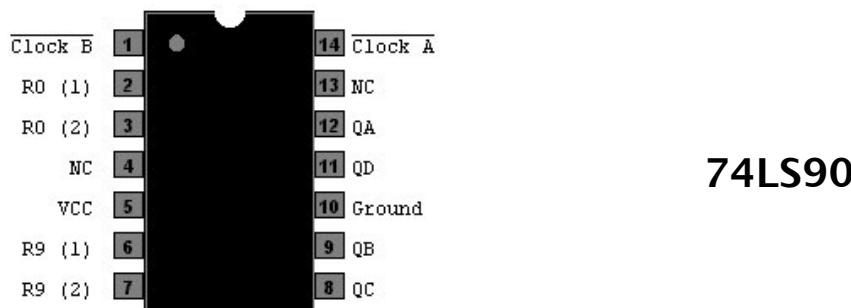
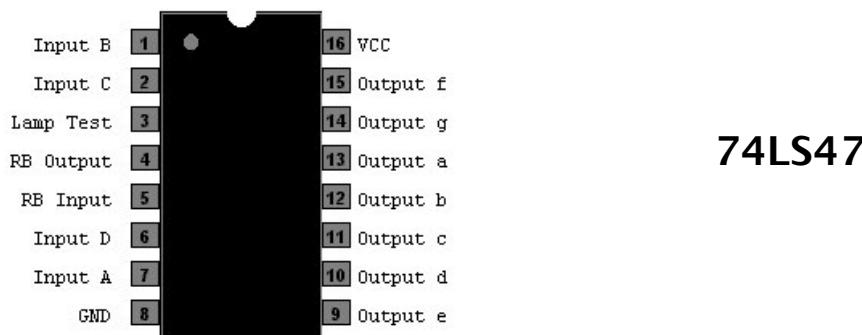
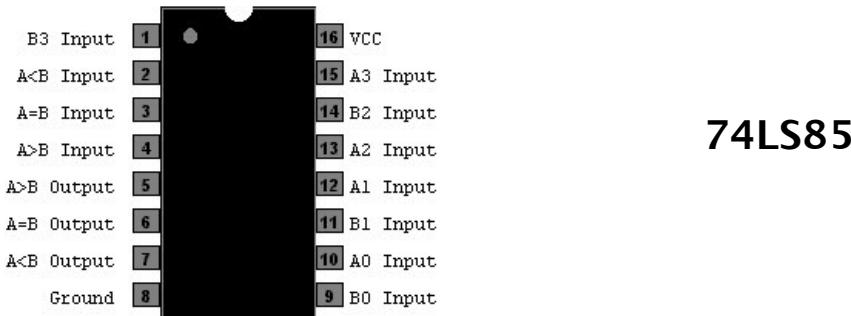
Parking spaces are very important to cities. A city must have enough parking spaces to provide their residents and their visitors a place to park their vehicles. This prototype keeps the count of the vehicles entering and indicates a red light when the parking lot is full. The main circuit includes an IR proximity sensor, a 4-bit decade counter(IC 74LS90), a 4-bit comparator(IC 74LS85), and a display driver(IC 74LS47) which is used to drive the 7-segment display.

The IR module is used to generate the clock pulse for the decade counter. The decade counter gets activated when triggered with falling edge clock pulse. Since the decade counter is a mod-10 counter, the count resets to 0 when it reaches a count of 9. The output of the counter is binary and is decoded by the BCD to 7-segment decoder which is displayed on a 7-segment display. A part of the output of the counter is given to the comparator. It compares the count with the reference count and the 3 outputs of comparator gets high accordingly.

HARDWARE

- IC 74LS90 (4-bit Decade Counter).
- IC 74LS85 (4-bit Comparator).
- IC 74LS47 (7-segment Display driver).
- Common anode 7-segment display.
- IR Proximity Sensor.
- LED.
- Resistor (100Ω , 330Ω).
- Jumpers.

Pin diagram:



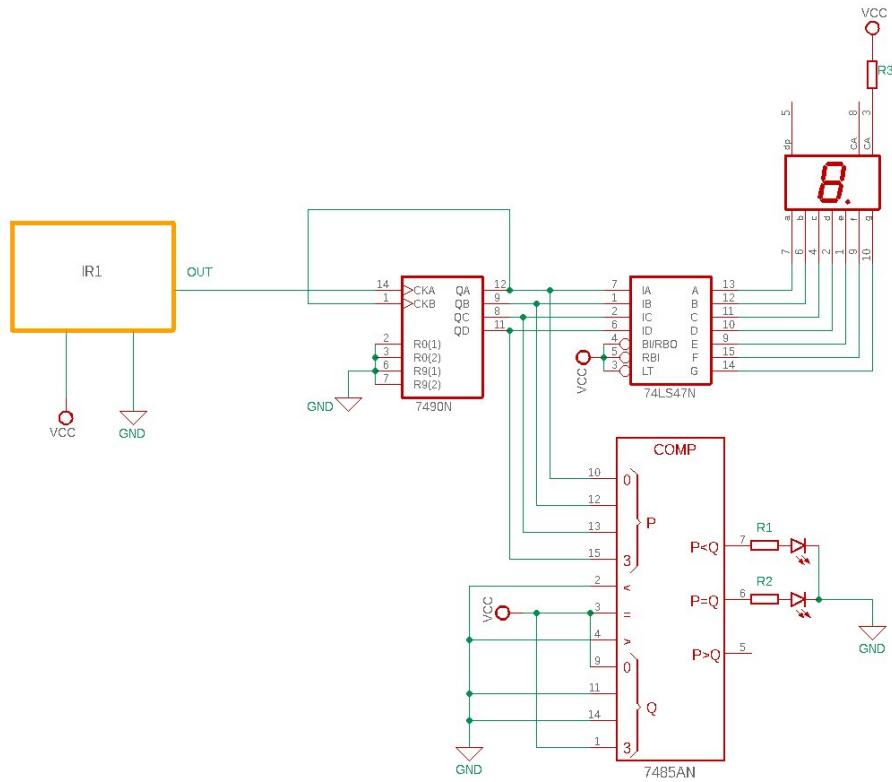
SOFTWARE

- Delay for the clock pulse is given by the MCU which is programmed in C++ language. The following code restricts the IR sensor output by 400 milliseconds and creates a clock of 20% duty cycle.

```
int IR = 10;
int CLK = 13;
void setup()
{
    pinMode(10, INPUT);
    pinMode(13, OUTPUT);
}
void loop()
{
    x = digitalRead(IR);
    delay(3);
    if(x == LOW)
    {
        digitalWrite(CLK, LOW);
        delay(400);
    }
    else
    {
        digitalWrite(CLK, HIGH);
        delay(100);
    }
}
```

- **TINA-TI** Simulation Software for simulation of system design.
- Circuit Schematic produced by **AUTODESK-EAGLE**.
- **Arduino IDE** for programming.

WORKING



SCHEMATIC

When a vehicle crosses the gate of the parking lot, IR module senses it and sends it to the 14th pin of the decade counter. The counter keeps the count when triggered with falling edge clock pulse. The 4 BCD outputs Q_A , Q_B , Q_C , and Q_D are given to the comparator to the pins 10, 12, 13, and 15 respectively. The reference BCD input to the comparator is 1 0 0 1(here) is given to the pins 9, 11, 14, and 1. The pin 2 and 4 are made logic 0 and pin 3 is made logic 1. These inputs are known as cascading inputs. Pin 6 and 7 are connected to red and green LED respectively. Green LED continues to glow until the count reaches 8. When the count reaches 9, red LED glows indicating that parking lot is full. A part of the BCD input of counter is fed to the display driver input pins 7, 1, 2, and 6. For the proper working of the 7-segment display, pin 3, 4, and 5 are made logic 1. The rest of the pins are the output pins connected to the 7-segment display.

APPLICATIONS

- Parking entry.
- Mall entry.
- Decade counters can be used in timer circuits.
- IR sensor can be used in line following robot.

LIMITATIONS

- Cannot decrement the count.
- Constrained to 9 counts.

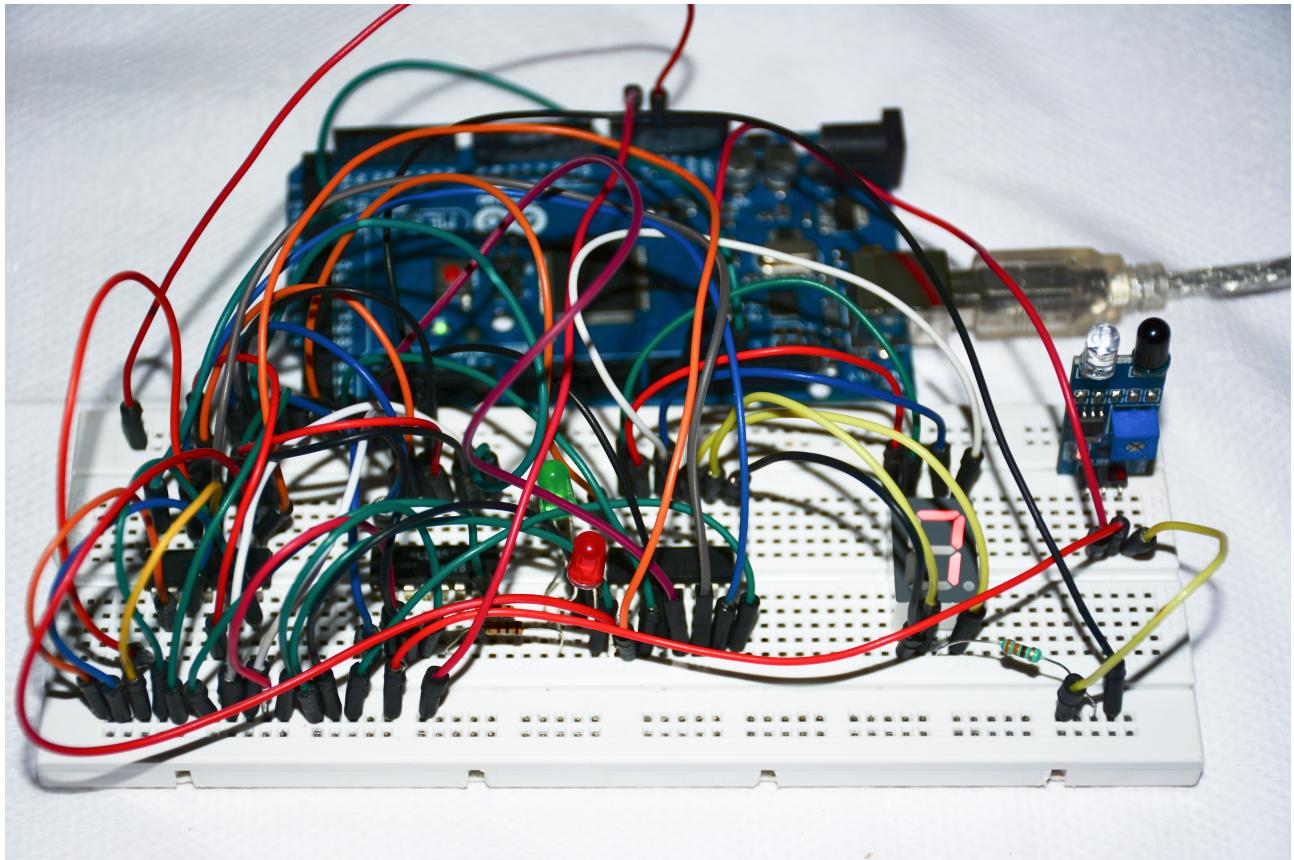
FUTURE ENHANCEMENTS

- Count can be increased using more counters.
- Similar model can be set up at the exit.

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<https://www.ti.com/lit/ds/sdls111/sdls111.pdf>

APPENDICES



PARKING ENTRY PROTOTYPE