

Group 42-Problem 13

Smart Lighting System

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ACKNOWLEDGEMENT

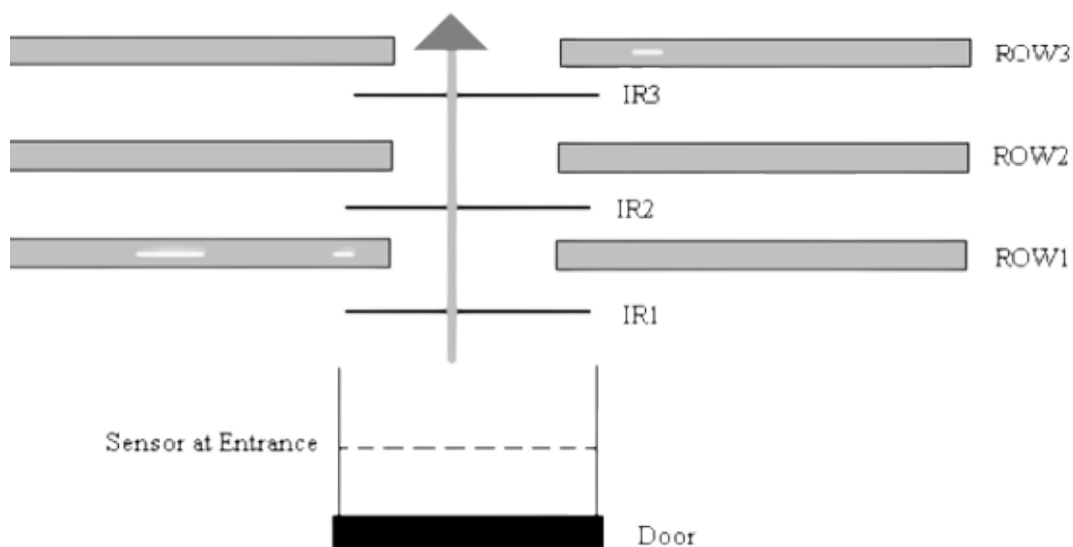
We, the students of BITS Pilani, KK Birla Goa Campus, would like to express our heartfelt thanks to our professor, Ms. Anupama, and her team for their unwavering guidance and support in our project. Their expertise, feedback, and assistance have been invaluable in shaping our research. We are grateful for their dedication and mentorship.

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PROBLEM STATEMENT

Smart Lighting System

Description: This is a lighting system for a conference room. As the seats get filled the light should be turned on. The rows are filled from row1 onwards. There are 4 lights per row. As each row begins to get filled the lights get turned on. As each rows empties completely the light gets turned off. You can assume there are atleast 5 rows. Entry to the auditorium is restricted to a certain point of time. Exit can be at any point of time.



ASSUMPTIONS

- Only one person can enter or exit at any given time.
- 5 rows have been assumed.
- 10 seats per row have been assumed
- People will not be switching rows
- Spectators can enter the conference room until a particular time t . After t , the exit time starts and people are free to leave.
- Rows are filled sequentially i.e. The lower rows have to be completely filled before the upper rows can begin to be occupied.
- An Array is used which displays the IR sensor triggered by an individual till a given time (using the assumption that the individual can enter/exit one by one)

DEVICE

SPECIFICATIONS

- 1 IR sensor for the entry/exit gate (IR0).
- 1 IR sensor for each individual row (IR1, IR2, IR3, IR4, IR5).
- Each IR sensor is low active output.

HARDWARE DEVICES

CHIP NUMBER	CHIP	QUANTITY REQUIRED
8086	Microprocessor	1
2716	ROM 2K	4
6116	RAM 2K	2
74LS373	8 Bit Latch	3
74LS138	3:8 Decoder	2
74LS245	8 Bit Buffer	2
8284	Clock Timer	1
8255	Programmable Peripheral Interface	1
220 V Tubelights	-	20
RJ 1V AH220	DC Relay	5
PIR SENSOR	555-28027	6
AND, OR, NOT	Gates: IC 7408(AND), IC 7432 (OR), IC 7404 (NOT)	1 AND, 2 NOT, 8 OR

JUSTIFICATION

- **8086 : Microprocessor**
- **8284 : For Stable Clock Timer**
- **8255 : Input and Output ports**
- **6116: Smallest RAM chip available is of 2K and is required for stack, temporary storage and the odd and even banks.**
- **2716: Smallest ROM chip available is 2K, and is required for even and odd banks with base address 00000H**
- **PIR Sensor : For motion detection**
- **74LS138 : A 3:8 line decoder**
- **RJ 1V AH220 : Electromagnetic switch**
- **74LS373,74LS245 and required gates**

ADDRESS MAP

Total RAM - 4KB

Total ROM - 8KB

RAM consists of two 2K chips

ROM consists of four 2K chips

MEMORY MAPPING

ROM1 (2716) : 00000H - 00FFFH

RAM1 (6116) : 08000H - 08FFFH

ROM2 (2716) : FF000H - FFFFFH

I/O MAPPING

8255: 00H - 06H

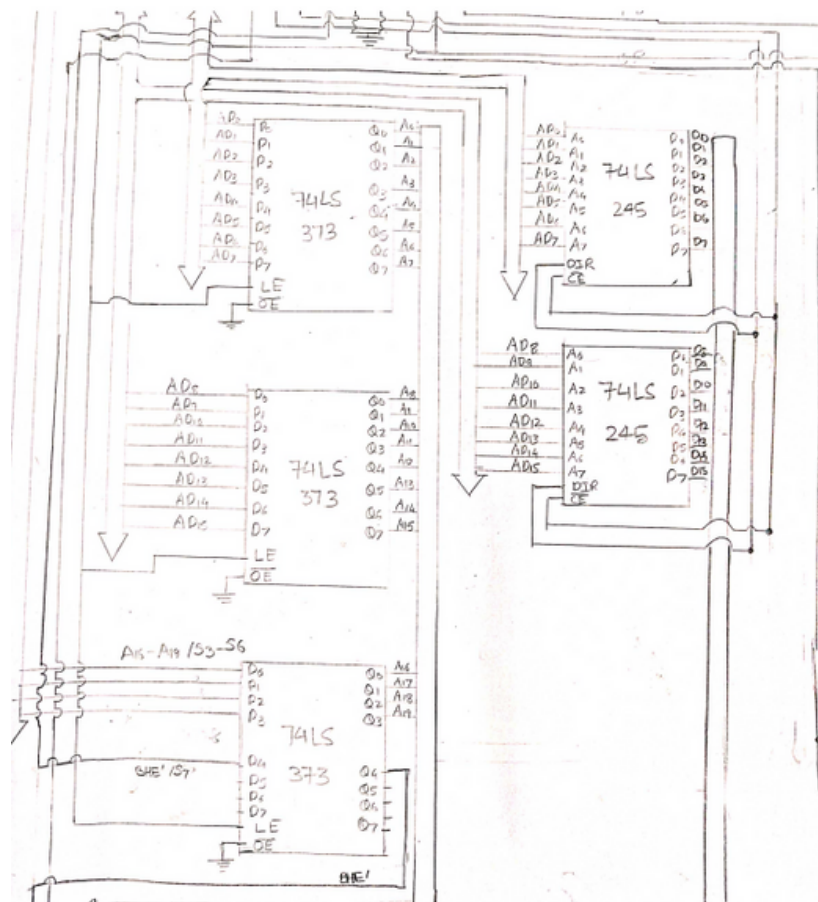
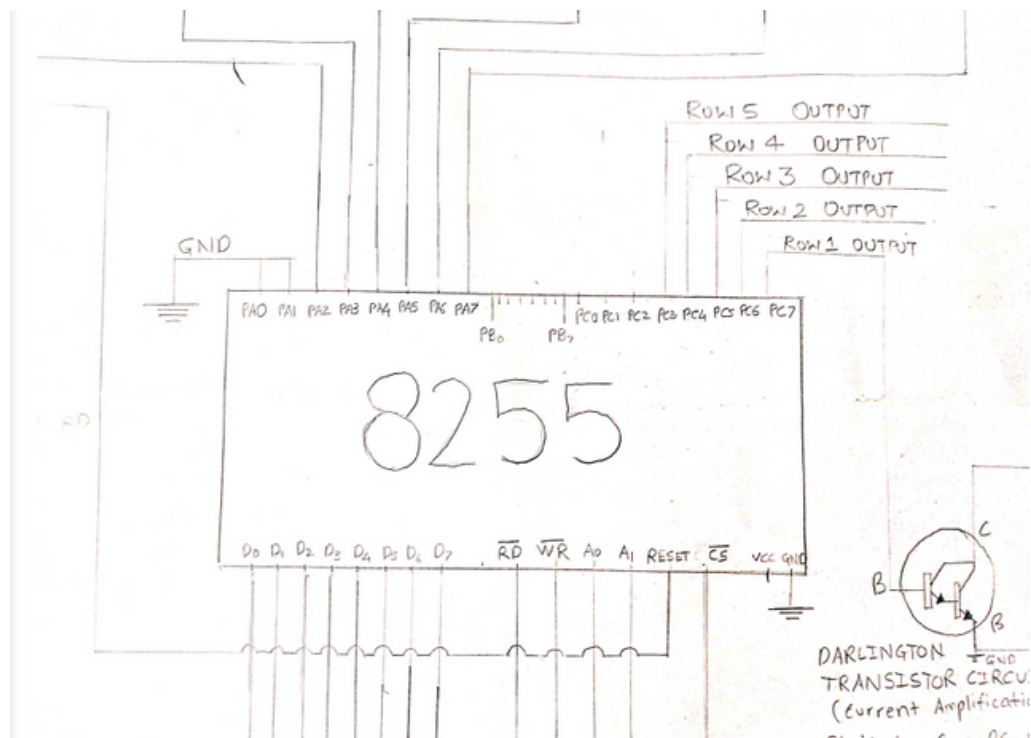
PORTA - 00H (Input from Sensors)

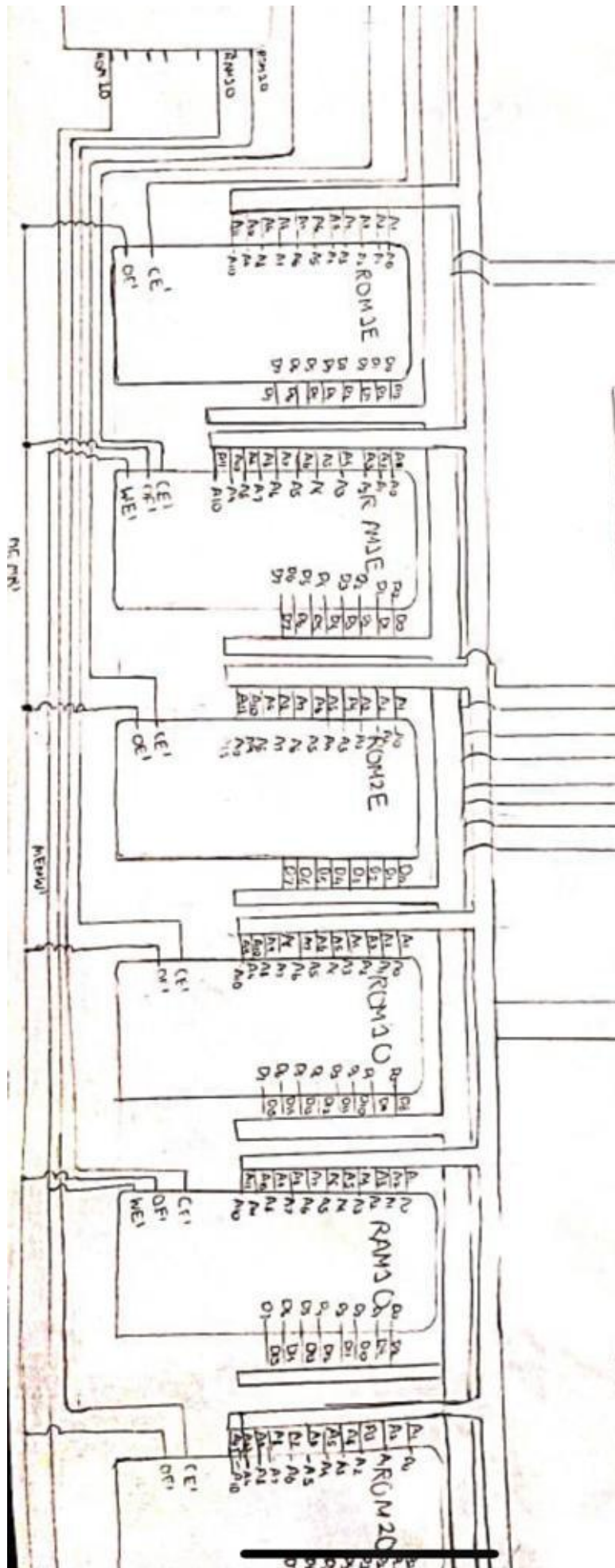
PORTB - 02H (Not Used)

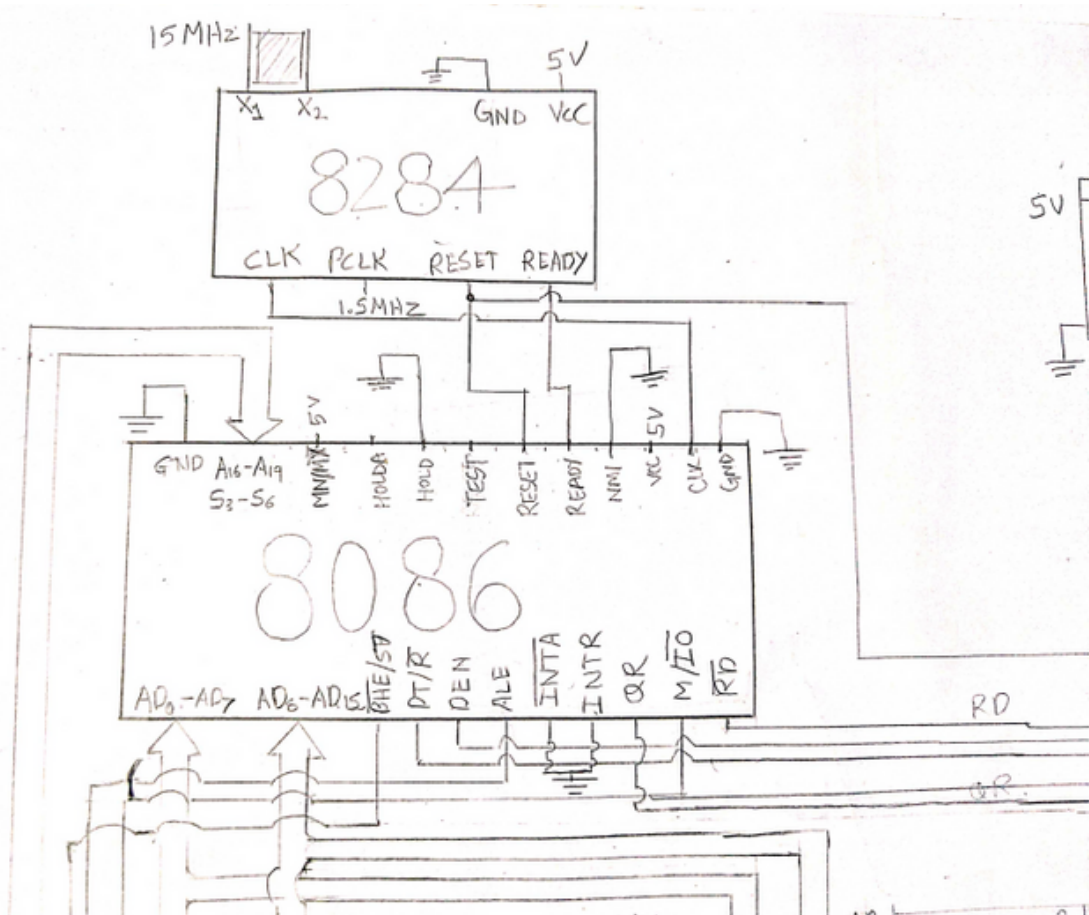
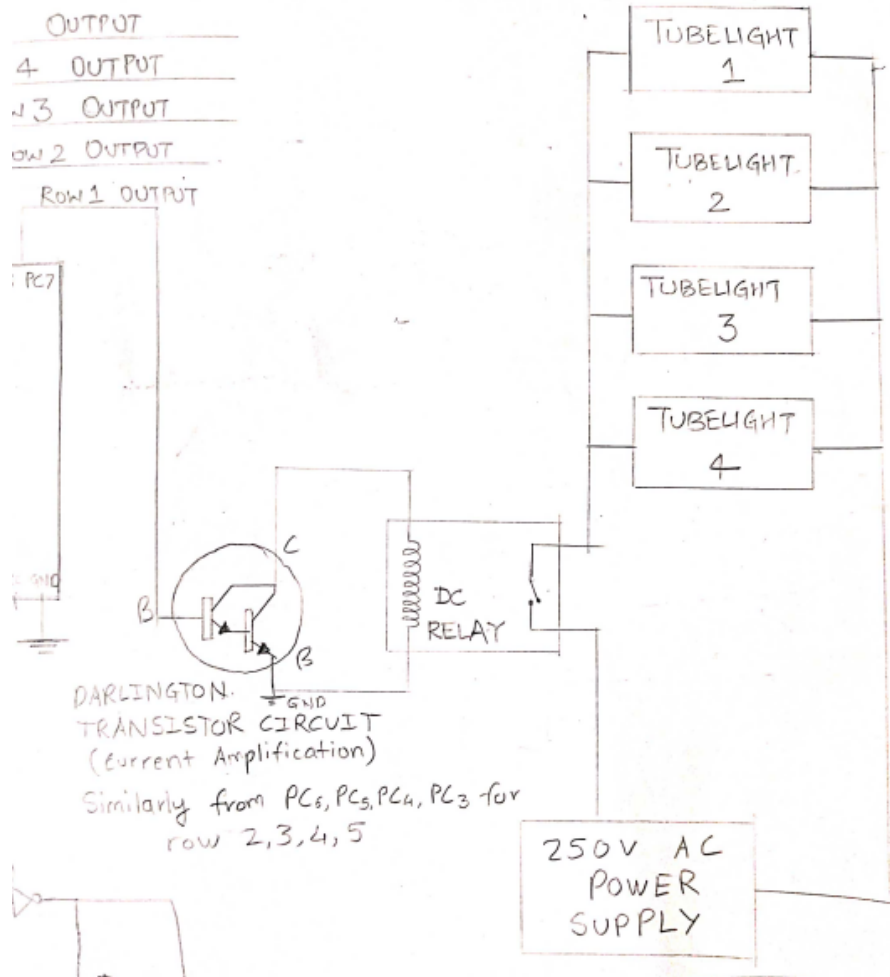
PORTC - 04H (Output to Light)

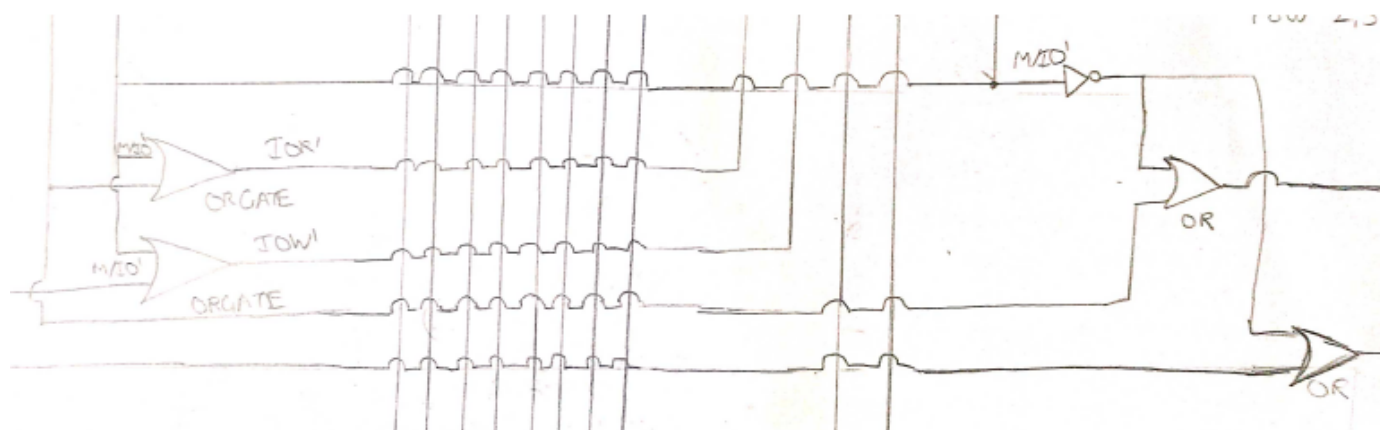
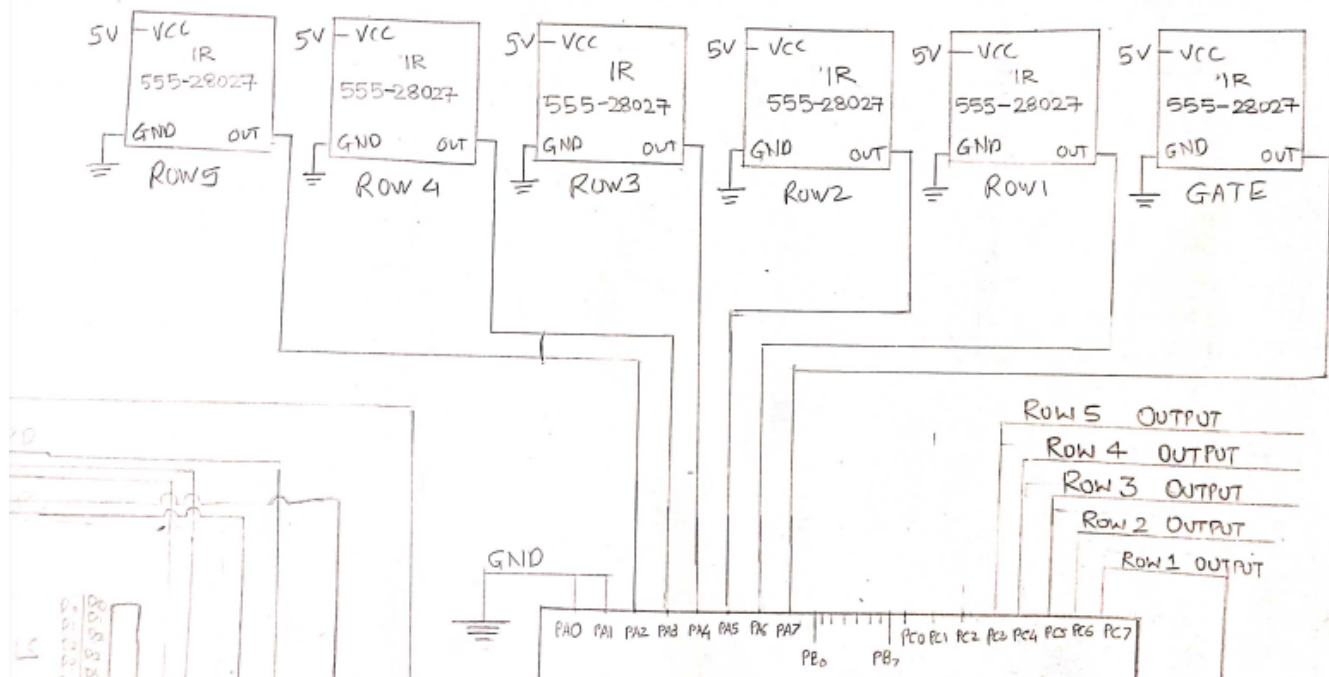
CWR - 06H (CONTROL REGISTER)

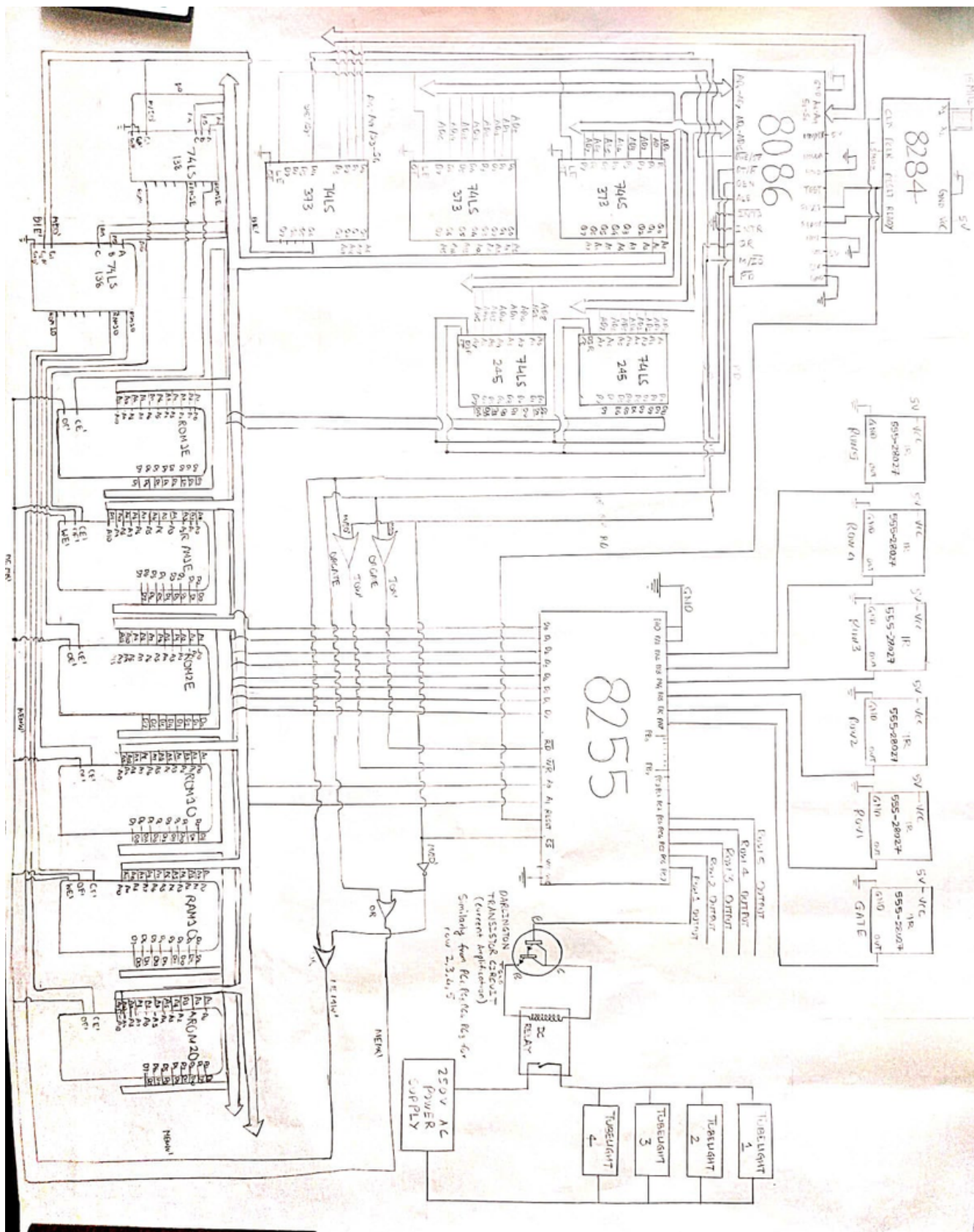
DESIGN





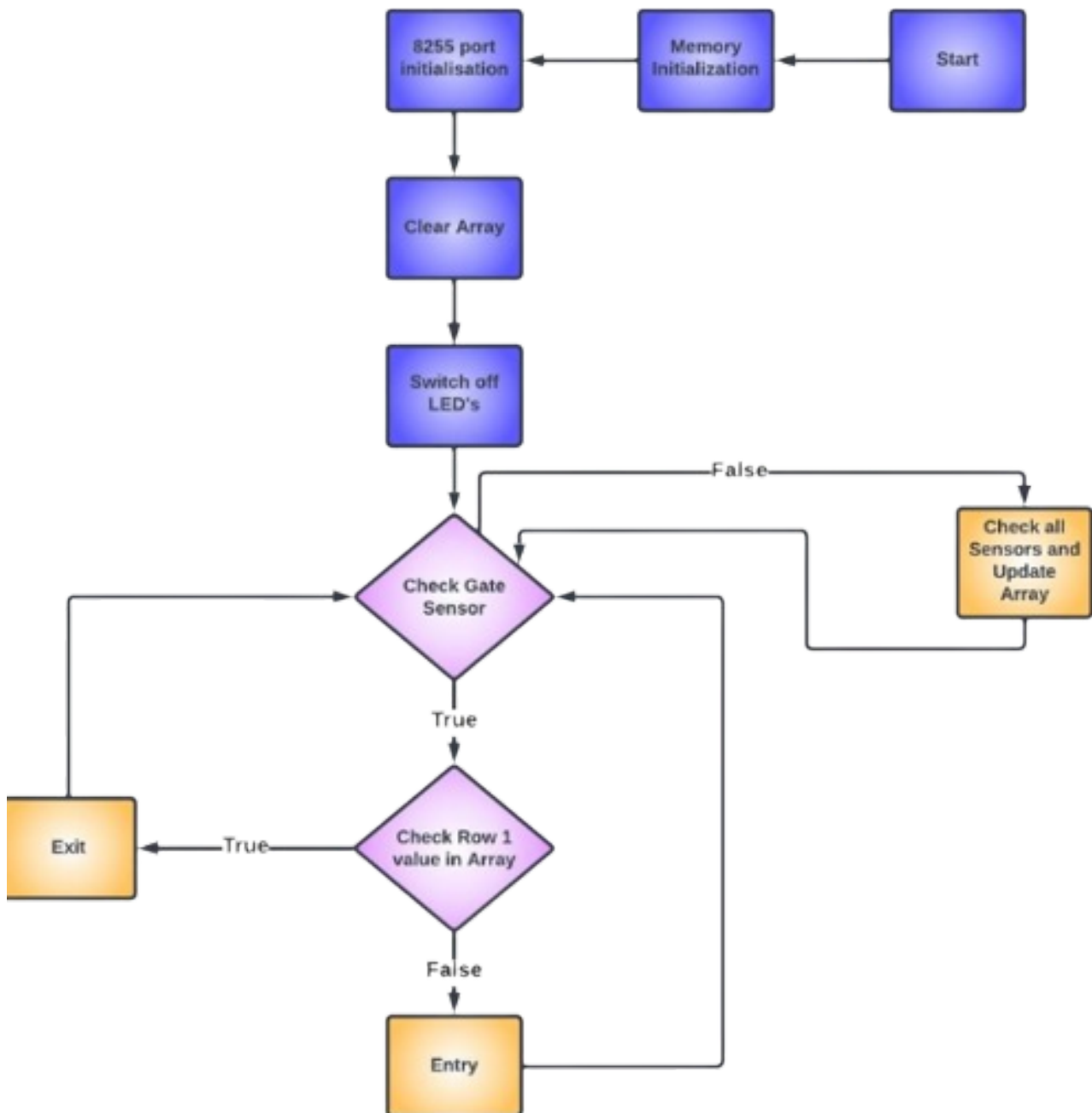


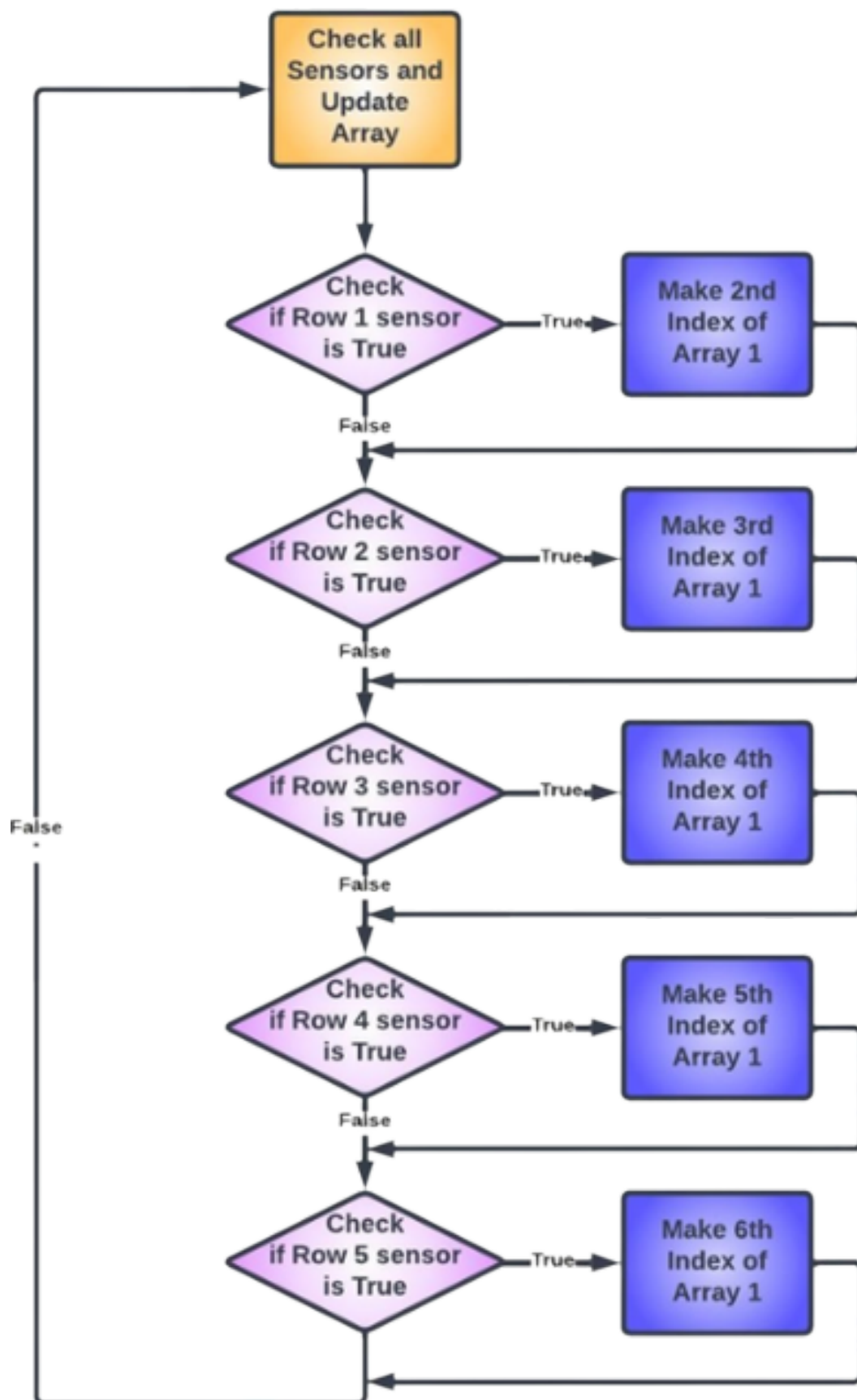


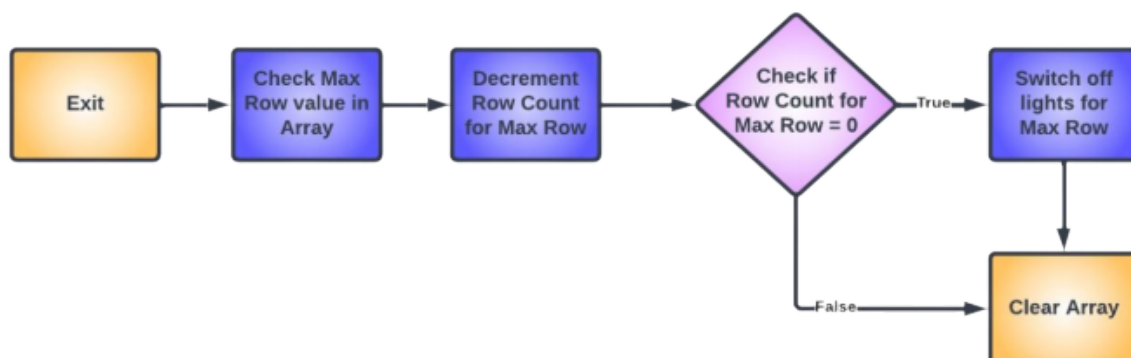
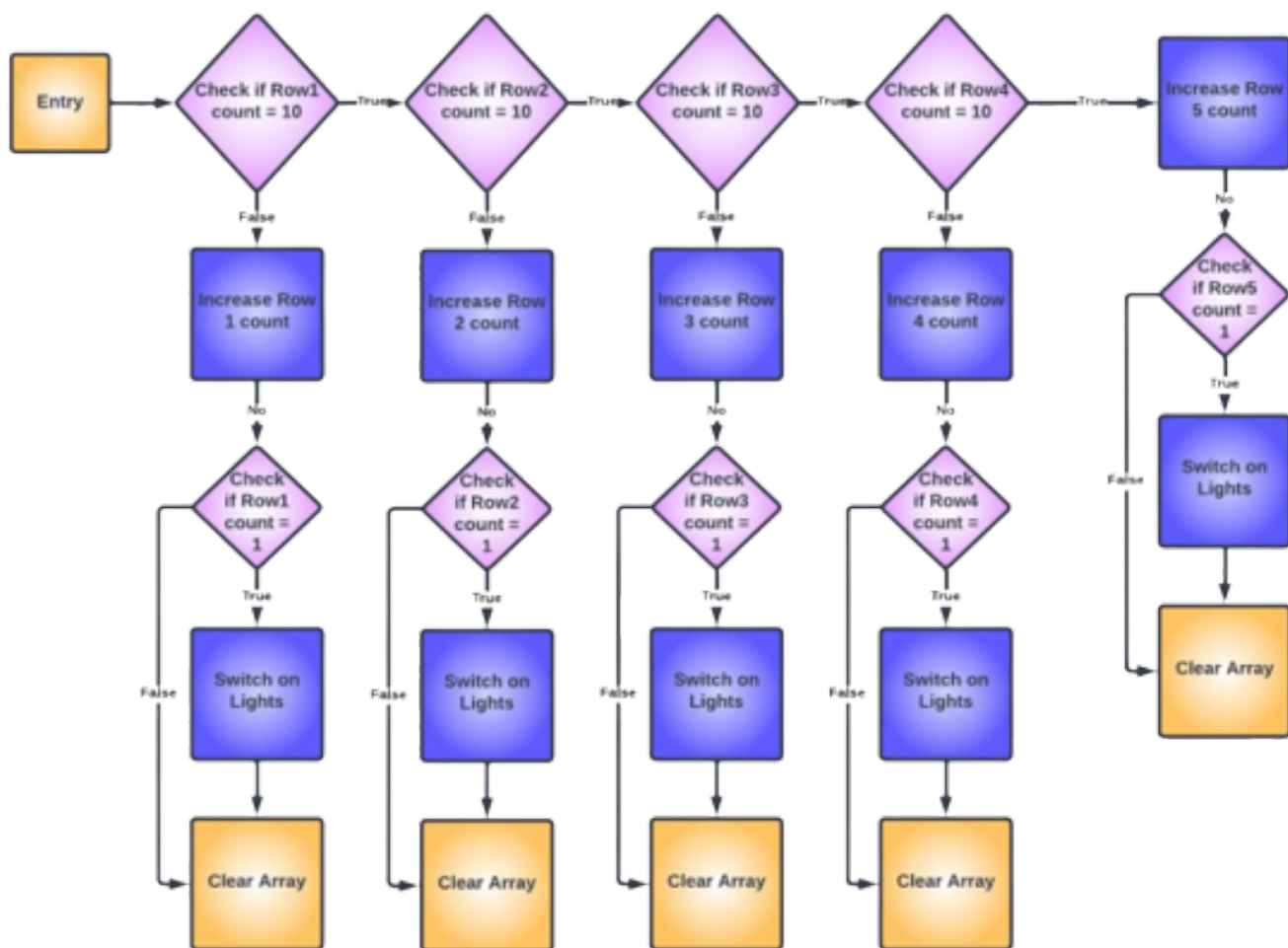


FLOWCHART

(FOR SOFTWARE)







Thank You