

# **An Electronic Voting Machine**

**Based on 8085 Microprocessor**

# **An Overview of The Problem**

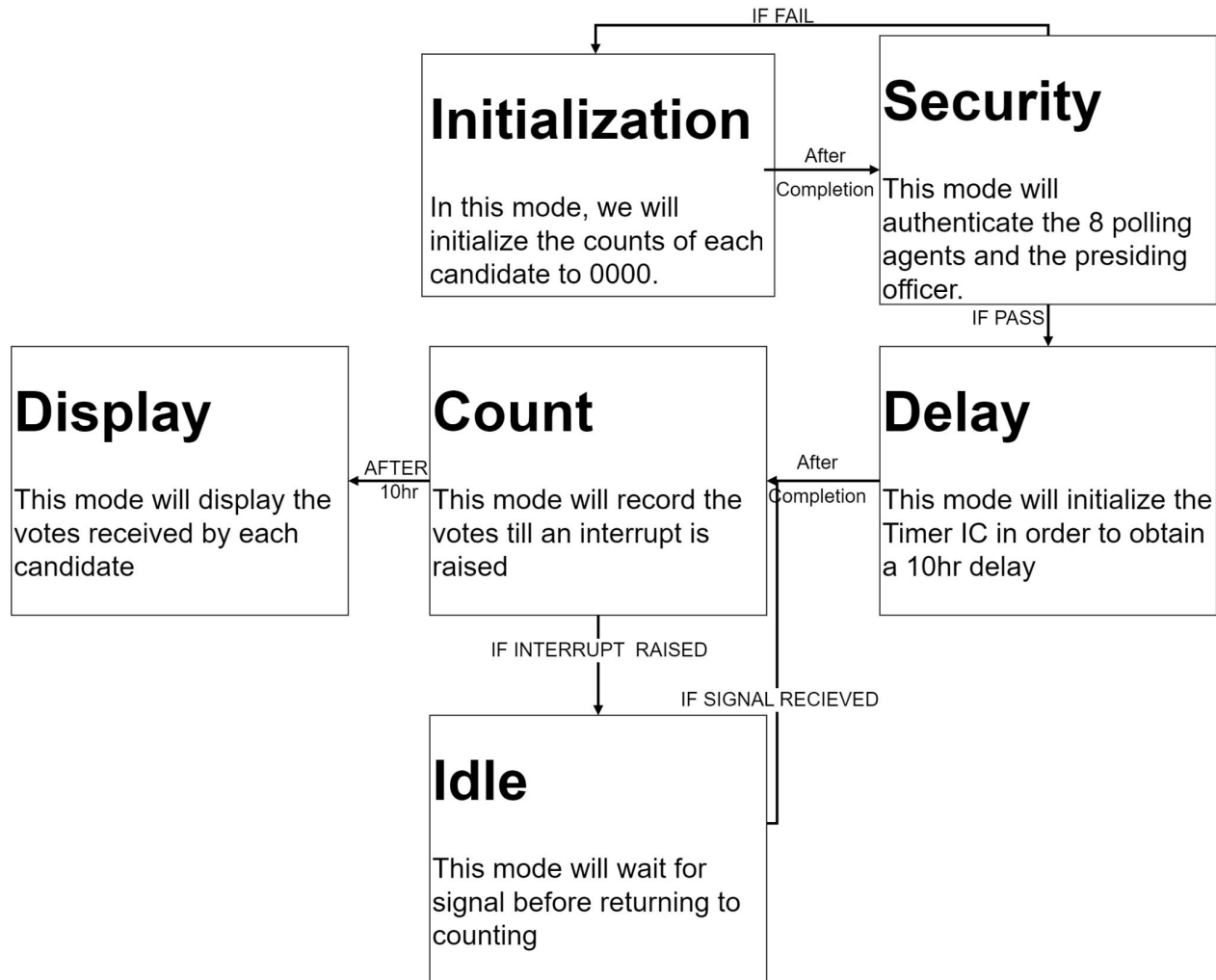
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# The Problem

- Design a microprocessor Voting Machine which has provision for 8 candidates.
- Clear the count before starting
- It needs to be enabled by 8 polling agents and the Presiding officer.
- After 10 hours (7 a.m. to 5 p.m.) it should stop taking input
- The Presiding officer by pressing a code can lock it in between & then can restart it by pressing another code.

# Components to be used

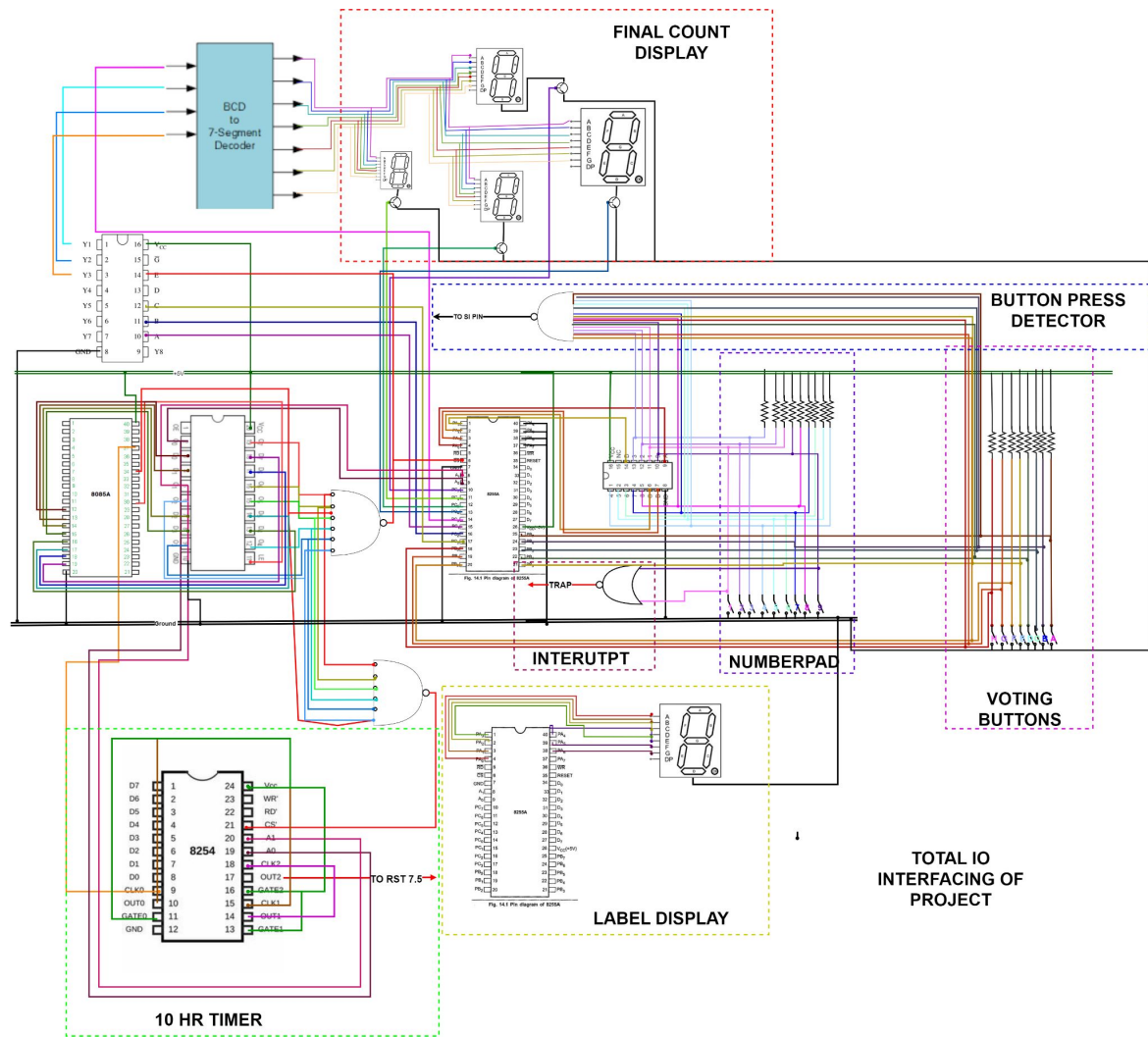
1. 8085 - Microprocessor
2. 8255-Programmable peripheral interface x2
3. 8254 -Timer IC
4. 7400 -NAND
5. 7402- NOR
6. Resistors
7. Switches
8. 74147 - Priority Encoder



# I/O Interfacing Table

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Sr No.	Type of IC	Port Address		Binary							
1	8255	Label	Hex	B7	B6	B5	B4	B3	B2	B1	B0
		A	0x00	0	0	0	0	0	0	0	0
		B	0x01	0	0	0	0	0	0	0	1
		C	0x02	0	0	0	0	0	0	1	0
		CWR	0x03	0	0	0	0	0	0	1	1
2	8255	A	0x04	0	0	0	0	0	1	0	0
		B	0x05	0	0	0	0	0	1	0	1
		C	0x06	0	0	0	0	0	1	1	0
		CWR	0x07	0	0	0	0	0	1	1	1
3	8254	C0	0x08	0	0	0	0	1	0	0	0
		C1	0x09	0	0	0	0	1	0	0	1
		C2	0x0A	0	0	0	0	1	0	1	0
		CWR	0x0B	0	0	0	0	1	0	1	1





# Initialization

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# How Data of Votes will Be Stored

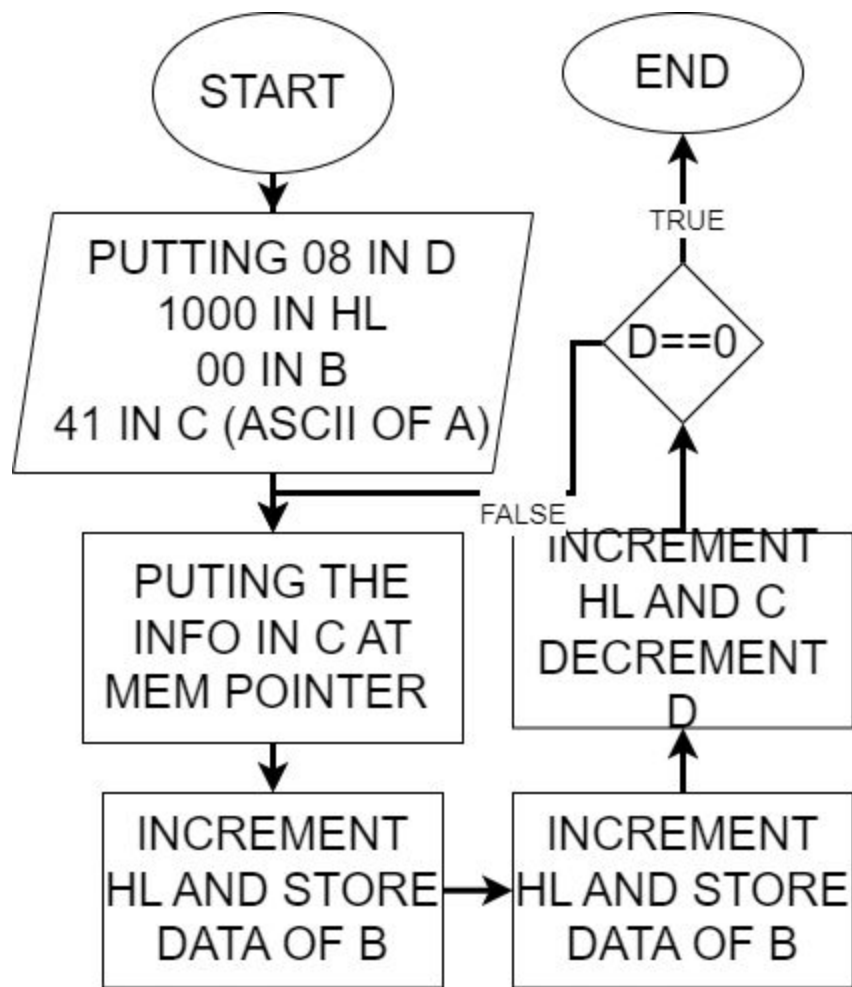
Mem Ad	Data	Mem Ad	Data	Mem Ad	Data	Mem Ad	Data
1000	"A"	1006	"C"	100C	"E"	1012	"G"
1001	LSB	1007	LSB	100D	LSB	1013	LSB
1002	MSB	1008	MSB	100E	MSB	1014	MSB
1003	"B"	1009	"D"	100F	"F"	1015	"H"
1004	LSB	100A	LSB	1010	LSB	1016	LSB
1005	MSB	100B	MSB	1011	MSB	1017	MSB

# Approach

- Initially,
  - All bit must be 00
  - Labels for candidates to be set alphabetically
- This initialization subroutine should be called on powering on the machine.

So, it is written at **0x000**

# Program



# Code

**Start:MVI A,92**

**OUT 03**

**MVI A,80**

**OUT 07**

**MVI D,08**

**MVI A,1B**

**SIM**

**LXI H,1000**

**MVI B,00**

**MVI C,41**

**loop\_init:MOV M,C**

**INX H**

**MOV M,B**

**INX H**

**MOV M,B**

**INR C**

**DCR D**

**JNZ loop\_init**

**CALL security:**

# Counting The Votes

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# Approach

- According to the Election commission of India, a EVM is expected to count a maximum of 3840 votes, So we are required to build a 16 bit counter.
- We will interface 8 buttons to port b of 8255



# Interfacing Diagram

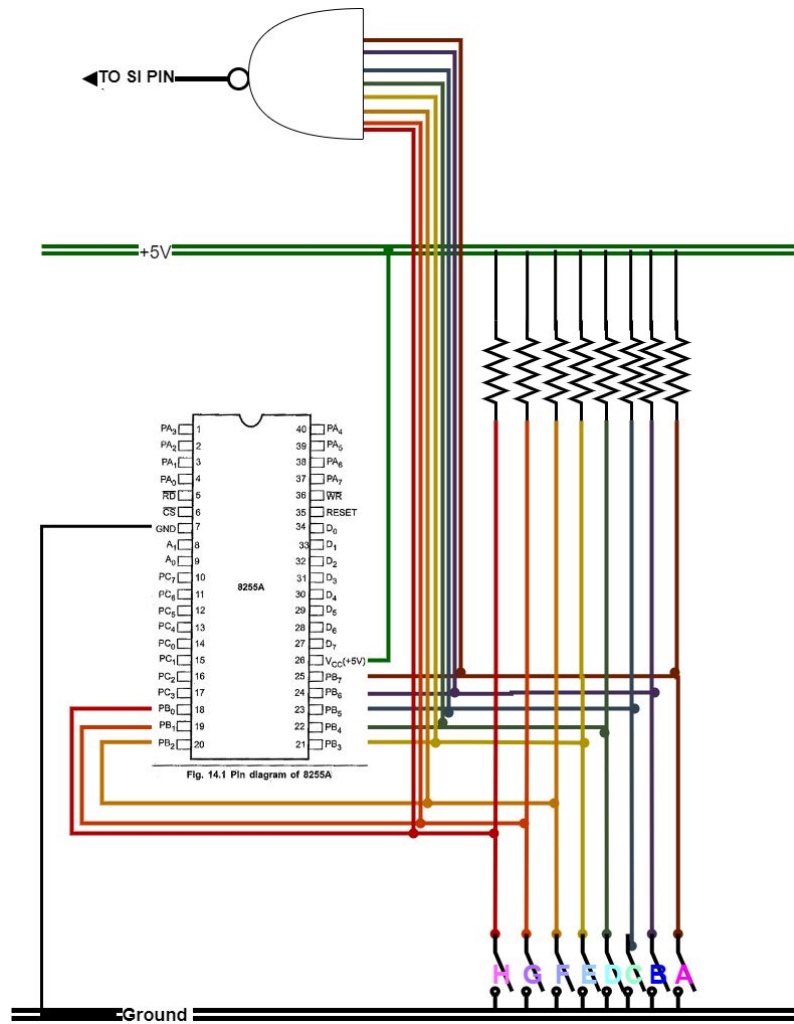
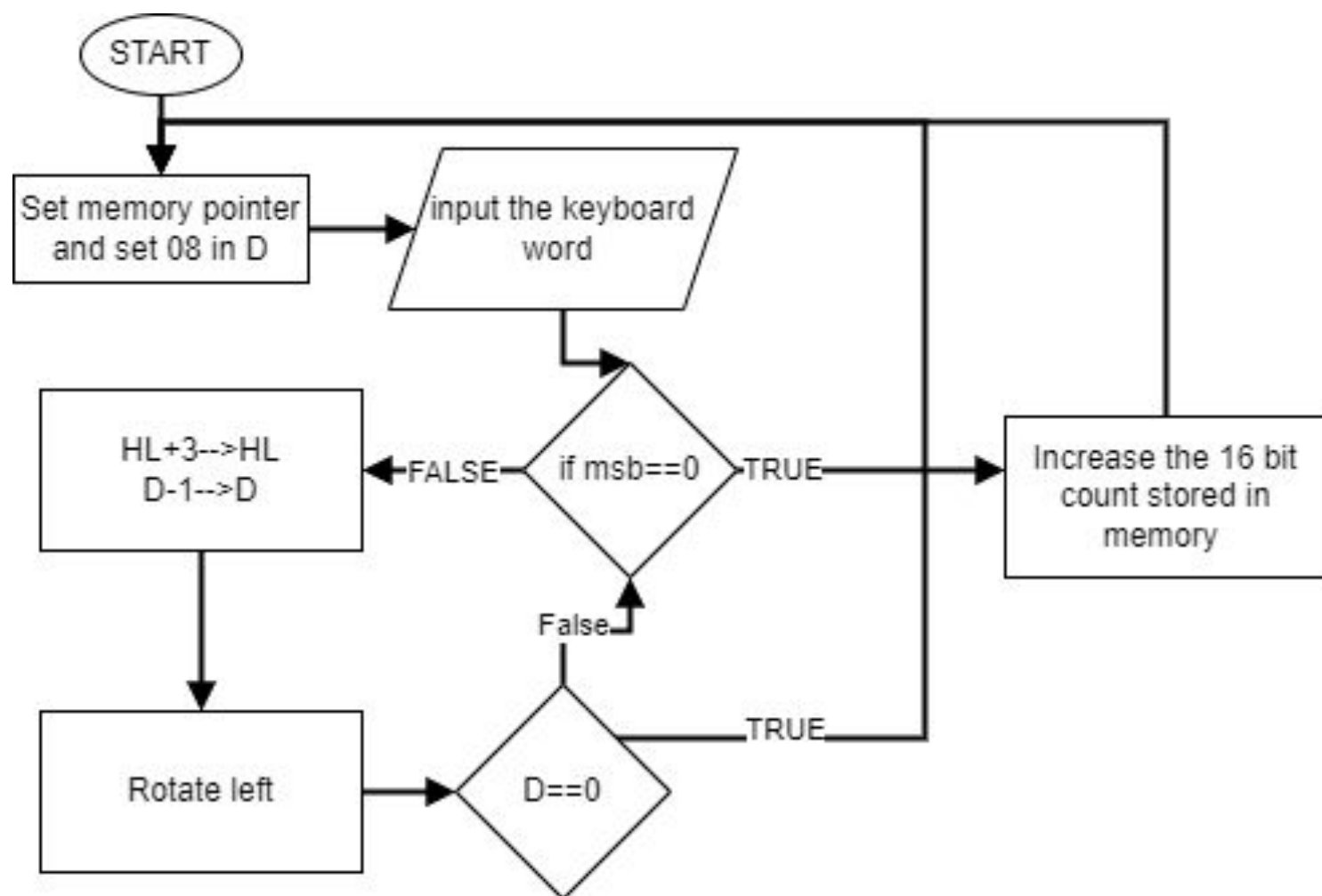


Fig. 14.1 Pin diagram of 8255A

# Components used

1. 8255-Programmable peripheral interface
2. 7400-NAND gate
3. Resistors
4. Switches
5. Connecting wire

Program



# Program

count:LXI H,1000

LDA 1023

OUT 04

wait3:RIM

JP wait3

IN 01

MVI D,08

loop\_rot:ORI 00

CP cntup

INX H

INX H

INX H

RLC

DCR D

JNZ loop\_rot

JMP count

cntup:INX H

MOV C,M

INX H

MOV B,M

INX B

MOV M,B

DCX H

MOV M,C

JMP count

# Security Procedures

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## Basic Appraoch

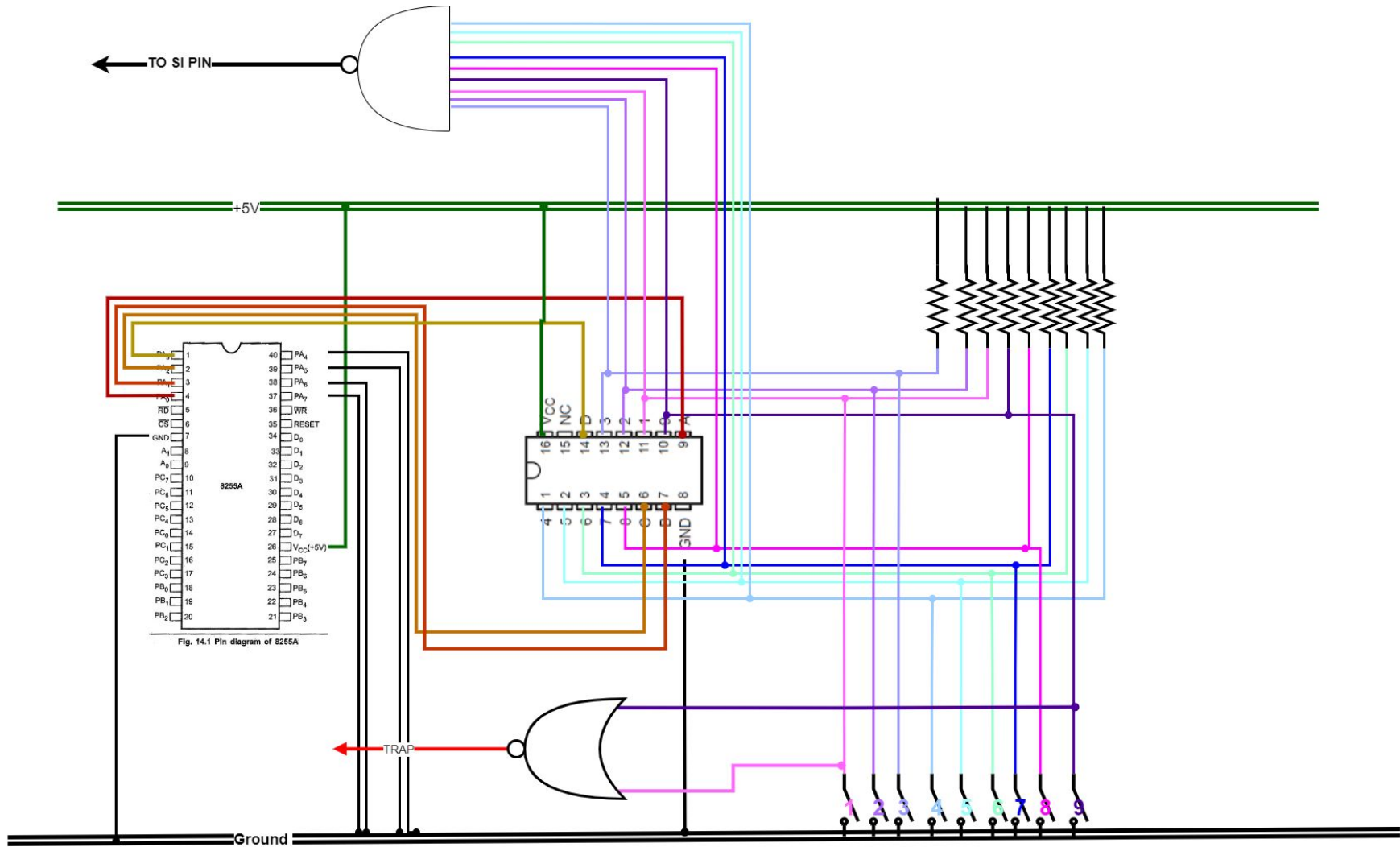
- Interface a number pad to the 8085 via a 8255.
- 8-bit security codes stored in the memory.
- All 9 codes need to be entered one after another correctly to authenticate.



# How Data will be stored in memory

Memory Address	Data	Memory Address	Data	Memory Address	Data
0x1018	Code 1	0x101B	Code 4	0x101E	Code 7
0x1019	Code 2	0x101C	Code 5	0x101F	Code 8
0x101A	Code 3	0x101D	Code 6	0x1020	Code 9

# Interfacing Diagram



# Components used

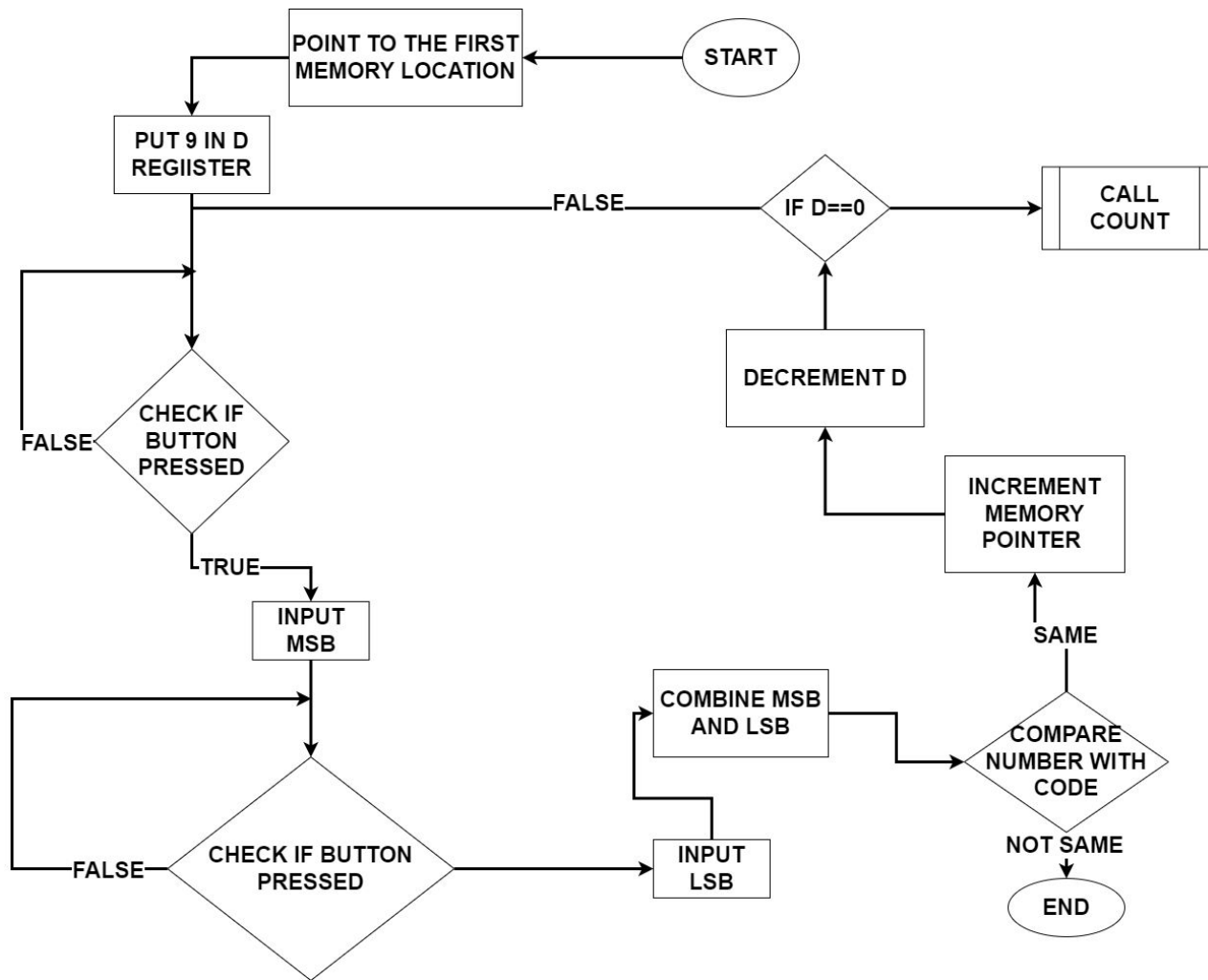
1. 8255-Programmable peripheral interface
2. 74147 -Priority Encoder
3. 7402-NOR gate
4. 7400-NAND gate
5. Resistors
6. Switches
7. Connecting wire

## Truth Table of Priority Encoder

INPUTS									OUTPUTS			
1	2	3	4	5	6	7	8	9	D	C	B	A
H	H	H	H	H	H	H	H	H	H	H	H	H
X	X	X	X	X	X	X	X	L	L	H	H	L
X	X	X	X	X	X	X	L	H	L	H	H	H
X	X	X	X	X	X	L	H	H	H	L	L	L
X	X	X	X	X	L	H	H	H	H	L	L	H
X	X	X	X	L	H	H	H	H	H	L	H	L
X	X	X	L	H	H	H	H	H	H	L	H	H
X	X	L	H	H	H	H	H	H	H	H	L	L
X	L	H	H	H	H	H	H	H	H	H	L	H
L	H	H	H	H	H	H	H	H	H	H	H	L

H = high logic level, L = low logic level, X = Irrelevant

Program



# Code

security:LXI H,1018

LDA 1029

OUT 04

wait1:RIM

JP wait1

IN 00

RLC

RLC

RLC

RLC

MOV B,A

wait2:RIM

JP wait2

IN 00

ADD B

CMA

CMP M

RNZ

INX H

DCR D

JNZ wait1

JMP Delay



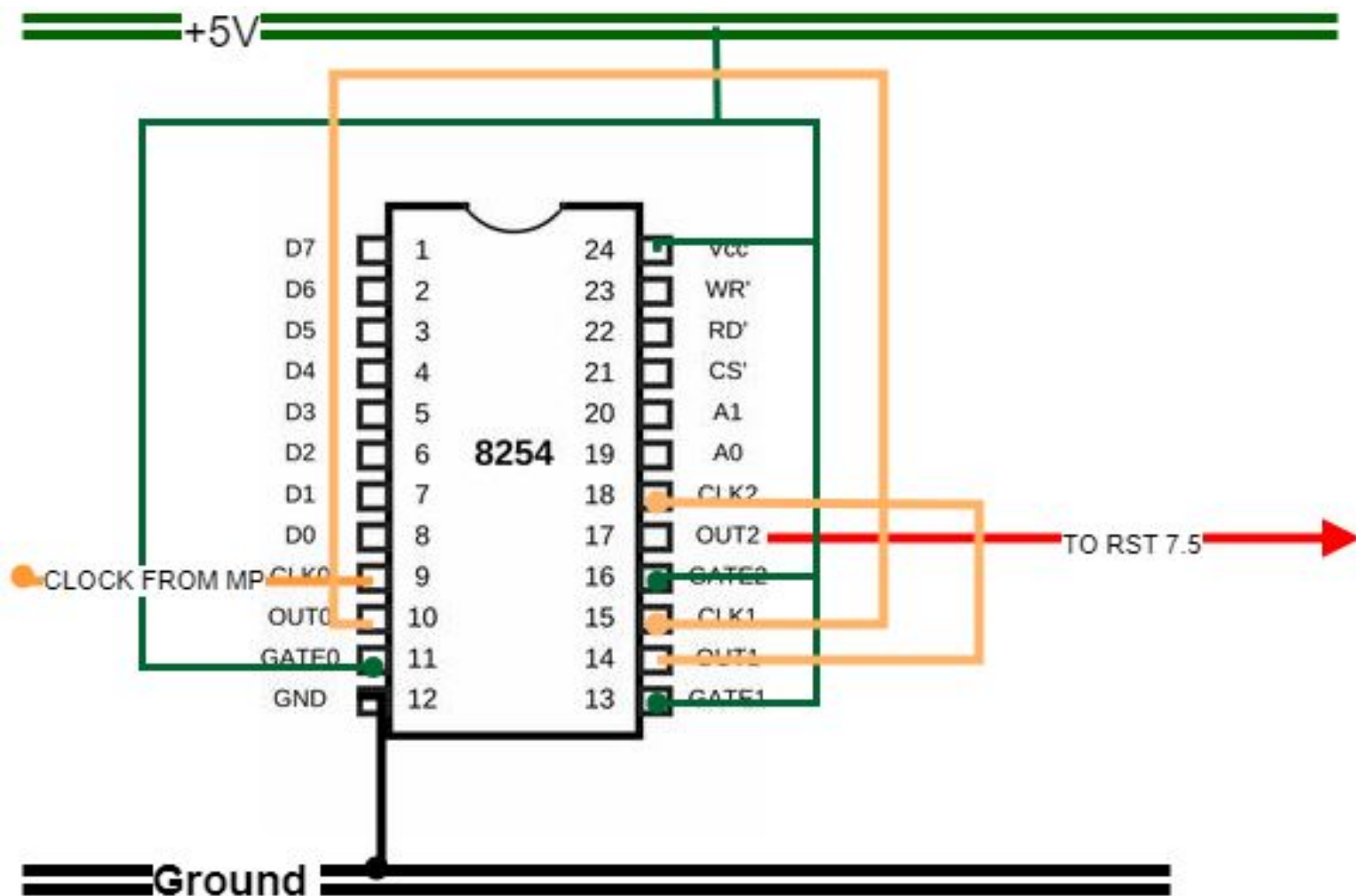
# Creating The 10 hr Delay

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## Basic Approach

- Perform frequency division using IC-8254, to make the time period of the clock 1,000s
- Then use a counter of 36 to make delay of 10hr
- After this, An RST7.5 is given and the display routine is written there

# Interfacing Diagram



# Program

# Code

delay:mvi a, 36

out 0B

mvi a, ff

out 08

mvi a,ff

out 08

mvi a, 76

out 0B

mvi a, B2

out 09

mvi a, C4

out 09

mvi a,B1

out 0B

mvi a, 36

out 0A

mvi a, 00

out 0A

jmp count

# Displaying The Count

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# Approach

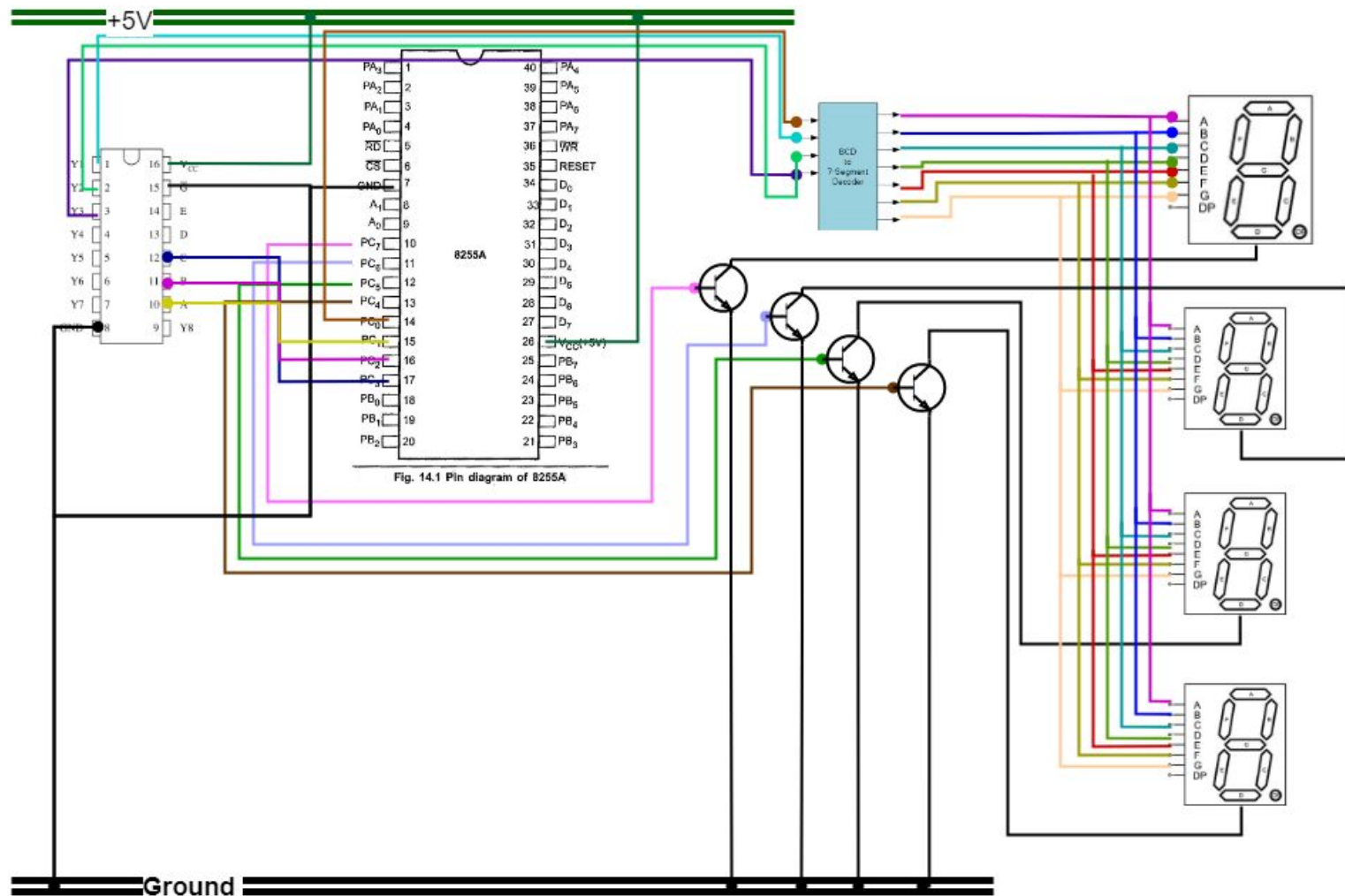
- Interfacing 5 seven segment displays,
  - 4 displays would display the count
  - 1 will act as the label for the candidates and the different modes
- Interfacing 4 seven segment via the c port of the 8255
- Interfacing the label seven segment via port a of another 8255
- The routine would be written at RST7.5 location



# Look up table for labels

Mem Ad	Label	Data	Mem Ad	Label	Data
0x1021	A	EE	0x1026	F	8E
0x1022	b	2E	0x1027	g	F6
0x1023	C	9C	0x1028	H	6E
0x1024	d	7A	0x1029	S	B6
0x1025	E	9E			

# Interfacing Diagram



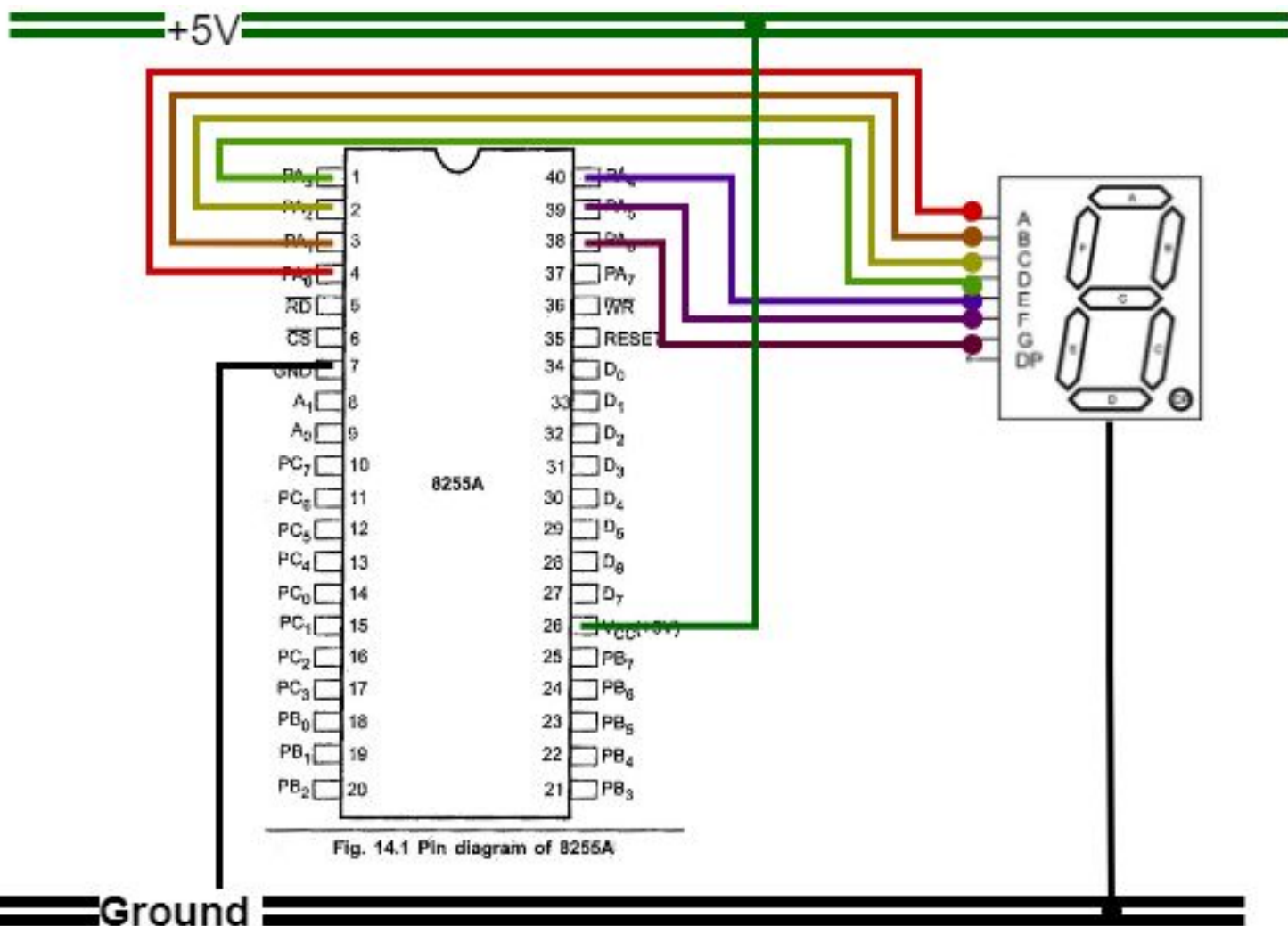
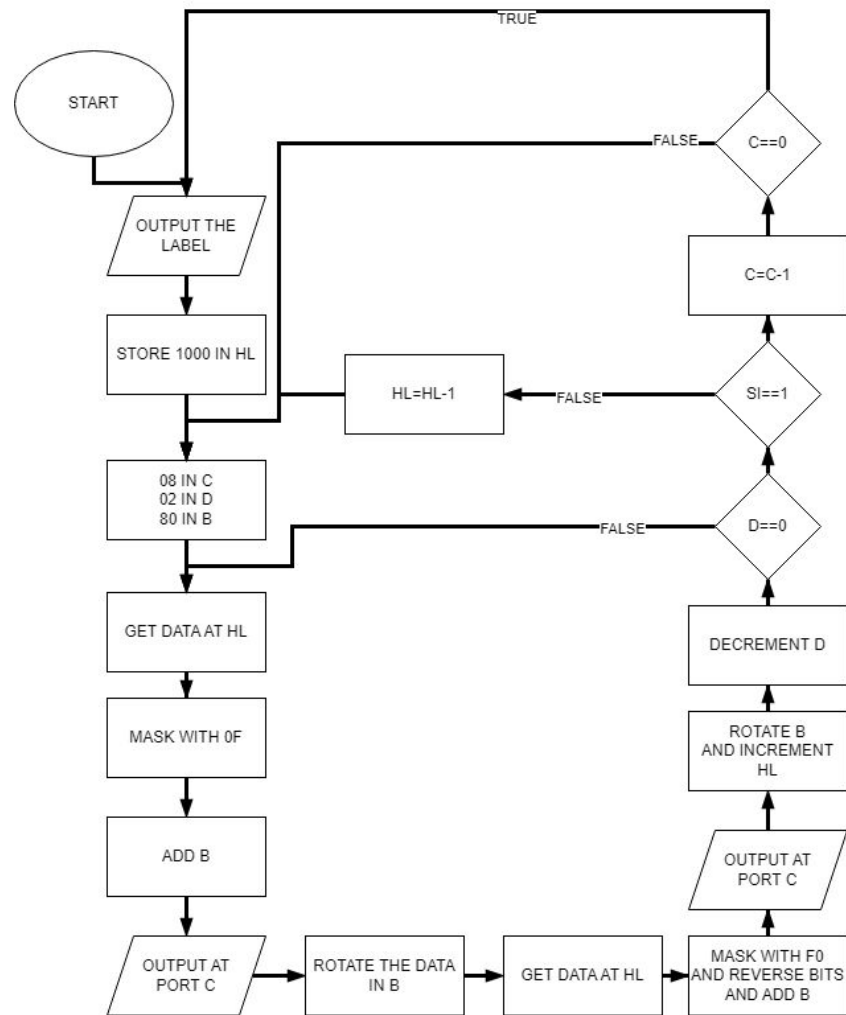


Fig. 14.1 Pin diagram of 8255A

# Program



# Code

REP1:LXI H,1021

MOV A,M

OUT 04

PUSH H

LXI H,1001

MVI C,08

REP:MVI D,02

MVI B,80

LOOP1:MOV A,M

ANI 0F

ADD B

OUT 02

MOV A,B

RRC

MOV B,A

MOV A,M

ANI F0

RRC

RRC

RRC

RRC

ADD B

OUT 02

MOV A,B

RRC

MOV B,A

INX H

DCR D

JNZ LOOP1

RIM

CP REPEAT

INX H

INX H

XCHG

POP H

INX H

OUT Pa2

PUSH H

XCHG

DCR C

JNZ REP

JMP REP1

REPEAT:DCX H

JMP REP

# Emergency Interrupt

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## Approach

- If the presiding officer presses 19 simultaneously the counting will be halted
- Untill, he presses 37 keys

# Program

# Code

**trap:RIM**

**JP wait1**

**IN 00**

**RLC**

**RLC**

**RLC**

**RLC**

**MOV B,A**

**wait2:RIM**

**JP wait2**

**IN 00**

**ADD B**

**CMA**

**CPI 37**

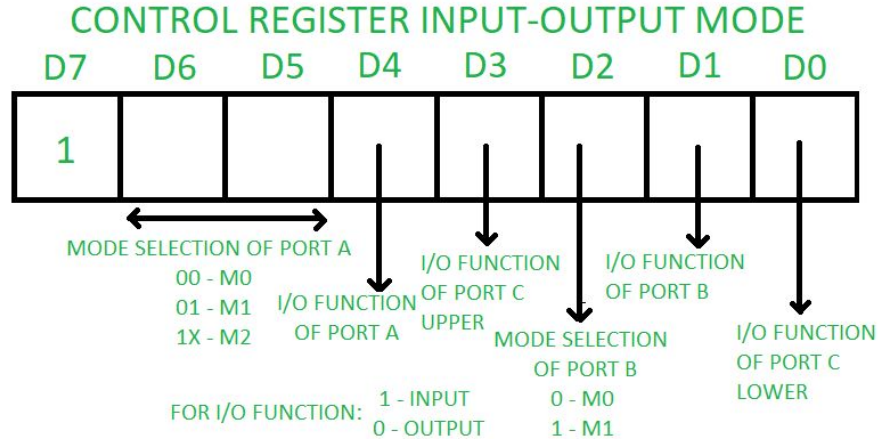
**JNZ trap**

**JMP count**

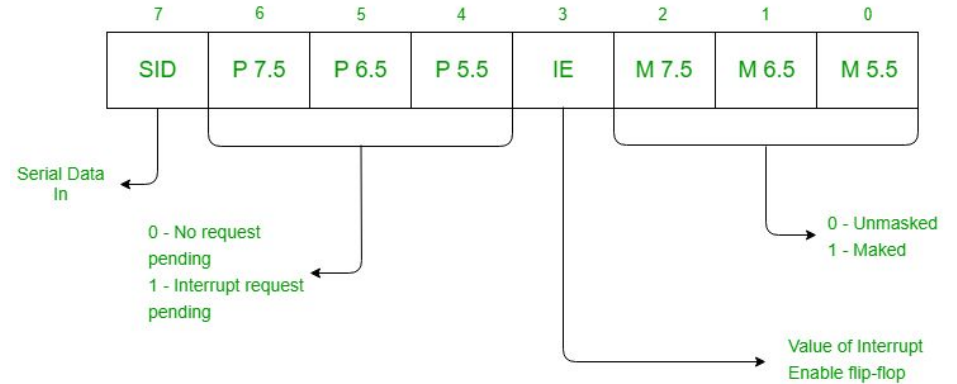
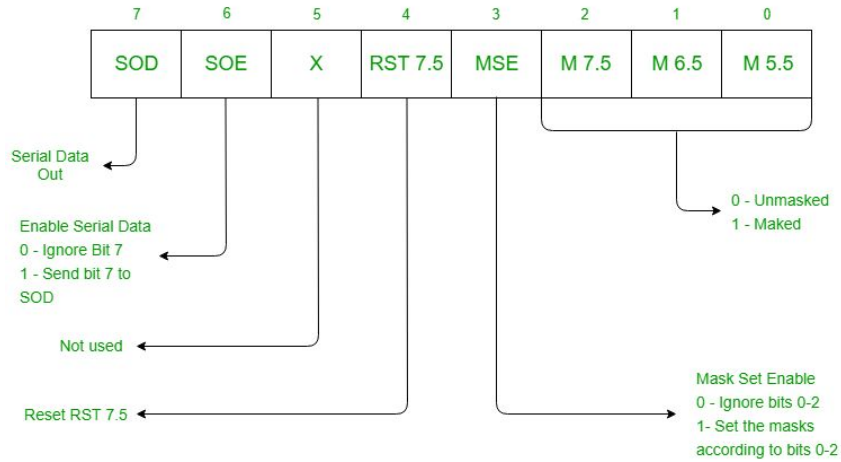
# **More Info for Reference**

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# CWR OF 8255 and 8254



# Format of RIM and SIM



**Click on the github link for access to code and other information**

<https://github.com/AnshumatDinesh/An-Electronic-Voting-Machine-Using-8085-Microprocessor>