

An Electronic Voting Machine

Based on 8085 Microprocessor

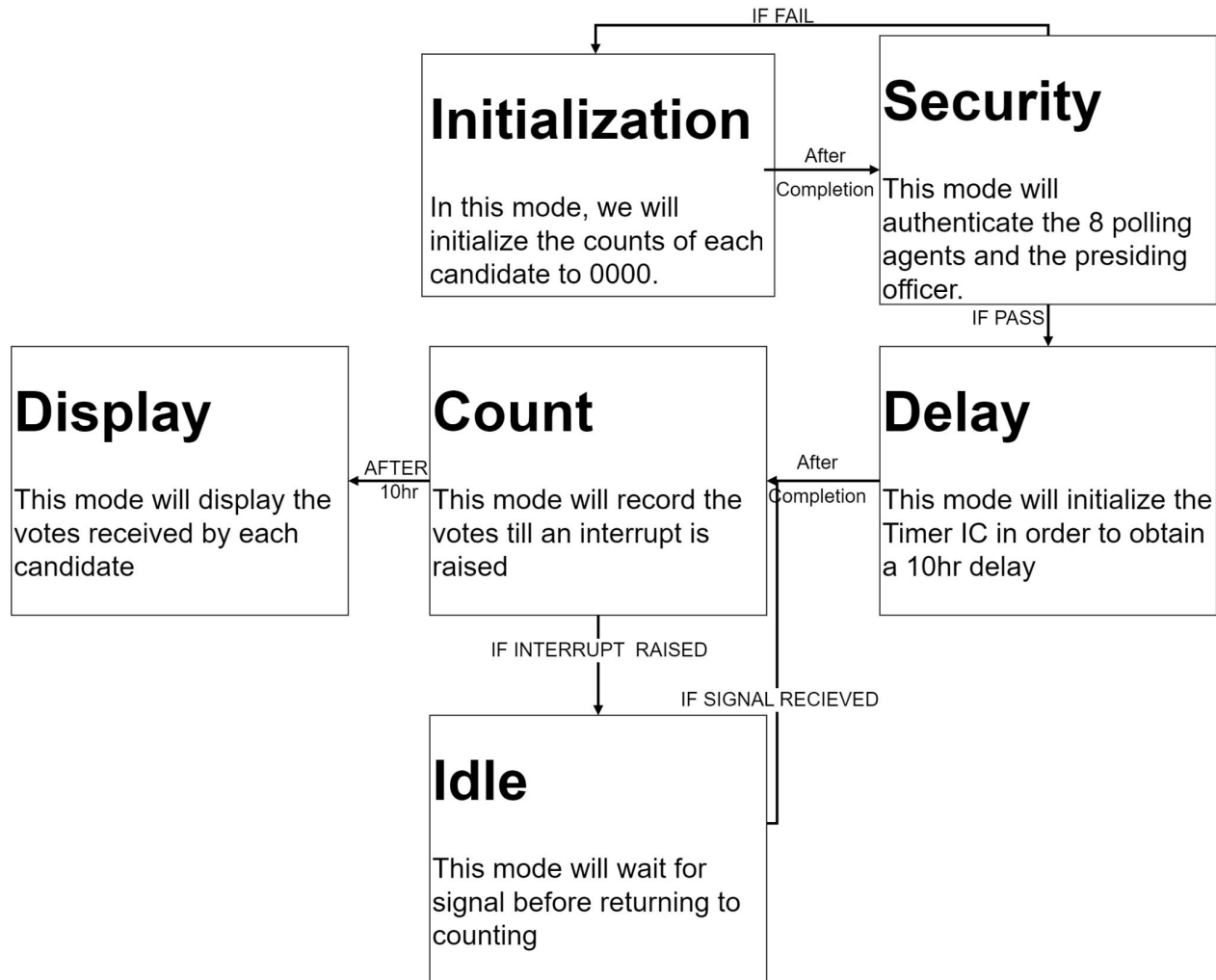
An Overview of The Problem

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.

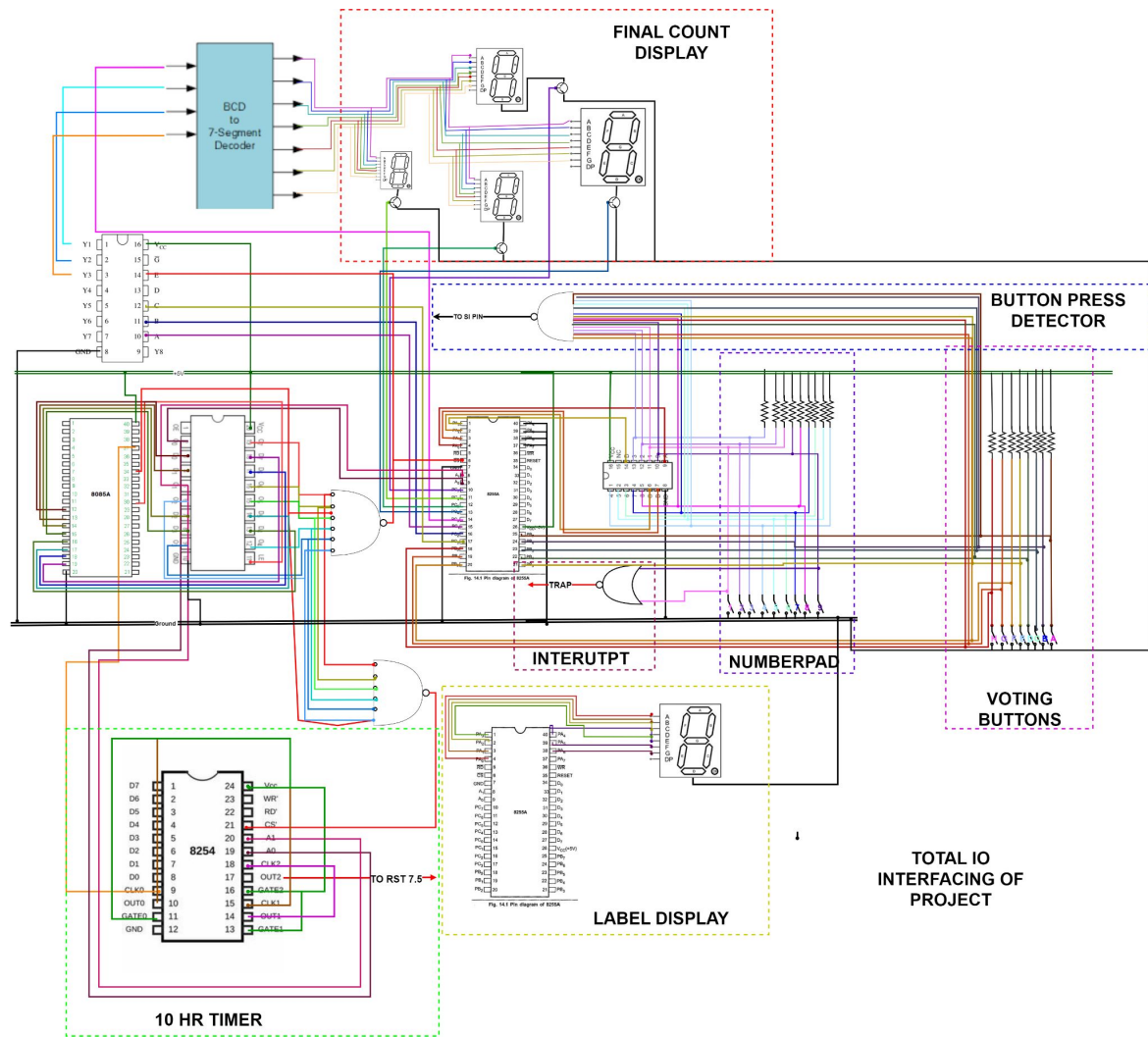
Components to be used

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

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

How Data of Votes will Be Stored

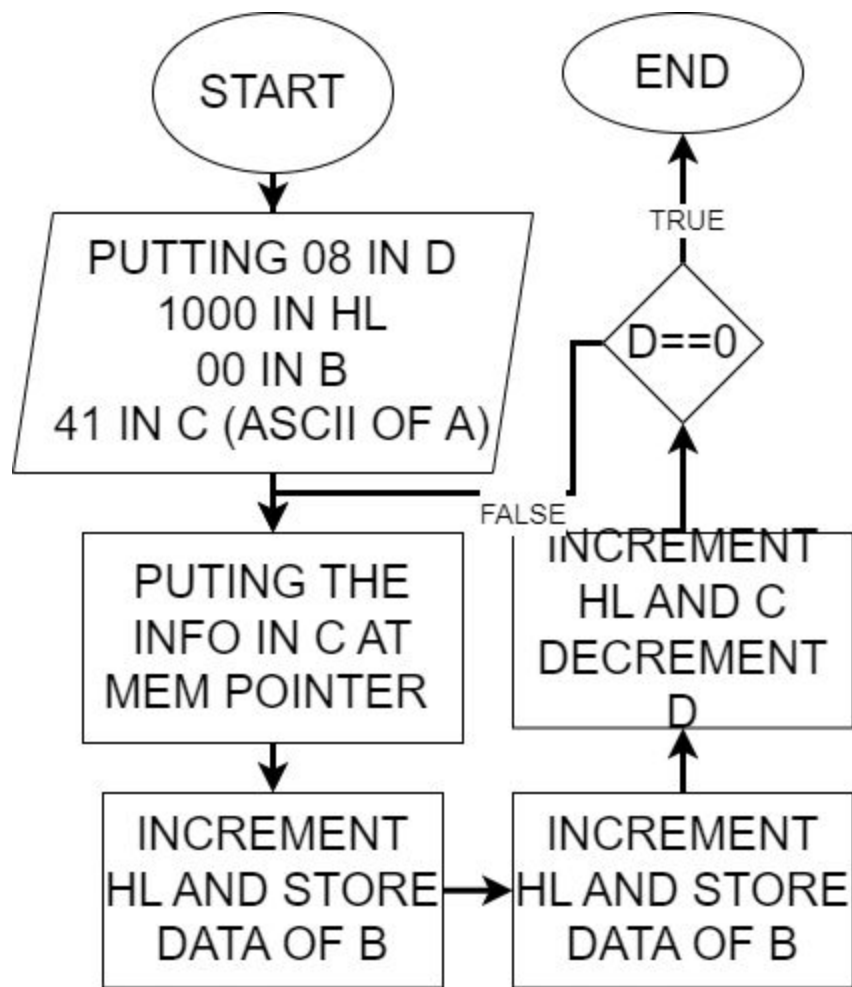
Mem Ad	Data	Mem Ad	Data	Mem Ad	Data	Mem Ad	Data
1000	"A"	1006	"C"	100C	"E"	1012	"G"
1001	LSB	1007	LSB	100D	LSB	1013	LSB
1002	MSB	1008	MSB	100E	MSB	1014	MSB
1003	"B"	1009	"D"	100F	"F"	1015	"H"
1004	LSB	100A	LSB	1010	LSB	1016	LSB
1005	MSB	100B	MSB	1011	MSB	1017	MSB

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

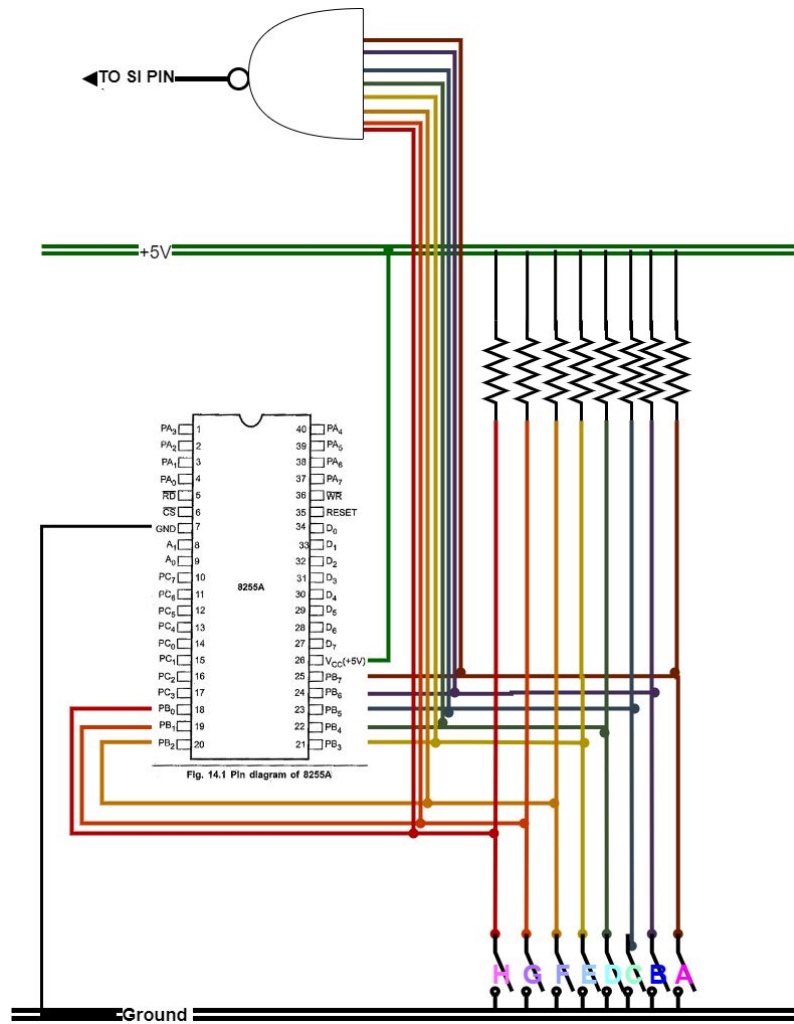
CALL security:

Counting The Votes

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

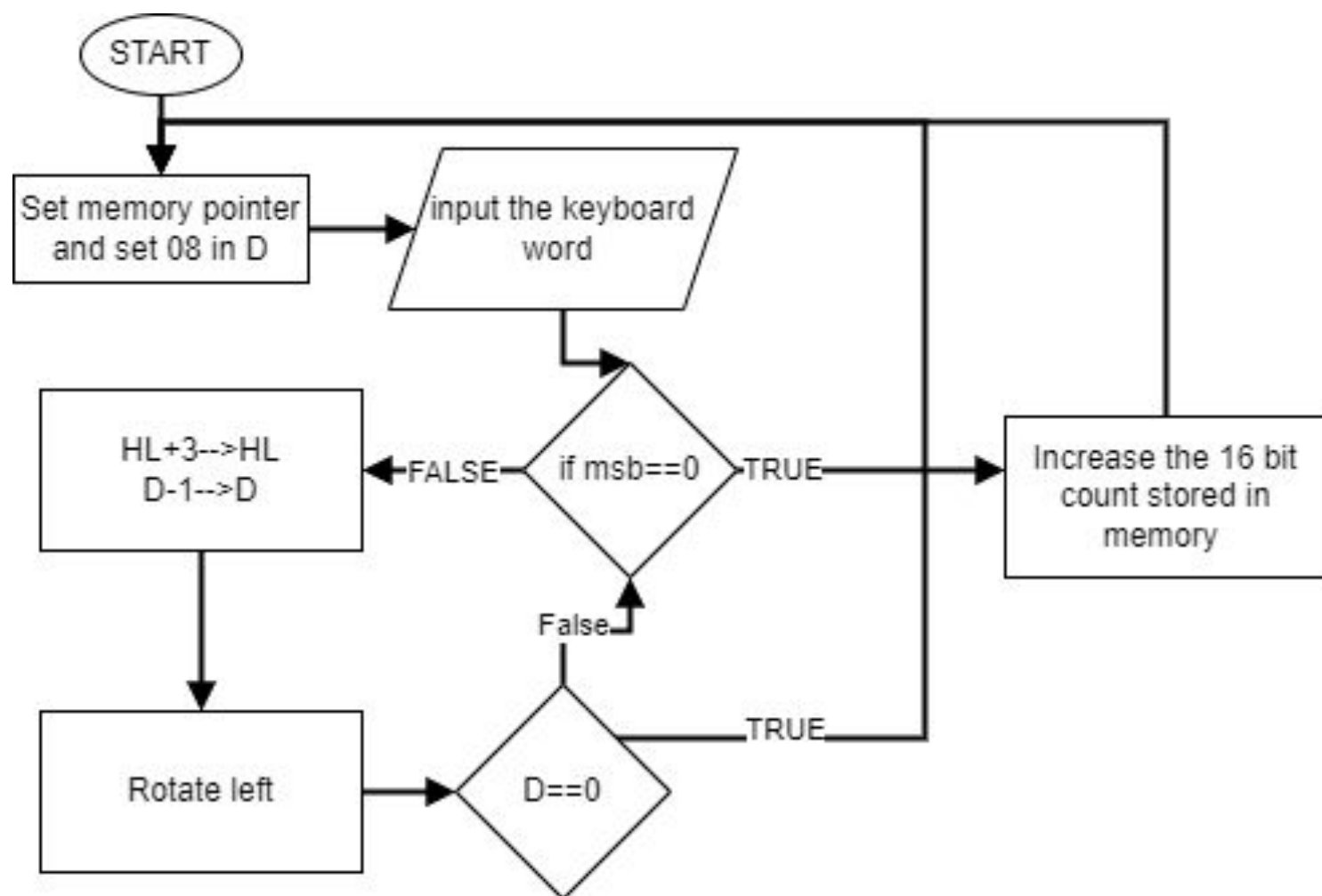
Interfacing Diagram



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

Basic Approach

- 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

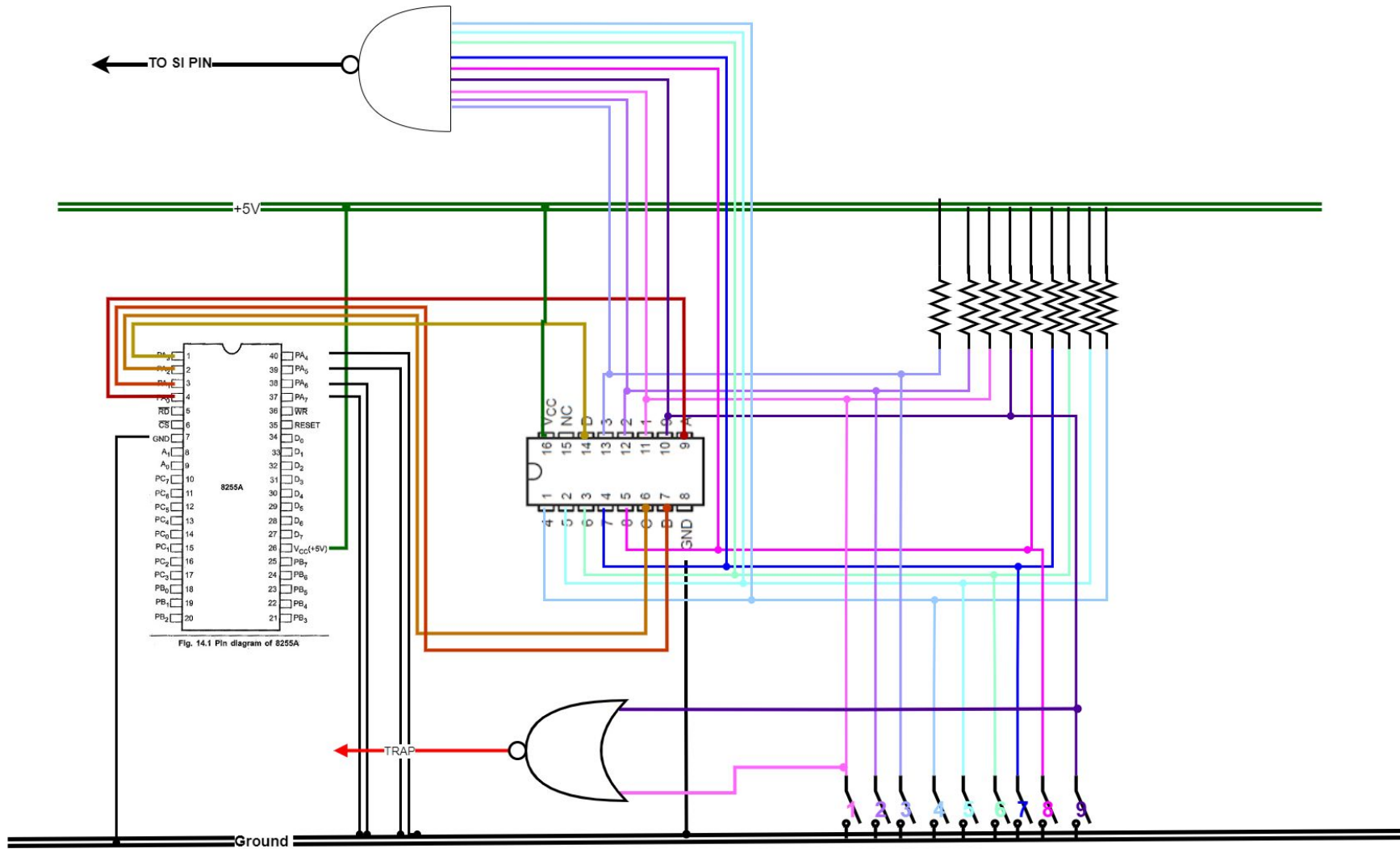


Fig. 14.1 Pin diagram of 8255A

Components used

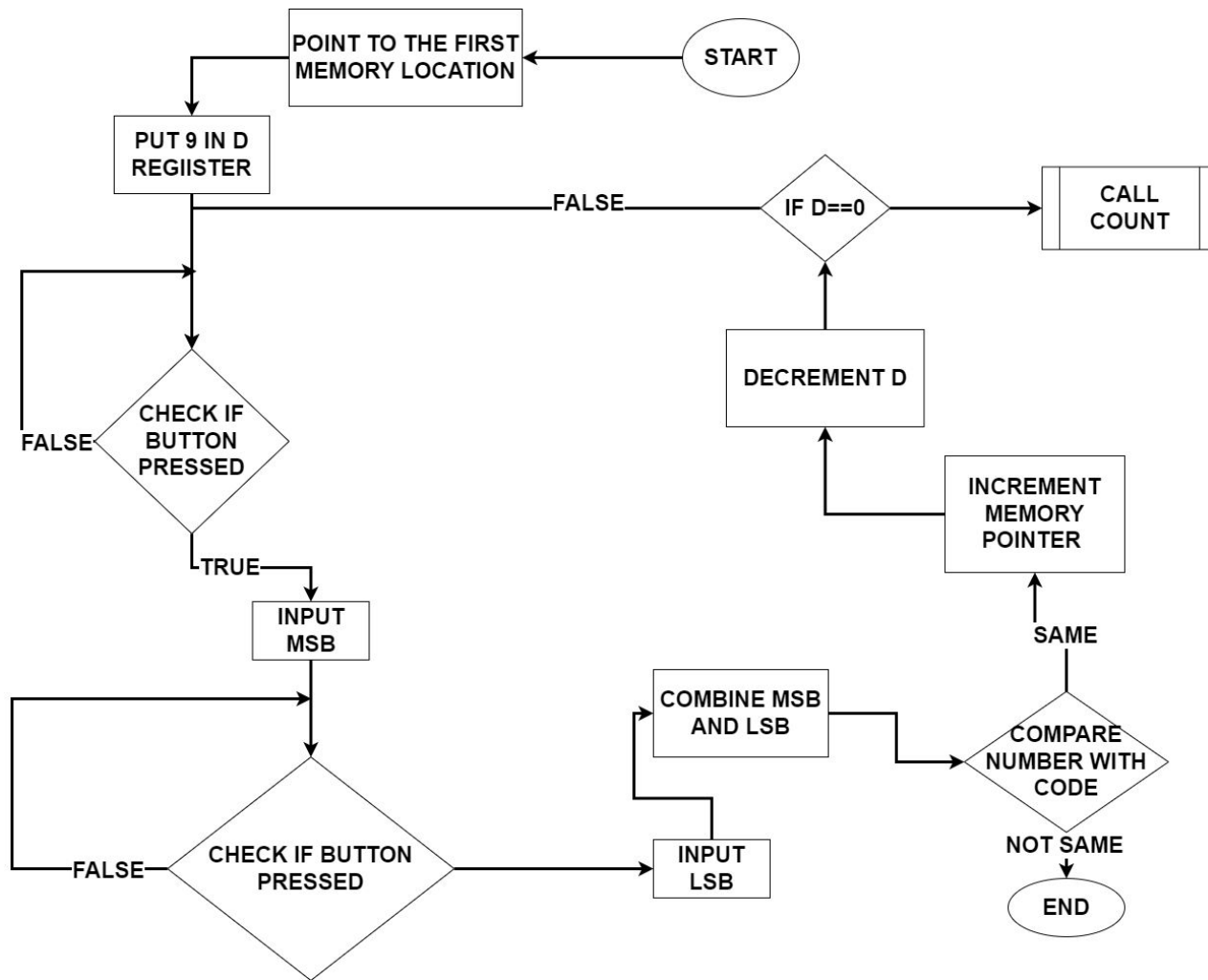
1. 8255-Programmable peripheral interface
2. 74147 -Priority Encoder
3. 7402-NOR gate
4. 7400-NAND gate
5. Resistors
6. Switches
7. Connecting wire

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

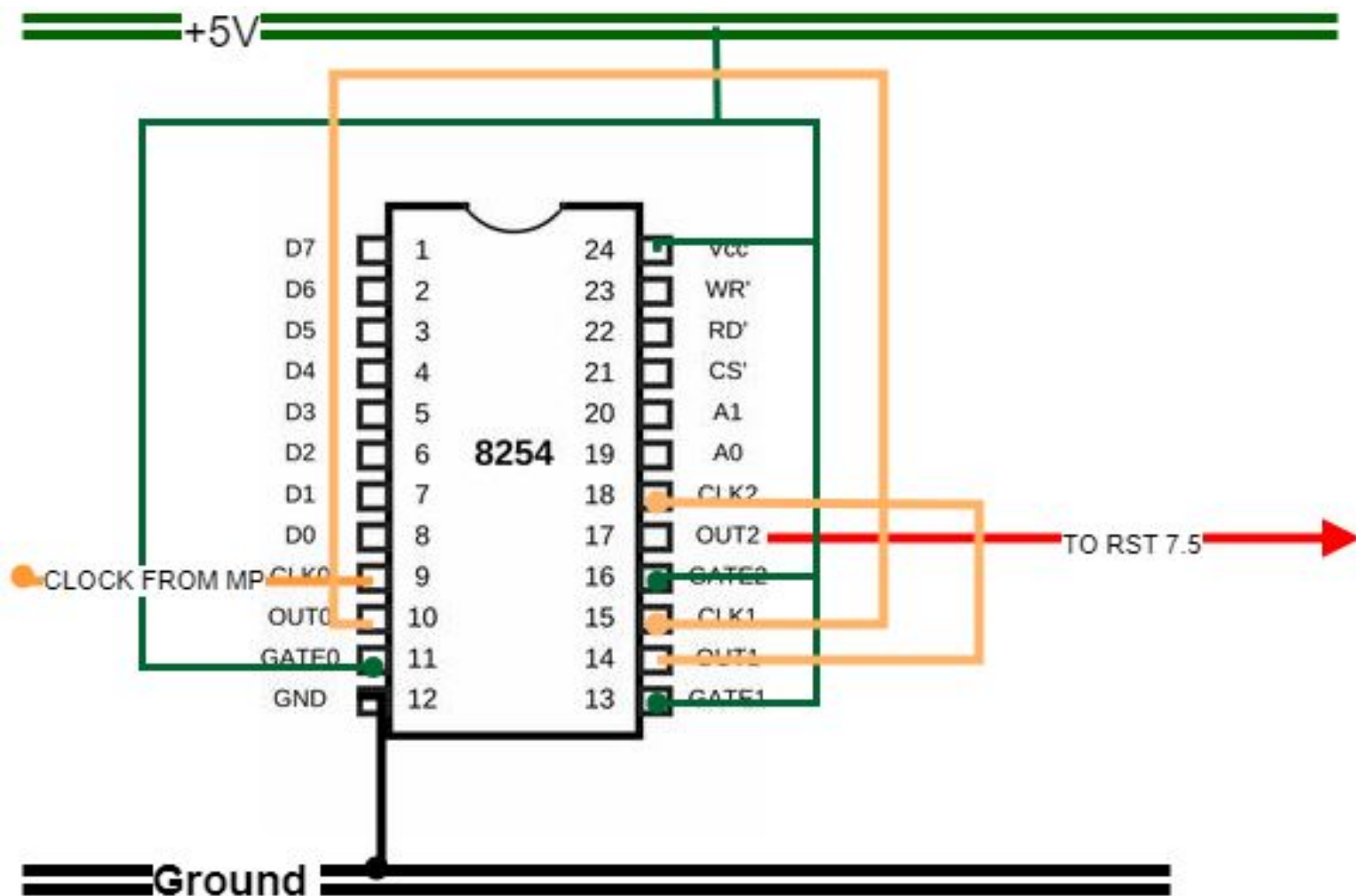
JMP Delay

Creating The 10 hr Delay

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

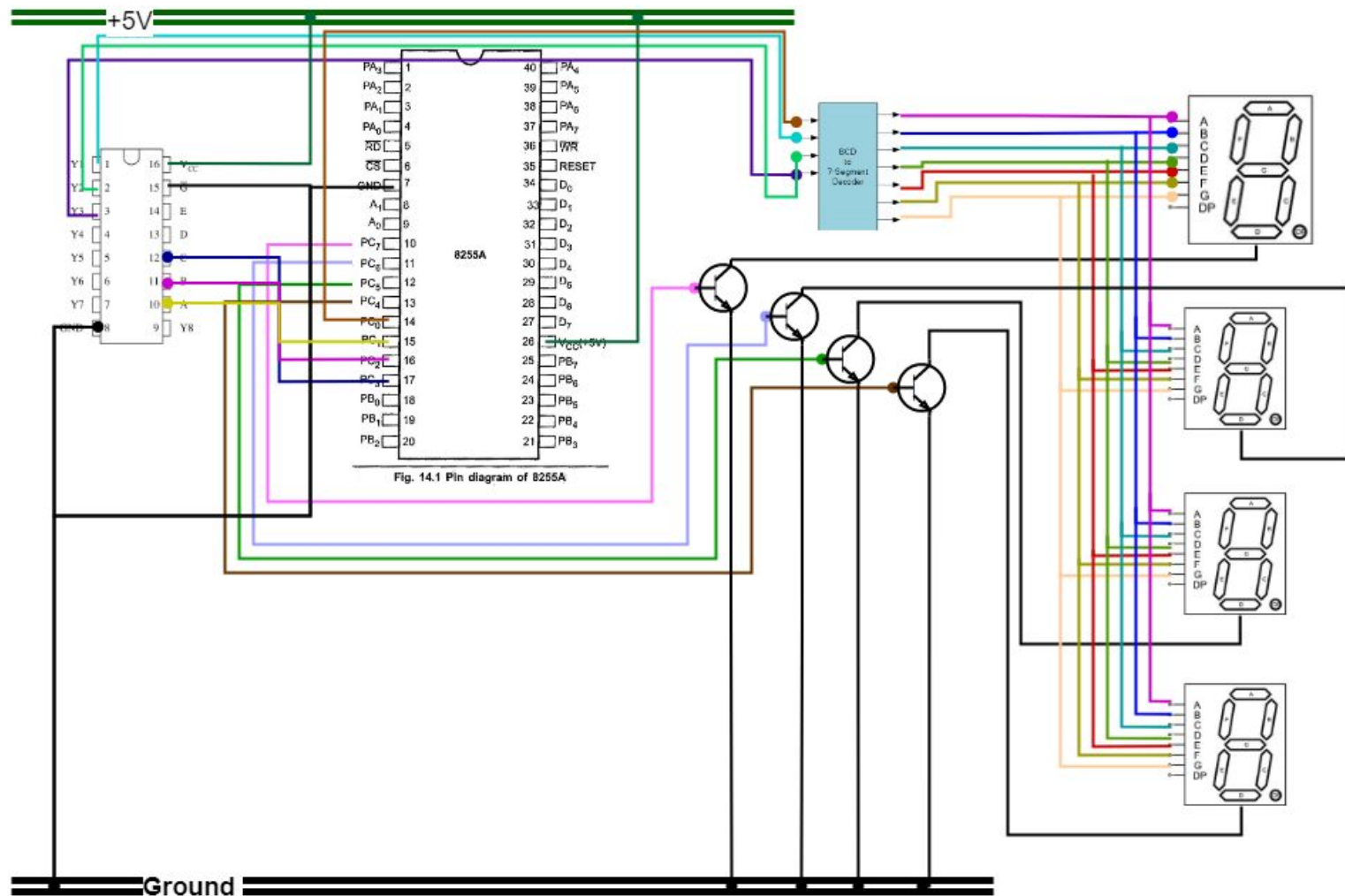
Approach

- 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



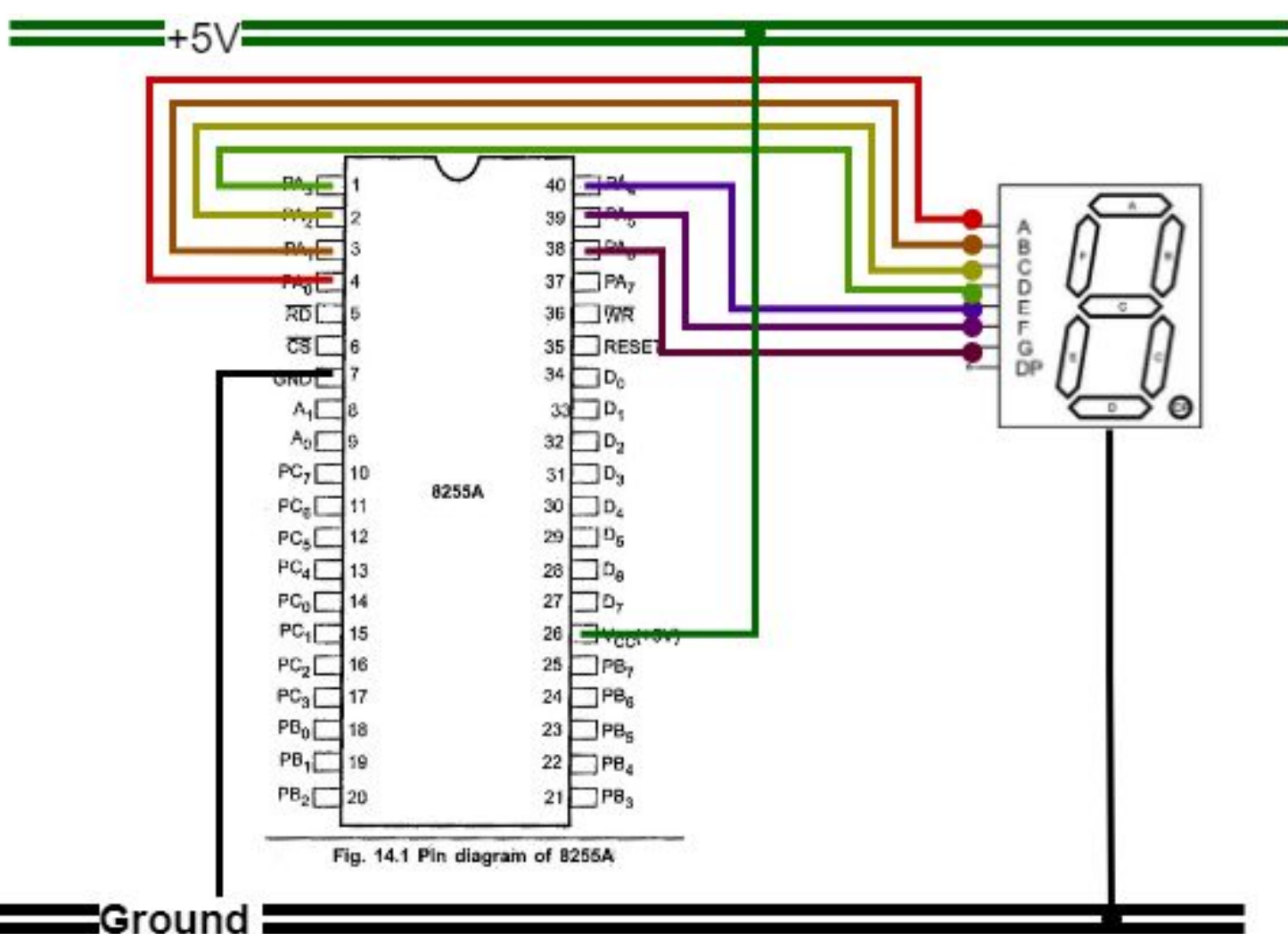
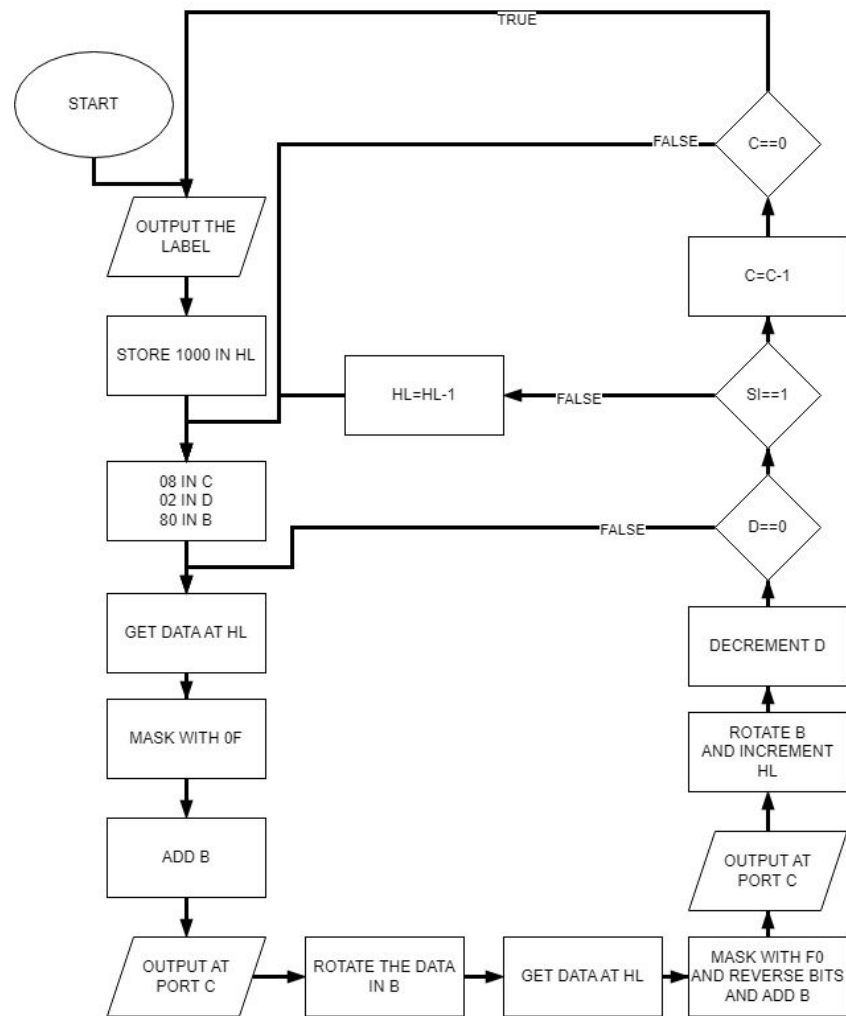


Fig. 14.1 Pin diagram of 8255A

Program



Code

REP1:LXI H,1021

MOV A,M

OUT 04

PUSH H

LXI H,1001

REP:MVI C,08

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

XCHG

POP H

INX H

OUT Pa2

PUSH H

XCHG

DCR C

JNZ REP

JMP REP1

REPEAT:DCX H

JMP REP

Emergency Interrupt

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

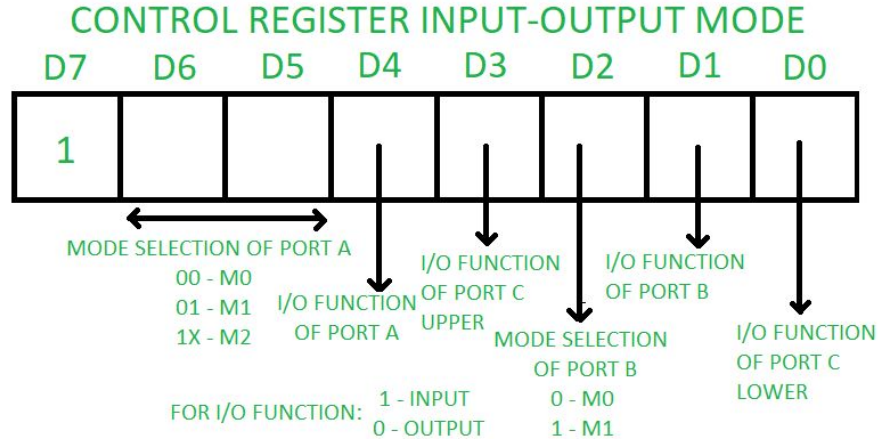
CPI 37

JNZ trap

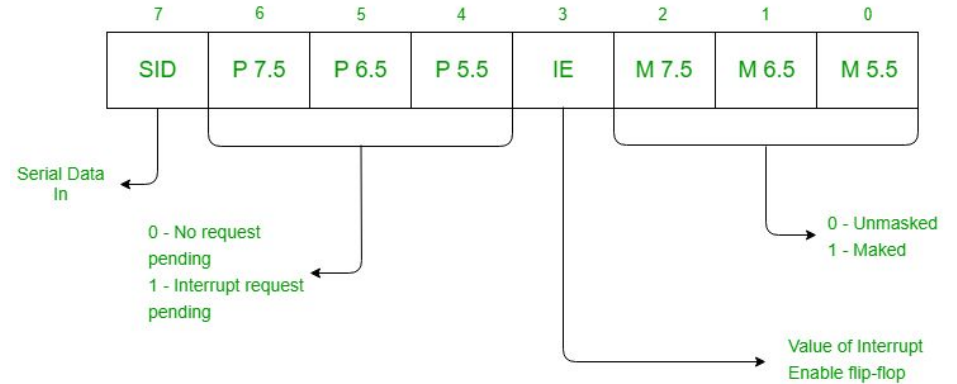
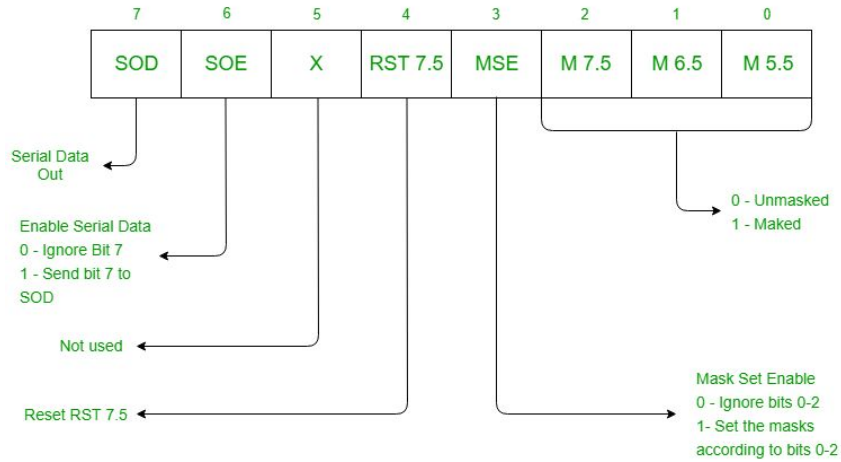
JMP count

More Info for Reference

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>