

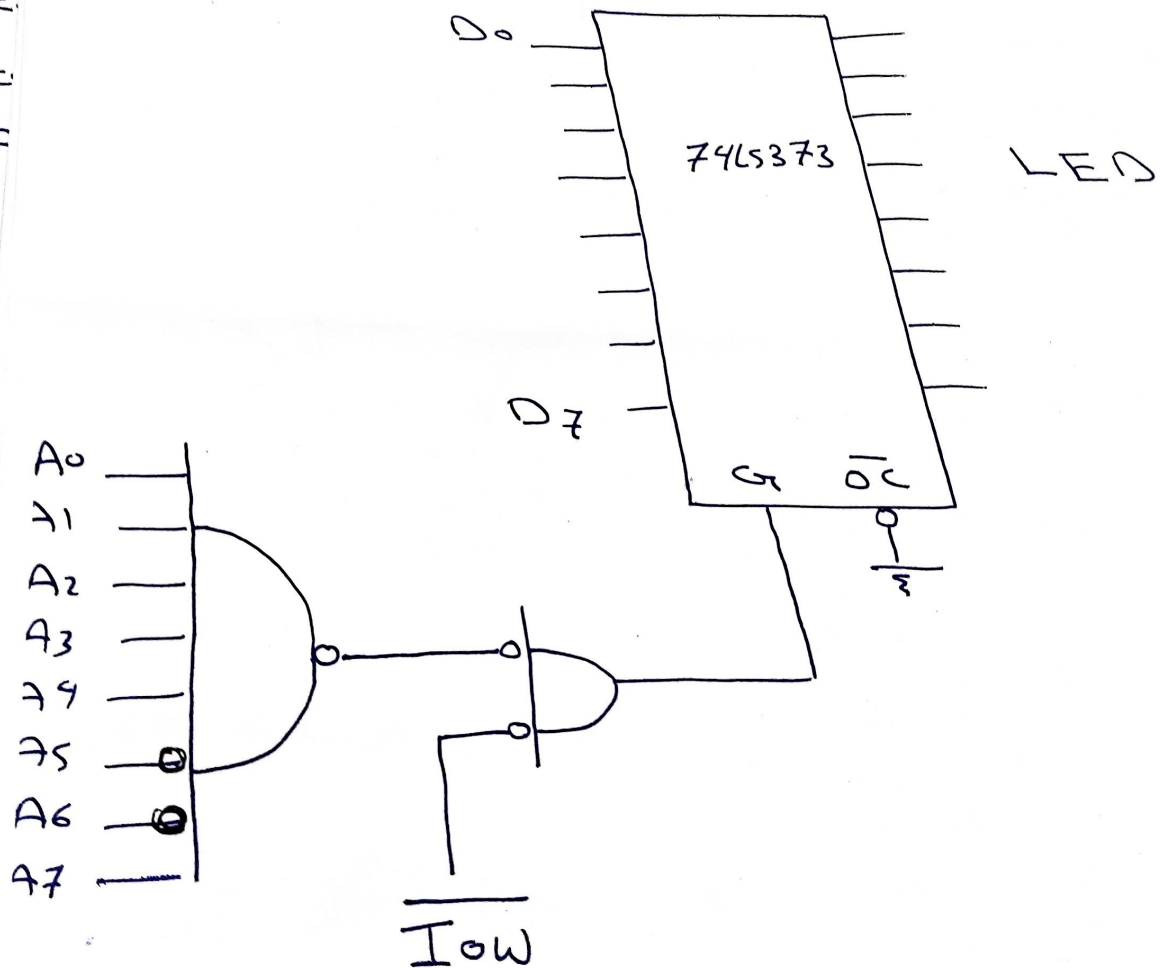
input/output interface

Q3 Show the Design of
OUT 9F₁₆ AL
by using 74LS373

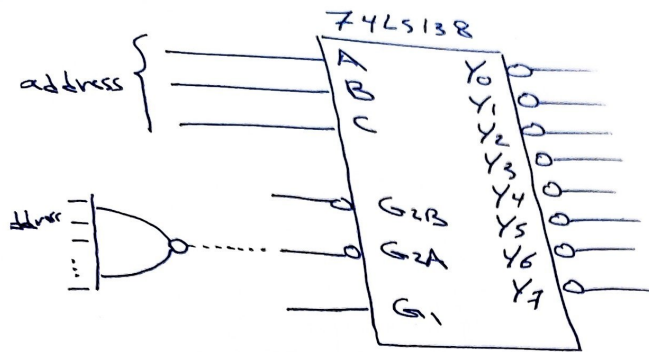
ans

∴ Port no. 9F

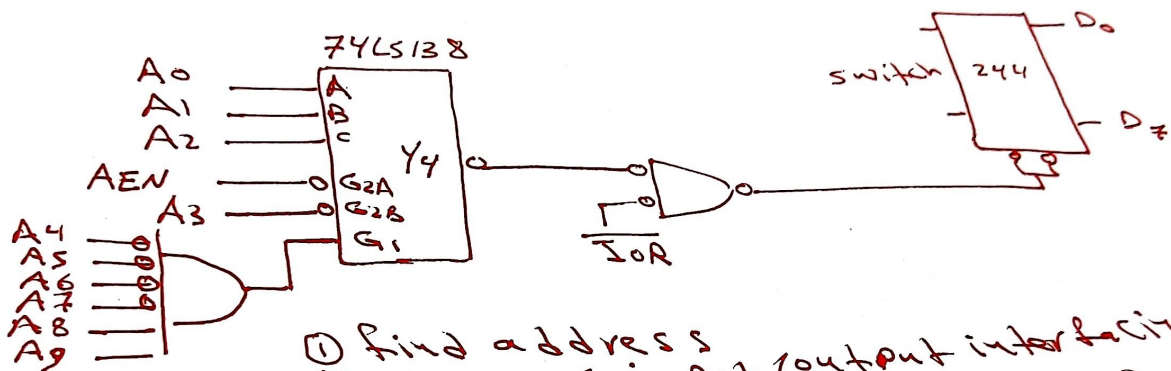
A₇ A₆ A₅ A₄ A₃ A₂ A₁ A₀
1 0 0 1 1 1 1 1



* decoder (3x8) decoder 74LS138



Ex



- ① find address
- ② type of input/output interfacing
- ③ write instruction to read Data from its port

ans = Y_4
C B A
A2 A1 A0
1 0 0

A7 A6 A5 A4 A3 A2 A1 A0
1 1 0 0 0 0 0 0
3 0 4

A3 = 0

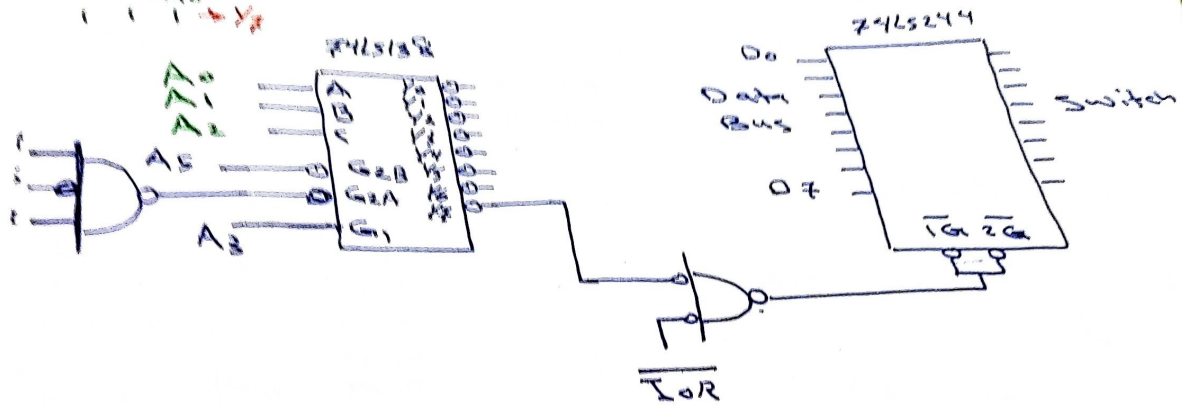
- ① address is 304H
- ② ∴ switch ∴ 74LS138 ∴ 244 ∴ input port interfacing

③ `MOV DX, 304H`
`IN AL, DX`

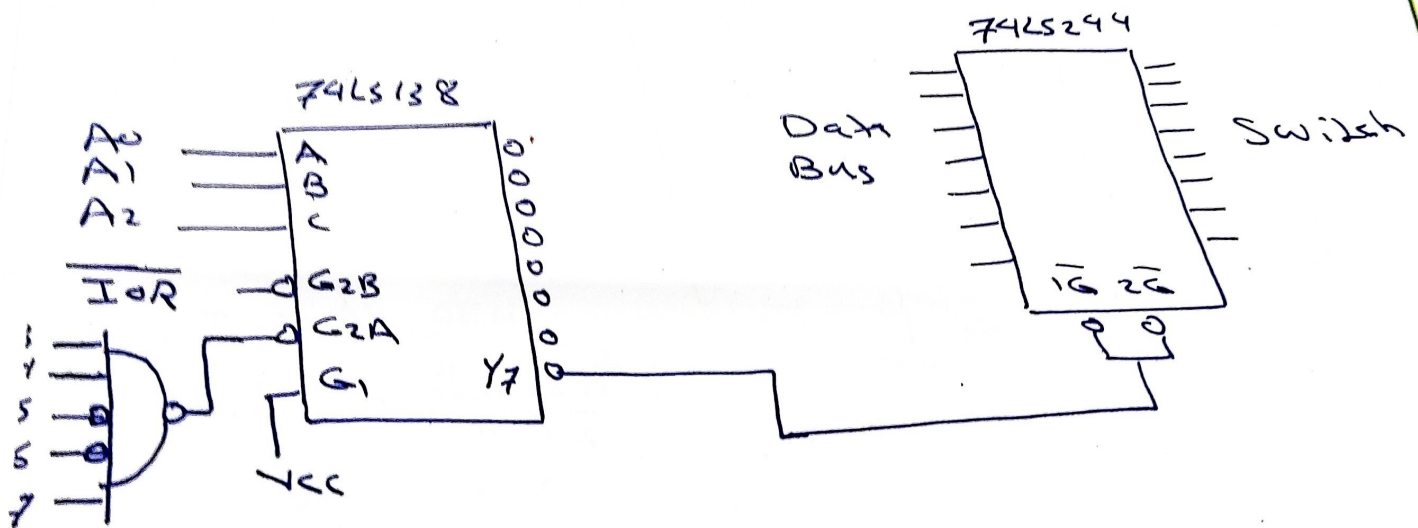
if port no. is 304H
IN AL, 304H

Q1 show the design of (20 Aug 21) (2)
 by using 74LS244, decoder, and NAND
 gate

Part No. 254

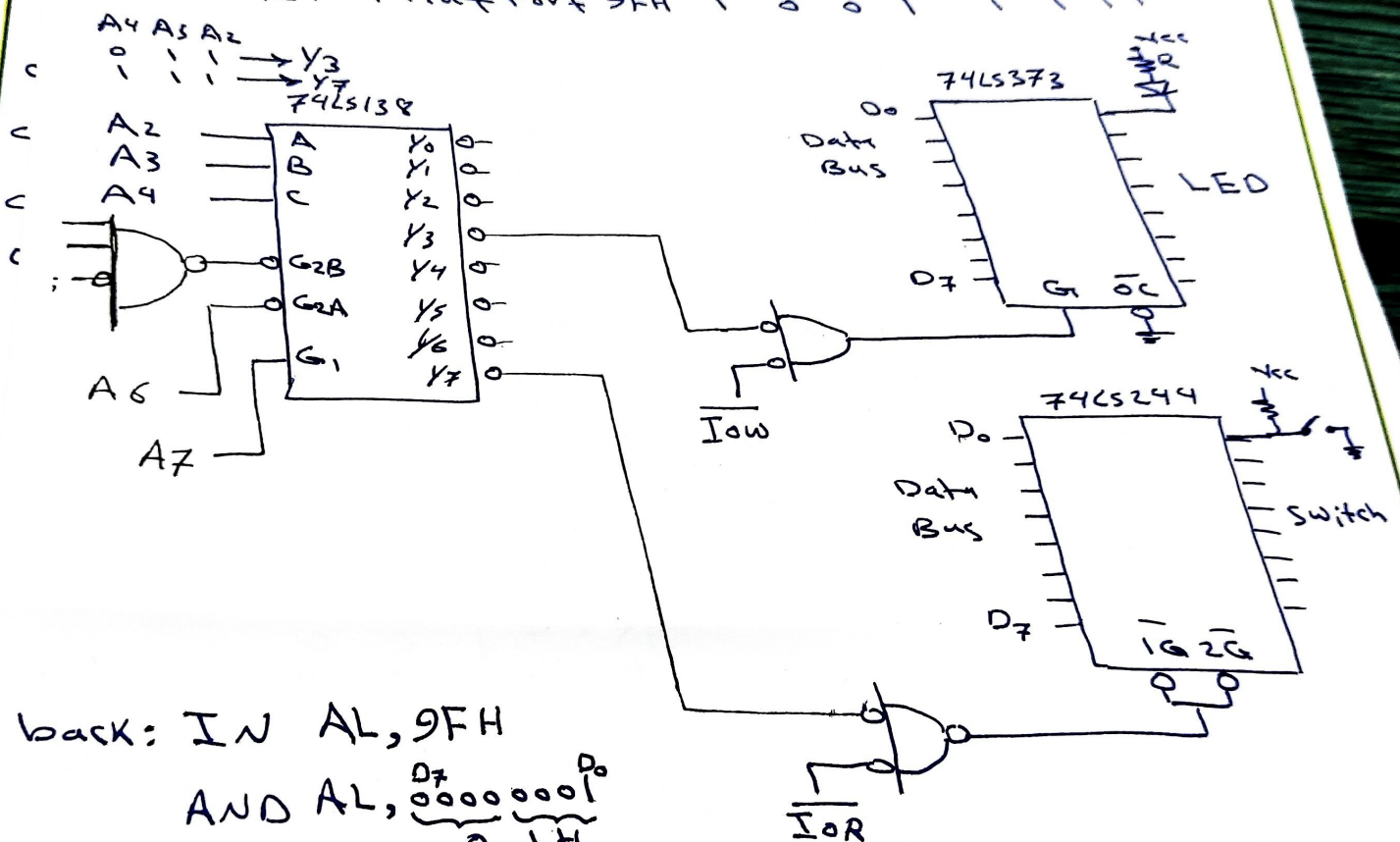


هناك حل اخر



Q3 Design led blink controlled by switch by using decoder and NAND gate interfacing circuit with port addressing (8FH and 9FH) then write the required instructions?

Ans =
 led output port 8FH $A_7 A_6 A_5 A_4 A_3 A_2 A_1 A_0$ 1 0 0 0 1 1 1 1
 Switch input port 9FH 1 0 0 1 1 1 1 1



back: IN AL, 9FH
 AND AL, $\underbrace{00000001}_{01H}$

JNZ back

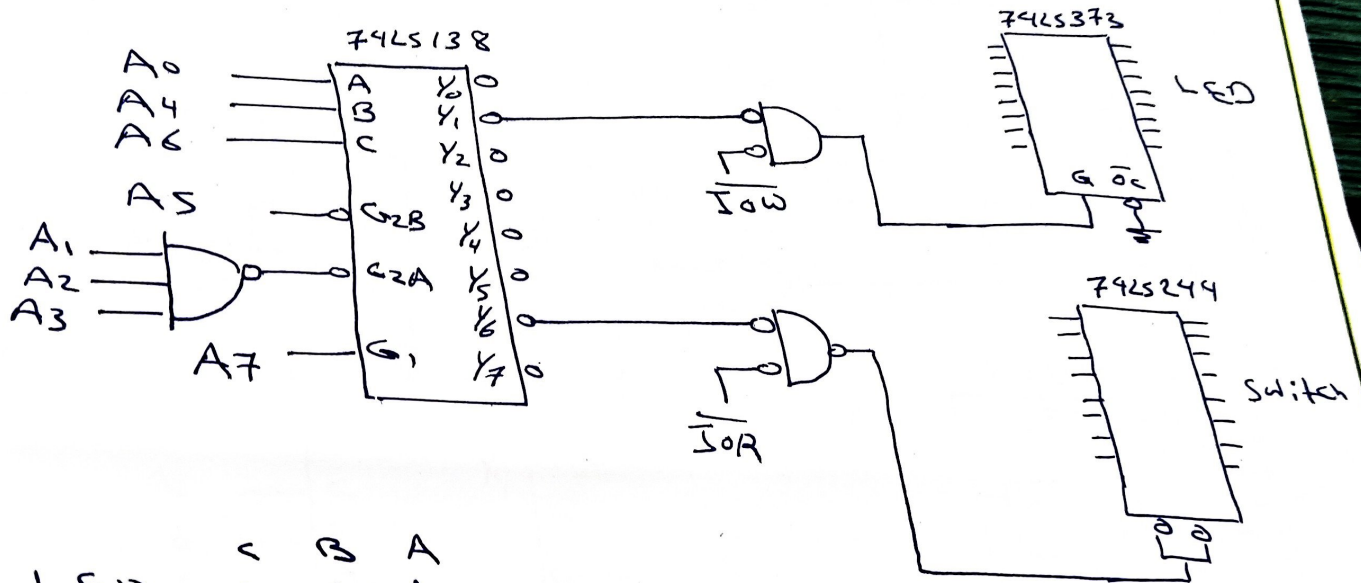
AGAIN: MOV AL, 01H
 OUT 8FH, AL
 MOV AL, 00H
 OUT 8FH, AL
 JMP AGAIN

note

if Port address (8FH and DEH) using decoder, NAND

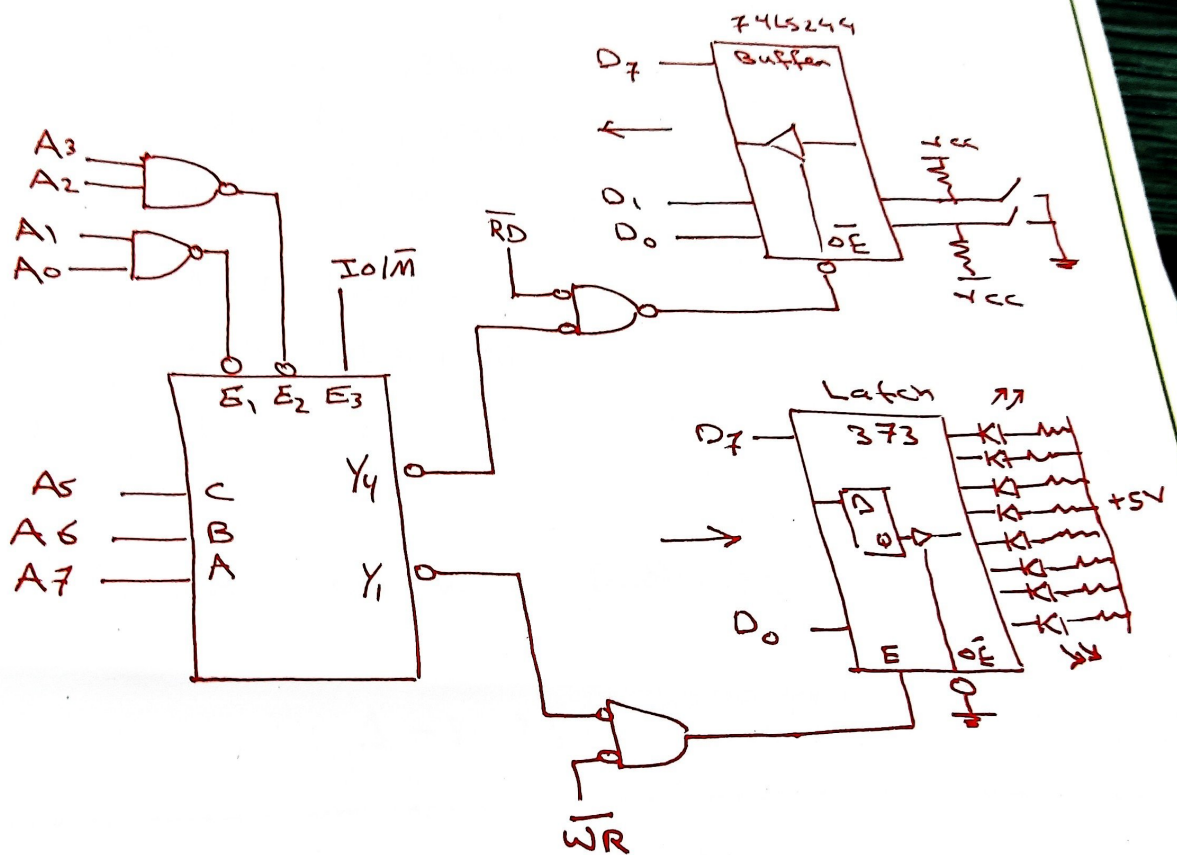
ans

		LED				Switch			
		A ₇	A ₆	A ₅	A ₄	A ₃	A ₂	A ₁	A ₀
LED Outpin	8FH	1	0	0	0	1	1	1	1
Switch Inpin	DEH	1	1	0	1	1	1	1	0



	C	B	A	
LED	A ₆	A ₄	A ₀	
	0	0	1	→ Y ₁
	4	2	1	→
Switch	1	1	0	→ Y ₆
	4	2	1	→

- Q2 For the following figure the question
- 1 - identify the address of input and output ports?
 - 2 - write the instructions for reading data if both switches are on then turn all LEDs



ans

C B A
A5 A6 A7

1 0 0 → Y₄ Switch
0 0 1 → Y₁ LED

A ₇	A ₆	A ₅	A ₄	A ₃	A ₂	A ₁	A ₀
0	0	1	X	1	1	1	1
1	0	0	X	1	1	1	1

address of input 001x 1111
2F or 3F
address of output 100x 1111
8F or 9F

② back IN AL, 2FH

AND AL, 03H

JNZ back →

MOV AL, 00H

OUT 8FH, AL

HLT

07 06 05 04 03 02 01 00
0000 0011
3

انتي بالمتحان
اختاري اي كلمة
NEXT هي
لي هي
ومعنا

∴ LED common ANODE

0 → ON

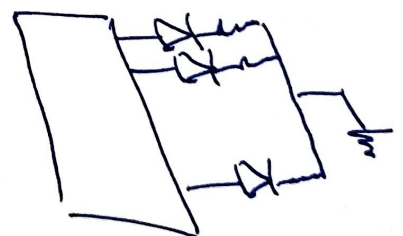
1 → off

Note

MOV AL, FFH

OUT 8FH, AL

HLT



Common Cathode

0 → off

1 → ON

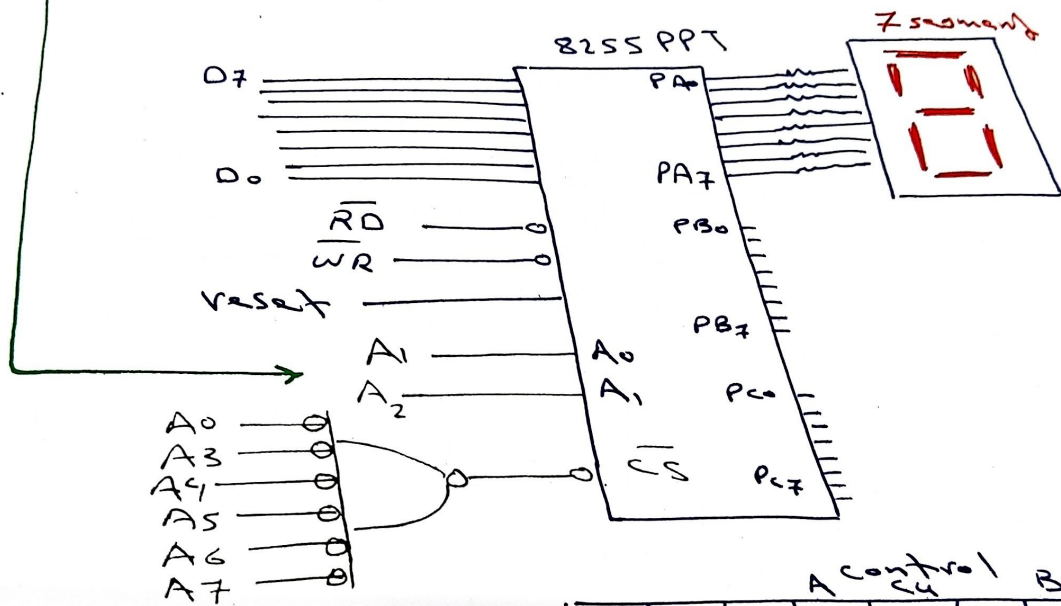
2019/2020

PSB Design an 8086 microprocessor interface circuit by using 8255 PPT to operate decimal counter and display digit on 7 segment where Port A address = 00H

ans

∴ 8086 → A₂A₁

		A ₇ A ₆ A ₅ A ₄	A ₃ A ₂ A ₁ A ₀
Port A	00H	0 0 0 0	0 0 0 0
Port B	02H	0 0 0 0	0 0 1 0
Port C	04H	0 0 0 0	0 1 0 0
Control	06H	0 0 0 0	0 1 1 0



A control				B control			
1	0	0	0	X	0	X	X
1	0	0	0	0	0	0	0
8				0			

MOV AL, 80H

OUT 06H, AL

AGAIN: MOV CL, 10

~~MOV AL, 0~~

*: OUT 00H, AL

INC AL

DEC CL

JNZ *

JMP AGAIN

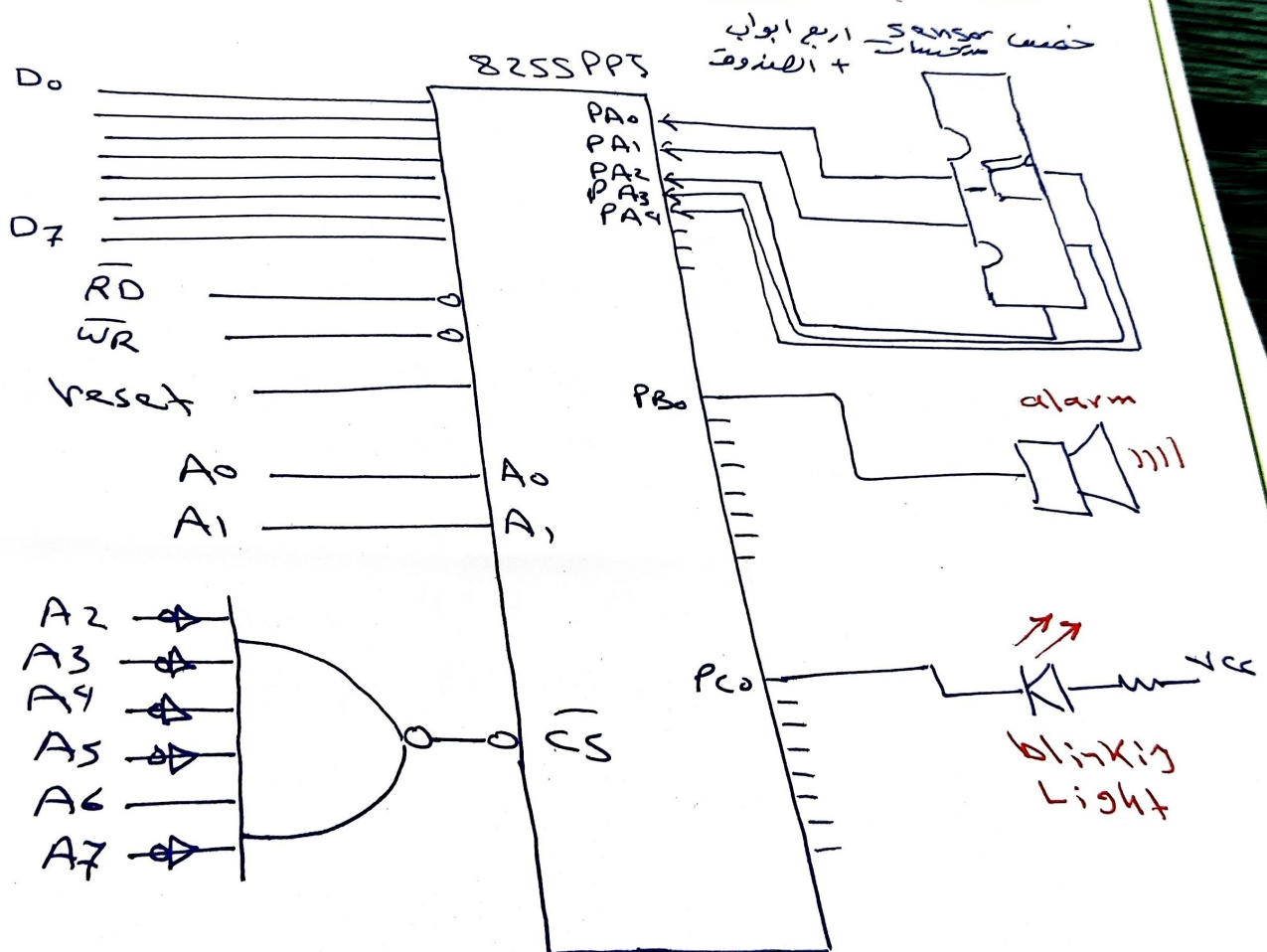
HLT

decimal 0 → 9

Q1 By using 8255 PPS design an interface circuit for car security and alarm indicator and light blinking. use start address 40H. then write the required instructions?

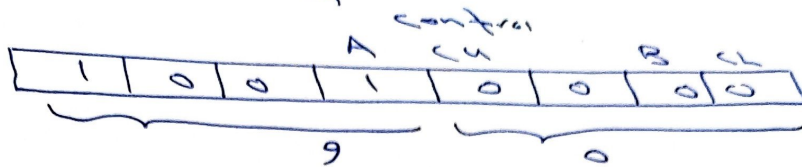
ans

Port	A7 A6 A5 A4	A3 A2 A1 A0
Port A	40H	0 1 0 0
Port B	41H	0 1 0 0
Port C	42H	0 1 0 0
Control	43H	0 1 0 0



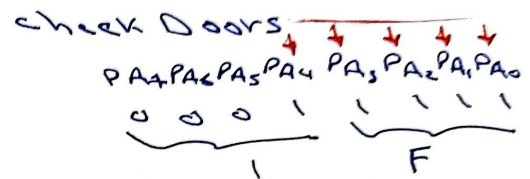
PC3 - PC0 CL } Port C
PC7 - PC4 CU }

Port A input
Port B output
Port C output



MOV AL, 90H
OUT 43H, AL

check: IN AL, 40H
AND AL, 1FH
JZ check



MOV AL, 01H
OUT 41H, AL

} turn on Alarm

AGAIN: MOV AL, 00H
OUT 42H, AL
MOV AL, 01H
OUT 42H, AL
JMP AGAIN
HL

} blinking
Light

8259 Interrupt

* four initial control word ICW

ICW₁ → A₀=0
ICW₂, ICW₃, ICW₄ → A₀=1

Ex find the address for ICW₁ - ICW₄ if chip select is activated by A₇-A₁ = 0010011

ans =

A ₇	A ₆	A ₅	A ₄	A ₃	A ₂	A ₁	A ₀	
0	0	1	0	0	1	1	0	→ 26H
0	0	1	0	0	1	1	1	→ 27H

ICW₁ port is 26H

ICW₂, ICW₃, ICW₄ port is 27H

* ICW₁

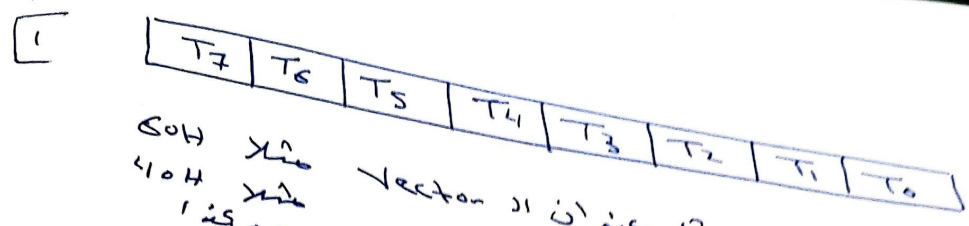
A ₀	D ₇	D ₆	D ₅	D ₄	D ₃	D ₂	D ₁	D ₀
0	0	0	0	1	LTIM	0	SNGL	IC ₄

1 : level trig input
0 : edge trig input

0 no ICW₄ needed
1 ICW₄ needed
1 single 8259
0 cascade mode
8259 اکثری

* ICW2

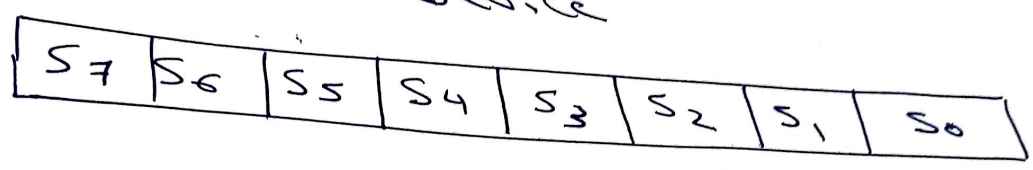
A0



هذا حسب العنوان يحدد عنوان ال Vector $\rightarrow R_0 - R_7$
 50H $\times 16$
 40H $\times 16$
 150H

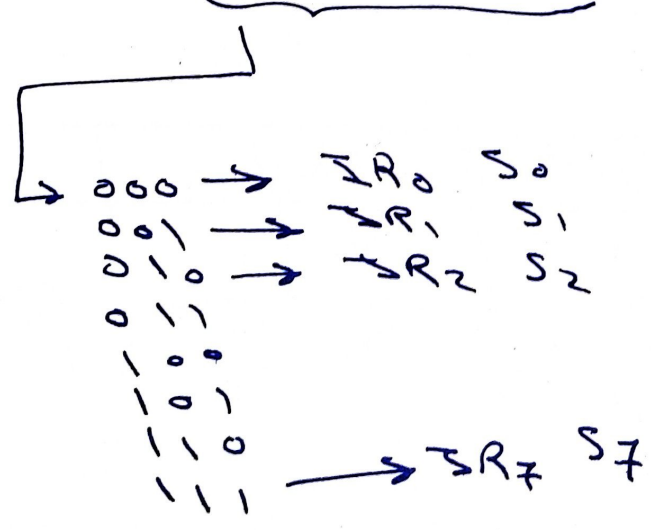
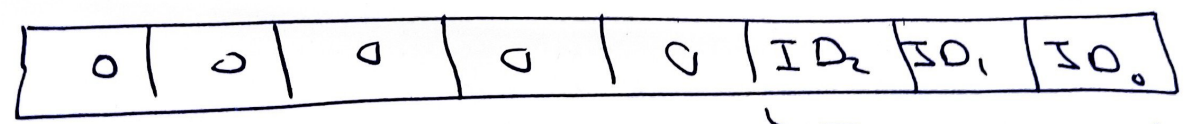
* ICW3

for master Device

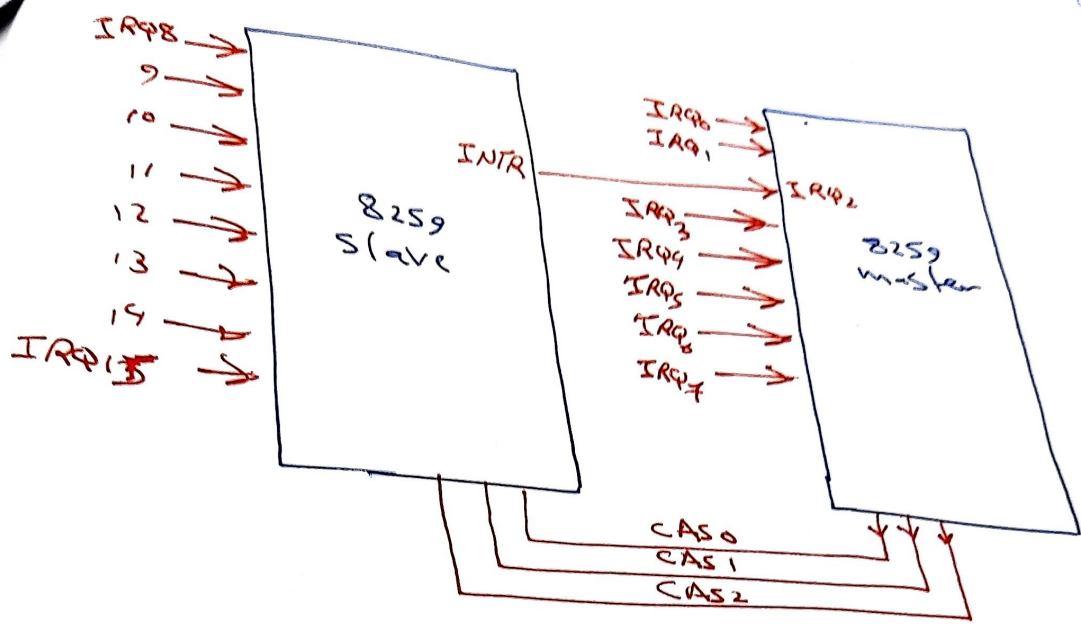


يحدد بان S_0 Slave $\rightarrow$ master
 0 no slave
 1 slave

for Slave Device



Note



ICW3

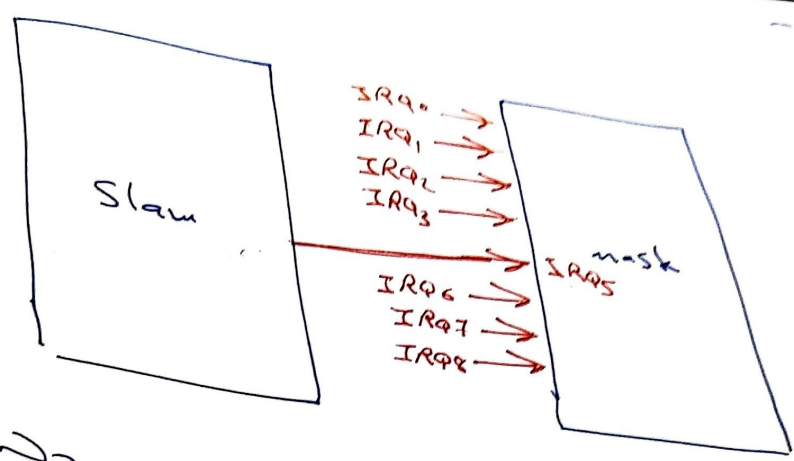
master

S ₇	S ₆	S ₅	S ₄	S ₃	S ₂	S ₁	S ₀
0	0	0	0	0	1	0	0
0				4			

slave

0	0	0	0	0	ID ₂	ID ₁	ID ₀
0	0	0	0	0	0	1	0
0				2			

Ex



IRQ3

mask for

S7	S6	S5	S4	S3	S2	S1	S0
0	0	1	0	0	0	0	0
2				0			

Slave

2	0	0	0	0	S02	S01	S00
0					1	0	1
					5		

17

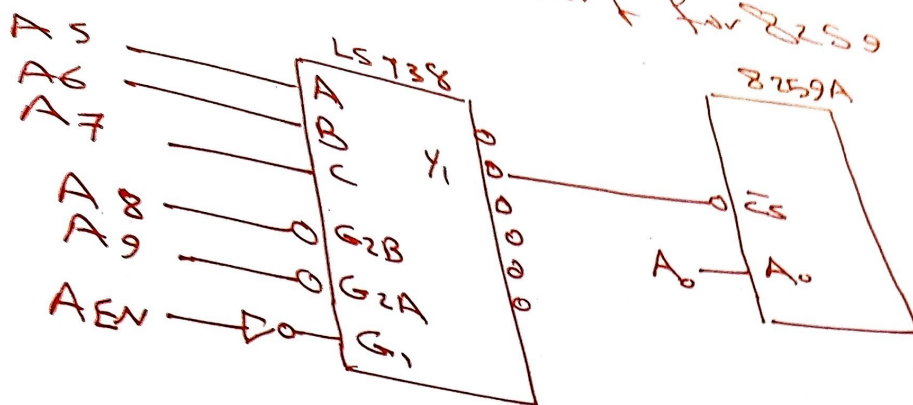
3. ω_2 master

3 ω_2 slave

HLT

A
A
A
A
A

Find address Port for 8259



ans

$$Y_1 = \begin{matrix} C & B & A \\ A_7 & A_6 & A_5 \\ 0 & 0 & 1 \end{matrix}$$

$$A_8 = 0$$

$$A_9 = 0$$

$$\begin{matrix} A_9 A_8 & A_7 A_6 A_5 A_4 & A_3 A_2 A_1 A_0 \\ 00 & 001X & XXX0 \\ 00 & 001X & XXX1 \end{matrix}$$

∴

20H

21H

$A_9 A_8$

00

00

$A_7 A_6 A_5 A_4$

0010

0010

$A_3 A_2 A_1 A_0$

0000

0001

∴ 20H

→ ICW₁

21H

→ ICW₂, ICW₃, ICW₄