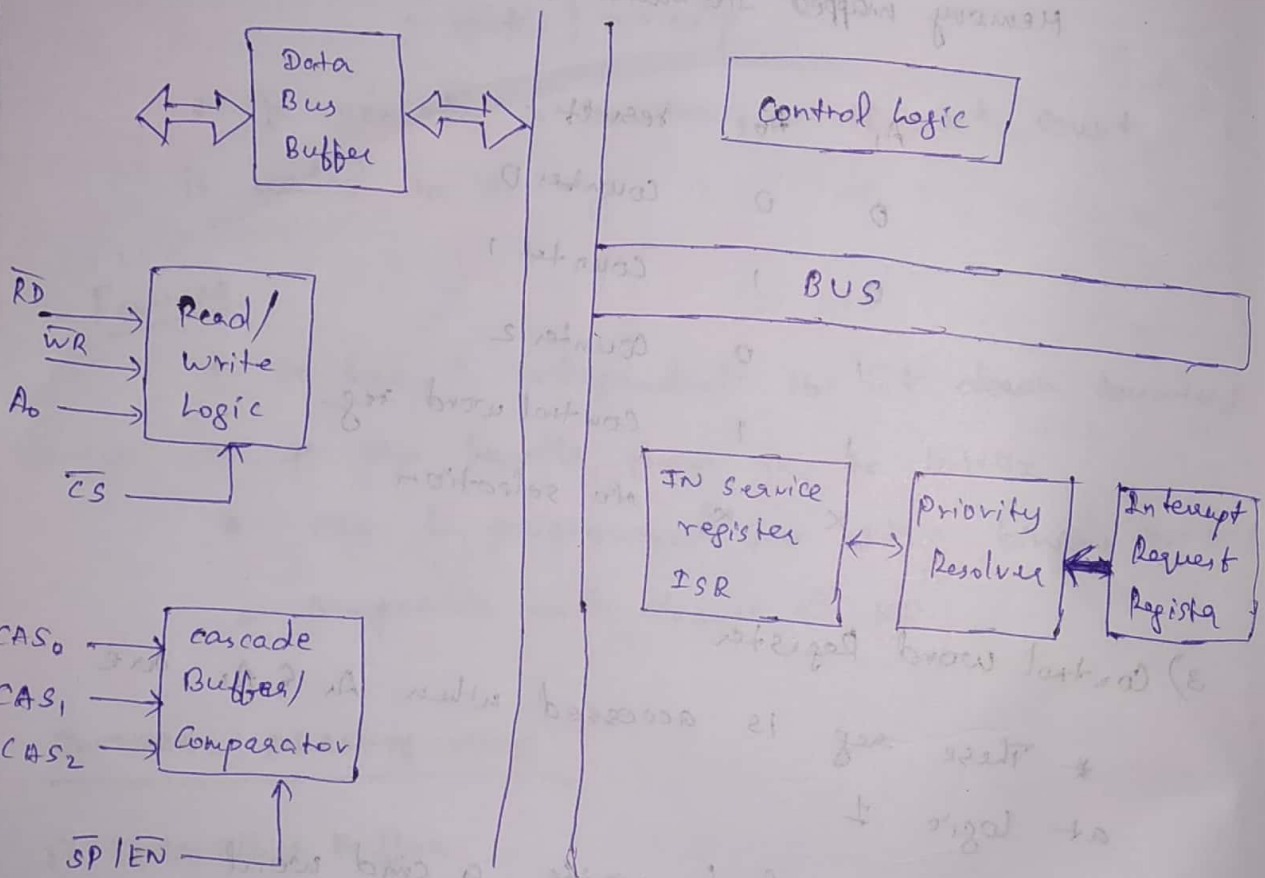
21/03/2022

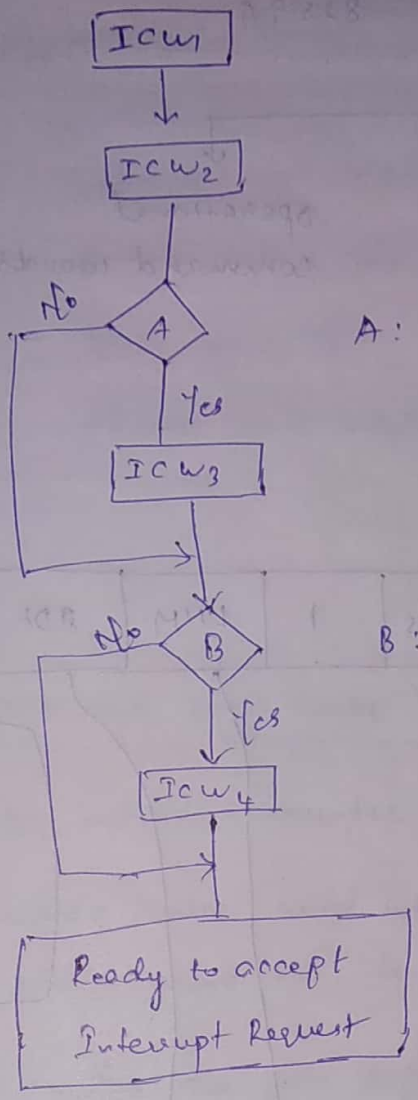
8259A

PRIORITY INTERRUPT CONTROLLER

Ao pins → 2 pins for ~~xxxx~~ interrupt

ARCHITECTURE





A: IN CASCADE MODE?

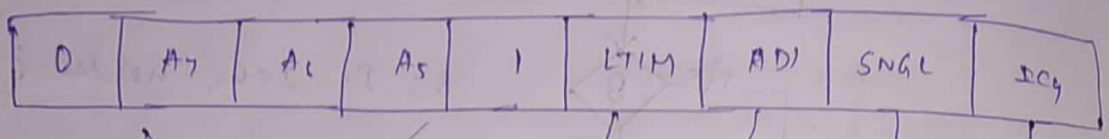
B: Is ICW4 needed?

0000	0000	1010	0000	
0000	0001	0100	0000	left shift
0000	0010	1000	0000	left shift
0	2	8	0	

COMMAND WORDS OF 8259A

- Initialization command words
- operational command words

ICW1



- IC4: 1 = ICW4; 0 = no ICW4
- SNGL: 1 - Single (8); 0 - Cascade (64)
- A7 - A5 of Interrupt vector address MCS 80/85 mode only
- LTIM: 1 = Level Triggered; 0 = edge triggered
- ADI: Call Address Interval; 1 - Interval of 4 bytes; 0 - " " 8 bytes

ICW3 → A0 = 1

CAT-2

1) 8254 < MODE 0 & ALP
MODE 3 & ALP

2) 8255 < Internal Block Diagram & Bit set/Reset control format
MODE 1 operation diagram & mode format control word

3) 8251 (UART) → ALP to transmit serial data

4) 8254 (PIC) < Internal Block Diagram & Initialization Flowchart
ICW1, ICW2, ICW3, ICW4

5) D-A & A-D

COMMAND WORDS OF 8259A

A_0	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
1	T_7	T_6	T_5	T_4	~~A_{15}~~ T_3	A_{10}	A_9	A_8

what will be the ICW2 when your PIC is programmed with base address C8H?

C8 = 1100 1000 – IR0
(don't change)
11001 111 – IR7

		VECTOR ADDRESS
IR0 – 0000 0000 1100 1000	– C8H	0320 : 0323
IR1 – 0000 0000	– C9	0324 : 0327
IR2 – 0000 0000	– CA	0328 : 032B
IR3 – 0000 0000	– CB	032C : 032F
IR4 – 0000 0000	– CC	0330 : 0333
IR5 – 0000 0000	– CD	0334 : 0337
IR6 – 0000 0000	– CE	0338 : 033B
IR7 – 0000 0000	– CF	033C : 033F

Vector address

IR0 → Either shift left 2 times
(or)
multiply by 4

IR0

C8 → 0000 0000 1100 1000 ↙ left shift
0000 0001 1001 0000 ↙
0000 0011 0010 0000 ↙
0 3 2 0

0320 : 0323

IR1

0324 : 0327

C9 → 0000 0000 1100 1001 ↙
0000 0001 1001 0010 ↙
0000 0011 0010 0100 ↙
0 3 2 4

Master mode ICW3

A_0	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
1	S_7	S_6	S_5	S_4	S_3	S_2	S_1	S_0

$S_n = 1 \rightarrow IR_n$ Input has slave

$S_n = 0 \rightarrow IR_n$ input doesn't have slave

slave mode ICW3

A_0	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
1	0	0	0	0	0	ID_2	ID_1	ID_0

$D_2 D_1 D_0$ – 000 to 111 for IR_0 to IR_7

(or)

slave 1 to slave 8

ICW3 slave

If slave is connected to IR_6 of master, then ICW3 = 0000 0110

ICW4

1	0	0	0	SFNM	BUF	M/S	AEOI	MPM