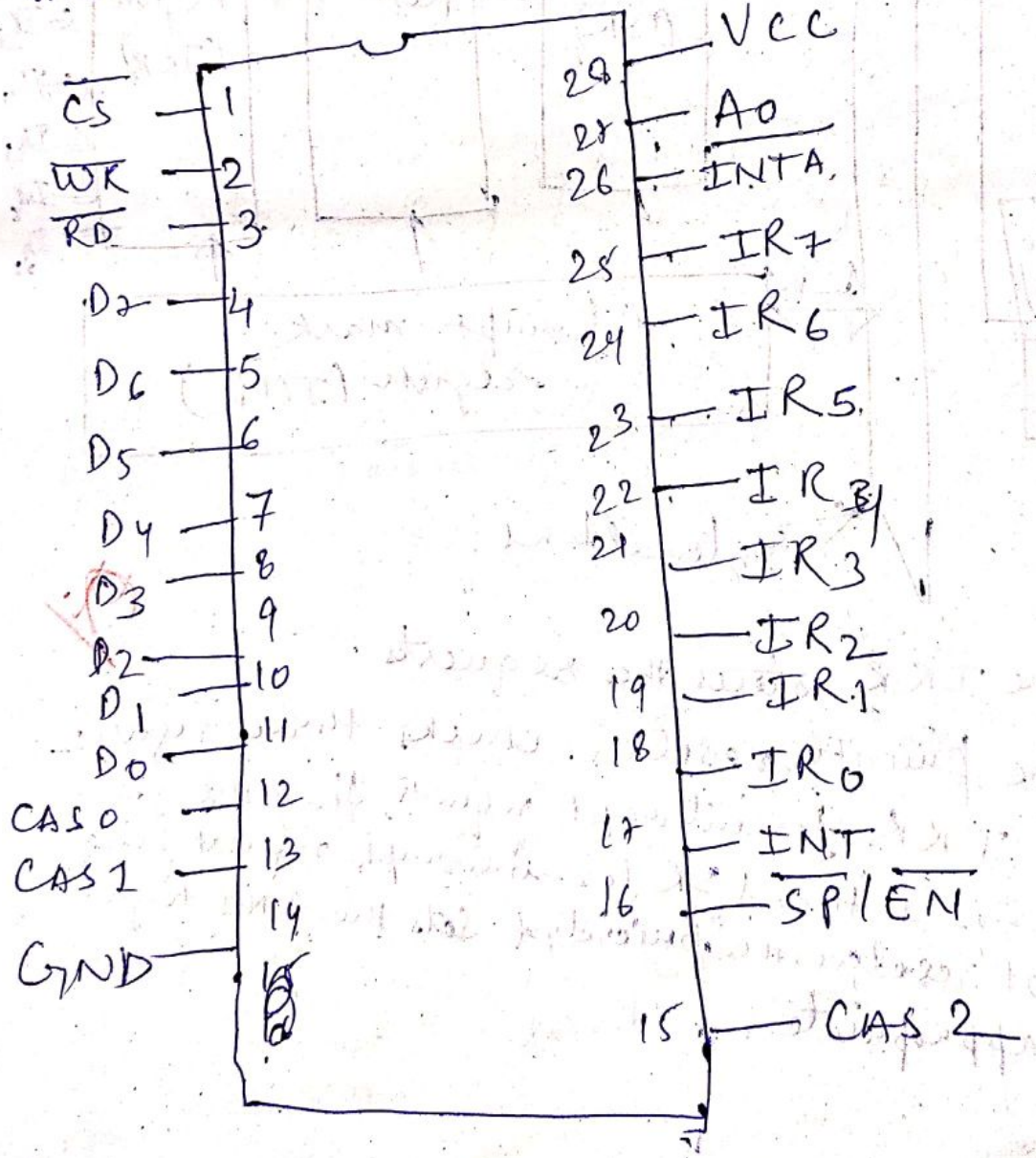
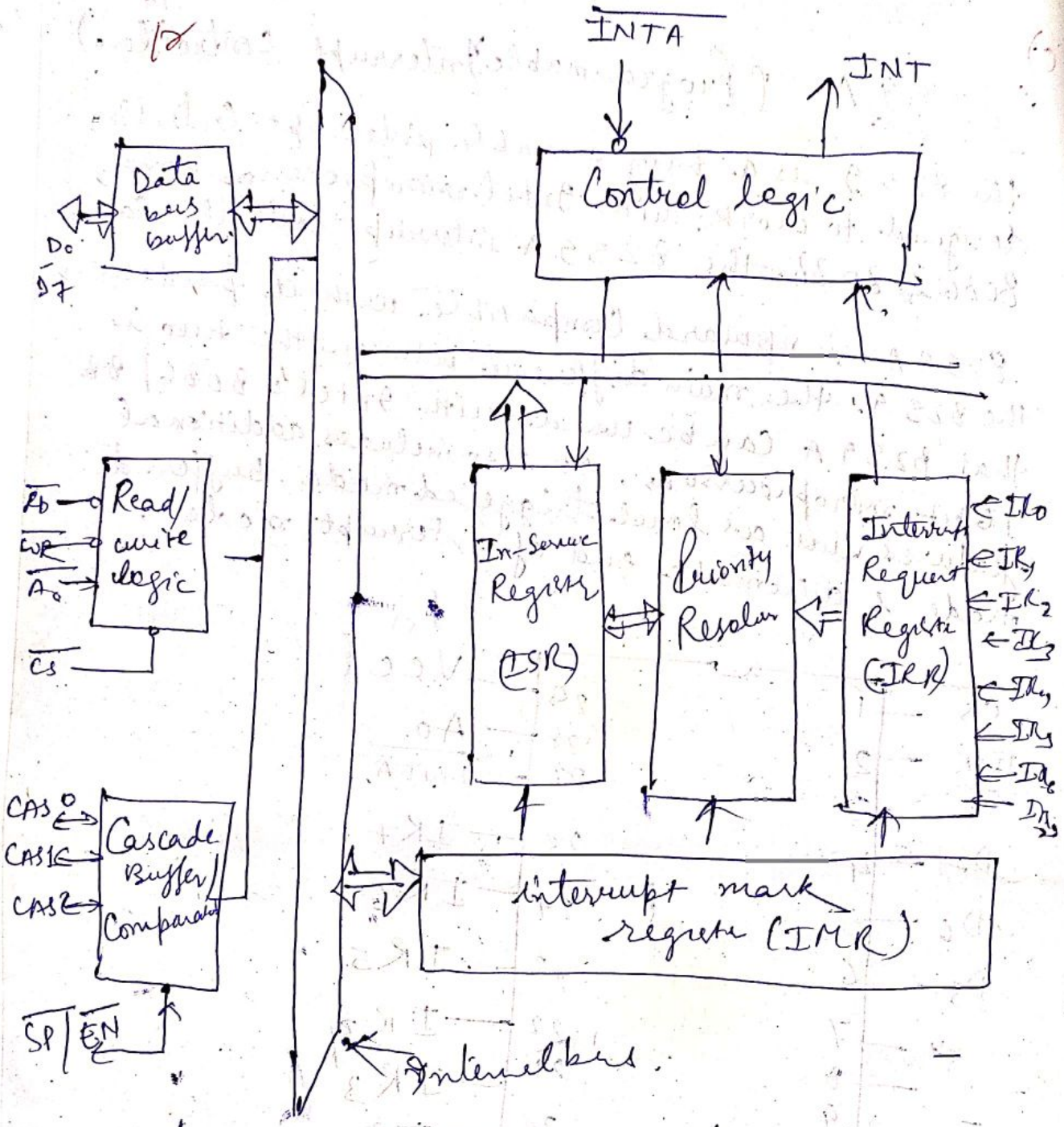
8259A (Programmable Interrupt Controller)

The 8259 is a programmable interrupt controller designed to work with Intel microprocessors 8085, 8086 & 8088. The 8259A interrupt controller Com. 8259A is upward compatible with its predecessor, the 8259. The main difference between the two is that 8259A can be used with Intel's 8086/88, 16 bit microprocessors. It also includes additional features such as level triggered mode, buffered mode & automatic end of interrupt mode.





1) The IRR stores the requests.

2) The priority resolver checks three registers the IRR for interrupt request, the IMR for masking bits & the ISR for interrupt request being served. It resolves the priority & sets the INT high when appropriate.

) flag register...

3) The MPU acknowledges the interrupt by sending $\overline{INTA}$.

4) After the $\overline{INTA}$ is received, the appropriate priority bit in ISR is set to indicate which interrupt level is being serviced. & the corresponding bit in IRR is reset to indicate that request is accepted. Then, the opcode for the CALL instruction is placed on data bus.

5) When MPU decodes the CALL instruction, it places two more $\overline{INTA}$ signals on data bus.

6) When the 8259A receives the second $\overline{INTA}$, it places the low order byte of CAL address on data bus. at the third $\overline{INTA}$, it places the high order byte on data bus. the CALL address is the vector memory location for the interrupt; this address is placed in control register during initialization.

7) During third $\overline{INTA}$ pulse, ISR bit is reset either automatically or by a command word that must be issued at the end of service routine. this option is determined by initialization Command word.

8) the program sequence is transffered to the memory location specified by CALL instruction

Priority Modes

1) Fully Nested Mode:- This is a general purpose mode in which all IRs (Interrupt Requests) are arranged from highest to lowest, with IR0 as the highest & IR7 as the lowest.

In addition, any IR can be assigned the highest priority in this mode; the priority sequence will then begin at that IR. In this example below, IR4 has the highest priority and IR3 has the lowest priority.

IR_0	IR_1	IR_2	IR_3	IR_4	IR_5	IR_6	IR_7
4	5	6	7	0	1	2	3
			↑ Lowest priority	↑ Highest priority			

2) Automatic Rotation Mode:- In this mode, a device after being serviced, receives the lowest priority. Assuming that the IR_2 has just been serviced, it will receive the seventh priority as shown below:

IR_0	IR_1	IR_2	IR_3	IR_4	IR_5	IR_6	IR_7
1	6	7	0	1	2	3	4

3) Specific Rotation Mode:- This mode is similar to automatic rotation mode; except that the user can select any IR for the lowest priority thus fixing all other priorities.