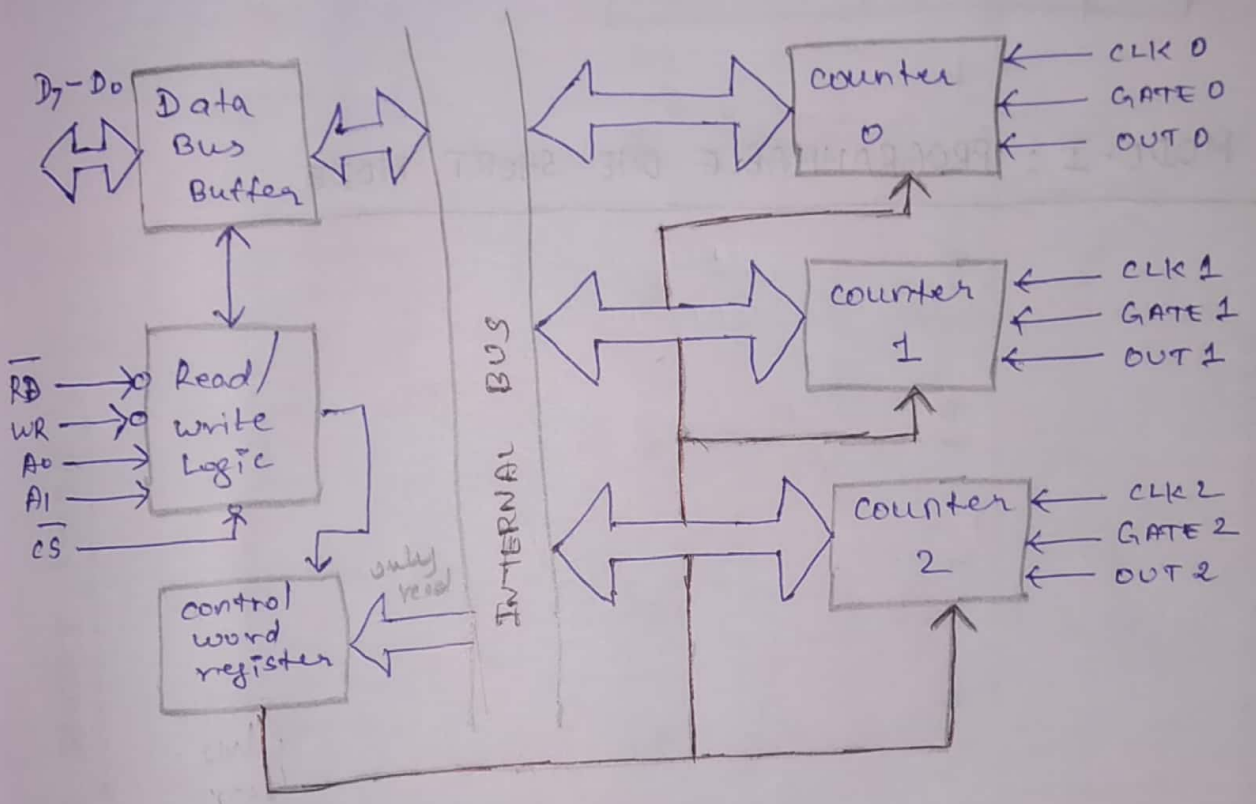
23/02/2022

A peripheral chips

- ✓ 8255
- ✓ 8253/54 → PROGRAMMABLE INTERVAL TIMER
- ✓ 8254
- ✓ 8251 → Universal Asynchronous Receiver Transmi



	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
	SC1	SC0	RL1	RL0	M2	M1	M0	BCD
Counter 0 ←	0	0	0	0	→ Latch counter for 'ON THE FLY' reading			
Counter 1 ←	0	1	0	1	→ Read/load LSB only			
Counter 2 ←	1	0	1	0	→ Read/Load MSB only			
			1	1	→ Read/Load LSB first MSB next			

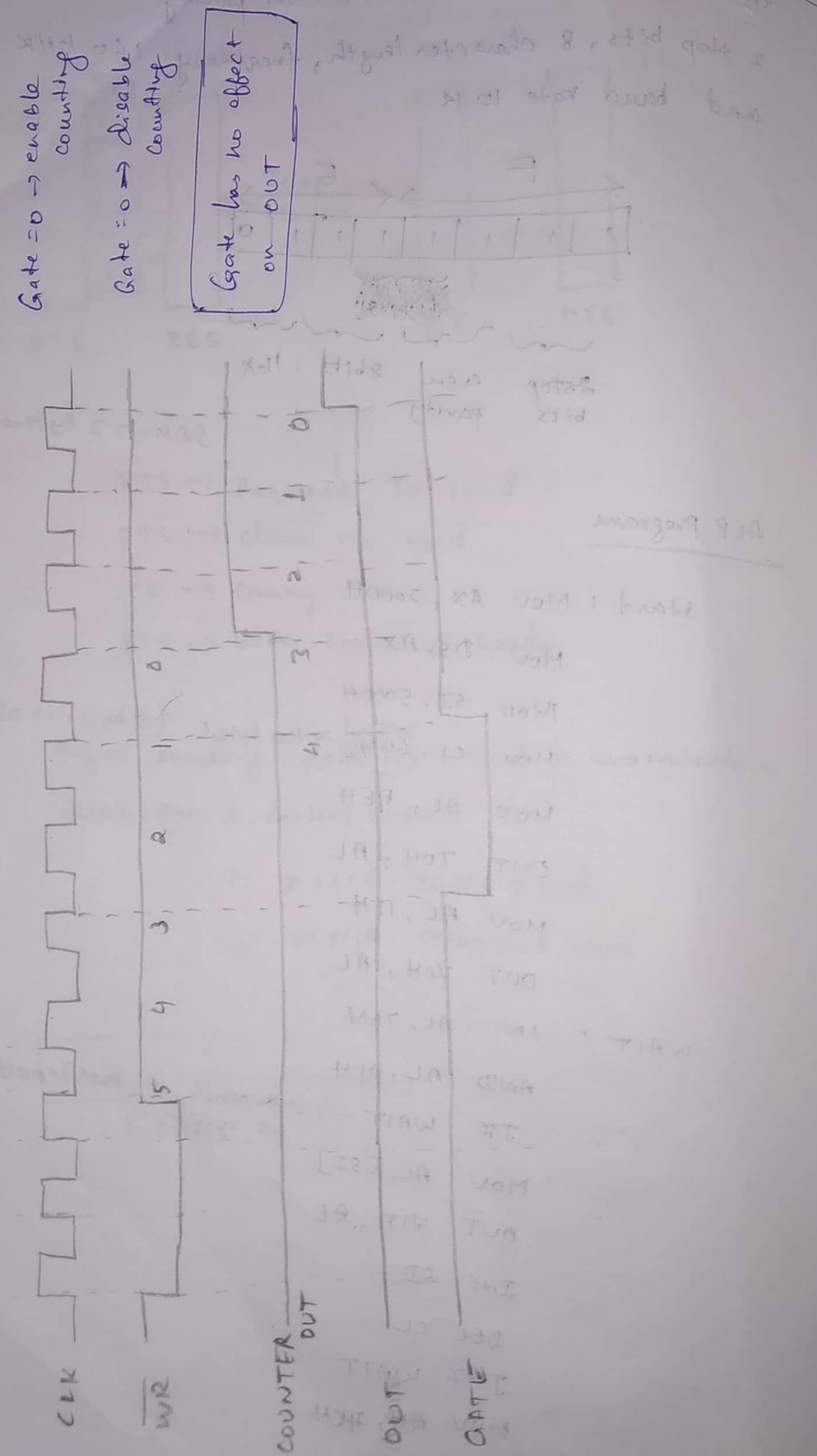
M_2	M_1	M_0	Selection mode
0	0	0	Mode 0
0	0	1	Mode 1
0	1	0	Mode 2
0	1	1	Mode 3
1	0	0	Mode 4
1	0	1	Mode 5

D_0 → 0 → Hexa input

D_0 → 1 → Binary input

8254/53 TIMER

MODE 0 : INTERRUPT ON TERMINAL COUNT MODE



Interrupt the processor after 10 ms

```
START MOV AL, 31H
      OUT 46H, AL
      MOV AL, 00H
      OUT A0H, AL
      MOV AL, 15H
      OUT 40H, AL
```

1500 - 05DC

$$N = \frac{10 \times 10^{-3}\ s}{66 \times 10^{-6}\ \mu s}$$

$$= 1500$$

46h - Ctrl word reg
00h -
15h -

CAT-2 ✻

1) 8251A UART → ALP 10 m

2) 8254/8253 Mode 0 & ALP 10 m
Mode 3 & ALP 10 m

3) 8255

4) 8259

5) D/A & A/D

To interrupt the processor after 10 ms (this mode 0 operation)

Count to be loaded in HEX format

8086 → 6 MHz
8254 → 1.5 MHz

Counter 1

$$N = \frac{10 \times 10^{-3}}{0.66 \times 10^{-6}} = 15 \times 10^{3} = 15000$$

$$= 3A98\ H$$

SC1	SC0	RL1	RL0	M_2	M_1	M_0	BCD
0	1	1	1	0	0	0	0

→ 70 H

Counter 1	Load MSB then LSB	Mode 0	Hexa input

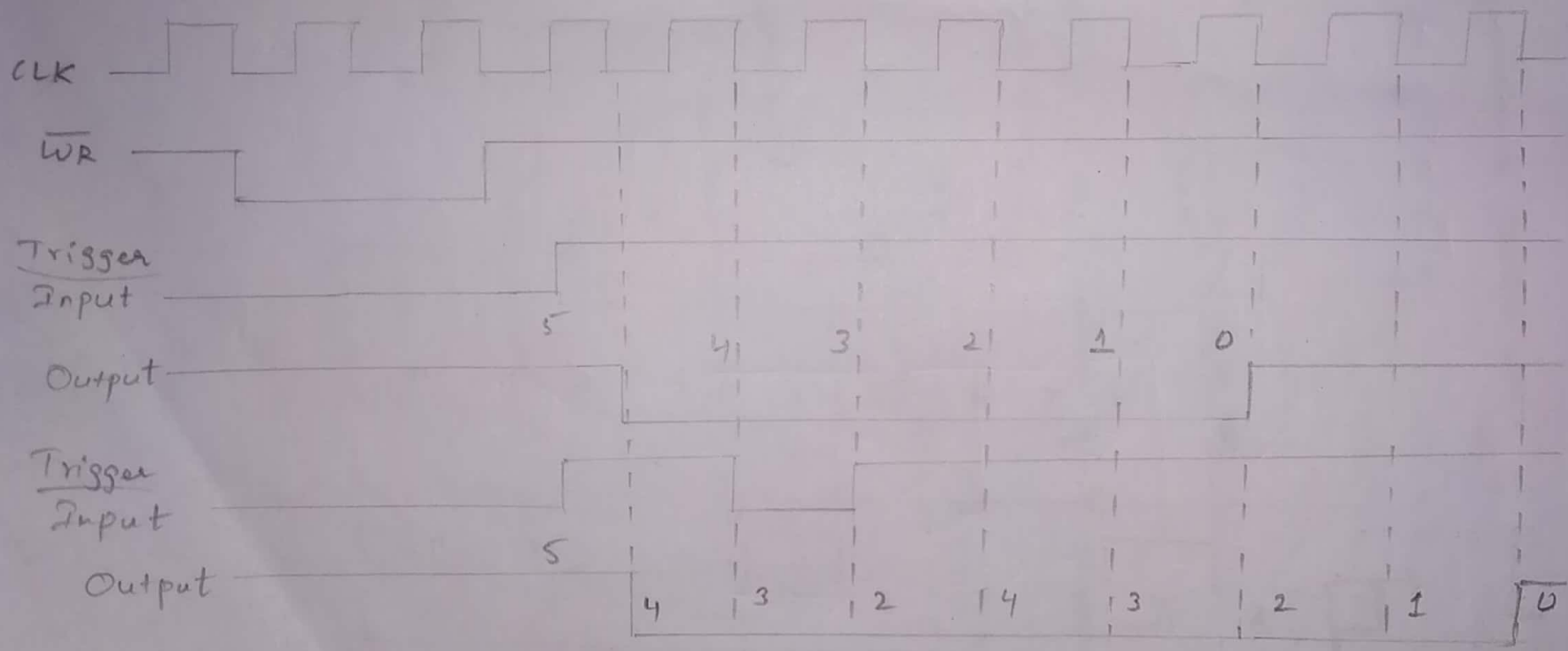
Code segment:

~~$6 \times 10^{+6}$~~

```
START : MOV  AL, 70H
        OUT  46H, AL
        MOV  AL, 98H
        OUT  42H, AL
        MOV  AL, 3AH
        OUT  42H, AL
        MOV  AH, 4CH
        INT  21 H
        END
```

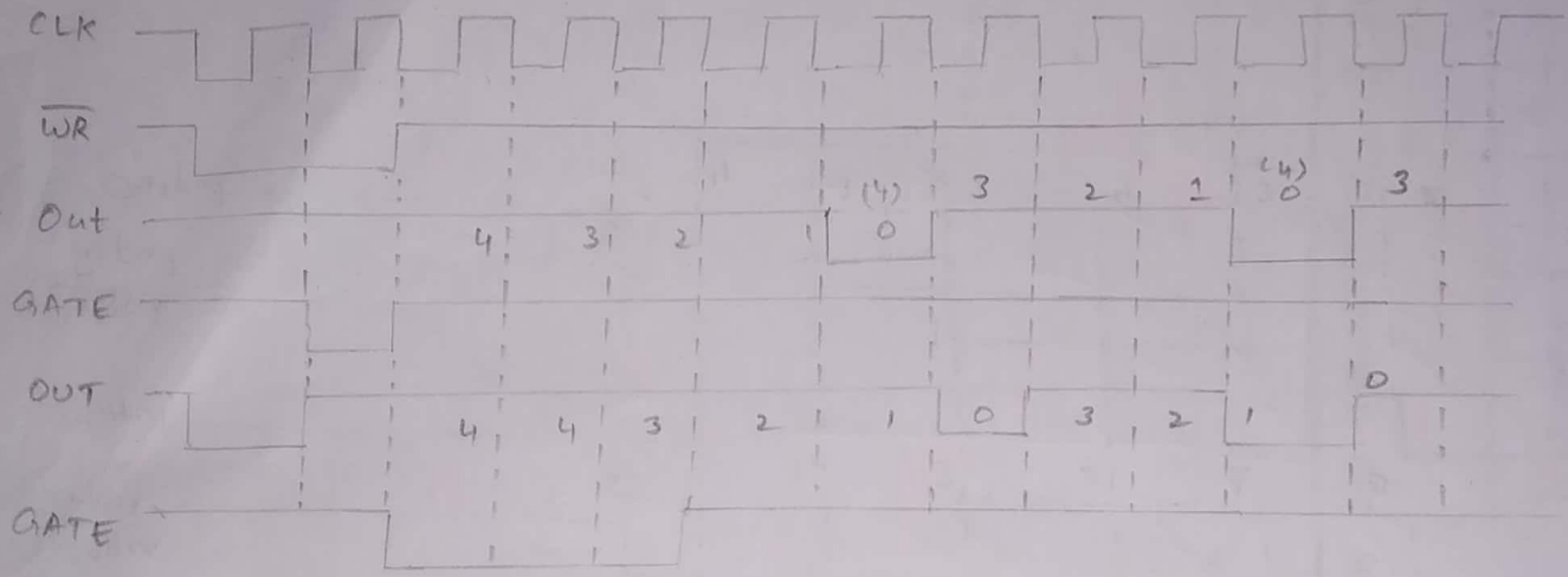
46 - CW word reg
42 - counter 1

MODE-I : PROGRAMMABLE ONE SHORT MODE:



LUNCH: FROM.....am/pm TO.....am/pm

MODE II : RATE GENERATOR OR DIVIDE BY N COUNTER



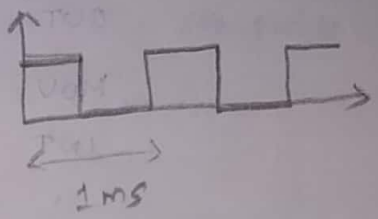
Design a programmable timer using 8254 at an address 0040 H counter 0 and write following ALP

8086 → 6MHz

8254 → 1.5 MHz

(i) To generate a square wave of period 1 ms

$f = \frac{1}{T} \Rightarrow T = \frac{1}{f}$



$f = 1.5$ MHz

$T = \frac{1}{1.5 \times 10^{+6}} = 0.66\ \mu s$

If 'N' is the number of T states required for 1 ms

$N = \frac{1 \times 10^{-3}}{0.66 \times 10^{-6}} = 1.5 \times 10^{3} = 1500$

Control word

SC1	SC0	RL1	RL0	M2	M1	M0	BCD
0	0	1	1	0	1	1	1

3 7

CODE SEGMENT

```
Start: MOV  AL, 37H
       OUT  4LH, AL
       MOV  AL, 00H
       OUT  40H, AL
       MOV  AL, 15H
       OUT  40H, AL
       MOV  AH, 4LH
       INT  21H
```

counter 0 → 40

counter 1 → 42

counter 2 → 44

control word register } → 46

1500 → 05DC

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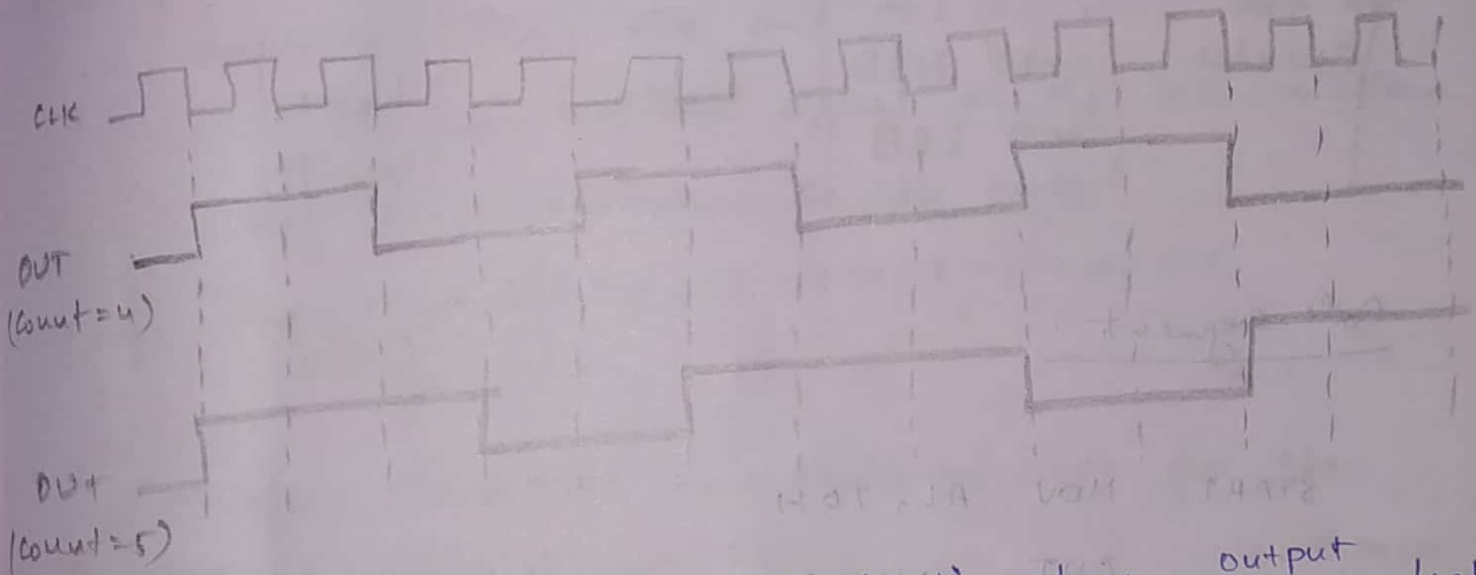
MODE-3 : SQUARE WAVE RATE GENERATED :

count loaded is even → First half of the count is High
→ Remaining half of the count is Low

count loaded is odd → Decrement the count for 1 clk pulse in high state



If loaded N value is odd $\frac{(N+1)}{2}$ pulses, output remains high

$\frac{(N-1)}{2}$ pulses, output remains low