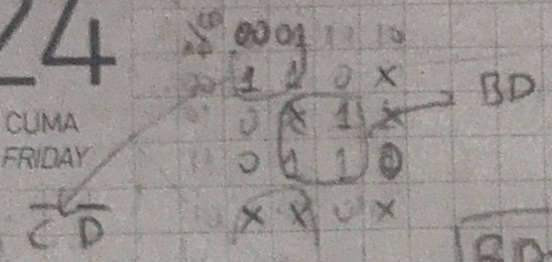
24

CUMA
FRIDAY

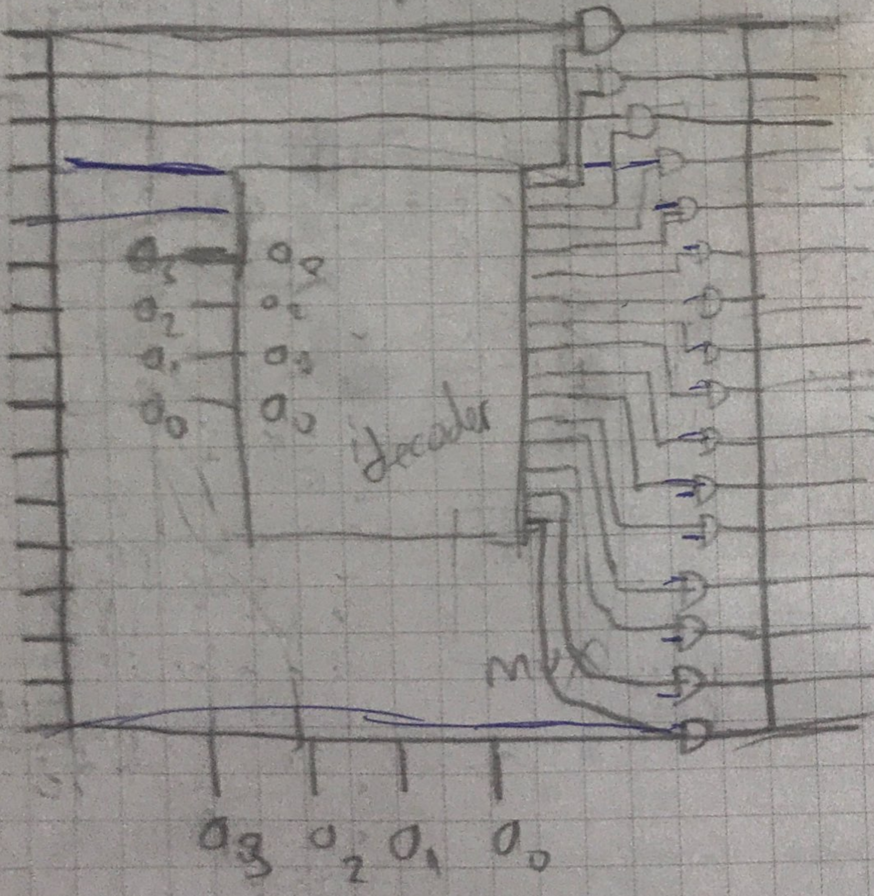
1) Optimize the following boolean functions F together with don't care conditions d.
$F(A,B,C,D) = m(0,1,7,13,15)$, $d(A,B,C,D) = m($[illegible]$)$



$BD + \overline{C}\,\overline{D}$

AND, OR, NOR

2) 16-1 mux using 4 to 16 line decoder and a 16×2 AND-OR



Randevu Programı

MAYIS MAY

P	S	Ç	P	C	C
		1	2	3	4
6	7	8	9	10	11
13	14	15	16	17	18
20	21	22	23	24	25
27	28	29	30	31	

25 CUMARTESİ SATURDAY

3) perform the arithmetic operations (−36) − (−24)

8 operation each one. If 0:+, 1:− (−35) − (−24)

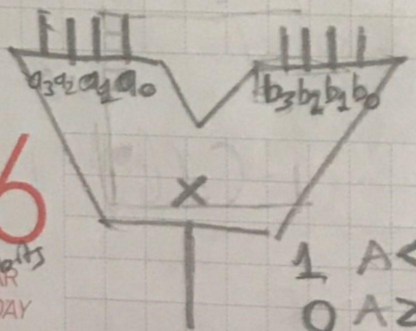
	1	2	
0 0 0	100100 + 011000	100011 + 011000	111100, 111011
0 0 1	100100 + 101000	0100011 + 1101000	001100, 001011
0 1 0	100100 − 011000	100011 − 011000	001100, 001011
0 1 1			111100, 111011
1 0 0	011100 + 011000	011101 + 011000	110100, 110101
1 0 1	011100 + 101000	1011101 + 1101000	101100, 000010
1 1 0			1011 001, 000100
1 1 1			110100, 110101

4)

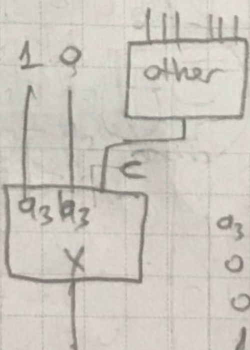
```
  011001      001111      001011      010010
+ 000111    + 010010    + 011010    ± 001000
  100000      100001      100101      011010
```

OF is 1 — no overflow

5) 4-bit unsigned number

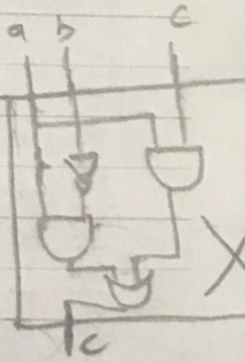


1 A<B
0 A≥B



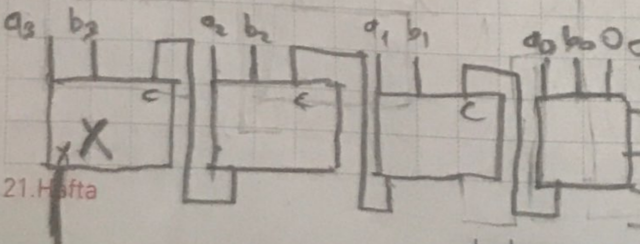
0 X X 0
1 0 X 1
1 0 X 1
0 1 X 0
1 1 1 1
1 1 0 0

a3	b3	c	
0	0	X	0
0	X	X	0
1	0	X	1
1	1	0	0
1	1	1	1



26 PAZAR SUNDAY

msb bits



ab \ c	0	1
00	0	0
01	0	0
11	0	1
10	1	1

$ac + a\bar{b}$

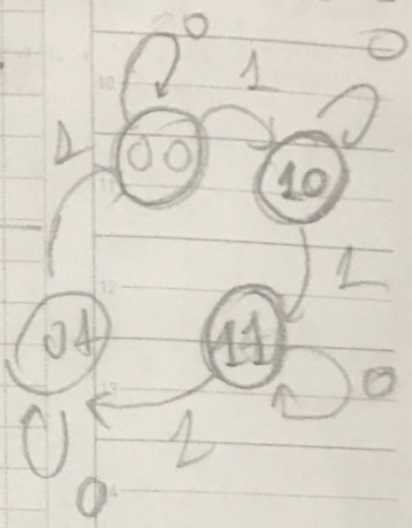
HAZİRAN JUNE

P	S	Ç	P	C	C	P
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

27
PAZARTESİ
MONDAY

6) Design a sequential circuit with two D flip-flops A and B and one input X. When X=0, the state of the circuit remains the same.

X	Q_A	Q_B	D_A	D_B
0	0	0	0	0
0	0	1	0	1
0	1	0	1	0
0	1	1	1	1
1	0	0	1	0
1	0	1	0	0
1	1	0	1	1
1	1	1	0	1



D_A

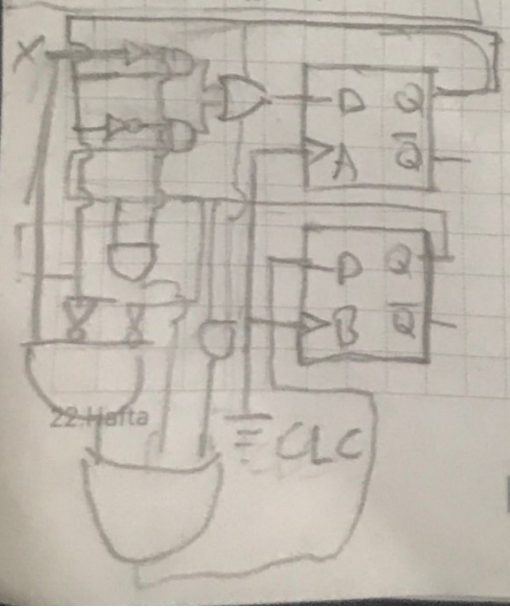
$Q_A Q_B$ \ X	0	1
00	0	0
01	1	1
11	1	0
10	1	0

$$P_A = \bar{Q}_A Q_B + Q_A \bar{X}$$

D_B

$Q_A Q_B$ \ X	0	1
00	0	1
01	1	0
11	1	1
10	0	0

$$P_B = \bar{Q}_A \bar{Q}_B X + Q_B \bar{X} + Q_A Q_B$$



MAYIS MAY

P	S	Ç	P	C	C	P
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

22. Hafta

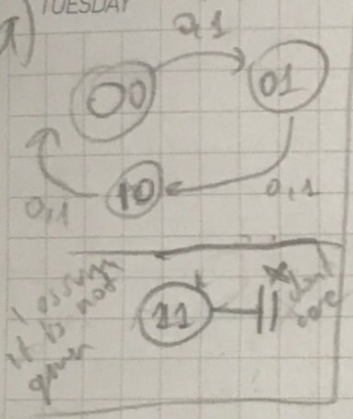
28 SALI TUESDAY

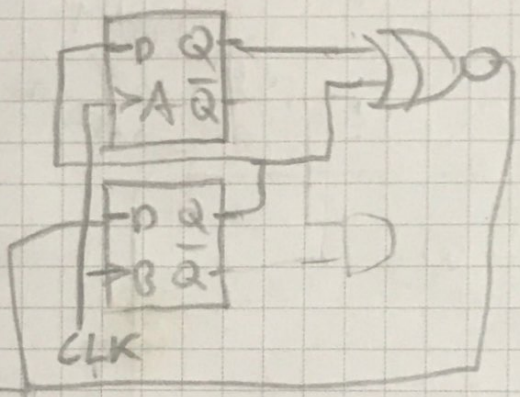
Randevu Programı

7) D-Flip flop and gates to design binary counter with each of the following repeated binary sequences.

(a) 0, 1, 2 (b) 0, 1, 2, 3, 4, 5

(a)





Q_A	Q_B	D_A	D_B
0	0	0	1
0	1	1	0
1	0	0	0
1	1	X	X

Q_A \ Q_B	0	1
0	0	1
1	0	X

$D_A = Q_B$

Q_A \ Q_B	0	1
0	1	0
1	0	X

$D_B = \bar{Q}_A \bar{Q}_B + Q_A Q_B$

1 1 1
0 0 1 → XNOR

HAZİRAN JUNE

P	S	Ç	P	C	C	P
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

29 ÇARŞAMBA WEDNESDAY

Randevu Programı

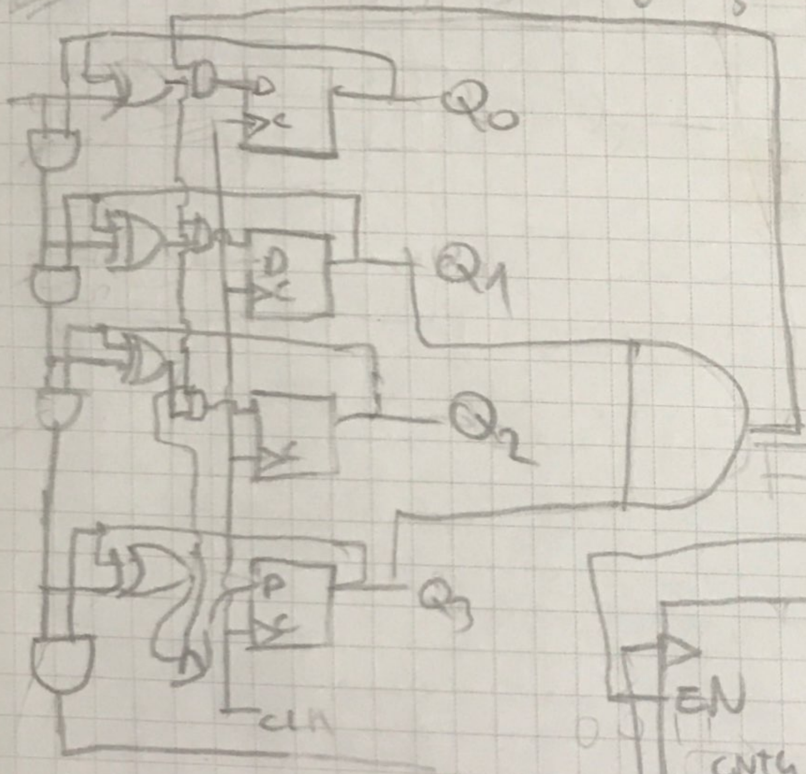
8) (a) Using the synchronous binary counter of figure 13 and an AND gate, construct a counter that counts from 0000 through 1010.
(b) Repeat for a count from 0000 to 1110. Minimize the number of inputs to the AND gate.

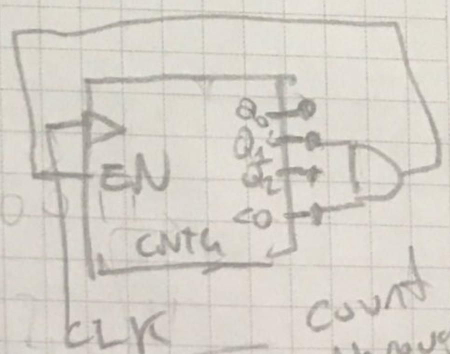
0101 → 0000

when this two appear ... reset

0110

a) repeatedly counting solution.





count through solution

10
11
12
13
14
15
16
17
18
19

MAYIS MAY

P	S	Ç	P	C	C	P
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		