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ID: 2018555301 1) Key: 21

2) $m = 210$ Hexadecimal: $210/16 = 13 + 2 = 00D2$

binary: $(D2)_{16} = (\underline{1101} \underline{0010})_2$

3) $m = 21 \bmod 15 = 6 < 7 \Rightarrow m = 6 + 7 = 13$

a) Unsigned range $[0, 2^{13}-1] \Rightarrow$ most negative number
 $= 0000000000000$

b) two's complement range $[-2^{12}, 2^{12}-1]$

\Rightarrow most negative number $= -2^{12}$

c) Sign magnitude $[-(2^{12}-1), 2^{12}-1]$

\Rightarrow most negative number $= -(2^{12}-1)$

4) $m = 21 \bmod 3 = 0 \Rightarrow x = 0 + 7 = 7$

$n = 21 \bmod 5 = 1 \Rightarrow y = 1 + 4 = 5$

$p = 21 \bmod 8 = 5 \Rightarrow z = 5 + 5 = 10$

$F(A, B, C, D) = \sum(0, 1, 5, 7, 9, 10) = \sum(0, 1, 5, 7, 10)$

MUHAMMAD NUR ALDIN HALUBI

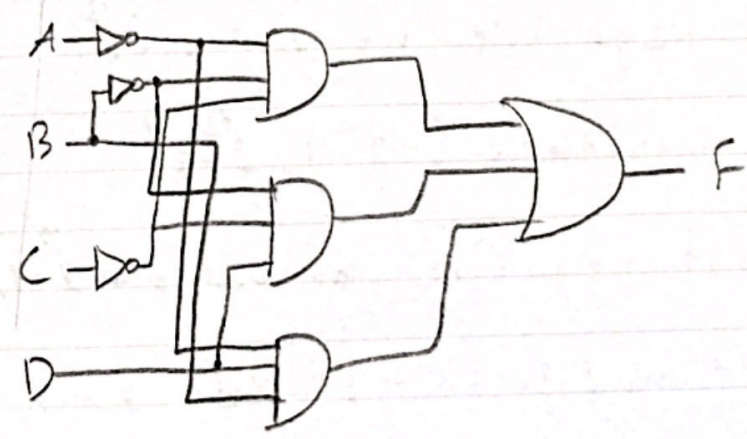
A	B	C	D
0	0	0	0
0	0	0	1
0	0	1	0
0	0	1	1
0	1	0	0
0	1	0	1
0	1	1	0
0	1	1	1
1	0	0	0
1	0	0	1
1	0	1	0
1	0	1	1
1	1	0	0
1	1	0	1
1	1	1	0
1	1	1	1

$m=0, n=1, P=5, K=7, Z=10$

$$\bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}\bar{B}\bar{C}D + \bar{A}\bar{B}C\bar{D} + \bar{A}BCD + A\bar{B}C\bar{D}$$

AB \ CD	00	01	11	10
00	1	0	0	0
01	1	1	0	1
11	0	1	0	0
10	0	0	0	0

$$F = \bar{A}\bar{B}\bar{C} + \bar{B}\bar{C}D + \bar{A}BD$$



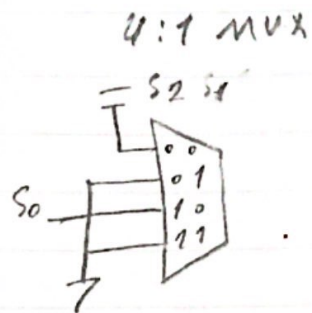
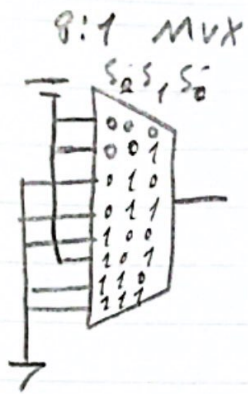
5) $m=0, n=1, P=5$ $m \bmod 3 = 0$
 $n \bmod 5 = 1$
 $P \bmod 8 = 5$

A	B	C
0	0	0
0	0	1
0	1	0
0	1	1
1	0	0
1	0	1

$$F = \bar{A}\bar{B}\bar{C} + \bar{A}\bar{B}C + A\bar{B}C$$

110
111

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S_2	S_1	S_0	F
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	0

S_2	S_1	F
0	0	1
0	1	0
1	0	S_0
1	1	0

6)