Suresh Yhap
Prof. Simha Phcture
CSCI 240 – Computer Organization and Assembly Language
Extra Credit
January 8, 2023

1. (1)

	x	y	z	O_5	O_4	O_3	O_2	O_1	O_0	
0	→ 0	0	0	0	0	0	0	0	0	← 0
1	→ 0	0	1	0	0	0	0	0	1	← 1
2	→ 0	1	0	0	0	0	1	0	0	← 4
3	→ 0	1	1	0	0	1	0	0	1	← 9
4	→ 1	0	0	0	1	0	0	0	0	← 16
5	→ 1	0	1	0	1	1	0	0	1	← 25
6	→ 1	1	0	1	0	0	1	0	0	← 36
7	→ 1	1	1	1	1	0	0	0	1	← Max $= 7^2 = 49 = 110001$

6 bits

(2) $O_5(x,y,z) = \Sigma(6,7)$

$= xyz' + xyz$

$O_4(x,y,z) = \Sigma(4,5,7)$

$= xy'z' + xy'z + xyz$

$O_3(x,y,z) = \Sigma(3,5)$

$= x'yz + xy'z$

$O_2(x,y,z) = \Sigma(2,6)$

$= x'yz' + xyz'$

$$O_1(x,y,z) = 0 \text{ (always zero)}$$

$$O_0(x,y,z) = \Sigma(1,3,5,7)$$

$$= x'y'z + x'yz + xy'z + xyz$$

2. $F(x,y,z) = xy + x'z$

(1) $F'(x,y,z) = (xy + x'z)'$

$$= (xy)'(x'z)'$$

$$= (x'+y')(x+z')$$

$$= x'x + x'z' + xy' + y'z'$$

$$= 0 + x'z' + xy' + y'z'$$

$$= x'z' + xy' + y'z'$$

(2) $F'(x,y,z) \Rightarrow (x+y)(x'+z)$

$$\Rightarrow = (x'+y')(x+z')$$

$$= \ldots$$

$$= x'z' + xy' + y'z'$$

(3) $F(x,y,z) = xy + x'z$

$$\downarrow \qquad \downarrow$$

$$6 \rightarrow 110 \qquad 001 \leftarrow 1$$

$$7 \rightarrow 111 \qquad 011 \leftarrow 3$$

$$F(x,y,z) = \Sigma(1,3,6,7)$$

$$F'(x,y,z) = \Sigma(0,2,4,5) \rightarrow x'y'z' + x'yz' + xy'z' + xy'z$$