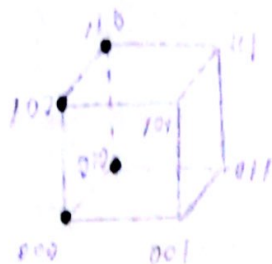Homework 9   蒋云翔 22 CST
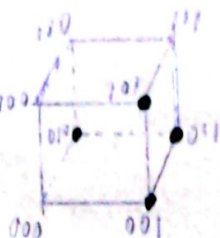
Section 12.1

Ex.8

(a) $F_{(x,y,z)} = \bar{z}$

(b) $F_{(x,y,z)} = \bar{x}y + \bar{y}z$

Ex.28.

(a) $x+y \Rightarrow$ dual: xy

(b) $\bar{x}\bar{y} \Rightarrow$ dual: $\bar{x}+\bar{y}$

(c) $xyz + \bar{x}\bar{y}\bar{z} \Rightarrow$ dual: $(x+y+z)(\bar{x}+\bar{y}+\bar{y})$

(d) $x\bar{z} + x\cdot0 + \bar{x}\cdot1 \Rightarrow$ ~~dual: $x+\bar{z}$ $x+\bar{z}$ $(x+0)$~~

dual: $(x+\bar{z})(x+0)(\bar{x}+1)$

Section 12.2

Ex.2

(a) Use Boolean identities to find it:

$$F_{(x,y)} = \bar{x}+y$$
$$= \bar{x}\cdot1 + y\cdot1$$
$$= \bar{x}(y+\bar{y}) + y\cdot(x+\bar{x})$$
$$= \bar{x}y + \bar{x}\bar{y} + xy + \bar{x}y$$
$$= \bar{x}y + \bar{x}\bar{y} + xy$$

(b) Using table: $F_{(x,y)} = x\bar{y}$

x	y	$x\bar{y}$
0	0	0
0	1	0
1	0	1
1	1	0

so : $F_{(x,y)} = x\bar{y}$

Ex.4

(a) when $x=0$, so we need to use complement of x, only under such situation can we the value 1:

$$F(x,y,z) = \bar{x}yz + \bar{x}y\bar{z} + \bar{x}\bar{y}z + \bar{x}\bar{y}\bar{z}$$

(b) X when $xy=0$, that is to say one of which is 0 or all of them are 0

So: $F(x,y,z) = \bar{x}yz + \bar{x}y\bar{z} + x\bar{y}z + x\bar{y}\bar{z} + \bar{x}\bar{y}z + \bar{x}\bar{y}\bar{z}$

Ex.8

when $x=y=1$ and $z=0$: $\bar{x}+\bar{y}+z = 0$

when $x=z=0$ and $y=1$: $x+\bar{y}+z=0$

when $x=y=z=0$: $x+y+z=0$

So the Boolean product is: $(\bar{x}+\bar{y}+z)(x+\bar{y}+z)(x+y+z)$
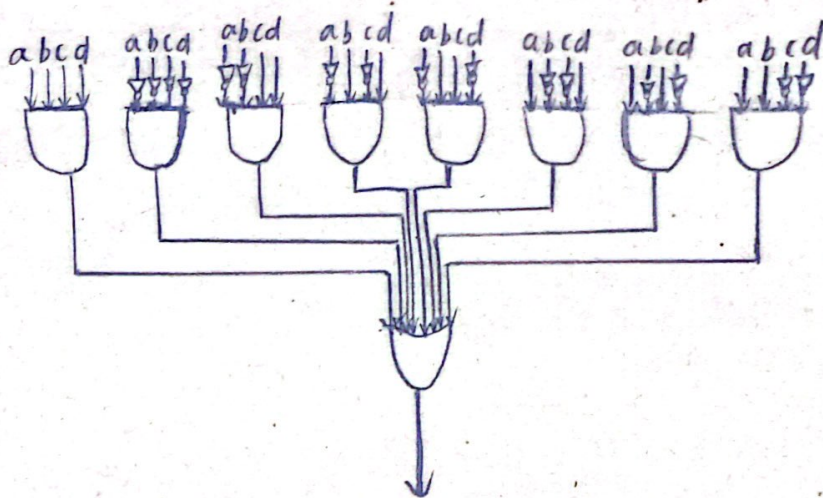
It is obvious that the result is 0

Ex.12

(a) $x+y+z \Rightarrow \bar{x}\,\bar{y}\,\bar{z}$

(b) $x+\bar{y}(\bar{x}+z) \Rightarrow (\bar{x}(\overline{\bar{y}(\bar{x}+z)})) \Rightarrow (\bar{x}(y(x\bar{z})))$

Section 12.3

Ex. 8

Ex. 10

half subtractor: