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EE 451

HOME WORK # 6

1. FIND THE KERNELS FOR THE FOLLOWING EQUATION AND USE THE BOOLEAN DIVISION METHOD TO CONVERT TO A SIMPLIFIED MULTILEVEL LOGIC FUNCTION

$$F = a\bar{c}\bar{g} + ahj + a\bar{g}d + bfd + x\bar{y} + bf\bar{c} + b\bar{c}\bar{g} + adf + a\bar{c}f + b\bar{g}d + bjh$$

kernels

4/4 $\frac{F}{a} = \bar{c}\bar{g} + hj + \bar{g}d + df + \bar{c}f = (\bar{c}+d)\,,\,(f+\bar{g})\,,\,h\,,\,j$

$\frac{F}{b} = fd + f\bar{c} + \bar{c}\bar{g} + \bar{g}d + jh = (\bar{c}+d)\,,\,(f+\bar{g})\,,\,h\,,\,j$

$\frac{F}{\bar{c}} = a\bar{g} + bf + b\bar{g} + af = (a+b)\,,\,(f+\bar{g})$

$\frac{F}{d} = a\bar{g} + bf + af + b\bar{g} = (a+b)\,,\,(f+\bar{g})$

$\frac{F}{f} = bd + b\bar{c} + ad + a\bar{c} = (a+b)\,,\,(\bar{c}+d)$

$\frac{F}{\bar{g}} = a\bar{c} + ad + b\bar{c} + bd = (a+b)\,,\,(\bar{c}+d)$

$\frac{F}{h} = aj + bj = (a+b)\,,\,j$

$\frac{F}{j} = ah + bh = (a+b)\,,\,h$

$\frac{F}{x} = \bar{y}$ $\qquad \frac{F}{\bar{y}} = x$

∴ THE KERNELS OF F ARE $(a+b)\,,\,(\bar{c}+d)\,,\,(f+\bar{g})\,,\,(h)(j)\,,\,(x)$ & $(\bar{y})$ 2/2

WE CAN CHOOSE ANY OF THE KERNEL AS THE DIVISOR OF F

LET'S CHOOSE $\boxed{p = a+b}$

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$$U = a+a+a+a+a+b+b+b+b+b$$

$$\boxed{U = a+b}$$

$$V = \bar{c}\bar{g} + hj + \bar{g}d + df + \bar{c}f + fd + f\bar{c} + \bar{c}\bar{g} + \bar{g}d + jh + x\bar{y}$$

$$\boxed{V = \bar{c}\bar{g} + hj + \bar{g}d + \bar{c}f + fd + x\bar{y}}$$

$$\boxed{V^a = \bar{c}\bar{g} + hj + \bar{g}d + df + \bar{c}f}$$

$$\boxed{V^b = fd + f\bar{c} + \bar{c}\bar{g} + \bar{g}d + jh}$$

$$\boxed{q \cdot V^a \cap V^b = \bar{c}\bar{g} + hj + \bar{g}d + df + \bar{c}f}$$

$$\boxed{r = F - qp = x\bar{y}}$$

$$\therefore F = r + pq$$

$$= (a+b)(\bar{c}\bar{g} + hj + \bar{g}d + df + \bar{c}f) + x\bar{y}$$

$$\boxed{F = (a+b)\left[(\bar{c}+d)(f+\bar{g}) + (hj)\right] + x\bar{y}}$$