# Assignment #4

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# Question # 1

Convert $AC + (A + \bar{B}C)(AC + B)$ to Standard Sop & Pos

expression = $AC + (A + \bar{B}C)(AC + B)$ , $D = \{A, B, C\}$

Simplify the expression

$= AC + (A \cdot AC + A \cdot B) + AC\bar{B}C + B \cdot \bar{B}C$

$\therefore B \cdot \bar{B} = 0$ , $A \cdot AC = AC$

$\Rightarrow AC + AC + AB + A\bar{B}C + 0$

$\Rightarrow AC + AB + A\bar{B}C$

$\Rightarrow$ Now conver this expression into Standard Sop form

$\Rightarrow AC(B + \bar{B}) + AB(C + \bar{C}) + A\bar{B}C$

$\Rightarrow ACB + A\bar{B}C + ABC + AB\bar{C} + A\bar{B}C$

$\Rightarrow \boxed{ACB + A\bar{B}C + AB\bar{C}}$

↳ Standard Sop form

Now Converting to Standard Pos form

(eTake

$F(5,6,7) = ACB + A\bar{B}C + AB\bar{C}$

$\Sigma F(0,1,2,3,4) = \bar{A}\bar{B}\bar{C} + \bar{A}\bar{B}C + \bar{A}B\bar{C} + \bar{A}BC + A\bar{B}\bar{C}$

(Take whole Compliment)

$= \overline{\bar{A}\bar{B}\bar{C} + \bar{A}\bar{B}C + \bar{A}B\bar{C} + \bar{A}BC + A\bar{B}\bar{C}}$

$\Rightarrow \boxed{(A+B+C)(A+B+\bar{C})(A+\bar{B}+\overset{*}{C})(A+\bar{B}+\bar{C})(\bar{A}+B+C}$

↳ Standard Pos form

Question #2

Construct Sop & Pos from truth table

Sop:-

$$\bar{A}\bar{B}C + \bar{A}BC + A\bar{B}C$$

Pos:-

$$(A+B+C)(\bar{A}+\bar{B}+C)(\bar{A}+B+C)(\bar{A}+\bar{B}+C)(A+\bar{B}+\bar{C})$$

Now Sop- K-map)

| A\BC | $\bar{B}\bar{C}$ 00 | $\bar{B}C$ 01 | $BC$ 11 | $B\bar{C}$ 10 |
|------|------|------|------|------|
| 0 |  | 1 | 1 |  |
| 1 |  | 1 |  |  |

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

Now Pos-kmap

| A\BC | 00 | 01 | 11 | 10 |
|------|------|------|------|------|
| 0 | 0 |  |  |  |
| 1 | 0 |  |  | 0 |

$$out = (B+C)(\bar{A}+C)$$