

Lista 03

1) a) $(\overline{A+B}) + (\overline{A \cdot B} + \overline{B \cdot C})$

$(\overline{A \cdot B}) + [(\overline{A+B}) \cdot (\overline{B+C})]$

$\overline{A \cdot B} + (\overline{A+B}) \cdot (\overline{B+C})$

$\overline{A \cdot B} + \overline{A} \cdot (\overline{B+C}) + \overline{B} \cdot (\overline{B+C})$

$\overline{A \cdot B} + \overline{A} \cdot \overline{B} + \overline{A} \cdot C + \overline{B} \cdot \overline{B} + \overline{B} \cdot C$

$(\overline{A \cdot B}) + \overline{A} \cdot \overline{B} + \overline{A} \cdot C + \overline{B} + \overline{B} \cdot C$

$\overline{A \cdot B} + \overline{A} \cdot \overline{B} + \overline{A} \cdot C + \overline{B}$

$\overline{A \cdot B} + \overline{B} + \overline{B} \cdot A + \overline{A} \cdot C$

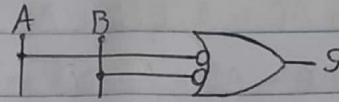
$\overline{A \cdot B} + \overline{B} + \overline{A} \cdot C$

$\overline{B} + \overline{B} \cdot \overline{A} + \overline{A} \cdot C$

$\overline{B} + \overline{A} + \overline{A} \cdot C$

$\overline{B} + \overline{A}$

$\overline{A} + \overline{B}$



b) $(B+\overline{D}) \cdot (\overline{A}+C) \cdot (\overline{B}+\overline{C}) \cdot (A+D)$

$(B+\overline{D}) \cdot (\overline{B}+\overline{C}) \cdot (\overline{A}+C) \cdot (A+D)$

$[B(\overline{B}+\overline{C}) + \overline{D}(\overline{B}+\overline{C})] \cdot [\overline{A}(A+D) + C(A+D)]$

$[B\overline{B} + B\overline{C} + \overline{D}\overline{B} + \overline{D}\overline{C}] \cdot [\overline{A}A + \overline{A}D + CA + CD]$

$[0 + B\overline{C} + \overline{D}\overline{B} + \overline{D}\overline{C}] \cdot [0 + \overline{A}D + CA + CD]$

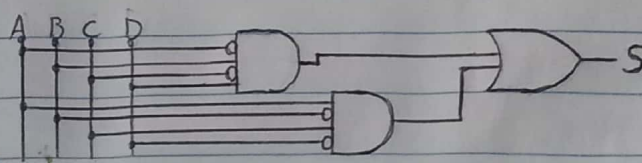
$[B\overline{C} + \overline{D}\overline{B} + \overline{D}\overline{C}] \cdot [\overline{A}D + CA + CD]$

$B\overline{C} \cdot [\overline{A}D + CA + CD] + \overline{D}\overline{B} \cdot [\overline{A}D + CA + CD] + \overline{D}\overline{C} \cdot [\overline{A}D + CA + CD]$

$[B\overline{C}\overline{A}D + B\overline{C}CA + B\overline{C}CD + \overline{D}\overline{B}\overline{A}D + \overline{D}\overline{B}CA + \overline{D}\overline{B}CD + \overline{D}\overline{C}\overline{A}D + \overline{D}\overline{C}CA + \overline{D}\overline{C}CD]$

$\overline{A}B\overline{C}D + 0 + 0 + \overline{A}\overline{D} + \overline{A}B\overline{C}\overline{D} + 0 + 0 + 0 + 0$

$\overline{A}B\overline{C}D + \overline{A}B\overline{C}\overline{D}$



$$c) [C.D.\bar{E} + \overline{B.C}].A + [(\overline{B+D}) + (B+D)].A$$

$$[C.D.\bar{E} + \bar{B} + \bar{C}].A + [\bar{B}.\bar{D} + B + D].A$$

$$A.C.D.\bar{E} + A\bar{B} + A\bar{C} + A.\bar{B}.\bar{D} + AB + AD$$

$$A\bar{B} + A\bar{B}.\bar{D} + A\bar{B} + AD + A.C.D.\bar{E} + A\bar{C}$$

$$A\bar{B} + AB + AD + A.C.D.\bar{E} + A\bar{C}$$

$$A(\bar{B} + B) + AD + ADC\bar{E} + A\bar{C}$$

$$A.1 + AD + A\bar{C}$$

$$A + AD + A\bar{C}$$

$$A \rightarrow S$$

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

$$A$$

$$② a) Z = A.\bar{B}.\bar{C} + A.\bar{B}.C + \bar{A}.B.C + \bar{A}.\bar{B}.C$$

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

$$Z = A.[\bar{B}(\bar{C} + C)] + \bar{A}.[C.(B + \bar{B})]$$

$$Z = A.[\bar{B}.1] + \bar{A}.[C.1]$$

$$Z = A.\bar{B} + \bar{A}.C$$

$$b) N = (x_1 + x_2).(\bar{x}_1 + x_1.x_2) + (\bar{x}_2 + x_2.\bar{x}_2)$$

$$N = x_1(\bar{x}_1 + x_1.x_2) + x_2(\bar{x}_1 + x_1.x_2) + \bar{x}_2$$

$$N = x_1.\bar{x}_1 + x_1.x_1.x_2 + \bar{x}_1.x_2 + x_1.x_2.x_2 + \bar{x}_2$$

$$N = 0 + x_1.x_2 + \bar{x}_1.x_2 + x_1.x_2 + \bar{x}_2$$

$$N = x_1.x_2 + \bar{x}_1.x_2 + \bar{x}_2$$

$$N = x_2(x_1 + \bar{x}_1) + \bar{x}_2$$

$$N = x_2.1 + \bar{x}_2$$

$$N = x_2 + \bar{x}_2$$

$$N = 1$$

$$e) Y = \bar{A}.B.\bar{C}.D + \bar{A}.B.\bar{C}.D + B.C.\bar{D} + A.\bar{B}.D$$

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

$$d) W = A_1.\bar{A}_2.A_3 + A_1.A_3 + \bar{A}_2.A_1.A_3 + A_1.A_3$$

$$W = A_1.\bar{A}_2.A_3 + A_1.A_3 + A_1.A_3$$

$$W = A_1.A_3 + A_1.A_3 + A_1.A_3$$

$$W = A_1.A_3 + A_1.A_3$$

$$W = A_1(A_3 + A_3)$$

$$2) G = \underline{X_1 + \bar{X}_2} + \underline{X_1.X_2 + \bar{X}_1.X_2 + \bar{X}_1.X_2}$$

$$G = X_1(X_2 + X_2) + \bar{X}_1(X_2 + \bar{X}_2)$$

$$G = X_1(1) + \bar{X}_1(1)$$

$$G = X_1 + \bar{X}_1$$

$$G = 1$$

$$1) H = (A + B + C).(A + \bar{B} + \bar{C}).A$$

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

$$H = (A + B + C).(0 + A\bar{B} + A\bar{C})$$

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

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

$$H = A\bar{A}\bar{B} + A\bar{A}\bar{C} + AB\bar{B} + AB\bar{C} + A\bar{B}C + A\bar{C}C$$

$$H = A\bar{B} + A\bar{C} + 0 + AB\bar{C} + A\bar{B}C + 0$$

$$H = A\bar{B} + A\bar{C} + AB\bar{C} + A\bar{B}C$$

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

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

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

$$\begin{aligned}
 g) S &= A.B.\bar{C} + \bar{A}.\bar{B}.C + A.B.C + \bar{A}.B.C + \bar{A}.B.\bar{C} \\
 S &= AB\bar{C} + ABC + \bar{A}Bc + \bar{A}B\bar{C} + \bar{A}Bc \\
 S &= AB(\bar{C}+C) + \bar{A}B(C+\bar{C}) + \bar{A}Bc \\
 S &= AB.1 + \bar{A}B.1 + \bar{A}Bc \\
 S &= BA + B\bar{A} + \bar{A}Bc \\
 S &= B(A+\bar{A}) + \bar{A}Bc \\
 S &= B.1 + \bar{A}Bc \\
 S &= B + \bar{B}AC \\
 S &= B + \bar{A}C
 \end{aligned}$$

$$\begin{aligned}
 h) S &= A.B.\bar{C}.D + \bar{A}.\bar{B}.C.D + AB\bar{C}\bar{D} + \bar{A}.B.C.\bar{D} + A.B.C.\bar{D} + A.\bar{B}.C.\bar{D} + A.B.C.D \\
 S &= AB\bar{C}\bar{D} + AB\bar{C}\bar{D} + AB\bar{C}D + AB\bar{C}D + \bar{A}B\bar{C}\bar{D} + \bar{A}B\bar{C}\bar{D} + \bar{A}B\bar{C}\bar{D} + A\bar{B}C\bar{D} \\
 S &= AB\bar{C}(D+\bar{D}) + A\bar{B}C(D+\bar{D}) + \bar{A}\bar{D}C(\bar{B}+B) + A\bar{B}C\bar{D} \\
 S &= AB\bar{C}.1 + A\bar{B}C.1 + \bar{A}\bar{D}C.1 + A\bar{B}C\bar{D} \\
 S &= AB\bar{C} + A\bar{B}C + \bar{A}\bar{D}C + A\bar{B}C\bar{D} \\
 S &= AB(\bar{C}+C) + \bar{A}\bar{D}C + A\bar{B}C\bar{D} \\
 S &= AB.1 + \bar{C}\bar{D}(\bar{A}+A\bar{B}) \\
 S &= AB + \bar{C}\bar{D}(\bar{A}+\bar{B}) \\
 S &= AB + \bar{A}\bar{C}\bar{D} + \bar{B}C\bar{D}
 \end{aligned}$$

$$\begin{aligned}
 i) S &= \bar{A}.B + A.\bar{B} + A.\bar{C} + B.\bar{C} + B\bar{D} \\
 S &= A(\bar{B}+\bar{C}) + B(\bar{C}+\bar{D}) + \bar{A}B
 \end{aligned}$$

$$\begin{aligned}
 j) K &= A.(B+C) + B.(C+D) + \bar{A}.\bar{B}.D \\
 K &= AB+AC+BC+BD+\bar{A}\bar{B}D \\
 K &= AB+AC+BC+D(B+\bar{B}\bar{A}) \\
 K &= AB+AC+BC+D(B+\bar{A}) \\
 K &= AB+AC+BC+BD+\bar{A}D \\
 K &= B(A+C+D) + \bar{A}D + AC
 \end{aligned}$$

$$1) S = A.(B+C) + B.(C+D) + \bar{A}.\bar{B}.\bar{C}.D$$

$$S = AB + AC + BC + BD + \bar{A}\bar{B}\bar{C}D$$

$$S = AB + AC + BC + D(B + \bar{B}\bar{A}\bar{C})$$

$$S = AB + AC + BC + D(B + \bar{A}\bar{C})$$

$$S = AB + AC + BC + BD + \bar{A}\bar{C}D$$

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

$$③ \begin{array}{cccc|c} A & B & C & D & S \\ 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 & 1 \\ 0 & 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 & 1 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 1 & 0 \\ 0 & 1 & 1 & 0 & 0 \\ 0 & 1 & 1 & 1 & 0 \\ 1 & 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & 1 & 1 \\ 1 & 0 & 1 & 0 & 0 \\ 1 & 0 & 1 & 1 & 0 \\ 1 & 1 & 0 & 0 & 0 \\ 1 & 1 & 0 & 1 & 1 \\ 1 & 1 & 1 & 0 & 1 \\ 1 & 1 & 1 & 1 & 1 \end{array}$$

$$S = \bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}\bar{B}\bar{C}D + \bar{A}\bar{B}C\bar{D} + \bar{A}\bar{B}CD + \bar{A}B\bar{C}\bar{D} + \bar{A}B\bar{C}D + \bar{A}B\bar{C}\bar{D} + \bar{A}B\bar{C}D$$

$$S = \bar{A}\bar{B}(\bar{C}\bar{D} + \bar{C}D + C\bar{D} + CD) + \bar{A}\bar{B}(\bar{C}\bar{D} + \bar{C}D) +$$

$$AB(\bar{C}\bar{D} + C\bar{D} + C\bar{D} + CD)$$

$$\bar{A}\bar{B}(\bar{C}\bar{D} + \bar{C}D + C\bar{D} + CD) + \bar{A}\bar{B}[\bar{C}(\bar{D} + D) + C(\bar{D} + D)] + AB[\bar{C}(\bar{D} + D) + C(\bar{D} + D)]$$

$$AB[\bar{C}(\bar{D} + D) + C(\bar{D} + D)]$$

$$S = \bar{A}\bar{B}(\bar{C}.1 + C.1) + \bar{A}\bar{B}[\bar{C}(\bar{D}.1 + D.1) + C(\bar{D}.1 + D.1)] + AB[\bar{C}(\bar{D}.1 + D.1) + C(\bar{D}.1 + D.1)]$$

$$S = \bar{A}\bar{B}(\bar{C} + C) + \bar{A}\bar{B}(\bar{C} + C) + AB(\bar{D} + D + C)$$

$$S = \bar{A}\bar{B}.1 + \bar{A}\bar{B}\bar{C} + AB(\bar{D} + C)$$

$$S = \bar{A}\bar{B} + \bar{A}\bar{B}\bar{C} + AB\bar{D} + ABC$$

$$S = \bar{A}\bar{B} + \bar{A}\bar{B}\bar{C} + AB(C + D)$$

$$S = \bar{B}(\bar{A} + \bar{A}\bar{C}) + AB(C + D)$$

$$S = \bar{B}(\bar{A} + \bar{C}) + AB(C + D)$$

$$S = \bar{A}\bar{B} + \bar{B}\bar{C} + AB(C + D)$$

$$S = \bar{A}\bar{B} + \bar{B}\bar{C} + AB(C + D)$$

$$S = \bar{A}\bar{B} + \bar{B}\bar{C} + AB(C + D)$$

$$S = \bar{A}\bar{B} + \bar{B}\bar{C} + AB(C + D)$$

$$S = \bar{A}\bar{B} + \bar{B}\bar{C} + AB(C + D)$$

$$S = \bar{A}\bar{B} + \bar{B}\bar{C} + AB(C + D)$$

$$S = \bar{A}\bar{B} + \bar{B}\bar{C} + AB(C + D)$$

$$S = \bar{A}\bar{B} + \bar{B}\bar{C} + AB(C + D)$$



④ D V S T	L	$L = \bar{D}\bar{V}ST + D\bar{V}\bar{S}\bar{T} + D\bar{V}S\bar{T} + D\bar{V}S\bar{T} +$
0 0 0 0	0	$DV\bar{S}\bar{T} + DV\bar{S}\bar{T} + DV\bar{S}\bar{T} + DV\bar{S}\bar{T}$
0 0 0 1	0	$L = \bar{D}\bar{V}ST + D\bar{V}\bar{S}\bar{T} + \bar{S}\bar{T} + ST + DV(\bar{S}\bar{T} + \bar{S}\bar{T} +$
0 0 1 0	0	$\bar{S}\bar{T} + ST)$
0 0 1 1	0	$L = D\bar{V}[T(\bar{S} + S) + \bar{S}\bar{T}] + D\bar{V}[\bar{S}(\bar{T} + T) + \bar{S}(\bar{T}$
0 1 0 0	0	$+ T)] + \bar{D}\bar{V}ST$
0 1 0 1	0	$L = D\bar{V}(T, 1 + \bar{S}\bar{T}) + D\bar{V}(\bar{S}, 1 + S, 1) + \bar{D}\bar{V}ST$
0 1 1 0	0	$L = D\bar{V}(T + \bar{S}\bar{T}) + D\bar{V}(\bar{S} + S) + \bar{D}\bar{V}ST$
0 1 1 1	1	$L = D\bar{V}(T + S) + D\bar{V}, 1 + \bar{D}\bar{V}ST$
1 0 0 0	0	$L = D\bar{V}T + D\bar{V}\bar{S} + D\bar{V} + \bar{D}\bar{V}ST$
1 0 0 1	1	$L = D[\bar{N}(T + S) + V] + \bar{D}\bar{V}ST$
1 0 1 0	1	$L = D(V + S + T) + \bar{D}\bar{V}ST$
1 0 1 1	1	$L = D\bar{V} + D\bar{S} + DT + \bar{D}\bar{V}ST$
1 1 0 0	1	$L = V(D + \bar{D}ST) + D\bar{S} + DT$
1 1 0 1	1	$L = V(D + ST) + D\bar{S} + DT$
1 1 1 0	1	$L = VD + VST + D\bar{S} + DT$
1 1 1 1	1	$L = D\bar{V} + D\bar{S} + DT + VST$

