ENEL 353 Section 02 Lecture

Mon Sept 23 2019

Quiz 1, tomorrow

- Covers numbers and codes, including binary addition
- does not cover logic gates

Assignment boxes are moving from ICT to ENA block on Wed Sept 25

- items handed into ICT boxes will be collected, not lost!
- for ENEL 353 B04, Lab 1 due date is Thu Sept 26, 1:00 PM

Set 3, Slide 8

$A, \bar{A}, B, \bar{B}$ are literals.

The others are not literals.

Slide 10

products: $\bar{A}$, AB, $\bar{A}B\bar{C}$, C

not products: $A+B$, $AB+B\bar{C}$

Slide 11 For variables A, B, C there are $2^3 = 8$ minterms, and each literal can be in true or complementary form.

The minterms are:

$\bar{A}\bar{B}\bar{C}$, $\bar{A}\bar{B}C$, $\bar{A}B\bar{C}$, $\bar{A}BC$, $A\bar{B}\bar{C}$, $A\bar{B}C$, $AB\bar{C}$, ABC

Slide 12

Maxterms for input variables A, B

There are $2^2 = 4$ ... $A+B$, $A+\bar{B}$, $\bar{A}+B$, $\bar{A}+\bar{B}$

Slide 14

$$AB + BC = (AB) + (BC)$$

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

Slide 18 Proof that $(XY)Z = X(YZ)$

We can do the proof by checking all possible combinations of values for X, Y and Z.

The name of this method of proof is proof by perfect induction.

X	Y	Z	XY	(XY)Z	YZ	X(YZ)
0	0	0	0	0	0	0
0	0	1	0	0	0	0
0	1	0	0	0	0	0
0	1	1	0	0	1	0
1	0	0	0	0	0	0
1	0	1	0	0	0	0
1	1	0	1	0	0	0
1	1	1	1	1	1	1

The columns for $(XY)Z$ and $X(YZ)$ match exactly, so the result is proved.

ENEL 353
Sept 23 2019
3 of 4

Slide 20 - Which are SOP?

1. Yes. It's a single product.
2. Yes. Sum of 3 products
3. Yes. Sum of 2 products.
4. Yes. Sum of 4 products.
5. No. $\bar{B}\bar{C} + BC$ is SOP. A is SOP
   But the whole thing is not SOP.
6. No. It's the NOT of an SOP expression

Slide 21

5 and 6 - No way! They are not even SOP, so can't be canonical SOP

Only #4 is SOP canonical

1, 2, 3 are SOP, but have products that are not minterms.

Slide 22

$F = \overline{A \oplus B}$

Step 1 : Truth table, with extra column for true minterms.

A	B	true minterm	F
0	0	$\bar{A}\,\bar{B}$	1
0	1	$\bar{A}\,B$	0
1	0	$A\,\bar{B}$	0
1	1	$A\,B$	1

Step 2

$F = \bar{A}\bar{B} + AB$