The Terminology of Digital Logic

Here is a short list of terms associated with Boolean algebra and switching theory. While not directly required for doing labs or doing a lot of circuit design, they are the minimum for understanding and discussing such design at a more abstract level. They are the core vocabulary for logic minimization. As such, I talk about them in class and will expect you to know their meaning at least for exams.

Combinational system: a logical system with no memory for which the output depends only on the current input values.

Truth table: tabular list of all possible input combinations for a combinational system and the corresponding output(s)

Logical Product: a logical term that is the Boolean AND of two or more variables, e.g., $A \cdot \overline{B} \cdot C$.

Logical Sum: the Boolean OR of two or more variables, e.g., $A + \overline{B} + C$.

SOP - (Sum of Products)

POS - (Product of Sums)

Canonical SOP: a sum of products, the terms of which are all minterms, that is, each term contains all input variables with or without the complement operator.

Canonical POS: a product of sums, the factors of which are all maxterms, that is, each term includes all input variables OR'd together with or without the complement operator on each variable, e.g., $\left(A + \overline{B} + C\right) \cdot \left(\overline{A} + B + \overline{C}\right) \cdot \left(A + \overline{B} + \overline{C}\right)$

Maxterm - a logical sum of all variables with or without the complement

Minterm - a logical product of all variables with or without the complement

Included minterm - one of the terms in a canonical SOP; Included maxterm

Excluded minterm - a minterm not in a particular canonical SOP; Excluded maxterm

Cover (*verb*)

Implicant: a Boolean product that if true implies that a larger combinational expression is also true

Prime implicant

Essential prime

Non-essential prime

Included non-essential prime

Gray code

Don't Care(s)

K-map or Karnaugh map