Standard Forms and De Morgans Theorem

Boolean equations may be written in many forms. Two forms are commonly used. These are the Sum of Products (SOP) form and the Product of sums (POS) form. Any logical expression can be reduced to either of these two forms.

Sum of Products: A SOP form consists of any number of AND logic gates whose inputs are tied to the function's inputs and the complement of those inputs. The outputs of the ANDs are then connected to the inputs of an OR gate whose output is the output of the function. The SOP name is a result of the OR function being the Boolean equivalent of summation and the AND is the boolean equivalent of multiplication. An example of the SOP expression would look like this:



The gate implementation would look like this:



Sum of Products: A POS form consists of any number of OR logic gates whose inputs are tied to the function's inputs and the complement of those inputs. The outputs of the ORs are then connected to the inputs of an AND gate whose output is the output of the function. An example of the SOP expression would look like this:





