Combinational Logic

Digital electronics operate with only 2 voltage levels of interest: a high voltage and a low voltage. All other voltage levels are temporary and occur while transitioning between the values. Low and high values are 0 and 1, respectively.

Computational "blocks" perform a set of logical functions in either a combinational or sequential way.

Block Diagram
1 scan

Combinational vs. Sequential
- Combinational has no feedback and outputs are defined completely in terms of the inputs
- Sequential has feedback, the system goes through different states and the new state depends on inputs and current state

Combinatinal vs Sequential
1 scan

Combinational logic blocks can be completely specified by defining the output values for each possible set of input values. This is done using a truth table.

For a logic table with n inputs, there are 2^n entries in the truth table each entry specifies the value of all the outputs for that particular input combination

If there are 2 input variables, there should be $2^2=4$ entries in the truth table.

Boolean Algebra deals with a set of variables (operands) combined with a set of operators.
- Variables denoted by X, Y, Z, etc.
- Variables take binary values: either 0 or 1 (false or true)

Logic Gates
3 scans

Adder
4 scans