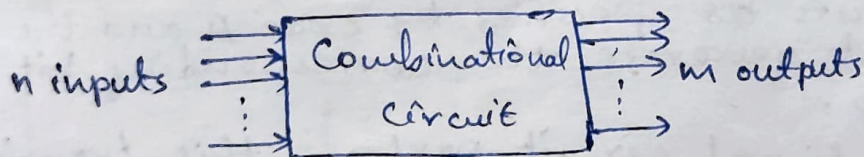


Combinational Circuits

- A combinational circuit consists of an interconnection of logic gates.
- Combinational logic gates react to the values of the signals at their inputs and produce the value of the output signal, transforming binary information from the given input data to a required output data.
- A block diagram of a combinational circuit consists of n input binary variables come from an external source; the m output variables are produced by the internal combinational logic circuit and go to an external destination.
- Each input and output variable are interpreted to be a binary signal that represents logic 1 and logic 0.
- In many applications, the source and destination are storage registers.
- If the registers are included with the combinational gates, then the total circuit must be considered to be a sequential circuit.



- For n input variables there are 2^n possible combinations of the binary inputs. For each possible input combination, there is one possible value for each output variable. Thus, a combinational circuit can be specified with a truth table that lists the output values for each combination of input variables.

Design Procedure

- The design of combinational circuits starts from the specification of the design objectives and ends in a logic circuit diagram or a set of Boolean functions from which the logic diagram can be obtained.
- The procedure involves the following steps:

- (1) From the specifications of the circuit, determine the required number of inputs and outputs and assign a symbol to each.
- (2) Derive the truth table that defines the required relationship between inputs and outputs.
- (3) Obtain the simplified Boolean functions for each output as a function of the input variables.
- (4) Draw the logic diagram and verify the correctness of the design.