# DIGITAL CIRCUITS

The practical approach - The introduction

- The Digital circuits are broadly classified to combinational and sequential circuits.
- Now we will discuss the combinational circuits first.
- Combinational circuits: They are the circuits in which the operation and the result are pre-defined and do not have memory. The current state of output would depend upon the current input.
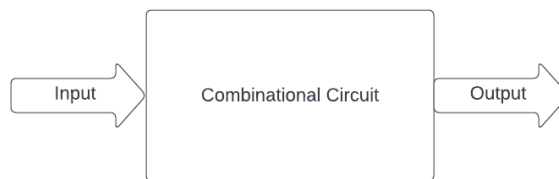
- A practice question: Is ROM a combinational/sequential circuit?
  - The answer is , Though ROM stores the value, once the data is programmed it cannot be modified that is the data is predefined. So the ROM is a combinational circuit.

- **Design rules of combinational circuits**
  - Identify the number of input and output lines
  - Construct a truth table between input and output
  - Develop the boolean expression for output variable
  - If possible reduce the expression by K-Map
  - Implement the circuit diagram by using logic gates
  - In IC , the universal gates are widely used to implement the logic and the logic gate that is the hybrid logic must be translated to universal gate

- The documentation involves design of the circuits by the above steps with explanation

- Now let us consider a basic project that involves addition of two bit and their implementation using the rules stated above in the following documents

- The following circuits will be implemented
  - Half adder
  - Full adder
  - Half Subractor
  - Full Subractor

- Serial Adder
- Parallel Adder