- **Minimization with Theorem**
  - **The Map Method (The Karnaugh Map Method)**

→ The complexity of the digital logic gates that implement a Boolean function is directly related to the complexity of the algebraic expression from which the function is implemented.

→ Boolean expressions may be simplified by algebraic means with basic theorems and properties of Boolean algebra. But it lacks specific rules to predict each succeeding step in the manipulative process.

→ The map method provides a simple, straightforward procedure for minimizing Boolean functions. This method may be regarded as a pictorial form of a truth table.

→ The map method is also known as the Karnaugh map or K-map.

→ A K-map is a diagram made up of squares, with each square representing one minterm of the function that is to be minimized.

→ A Boolean function is recognized graphically in the map from the area enclosed by those squares whose minterms are included in the function.

→ By recognizing various patterns, the user can derive alternative algebraic expressions for the same function, from which the simplest can be selected.

→ The simplified expressions produced by the map are always in one of the two standard forms: sum of products or product of sums.

→ The simplest expression is not unique sometimes, so it is possible to find two or more expressions that satisfy the minimization criteria.