Lecture 6 - 1

## Lecture 6

# **Optimal Karnaugh-Map Simplification**

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#### **Key Terms for Systematic Map Simplification**

- 1-point a cell marked 1
- Implicant a product term that covers at least one 1-point but does not include any 0-point.



#### **Prime Implicant**

A product term obtained by combining the maximum possible number of adjacent squares in the map.



### **Essential Prime Implicant**

A prime implicant is *essential* if a 1-point is covered by only that prime implicant.



#### **How to Find Essential Prime Implicants Easily?**

1. Circle all prime implicants.

2. Remove a prime implicant if it does not include any 1-point that is coved by the prime implicant only.

3. Remaining circles are essential prime implicants.



#### **Find the Optimal SOP**

1) Include essential prime implicant (EPI) in the expression.



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2) For a 1-point that is not contained in an EPI, one prime implicant must be chosen to be included in the expression.



Occasionally, there may be more than one way of combining squares, and each combination may produce an equally simplified expression.

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