Quaid-e-Awam University of Engineering, Science and Technology


بسم الله الرحمن الرحيم

*In the name of Allah, the Most Merciful, the Most Kind*

Date: 22-10-2021

# BCS 103
# Digital Logic & Computer Architecture

**Lecture 21 and 22**

**Department of Computer Science**

# IN THE LAST LECTURE

We have discussed

- **Sum of Product (minterm)**
- **Product of Sum (Maxterm)**
- **Karnaugh Map (2-variables)**

# TODAY

We will discuss about

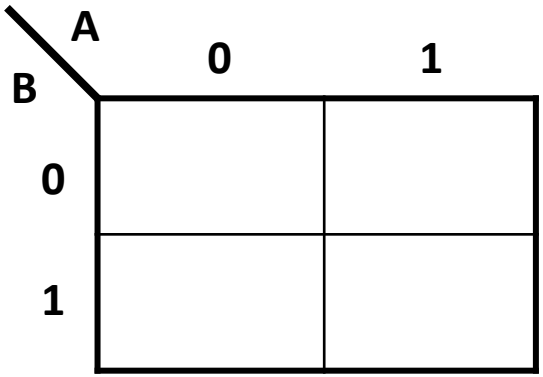
- **Karnaugh Map (3 variables)**

# Karnaugh Maps

- 2 variables Karnaugh map

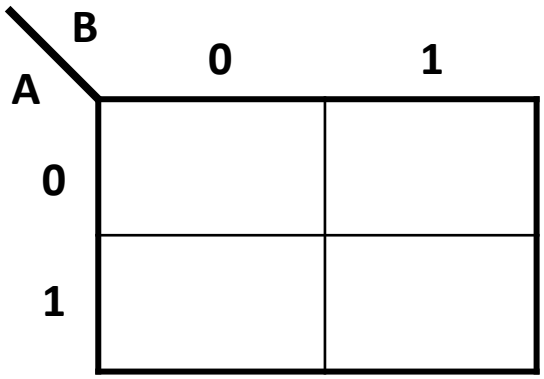
Q: Simplify the following expressions

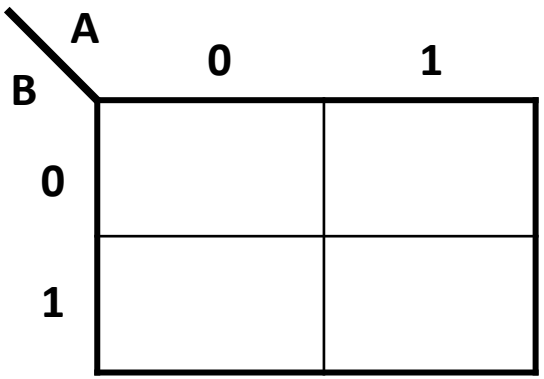
1. AB’ + AB + A’B’
2. A’B’ + A’B
3. A’B + AB
4. A’B’ + A’B + AB’ + AB



- 2 variables Karnaugh map

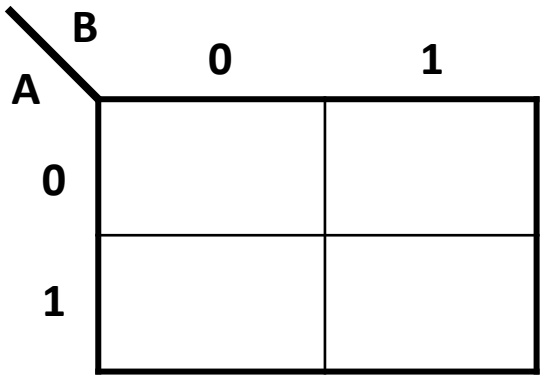
AB’ + AB + A’B’

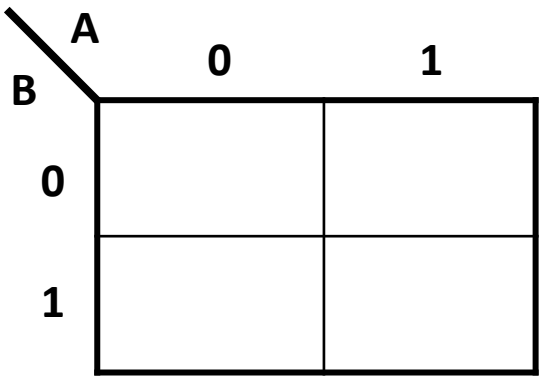


- 2 variables Karnaugh map

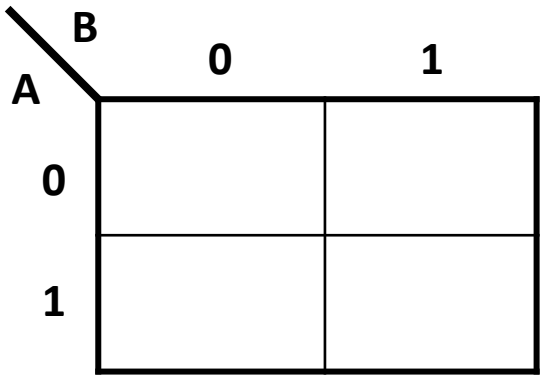
A’B’ + A’B

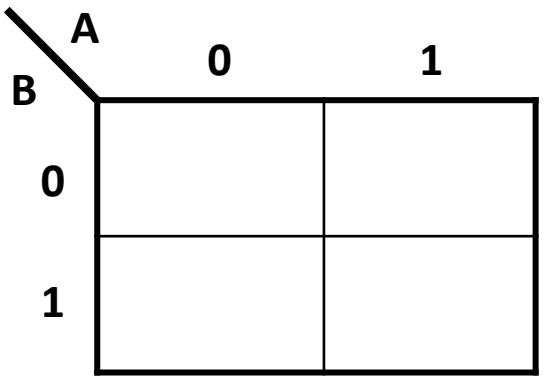


- 2 variables Karnaugh map

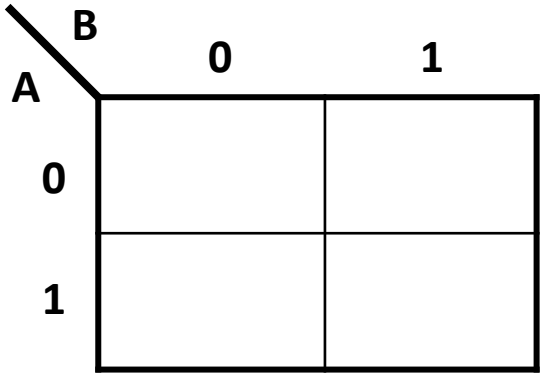
A’B + AB

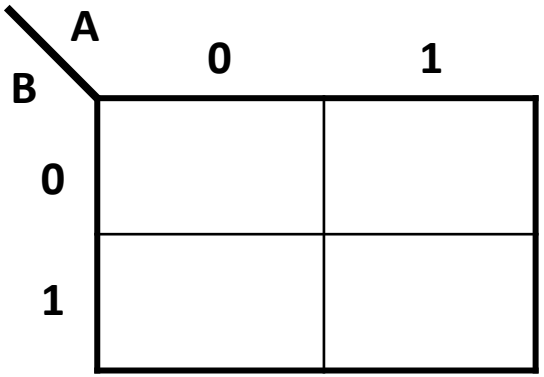


- 2 variables Karnaugh map

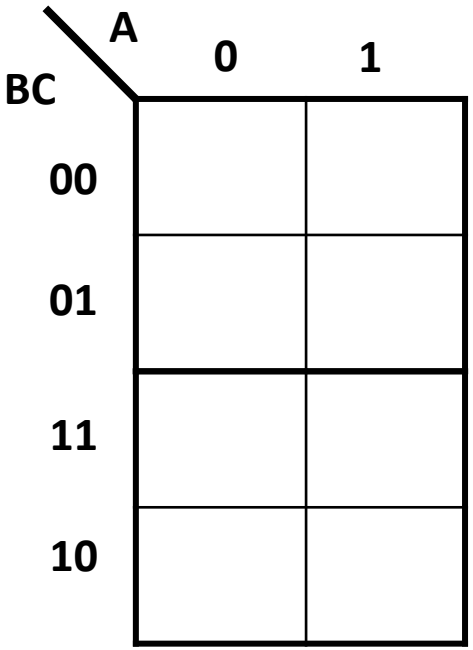
A’B’ + A’B + AB’ + AB

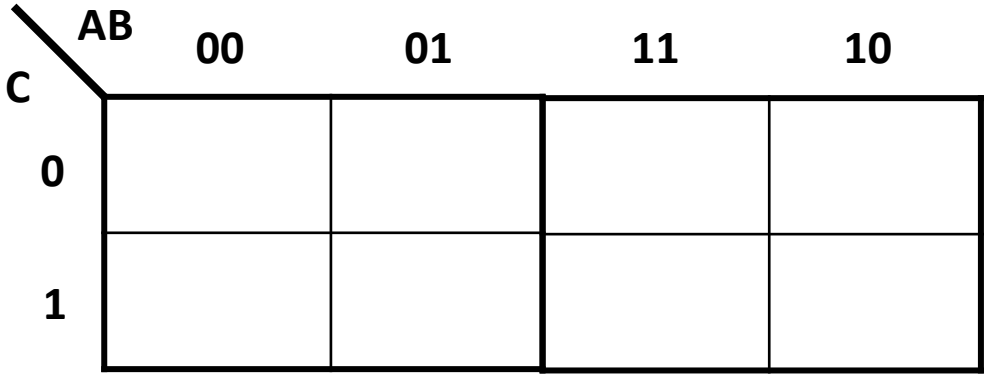


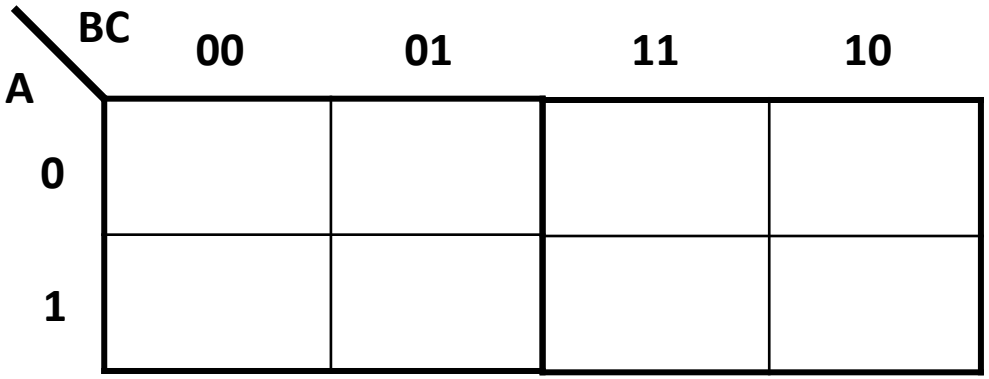



# Karnaugh Maps

- 3 variables Karnaugh map

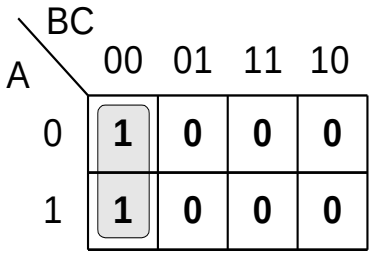


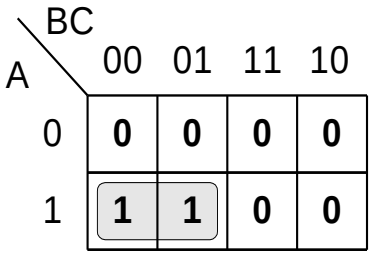



# Three-Variable K-Maps

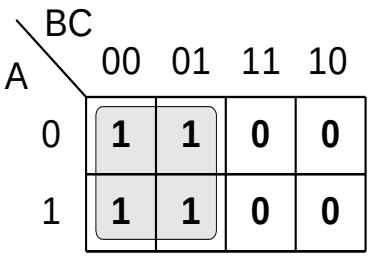
$f = \sum(0,4) = \overline{B}\,\overline{C}$



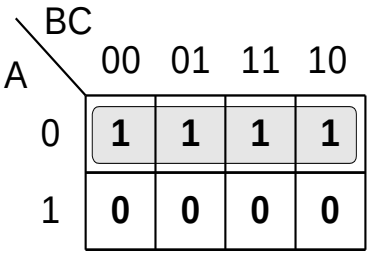

$f = \sum(4,5) = A\,\overline{B}$



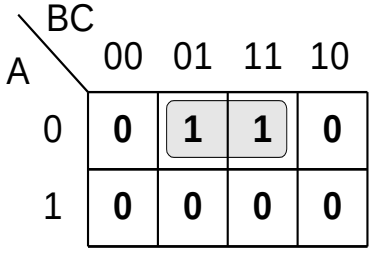

$f = \sum(0,1,4,5) = \overline{B}$



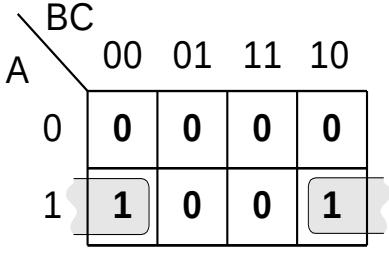

$f = \sum(0,1,2,3) = \overline{A}$



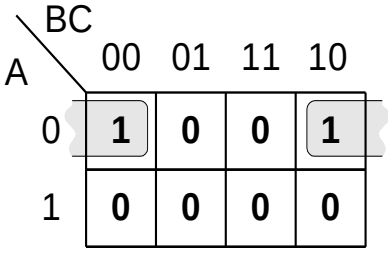

$f = \sum(0,4) = \overline{A}\,C$



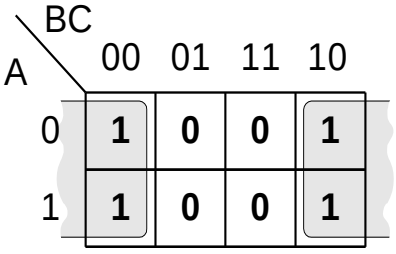

$f = \sum(4,6) = A\,\overline{C}$



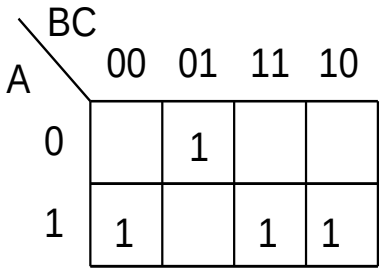

$f = \sum(0,2) = \overline{A}\,\overline{C}$

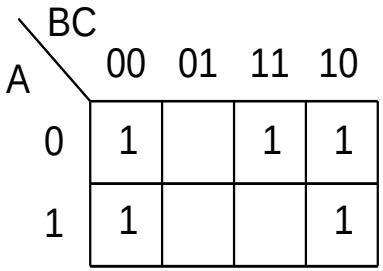


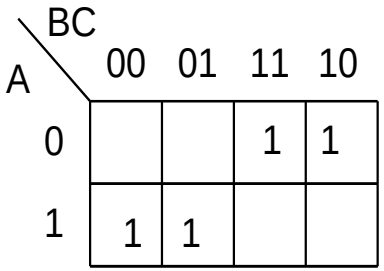

$f = \sum(0,2,4,6) = \overline{C}$

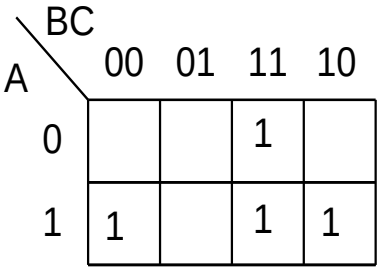


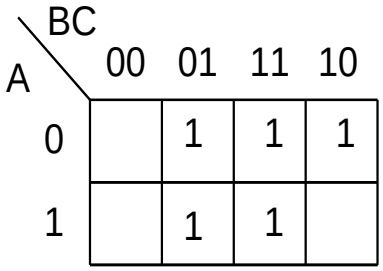
# Three-Variable K-Maps

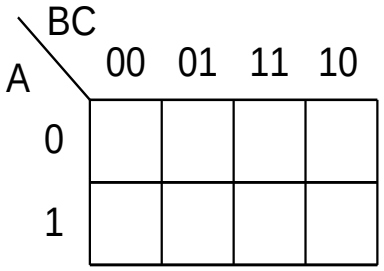


# Three-Variable K-Maps

**AB’C + A’B’C + ABC + AB + AC + BC**

# Three-Variable K-Maps

**A’B’C’ + A’B’ + AB’C + A’B + AC’ + AB’C’**

# Thanks