BRAC UNIVERSITY
Inspiring Excellence

Department of Computer Science and Engineering

Course Code:CSE260	Credits: 1.5
Course Name: Digital Logic Design	Semester: Sum'18

Lab 03

Applications of Kmap method

I. Topic Overview:

The students will investigate the rules of kmap for familiarizing themselves with the simplification process of complex equations/functions. They will also gain the experience of working with practical circuits. After this lab, they will be able to simplify a complex function using kmap. There are in total of 2 problems in this lab.

II. Lesson Fit:

The Boolean algebra is pre-requisite to this lab.

III. Learning Outcome:

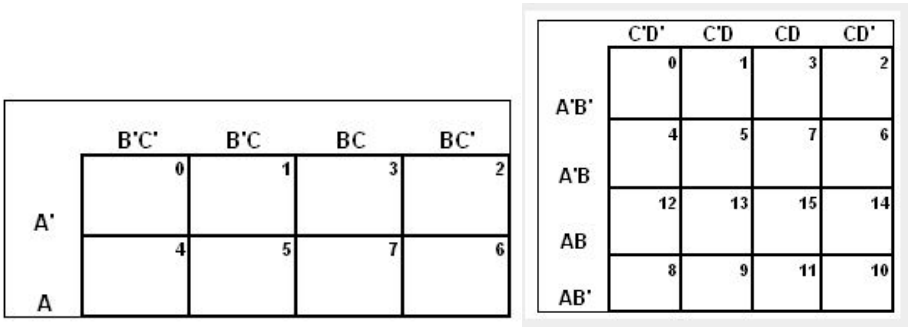
After this lecture, the students will be able to:

a. investigate the rules of kmap
b. gain experience working with practical circuits
c. simplify a complex function using kmap

IV. Anticipated Challenges and Possible Solutions

a. Students will make mistakes while making the table of kmap

Solutions:



	B'C'	B'C	BC	BC'
A'	0	1	3	2
A	4	5	7	6

	C'D'	C'D	CD	CD'
A'B'	0	1	3	2
A'B	4	5	7	6
AB	12	13	15	14
AB'	8	9	11	10

V. Acceptance and Evaluation

Students will show their progress as they complete each step of the problem. They will be marked according to their lab performance. Students have to show the outputs of both the problems from the constructed circuit otherwise full marks will not be given.

VI. Activity Detail

a. Hour: 1

Discussion:

Explain how the kmap works for 3 bit and 4 bit numbers. Show them few examples how to simplify complex equations. Ask them to simplify Task1 & Task2 using kmap. Ask them also to make a truth table which will be help them for checking and understanding the circuit constructed from the breadboard later in the Laboratory.

Problem Task:

Functions from Task1 & Task2.

b. Hour: 2

Discussion:

Check the simplified functions fromTask1 and Task2. After checking the simplified functions, ask them to construct the Circuit.

Problem Task:

Construct the Circuit of functions from Task1 & Task2 on the breadboard of AT-700.

c. Hour: 3

Discussion: Check their progress in implementation.

Problem Task:

Construct the Circuit of functions from Task1 & Task2

VII. Home tasks:

As a part of their home tasks students need to submit a lab report covering the followings

i. Name of the Experiment

ii. Objective

iii. Required Components and Equipments

iv. Experimental Setup (You must draw the IC configurations)

v. Results (Truth Table) and Discussions. The discussions part must include the answers of the following questions:

a) What is the Boolean Equation for the output?
b) Simplify the Boolean equation.
c) The circuit's function is identical to a single gate. Write down the name of that gate.

Lab 3 Activity List

Required Components and Equipments:

1. AT-700 Portable Analog/Digital Laboratory
2. AND, OR, NOT, XOR IC

Task1:

$F(A,B,C,D)=\sum(1,3,9,10,13,15)$

Task2:

$F(A,B,C,D)=\sum(1,4,10,15)+d(3,5,13,14)$

Procedure:

- ✓ Simplify the function using kmap and Construct the Circuit of these functions, on the breadboard of AT-700.
- ✓ Remember each IC's pin 14 connected to "+5V" position of DC Power Supply of AT-700, and pin 7 connected to "GND" position.
- ✓ Connect the inputs to Data switches and outputs to any position of LED Display.
- ✓ Find out the outputs for all possible combinations of input states.
- ✓ Write down the input-output in tabular form.