

**Department of Computer Science**  
**Forman Christian College**  
**(A Chartered University)**  
**Lahore**



**Digital Logic Design**  
**COMP 206**

# DIGITAL LOGIC DESIGN

## COMP 206

### LAB 08- RUBRIX

DESCRIPTION	MARKS ALLOCATED
Attendance	5%
Proper handling of components, ICs and wiring	20%
Hardware wired completely( for all circuits)	30%
Expression	10%
Circuit Diagram	15%
Data Table 4	20%

**Marks will be deducted in case if students have not completely and correctly filled the data tables.**

**Note that these marks are max in each category. We may assign less than the given percentage of marks in case students have not successfully completed all the requirements.**

**This lab is time constrained. Please note that you must finish your work and submitted duly filled handout to the lab engineer within given time.**

## LAB 08

### IMPLEMENTATION OF A DECODER

**Name:**

**Roll No:**

**Date:**

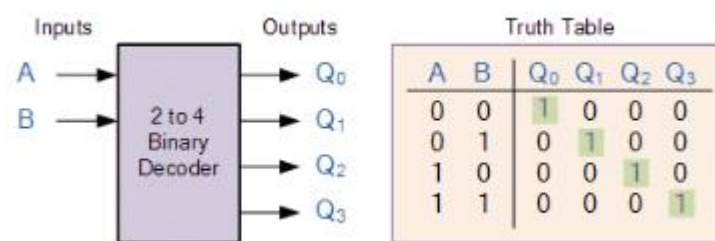
#### Learning Objectives:

By the end of this lab, you will be able to form a 2-to-4 binary decoder using basic AND, OR, NOT gates.

#### Background:

The name “Decoder” means to translate or decode coded information from one format into another, so a binary decoder transforms “ $n$ ” binary input signals into an equivalent code using  $2^n$  outputs.

**Binary Decoders** are another type of digital logic device that has inputs of 2-bit, 3-bit or 4-bit codes depending upon the number of data input lines, so a decoder that has a set of two or more bits will be defined as having an  $n$ -bit code, and therefore it will be possible to represent  $2^n$  possible values. Thus, a decoder generally decodes a binary value into a non-binary one by setting exactly one of its  $n$  outputs to logic “1”. Basic working of a 2—to-4 decoder is shown in the following figure:



**TASK 1:** Obtain expressions for the outputs

Q<sub>0</sub>, Q<sub>1</sub>, Q<sub>2</sub> and Q<sub>3</sub>.

**TASK 2:** Obtain circuit diagram for this decoder

**TASK 3:** Implement this decoder on Logisim and record your results in the following table:

A	B	Q0	Q1	Q2	Q3
0	0				
0	1				
1	0				
1	1				