EGE UNIVERSITY
LOGIC DESIGN LABORATORY
EXPERIMENT-4

Combinational Circuit Design

EXPERIMENTAL WORK

Design a combinational circuit that accepts 4-bit number (ABCD) and generates 3-bit binary number output (XYZ) that approximates the square root of the number. (*For example, if the square root is 3.5 or larger, give the result of 4. If the square root is <3.5 and >= 2.5, give a result of 3.*)

1- Fill the truth table and obtain the boolean functions for X, Y and Z outputs using Karnaugh maps.

TRUTH TABLE **KARNAUGH MAP OPTIMIZATION**

Inputs				Outputs		
A	B	C	D	X	Y	Z

X=

Y=

Z=

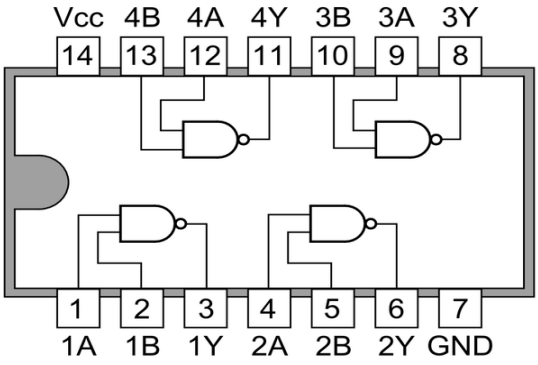
2- Draw the logic circuit diagram of the Boolean functions X, Y and Z

a) Using only NAND gates and inverters

b) Using only NOR gates and inverters

3- Implement the circuit using only 7400 NAND and 7404 NOT gates or 7402 NOR and 7404 NOT gates. Use switches for the inputs and connect the outputs to leds.

7400 Quad 2-input NAND Gates



7402 Quad 2-input NOR Gates