ASSIGNMENT-1
Designing XOR with NOR Gates

PRATHYUSHA KOREPU

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1 Introduction

1)Abstract—This manual shows how to implement XOR using NOR Gates through Arduino.

Connections :-

Arduino	2	GND
LED	+ve	-ve

1.1. XOR GATE :- The output is HIGH(1) if only if one of the inputs is HIGH.If both the inputs are LOW or HIGH, then the output is LOW(0).When the two inputs are different it produce HIGH value.

TRUTH TABLE :-

A	B	Q
0	0	0
0	1	1
1	0	1
1	1	0

Table-1

BOOLEAN EXPRESSION :-

$$Q = AB' + BA' \tag{1}$$

2. XOR with NOR Gates :-
$$Q = AB' + BA'$$
$$Q = A'.B + A.B' + A.A' + B.B'$$

$$Q = A'(A + B) + B'(A + B)$$
$$Q = (A + B)(A' + B') \quad (2)$$
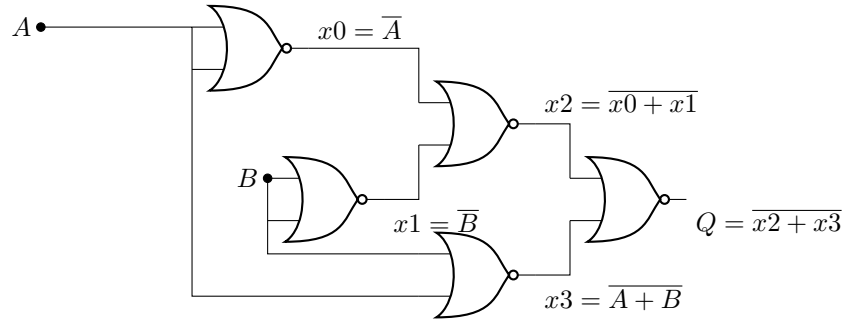Take complement on both sides to equation (2)
$$Q' = ((A + B)(A' + B'))'$$
$$Q' = (A + B)' + (A' + B')' \text{ (Demorgan's theorem) (3)}$$
Take complement on both sides to equation (3)
$$Q = ((A + B)' + (A' + B')')'$$

CIRCUIT DIAGRAM

Fig-1

$$X0 = A'$$
$$X1 = B'$$
$$X2 = (X0 + X1)'$$
$$X3 = (A + B)'$$
$$Q = (X2 + X3)'$$

Download the following code using the arduino IDE and execute
https://github.com/Prathyushakorepu/FWC