CDA 3201L – Computer Logic Design Laboratory
Lab Exercise 2

Combinational Logic Circuits (II)

Part A: $Z = XY'+X'Y$ Implement this Boolean expression using only NAND gates. Apply De Morgan's law and Boolean laws for the expression to represent it only using NAND operation. Your implementation should use the minimum number of gates (4 NAND gates) required.

Part B: Design a logic circuit for your car's signal lights as follows:
1) Left turning light is on when turning on left turn switch.
2) Right turning light is on when turning on right turn switch.
3) Taillights are on when hitting the break.
4) Both left turning light and right turning light are on when emergency switch is turned on.
5) The turning switches cannot control the turning lights when emergency switch is turned on.

IMPORTANT: Lab grade will depend on the working of the circuit and will be checked off by the lab instructor.

References:
"Fundamentals of Logic Design", 7th Edition, by Charles H. Roth Jr. and Larry L Kinney, 2014, ISBN-13: 978-1133628477 or ISBN-10: 1133628478, CENGAGE Learning, Stamford, CT, USA

Notes:
1. You can use http://en.wikipedia.org/wiki/List of 7400 series integrated circuits to find the TTL chip you need.
2. Datasheets of some commonly used TTL chips can be found at the following sites:
   - http://www.jameco.com
   - http://www.ti.com/sc/docs/psheets/databook.htm
   - http://www.datasheetcatalog.com/fairchildsemiconductor/1/