PHYS 2P30 Assignment #4 Due 2024-03-19

(3) ① Prove the following Boolean equalities

$A+\bar{A}B = A+B$; $AB+\bar{A}C = AB+BC+\bar{A}C$; $AB+A\bar{B}+\bar{A}B = A+B$

(3) ② Reduce to the simplest forms

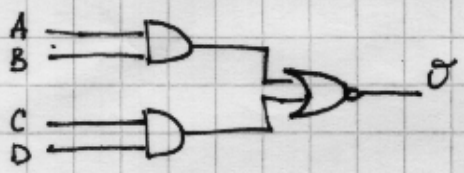
$ABCD+A\bar{B}CD$; $AB+\bar{A}C+A\bar{B}C(AB+C)$; $A+B\overline{(C+\bar{D}E)}$;

(4) ③ Implement the following using only NAND gates

$AB+\bar{A}B+A\bar{B}+\bar{A}\bar{B}$; $(AB+C)(AB+D)$; $(\bar{A}B)(AB)+AB$; $(1+B)(ABC)$

(2) ④ Implement AND, OR, NAND using only NOR gates

(3) ⑤



This is the so-called AND-or-Invert gate (AOI). Develop its truth table

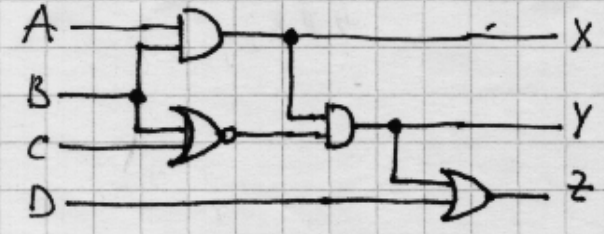
(3) ⑥ Convert the following numbers into decimal

$11010l_2$ 754_8 $A10E_{16}$

(4) ⑦ Convert the following numbers into binary

67_{10} 3625_{10} 635_8 $8FE_{16}$

(3) ⑧ Derive Boolean expressions to describe the operation of this circuit. Minimize these expressions by algebraic manipulation and hence simplify the circuit



(5) ⑨ Complete all Exercises-For-The-Students (EFTSs) in Section 14: pp. 14-9, 14-10, 14-14, 14-21