Worksheet 1

Computer Processors (COMP1212)

This worksheet is available in week 1 and will be discussed in week 2's tutorials. You should prepare your solutions to the questions, questions marked with (*) are more difficult and are for discussion in the tutorials.

1. What is the logic circuit symbol used to denote the following gates

   (a) And
   (b) Not
   (c) Or
   (d) Nand
   (e) Xor
   (f) Nor

2. For each of the following expressions construct:

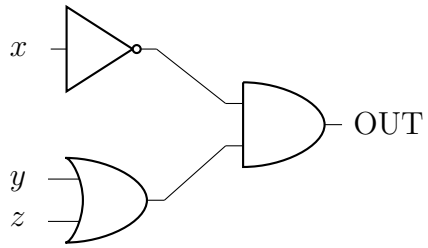
   - a truth table
   - a logic circuit diagram
   - an equivalent expression in CNF
   - an equivalent expression in DNF

   (a) $(x \wedge s) \vee (y \wedge \neg s)$
   (b) $x \wedge \neg s$
   (c) $x \wedge s$
   (d) $(x \vee y) \wedge \neg(x \wedge y)$
   (e) $\neg(x \wedge y)$
   (f) $\neg x \vee y$

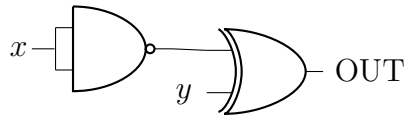
3. Construct using only nor gates the following gates

   - And
   - Not
   - Nand
   - Xor

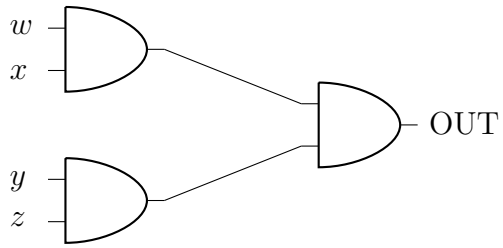
4. Construct boolean expressions which are equivalent to the logic circuits below and draw an equivalent logic circuit that only uses Nand gates.



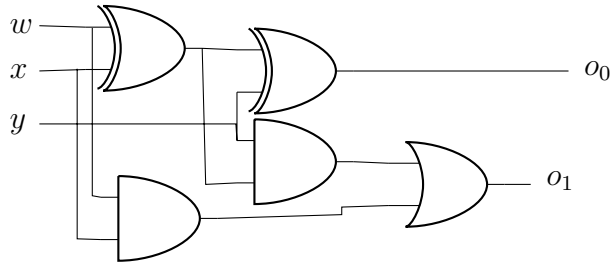
(a)



(b)



(c)



(d)