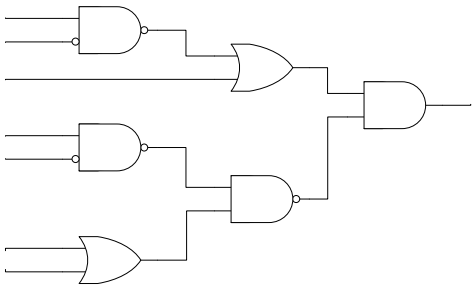
EECS 270

Homework #2

1. a) How many primitive gates (NAND, NOR, INV) are required to implement the circuit below?



   b) By moving bubbles around, reduce the number of primitive gates necessary for implementation as much as possible. How many gates are required for your new implementation? **(2)**

2. Use the theorems of switching algebra to simplify each of the following logic expressions: **(3)**

   a) F = A'BCD' + A'CE + B'E + DE

   b) F = A'BCDE + ABCDE + A'BCD'E + ABCD'E

   c) page 302, 4.6c

3. Page 302: a) 4.7c b) 4.7g c) 4.7f **(3)**

4. Page 302: a) 4.9c b) 4.9d c) 4.9e **(3)**

5. For the function F = XY' + X'Y, show whether the following statements are true or false: **(2)**

$$F = F^D$$
$$F^D = F'$$

6. How many unique functions of 2 input variables exist?

   How many of these functions are self-dual? (A function F is self-dual if $F = F^D$) **(2)**