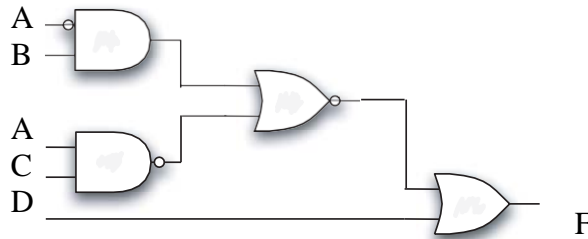


First Name: \_\_\_\_\_ Last Name: \_\_\_\_\_

For full credit, you need to show your work neatly and box your answers.

- Using AND and OR gates, draw the logic diagrams for the following Boolean expressions without expanding or simplifying them.
  - $Y = (A' + B')C + B(A + C)$
  - $W = (A + B')(C + D')$
- Write the Boolean expression equivalent to the following logic circuit. Do not simplify!



- Write a truth table for

$$F(A, B, C) = (A + \overline{B})(B + \overline{C})$$

- Find the dual of
  - $F = A'B + B'C' + D'$
  - $F(A, B, C) = (\overline{A + B})(B + \overline{C})$
- Find the complement of
  - $F = A'B + B'C' + D'$
  - $F(A, B, C) = (\overline{A + B})(B + \overline{C})$
- Demonstrate by means of truth tables the validity of the following identities
  - DeMorgan's law for three variables:  $(X + Y + Z)' = X'Y'Z'$  and  $(XYZ)' = X' + Y' + Z'$
  - $(X + Y)X = X$
- Simplify the following Boolean expression as much as possible.
  - $ABC + A'B + ABC'$
  - $(X + Y)'(X' + Y')$
  - $(BC' + A'D)(AB' + CD')$
  - $X'YZ + XZ$
  - $XY + X(WZ + WZ')$
- Reduce the following Boolean expression to the indicated number of literals:
  - $A'C' + ABC + AC'$  to three literals
  - $(A' + C)(A' + C')(A + B + C'D)$  to four literals
  - $A'B(D' + C'D) + B(A + A'CD)$  to one literal

Due Date: Thursday 9/20/2018