

Homework I

Tom Kelliher, CS 240

50 points, due Feb. 10

1. Use **truth tables** to verify each of the following:

- (a) DeMorgan's theorem for three variables: $\overline{XYZ} = \overline{X} + \overline{Y} + \overline{Z}$.
- (b) Identity 15 (from Sept. 12's notes).
- (c) $\overline{X}Y + \overline{Y}Z + X\overline{Z} = X\overline{Y} + Y\overline{Z} + \overline{X}Z$

2. Use **Boolean manipulation** to verify each of the following:

- (a) $\overline{X} \cdot \overline{Y} + \overline{X}Y + XY = \overline{X} + Y$
- (b) $\overline{A}B + \overline{B} \cdot \overline{C} + AB + \overline{B}C = 1$
- (c) $(X + Y)(X + \overline{Y}) = X$
- (d) $X(X + Y) = X$