Gate-Level Circuit Design

For each expression below, create a gate level implementation using only the specified types of gate. Use mixed logic notation (i.e., bubbled output go to bubbled inputs and non-bubbled outputs go to non-bubbled inputs). Do **not** assume you have the complements of the inputs.

$Out = AB + BC$ using only NAND gates

$Out = (A + B)(C + D)$ using only NOR gates

$Out = A + BC$ using only NAND and NOT gates

$Out = (A + B)(C + D)$ using only NOR gates

$Out = A \oplus B$ using NAND and NOT gates

$Out = AB + C(D + E)$ using NAND and NOT gates

$Out = A \oplus B$ using NOR and NOT gates

$Out = (A + B)(C\,\overline{D} + E)$ using NOR and NOT gates