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1. Simplify the following Boolean functions, using three-variable maps:
   (a) $F(x, y, z) = \sum(0, 2, 4, 5)$
   (b) $F(x, y, z) = \sum(0, 2, 4, 5, 6)$
   (c) $F(x, y, z) = \sum(0, 1, 2, 3, 5)$
   (d) $F(x, y, z) = \sum(1, 2, 3, 7)$
2. Simplify the following Boolean functions, using three-variable maps:
   (a) $F(x, y, z) = \sum(0, 1, 5, 7)$
   (b) $F(x, y, z) = \sum(1, 2, 3, 6, 7)$
3. Simplify the following Boolean expressions, using four-variable maps:
   (a) $A'B'C'D' + AC'D' + B'CD' + A'BCD + BC'D$
   (b) $x'z + w'xy' + w(x'y + xy')$
4. Simplify the following Boolean expressions, using four-variable maps:
   (a) $w'z + xz + x'y + wx'z$
   (b) $AB'C + B'C'D' + BCD + ACD' + A'B'C + A'BC'D$
5. Find all the prime implicants for the following Boolean functions, and determine which are essential:
   (a) $F(w, x, y, z) = \sum(0, 2, 4, 5, 6, 7, 8, 10, 13, 15)$
   (b) $F(A, B, C, D) = \sum(0, 2, 3, 5, 7, 8, 10, 11, 14, 15)$
6. Simplify the following Boolean functions:
   $F(A, B, C, D) = \prod(1, 3, 5, 7, 13, 15)$
7. Simplify the following expressions to (1) sum-of-products and (2) products-of-sums:
   $x'z' + y'z' + yz' + xy$
8. Draw a NAND logic diagram that implements the complement of the following function:
   $F(A, B, C, D) = \sum(0, 1, 2, 3, 6, 10, 11, 14)$