CS 228, Induction Exercises

Name:

Some questions are from Discrete Mathematics and It's Applications 7e by Kenneth Rosen.

Bit Strings

Prove that for any positive integer n, the number of distinct bit strings of length n is 2^n.

Divisibility

Prove that 2 divides $n^2 + n$ whenever n is a positive integer.
(Recall Theorem 1(i) from Section 4.1: If $a \mid b$ and $a \mid c$ then $a \mid (b + c)$.)

Tiling Rectangular Checkerboards

Let n be a positive integer. Show that every $2^n \times 3 \cdot 2^{n-1}$ sized checkerboard with one square removed can be tiled using a mix of dominoes and right-triominoes. (Use diagrams where appropriate.)