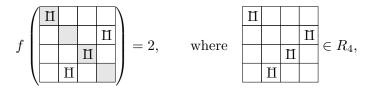
Math 2001: PHW11

1. From the book do:

- 2. Let R_n be the set of ways to place n non-attacking rooks on an $n \times n$ chess-board.
 - (a) Let $f: R_n \to \mathbb{Z}$ be given by

$$f(r)$$
 = number of rooks on the diagonal squares of r , for $r \in R_n$.

For example, if n = 4,



and I've shaded the diagonal squares.

- i. What is $f(R_5)$?
- ii. Is f injective?
- iii. Is f surjective?
- (b) Find an injective function $g: R_n \to \mathbb{Z}$ (without changing the sets R_n and \mathbb{Z}).