MATH 265H, FALL2022, HOMEWORK #12

1. Problems not from the book

Problem #1: Consider an "array" $\{a_{i,j,k}\}_{1\leq i,j,k\leq n}$, where each $a_{i,j,k}$ is equal to 1 or 0, with the additional property that this box does not contain "vertices of a box". Make sense of what this must mean and prove that there is $\alpha > 0$ such that the total numbers of 1s in this array does not exceed $10n^{3-\alpha}$. This is a generalization of the two-dimensional case you handled in Homework #5. In arbitrary dimensions this was done by Lisa Rosenfeld in her honors undergraduate thesis about 8 years ago.

2. Problems from the book

Chapter 6, problem 16

Chapter 7, problems 1, 2, 3, 4, 6, 7, 8. 9, 12