

HOMEWORK 12

Problem 1. Use the transfer matrix method to find the number of (a) n -letter words in the alphabet $\{a, b, c\}$ not containing subwords aa and bc ; (b) n -letter words in the alphabet $\{a, b\}$ not containing subwords aba and bab , (c) colorings of vertices of a regular n -gon in 3 colors so that two adjacent vertices have different colors (vertices are numbered).

Problem 2. How many are there ways to tile a rectangle $3 \times n$ by rectangles 1×2 ?

Problem 3. (a) How many are there permutations $\{a_1, \dots, a_n\}$ of the set $\{1, 2, \dots, n\}$ such that $|a_i - i| \leq 1$ for all $i = 1, 2, \dots, n$? (b) How many are there permutations $\{a_1, \dots, a_n\}$ of the set $\{1, 2, \dots, n\}$ such that $a_i - i$ has a residue 0, 1 or $n - 1$ modulo n , for all $i = 1, 2, \dots, n$?