

CSCE 222 Homework 5 (Due Apr. 10)

1. How many combinations are there to pick r objects from $2n$ objects numbered from 1 to $2n$ when repetitions are allowed and it is not true that both odd-numbered objects occur odd number of times and even-numbered objects occur even number of times?
2. How many permutations can be formed from $2n$ types of objects with n_1 objects of each odd-numbered type and n_2 objects of each even-numbered type and each permutation starts from an object of an odd-numbered type?
3. Find an explicit formula for the recurrence relation $a_n = ca_{n-1} + (c + 1)a_{n-2}$ where $c \neq -2$ with initial conditions $a_0 = 2$ and $a_1 = c$.
4. Solve the recurrence relation $f(n) = a^3 f(n/a^2) + a(n + 1)^2$ with $f(1) = 1$ and $a > 1$ by finding an expression for $f(n)$ in big-Oh notation.
5. Find the generating function to determine the number of ways to pick k objects from $2n$ objects when repetitions are allowed and the i th object appears at least $\lceil i/2 \rceil$ times for $1 \leq i \leq 2n$.