

21-301 Combinatorics  
Homework 2  
Due: Monday, September 11

1. Let  $M$  be a multiset consisting of two each of  $n$  types of letters. How many permutations of  $M$  are there in which no two consecutive letters are the same?
2. How many permutations  $\pi$  of  $[n]$  are there such that  $\pi(i) = j$  implies that  $\pi(j) \neq i$ . Here  $i \neq j$ .
3. How many ways are there of pairing  $n$  boys with  $n$  girls so that the  $i$ th tallest boy is not paired with the  $i$ th tallest girl, for all  $i = 1, 2, \dots, n$ .