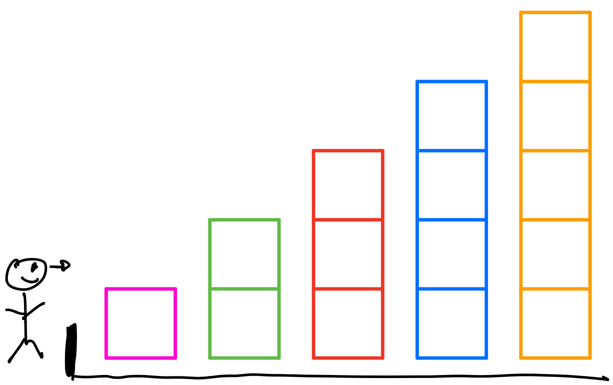
MATH 532 Discussion FRIDAY 28/08

Suppose you have n blocks, with block i height i.



Given a positive integer k, let $f(n,k)$ denote the number of ways to line up the blocks so that looking from the left side exactly k are visible.

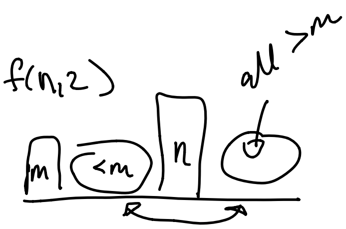
Figure something out about $f(n,k)$.

Breakout Room 1
Jishnu
Robel
Xiao

Breakout Room 2
Bo
Sam
Taorui

Breakout Room 3
Bixing
Haoyang
Shannon
William

$f(n,2)$

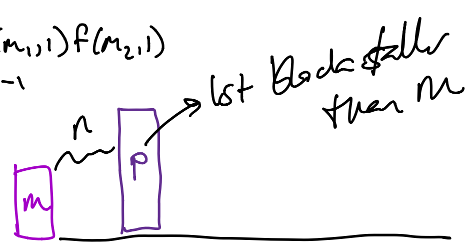


$\sum_{m=1}^{n-1} (n-2)!$

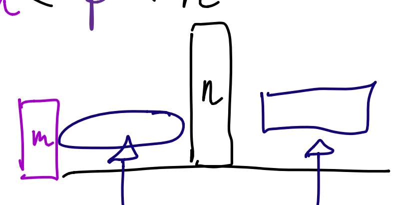
put blocks other than m,n in any order behind $\underline{m}$.

$f(n,1) = (n-1)!$

$f(n,2) = \sum_{m_1+m_2=n-1} f(m_1,1) f(m_2,1)$



$m < p < n$



$$\sum_{m=1}^{n-1} \left(\sum_{i=0}^{m-1} \binom{m-1}{i} i! \, (n-i-2)! \right)$$

(signless) STIRLING NUMBERS OF THE FIRST KIND

$C(n,k) = \#\{w \in S_n \mid w \text{ has } k \text{ cycles}\}.$

STIRLING NUMBERS OF THE FIRST KIND

$$s(n,k) = (-1)^k c(n,k)$$

Ex. $(312)(54)$ $\quad$ $(\underline{3}\,1\,2)(\underline{5}\,4)(\underline{8}\,6\,7)$

Canonical cycle notation

$w = \gamma_1 \gamma_2 \cdots \gamma_k$ $\quad$ each γ_i is a cycle

write γ_i w/ largest # in that cycle.

(312)

(321)

order γ_i's based on 1st letter, smallest first.