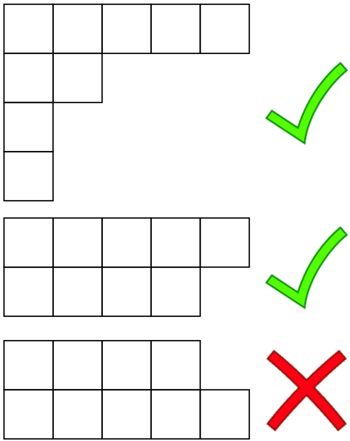
What is...the Robinson–Schensted correspondence?

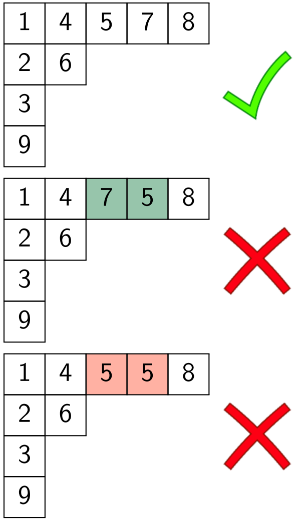
Or: Boxes and permutations

Young diagrams (YD)



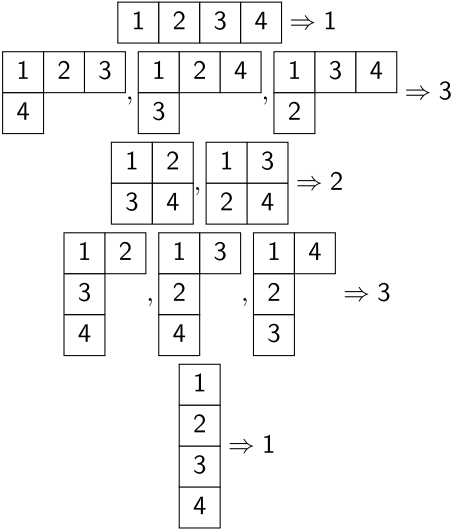
- Young diagram = boxes arranged in left-justified nonincreasing rows
- Young diagrams are everywhere in combinatorics
- Careful There are three conventions: English, French and Russian

Young tableaux (YT)



- Tableaux = fill boxes with numbers $\{1, ..., n\}$
- Standard tableaux = non-repeating, numbers in rows and columns increase

A funny count



- $|S_n| = n! = \sum_{\text{YD of } n} |\text{YT}|^2 \Rightarrow$ pairs of YT count permutations
- Task Find an explicit bijection

Enter, the theorem

There is an explicit bijection

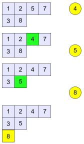
Permutations $\to$ pairs of YT (P, Q)

with an explicit inverse

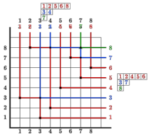
Permutations $\leftarrow$ pairs of YT (P, Q)

- The algorithm is best explained via example (next slide)

bumping:



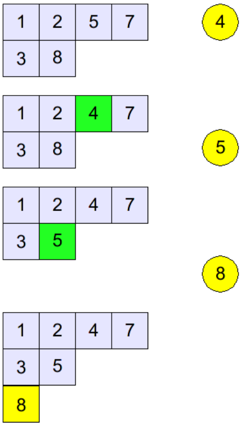
geometric:



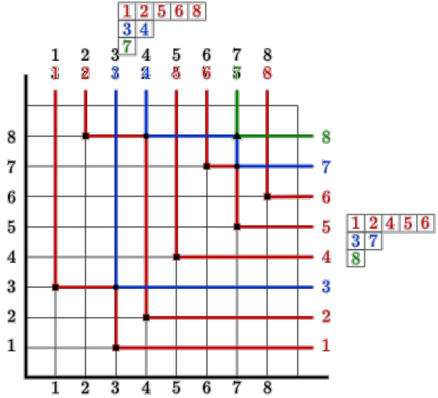
- If $\sigma \mapsto (P, Q)$, then $\sigma^{-1} \mapsto (Q, P)$
- There are many other important properties

Schensted and Viennot

S:



V:



- Schensted's algorithm (S) bumps and records
- Viennot's algorithm (V) uses a grid

Thank you for your attention!

I hope that was of some help.