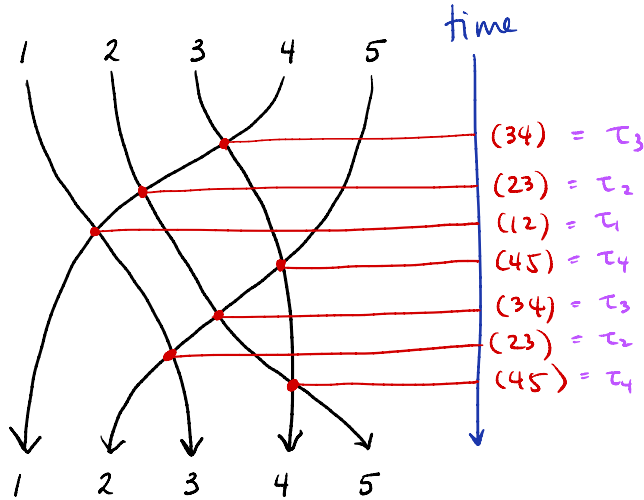


Problem Write the permutation $p = (341)(25)$ as a composition of transpositions.

An intuitive (unrigorous) method of finding a solution:



At the red times, two adjacent students swap seats, i.e. a transposition $\tau_i = (i \ i+1)$ is performed.

Therefore $p = \tau_4 \tau_2 \tau_3 \tau_4 \tau_1 \tau_2 \tau_3$

(There are many different valid solutions.)

Sanity Check:

	1	2	3	4	5
τ_3	1	2	4	3	5
τ_2	1	4	2	3	5
τ_1	4	1	2	3	5
τ_4	4	1	2	5	3
τ_3	4	1	5	2	3
τ_2	4	5	1	2	3
τ_4	4	5	1	3	2

This indicates that p has sent

- 4 to position 1
- 5 to pos. 2
- 1 to pos. 3
- 3 to pos. 4
- 2 to pos. 5

i.e. $p = (413)(52) = (341)(25)$ as desired.

This is not a proof, but gives an intuitive reason for why any permutation can be built as a composition of transpositions, of adjacent indices.