

Algorithms – Bubble Sort Animations

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Permutation Visualization – Bars

Permutations

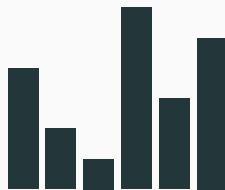
$$\pi = \begin{pmatrix} 1 & 2 & \dots & n \\ \pi_1 & \pi_2 & \dots & \pi_n \end{pmatrix}$$

can be represented as a sequence of n vertical bars, where

- bar order corresponds to the index i ,
- the height of the bar corresponds to π_i , and
- the width of all bars is the same and does not matter.

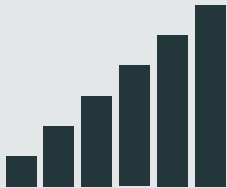
Example

$$\pi = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 4 & 2 & 1 & 6 & 3 & 5 \end{pmatrix}$$

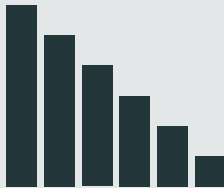


Permutation Visualization – Bars, Examples

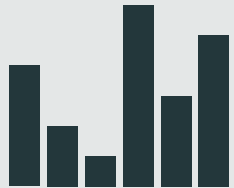
Identical



Reverse



Random



Permutation Visualization – Mosaic

Permutation

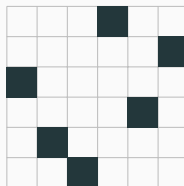
$$\pi = \begin{pmatrix} 1 & 2 & \dots & n \\ \pi_1 & \pi_2 & \dots & \pi_n \end{pmatrix}$$

can be represented by squares in a square grid, of size $n \times n$, where

- column corresponds to index i ,
- row of the square corresponds to the value of π_i , and
- the size of all squares is the same and does not matter.

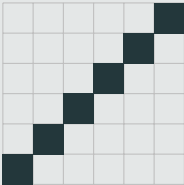
Example

$$\pi = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 4 & 2 & 1 & 6 & 3 & 5 \end{pmatrix}$$

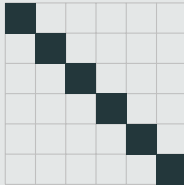


Permutation Visualization – Mosaic, Examples

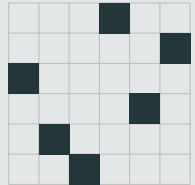
Identical



Reverse



Random



Colors of elements

black – unsorted element

red – the element is currently being compared with the neighbouring element and possibly exchanged with the neighbour

green – the element is sorted, the element is in the correct position

Bubble Sort – Random Permutation

Bubble Sort – Random Permutation

Bubble Sort – Identical Permutation

Bubble Sort – Reverse Permutation

Bubble Sort – Reverse Permutation

Shaker Sort – Random Permutation

Shaker Sort – Random Permutation