

# Algoritmy – Shell Sort Animations

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# Permutation Visualization – Bars

Permutations

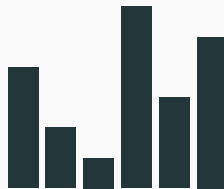
$$\pi = \begin{pmatrix} 1 & 2 & \dots & n \\ \pi_1 & \pi_2 & \dots & \pi_n \end{pmatrix}$$

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  $\pi_i$ , and
- the width of all bars is the same and does not matter.

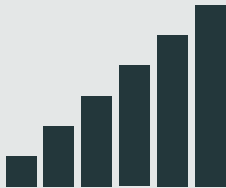
Example

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

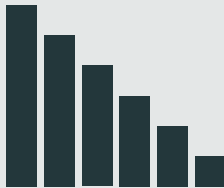


# Permutation Visualization – Bars, Examples

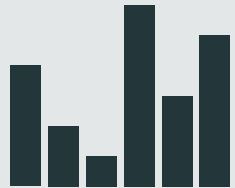
Identical



Reverse



Random



# Permutation Visualization – Mosaic

Permutation

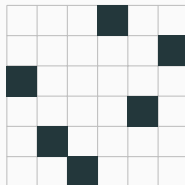
$$\pi = \begin{pmatrix} 1 & 2 & \dots & n \\ \pi_1 & \pi_2 & \dots & \pi_n \end{pmatrix}$$

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  $\pi_i$ , and
- the size of all squares is the same and does not matter.

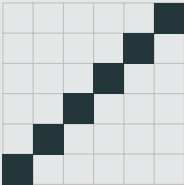
## Example

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

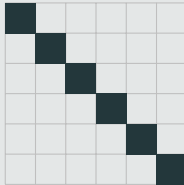


# Permutation Visualization – Mosaic, Examples

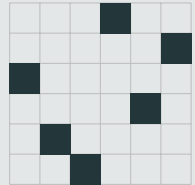
Identical



Reverse



Random



# Shell Sort – Random Permutation

# Shell Sort – Random Permutation

## Shell Sort – Identical Permutation



# Shell Sort – Reverse Permutation

# Shell Sort – Reverse Permutation