Selection vs. **Insertion** Sort

Slides by **Sean Szumlanski**

for **CS106B**, Programming Abstractions

Summer 2024

Selection Sort

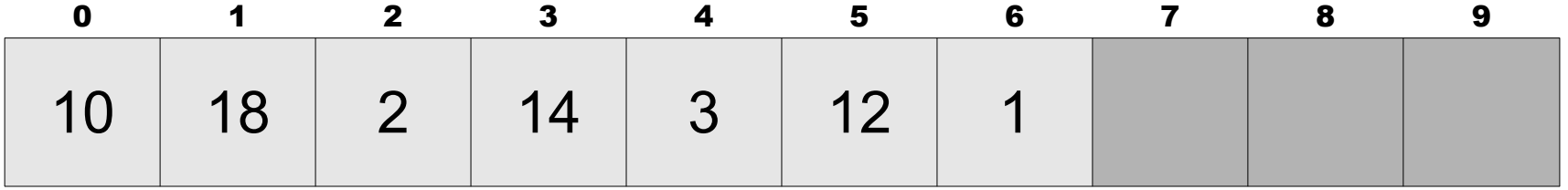
(select the smallest element)

- Comparison Heavy

Insertion Sort

(insert into sorted partition)

- Swap heavy



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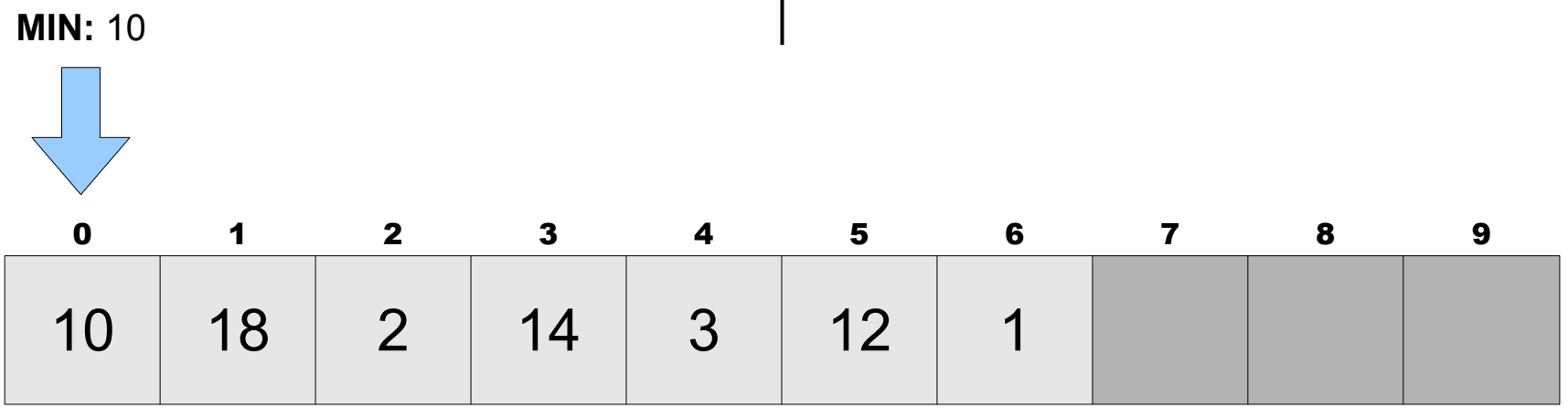

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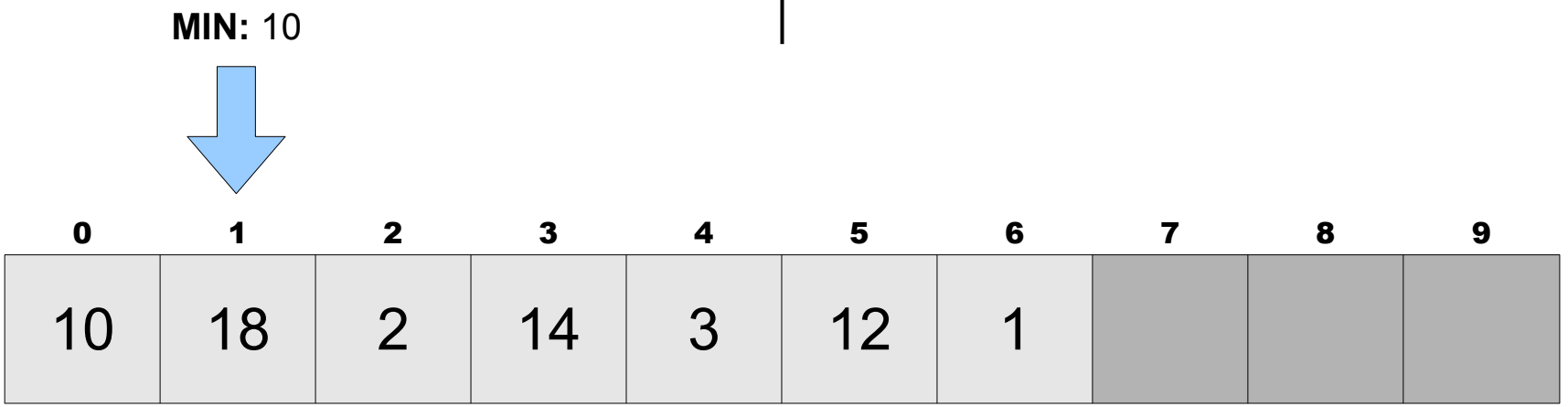

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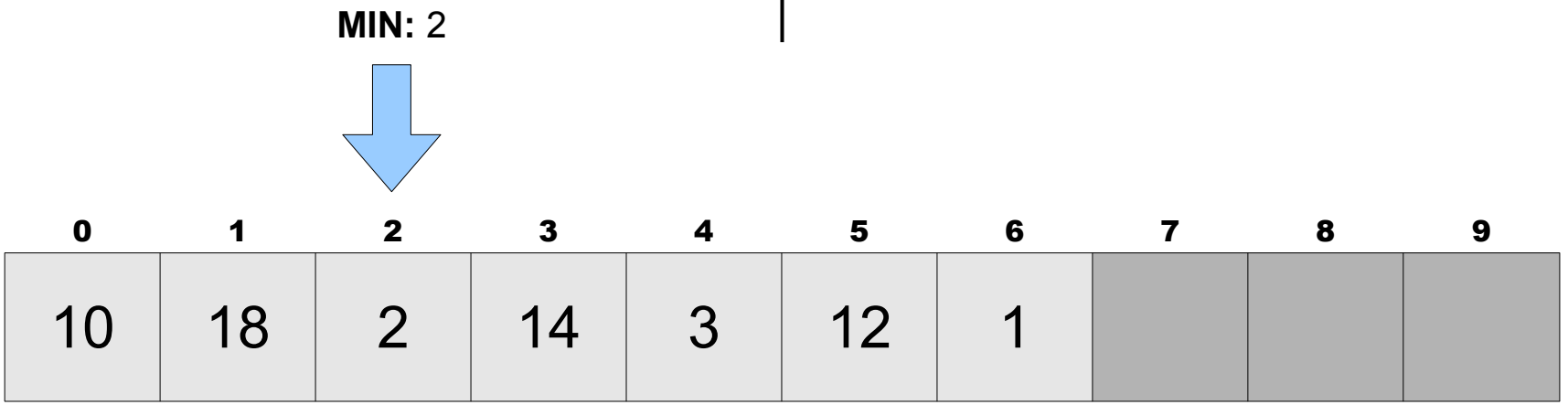

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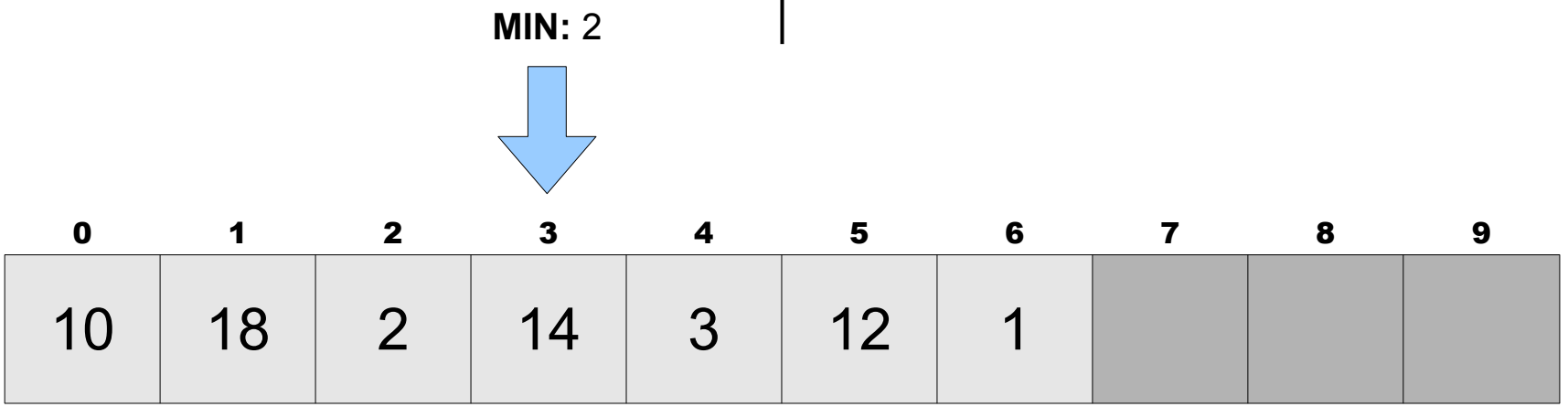

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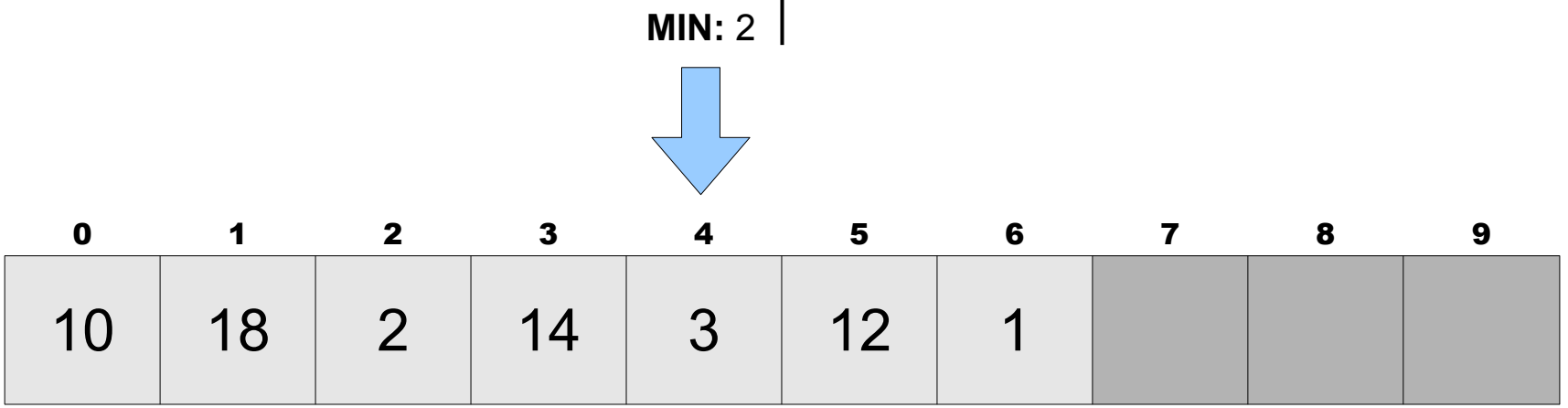

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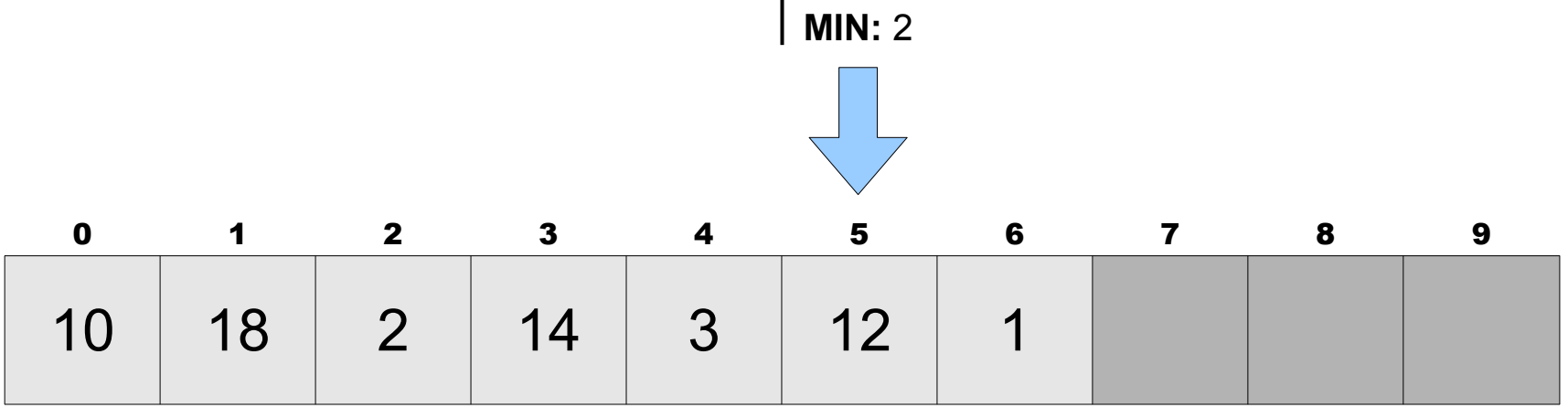

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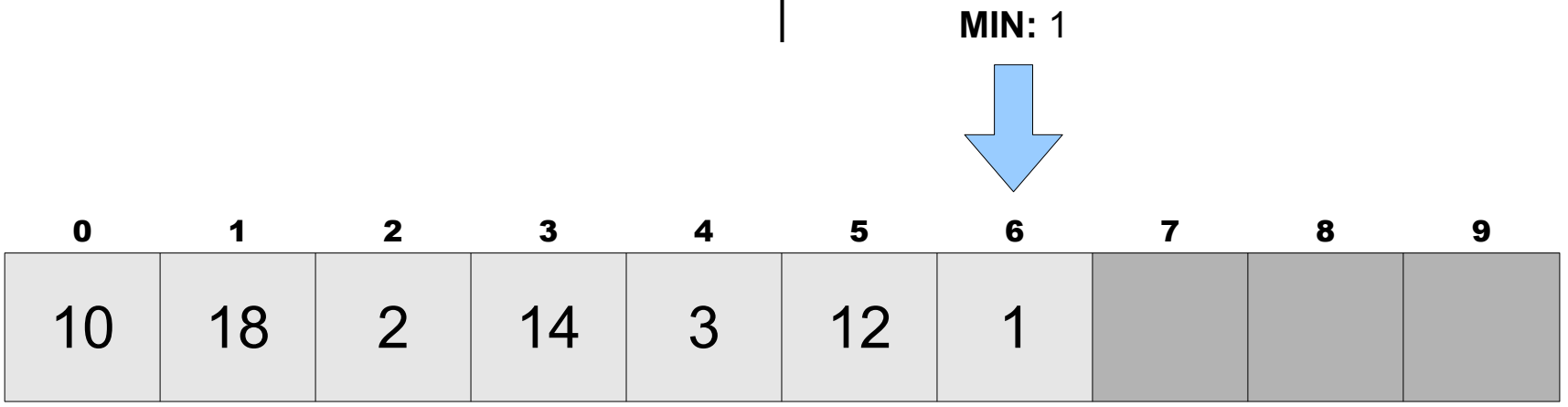

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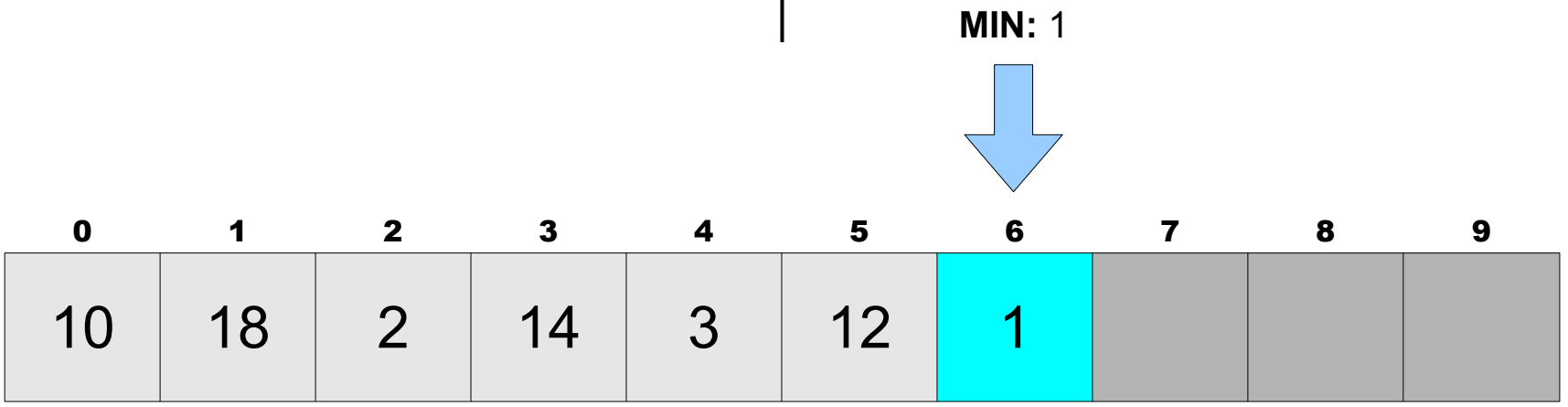

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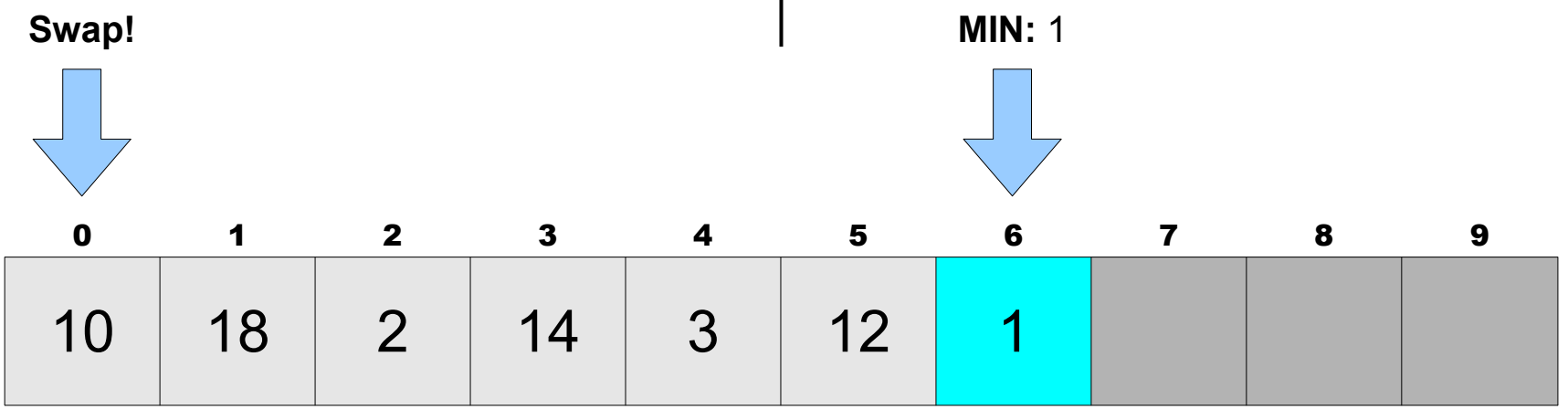

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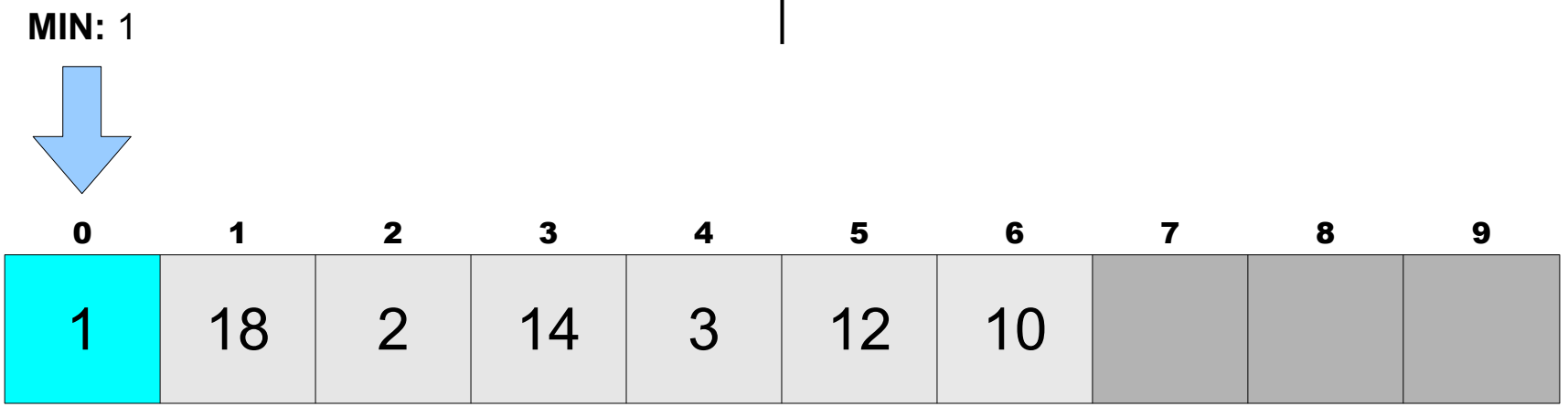

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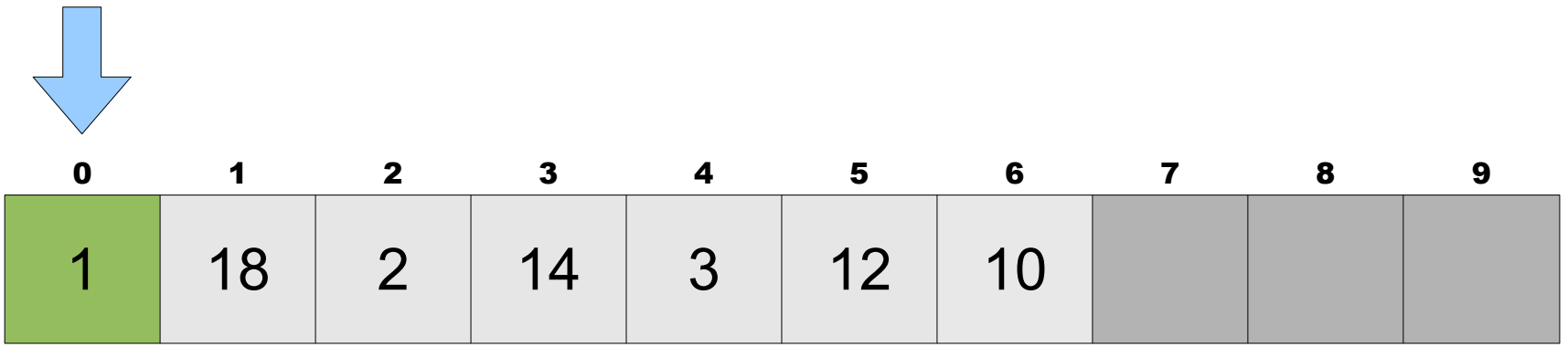

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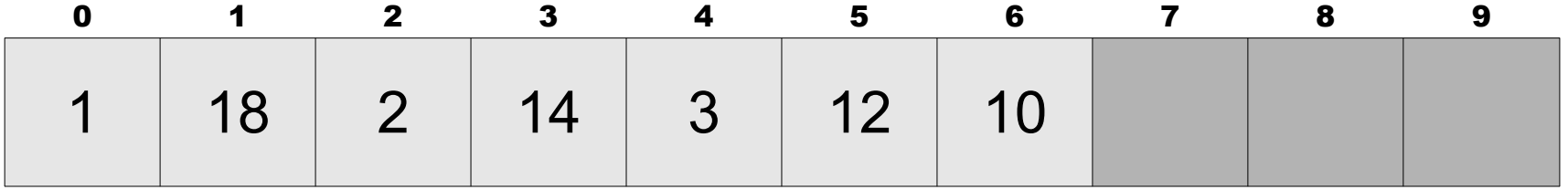

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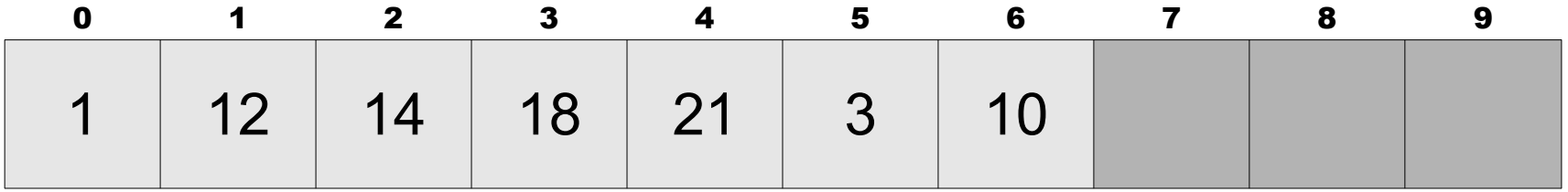

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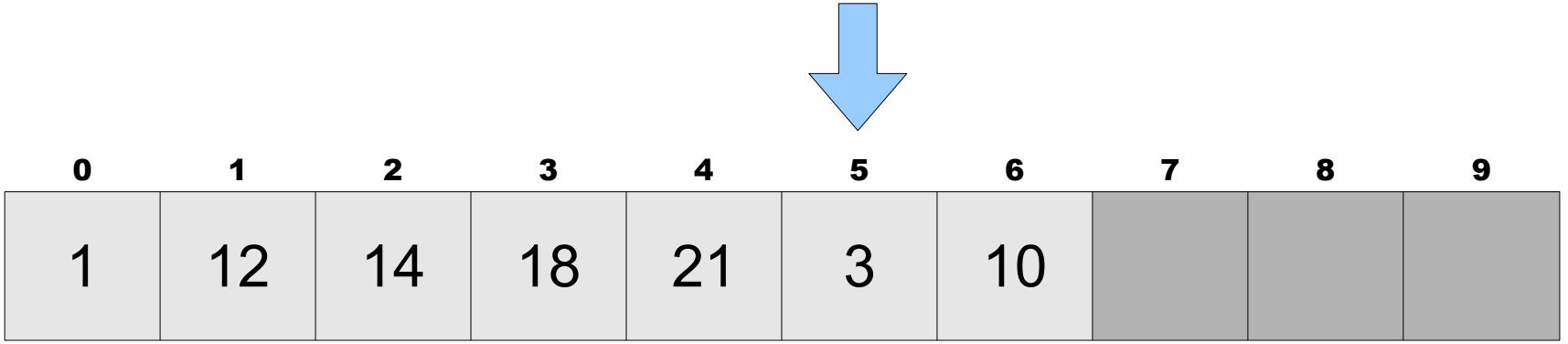

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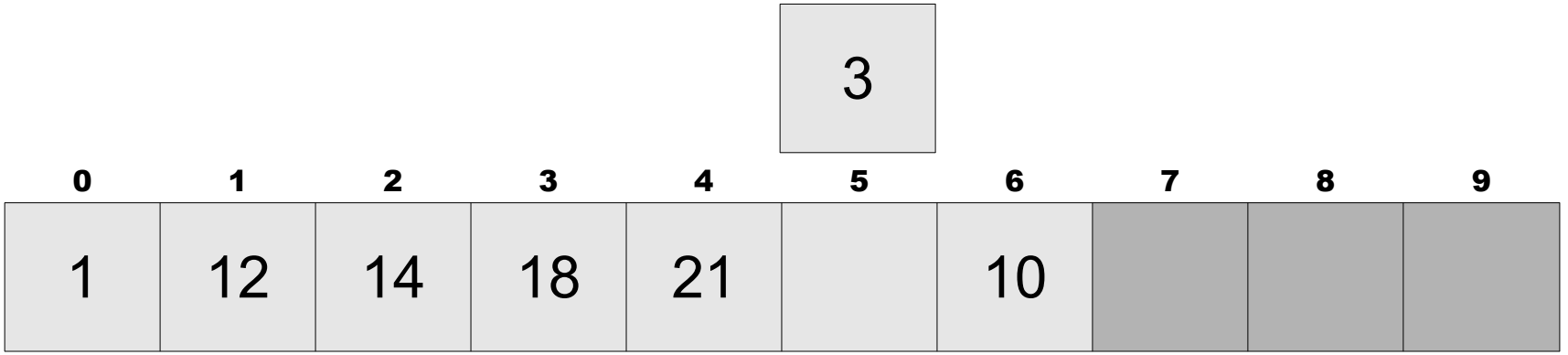

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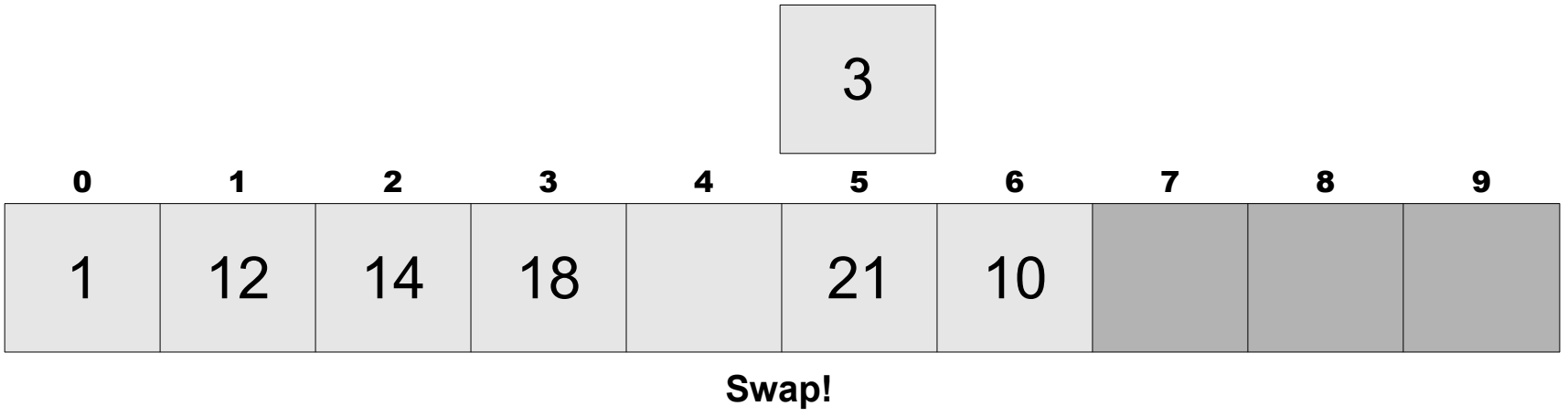

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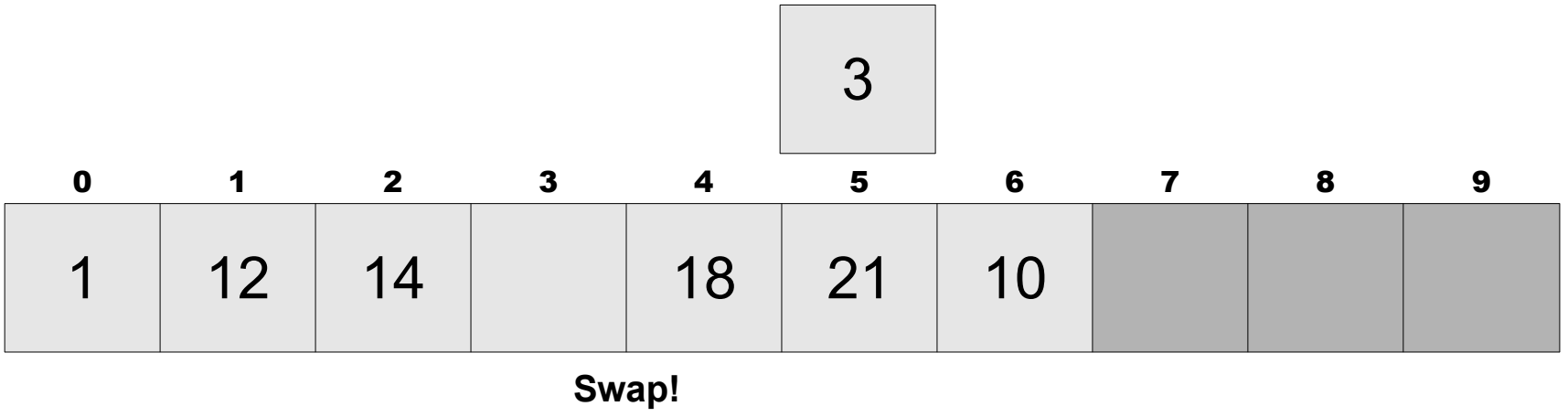

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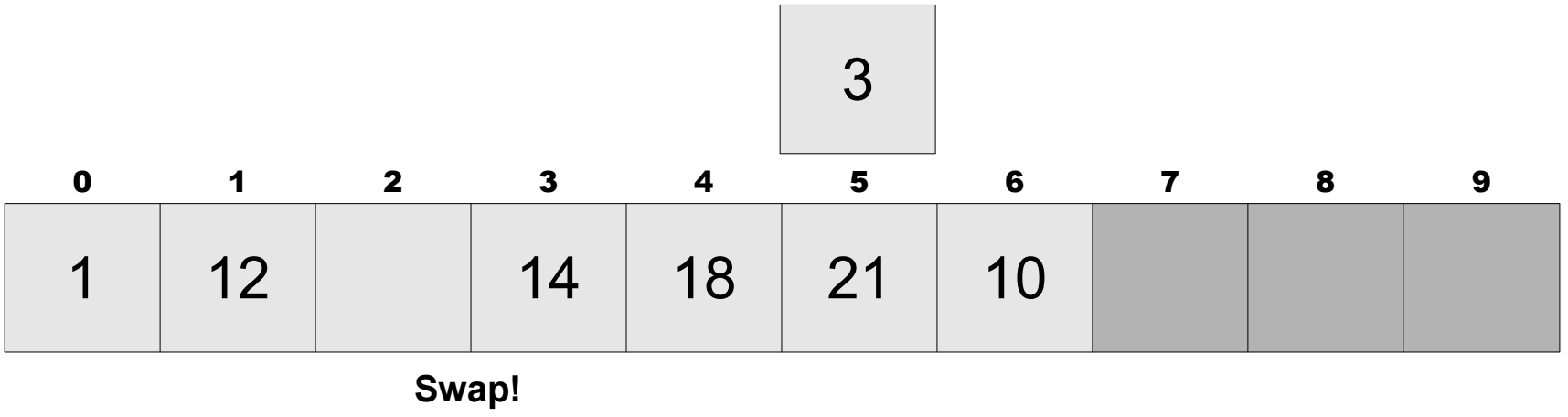

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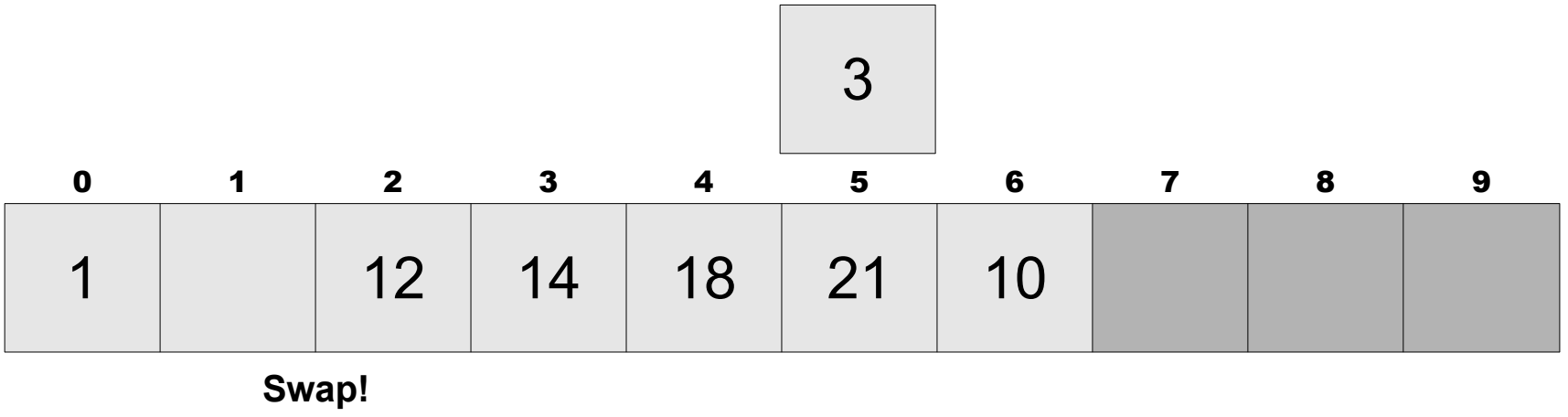

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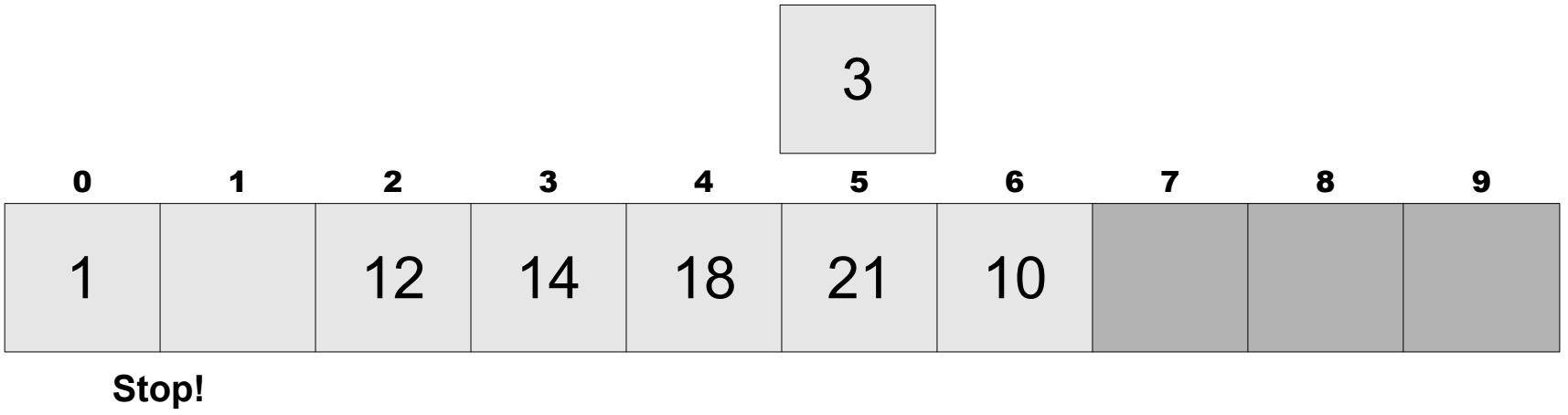

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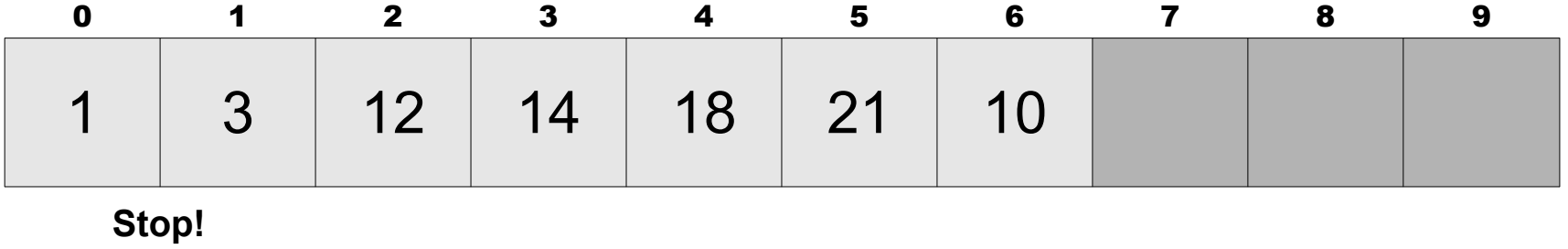

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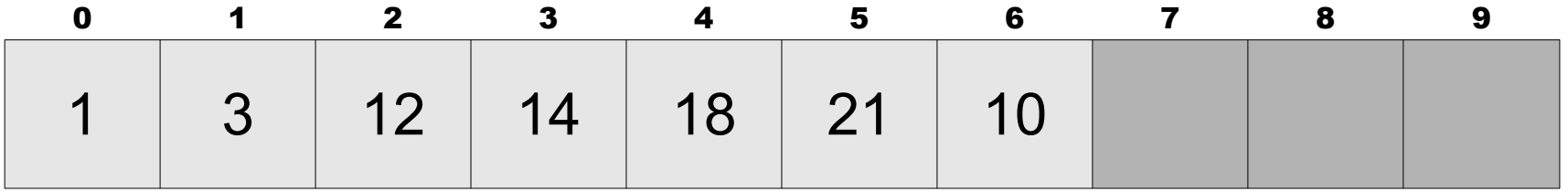

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(insert into sorted partition)

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Selection Sort

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- Swap heavy

Example: Sorting fridges in a warehouse by price.

Selection Sort

(select the smallest element)

- Comparison Heavy

Insertion Sort

(insert into sorted partition)

- Swap heavy

Example: Sorting fridges in a warehouse by price.

- Comparisons are easy.

Selection Sort

(select the smallest element)

- Comparison Heavy

Insertion Sort

(insert into sorted partition)

- Swap heavy

Example: Sorting fridges in a warehouse by price.

- Comparisons are easy.
- Swapping is obnoxious.

Selection Sort

(select the smallest element)

- Comparison Heavy

Insertion Sort

(insert into sorted partition)

- Swap heavy

Example: Sorting fridges in a warehouse by price.

Selection Sort!

- Comparisons are easy.
- Swapping is obnoxious.

Selection Sort

(select the smallest element)

- Comparison Heavy

Insertion Sort

(insert into sorted partition)

- Swap heavy

Selection Sort

(select the smallest element)

- Comparison Heavy

Insertion Sort

(insert into sorted partition)

- Swap heavy

Example: Athletic competition with 1-on-1 comparison.

Selection Sort

(select the smallest element)

- Comparison Heavy

Insertion Sort

(insert into sorted partition)

- Swap heavy

Example: Athletic competition with 1-on-1 comparison.

- Comparisons are taxing.

Selection Sort

(select the smallest element)

- Comparison Heavy

Insertion Sort

(insert into sorted partition)

- Swap heavy

Example: Athletic competition with 1-on-1 comparison.

- Comparisons are taxing.
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Selection Sort

(select the smallest element)

- Comparison Heavy

Insertion Sort

(insert into sorted partition)

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Example: Athletic competition with 1-on-1 comparison.

- Comparisons are taxing.
- Swapping is easy.

Insertion Sort!

Selection Sort

(select the smallest element)

- Comparison Heavy

Insertion Sort

(insert into sorted partition)

- Swap heavy

Selection Sort

(select the smallest element)

- Comparison Heavy

Insertion Sort

(insert into sorted partition)

- Swap heavy

Example: Computational biology with simulations.

Selection Sort

(select the smallest element)

- Comparison Heavy

Insertion Sort

(insert into sorted partition)

- Swap heavy

Example: Computational biology with simulations.

- Comparisons are expensive.

Selection Sort

(select the smallest element)

- Comparison Heavy

Insertion Sort

(insert into sorted partition)

- Swap heavy

Example: Computational biology with simulations.

- Comparisons are expensive.
- Swapping is easy (unique IDs?).

Selection Sort

(select the smallest element)

- Comparison Heavy

Insertion Sort

(insert into sorted partition)

- Swap heavy

Example: Computational biology with simulations.

- Comparisons are expensive.
- Swapping is easy (unique IDs?).

Insertion Sort!

Selection Sort

(select the smallest element)

- Comparison Heavy

Insertion Sort

(insert into sorted partition)

- Swap heavy

Selection Sort

(select the smallest element)

- Comparison Heavy

Insertion Sort

(insert into sorted partition)

- Swap heavy

Example: Sorting data-heavy student records.

Selection Sort

(select the smallest element)

- Comparison Heavy

Insertion Sort

(insert into sorted partition)

- Swap heavy

Example: Sorting data-heavy student records.

- Comparisons are easy.

Selection Sort

(select the smallest element)

- Comparison Heavy

Insertion Sort

(insert into sorted partition)

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Example: Sorting data-heavy student records.

- Comparisons are easy.
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Selection Sort

(select the smallest element)

- Comparison Heavy

Insertion Sort

(insert into sorted partition)

- Swap heavy

Example: Sorting data-heavy student records.

Selection Sort!

- Comparisons are easy.
- Swapping is expensive.

Selection Sort

(select the smallest element)

- Comparison Heavy

Insertion Sort

(insert into sorted partition)

- Swap heavy

Selection Sort

(select the smallest element)

- Comparison Heavy
  - Sorting refrigerators
  - Sorting data-heavy student records

Insertion Sort

(insert into sorted partition)

- Swap heavy
  - Athletic comparisons
  - Expensive simulations

Selection Sort

(select the smallest element)

- Comparison Heavy
  - Sorting refrigerators
  - Sorting data-heavy student records
- Runtime consistency

Insertion Sort

(insert into sorted partition)

- Swap heavy
  - Athletic comparisons
  - Expensive simulations

Selection Sort

(select the smallest element)

- Comparison Heavy
  - Sorting refrigerators
  - Sorting data-heavy student records
- Runtime consistency

Insertion Sort

(insert into sorted partition)

- Swap heavy
  - Athletic comparisons
  - Expensive simulations
- Faster in special cases

Selection Sort

(select the smallest element)

- Comparison Heavy
  - Sorting refrigerators
  - Sorting data-heavy student records
- Runtime consistency
- Ease of coding and debugging

Insertion Sort

(insert into sorted partition)

- Swap heavy
  - Athletic comparisons
  - Expensive simulations
- Faster in special cases

Selection Sort

(select the smallest element)

- Comparison Heavy
  - Sorting refrigerators
  - Sorting data-heavy student records
- Runtime consistency
- Ease of coding and debugging

Insertion Sort

(insert into sorted partition)

- Swap heavy
  - Athletic comparisons
  - Expensive simulations
- Faster in special cases
- Potential performance gains