Shuffle a deck of cards

- In $i^{th}$ iteration, choose a random element from remainder of deck and put at index $i$
  - choose random integer $r$ between $i$ and $N-1$
  - swap values in positions $r$ and $i$

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<tr>
<th>Array index</th>
<th>0</th>
<th>1</th>
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</thead>
<tbody>
<tr>
<td>Value</td>
<td>9♣</td>
<td>3♣</td>
<td>4♣</td>
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<td>8♣</td>
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<td>J♣</td>
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</table>

random integer = 3
Shuffle an Array

Shuffle a deck of cards

- In $i^{th}$ iteration, choose a random element from remainder of deck and put at index $i$
  - choose random integer $r$ between $i$ and $N-1$
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<tr>
<td>Value</td>
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<td>5♣</td>
<td>J♣</td>
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<td>6♣</td>
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<td>8♣</td>
<td>2♣</td>
<td>10♣</td>
<td>4♣</td>
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</table>

random integer = 9
Shuffle a deck of cards

- In $i^{th}$ iteration, choose a random element from remainder of deck and put at index $i$
  - choose random integer $r$ between $i$ and $N-1$
  - swap values in positions $r$ and $i$

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<tbody>
<tr>
<td>Value</td>
<td>9♣</td>
<td>5♣</td>
<td>J♠</td>
<td>4♣</td>
<td>6♣</td>
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random integer = 9
Shuffle a deck of cards

- In $i^{th}$ iteration, choose a random element from remainder of deck and put at index $i$
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<tbody>
<tr>
<td>Value</td>
<td>9♦</td>
<td>5♣</td>
<td>J♣</td>
<td>4♦</td>
<td>8♦</td>
<td>7♣</td>
<td>6♦</td>
<td>2♣</td>
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<td>3♣</td>
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random integer = 6
Shuffle a deck of cards

- In $i^{th}$ iteration, choose a random element from remainder of deck and put at index $i$
  - choose random integer $r$ between $i$ and $N-1$
  - swap values in positions $r$ and $i$

Array index | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9
---|---|---|---|---|---|---|---|---|---|---
Value | 9♥ | 5♣ | J♣ | 4♠ | 8♣ | 3♣ | 6♠ | 2♣ | 10♦ | 7♣

random integer = 9
Shuffle an Array

Shuffle a deck of cards

- In $i^{th}$ iteration, choose a random element from remainder of deck and put at index $i$
  - choose random integer $r$ between $i$ and $N-1$
  - swap values in positions $r$ and $i$

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random integer = 8
Shuffle a deck of cards

- In $i^{th}$ iteration, choose a random element from remainder of deck and put at index $i$
  - choose random integer $r$ between $i$ and $N-1$
  - swap values in positions $r$ and $i$

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random integer = 9
Shuffle an Array

Shuffle a deck of cards

- In $i^{th}$ iteration, choose a random element from remainder of deck and put at index $i$
  - choose random integer $r$ between $i$ and $N-1$
  - swap values in positions $r$ and $i$

```
Array index | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9
---|---|---|---|---|---|---|---|---|---|---
Value | 9♥ | 5♠ | J♠ | 4♣ | 8♠ | 3♣ | 10♠ | 7♠ | 6♣ | 2♣
```

random integer = 8
Shuffle an Array

Shuffle a deck of cards

- In $i^{th}$ iteration, choose a random element from remainder of deck and put at index $i$
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random integer = 9
Shuffle a deck of cards

- In i\textsuperscript{th} iteration, choose a random element from remainder of deck and put at index i
  - choose random integer r between i and N-1
  - swap values in positions r and i

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