

1 Selection Sort

1.1 Pseudocode

Algorithm 1: Selection Sort

Input: number *Array* length l

Output: array in ascending order

```
1 for  $i \leftarrow 0$  to  $l - 2$  by 1 do
2    $minIndex \leftarrow i$ 
3   for  $j \leftarrow i + 1$  to  $l - 1$  by 1 do
4     if  $Array[minIndex] > Array[j]$  then
5        $minIndex \leftarrow j$ 
6     end
7   end
8   if  $minIndex \neq i$  then
9     Swap( $Array[i]$ ,  $Array[minIndex]$ )
10  end
11 end
12 return Array
```

1.2 Analysis

$$\begin{aligned} \sum_{i=0}^{n-2} \sum_{j=i+1}^{n-1} 1 &= \sum_{i=0}^{n-2} (n-1) - (i+1) + 1 \\ &= \sum_{i=0}^{n-1} n - 1 - i \\ &= \sum_{i=0}^{n-1} i \\ &= \frac{1}{2}n(n-1) \\ &= \Theta(n^2) \end{aligned}$$

1.3 Mathematics

$$\begin{aligned}\sum_{i=0}^{n-1} i &= 0 + 1 + 2 + \cdots + (n-1) \\ &= \frac{1}{2} \left(\sum_{i=0}^{n-1} i + \sum_{i=0}^{n-1} n-1-i \right) \\ &= \frac{1}{2} \sum_{i=0}^{n-1} n-1 \\ &= \frac{1}{2} n(n-1)\end{aligned}$$

1.4 Other

- 变量交换
 - MDN: [JS-Destructuring assignment](#)
 - Wiki: [XOR swap algorithm](#)
- 知乎: [如何理解异或含义](#)