628 Maximum Product of Three Numbers

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Given an integer array, find three numbers whose product is maximum and output the maximum product.

Example 1:

Input: [1,2,3]

Output: 6

Example 2:

Input: [1,2,3,4]

Output: 24

Note:

1. The length of the given array will be in range [3,10^4] and all elements are in the range [-1000, 1000].
2. Multiplication of any three numbers in the input won't exceed the range of 32-bit signed integer.

来自 <https://leetcode.com/problems/maximum-product-of-three-numbers/description/>

给定一个整型数组，在数组中找出由三个数组成的最大乘积，并输出这个乘积。

示例 1:

输入: [1,2,3]

输出: 6

示例 2:

输入: [1,2,3,4]

输出: 24

注意:

1. 给定的整型数组长度范围是[3,10^4]，数组中所有的元素范围是[-1000, 1000]。
2. 输入的数组中任意三个数的乘积不会超出32位有符号整数的范围。

Solution for Python3:

```
class Solution1:
    def maximumProduct(self, nums):
        """
        :type nums: List[int]
        :rtype: int
        """
        nums.sort();
        return max(nums[-1] * nums[-2] * nums[-3], nums[-1] * nums[0] * nums[1])

class Solution2:
    def maximumProduct(self, nums):
        """
        :type nums: List[int]
        :rtype: int
        """
        max1, max2, max3, min1, min2 = -2000, -2000, -2000, 2000, 2000
        for n in nums:
            if n < min1:
                min2 = min1
                min1 = n
            elif n < min2:
                min2 = n
            if n > max1:
                max3 = max2
                max2 = max1
                max1 = n
            elif n > max2:
                max3 = max2;
                max2 = n
            elif n > max3:
                max3 = n
        return max(max1*max2*max3, max1*min1*min2)
```

```cpp
class Solution1 {
public:
    int maximumProduct(vector<int>& nums) {
        sort(nums.begin(), nums.end());
        return max(nums[0]*nums[1]*nums[nums.size()-1],
nums[nums.size()-1]*nums[nums.size()-2]*nums[nums.size()-3]);
    }
};

class Solution2 {
public:
    int maximumProduct(vector<int>& nums) {
        int min1 = INT_MAX, min2 = INT_MAX;
        int max1 = INT_MIN, max2 = INT_MIN, max3 = INT_MIN;
        for (int n : nums) {
            if (n <= min1) {
                min2 = min1;
                min1 = n;
            } else if (n <= min2) {
                min2 = n;
            }
            if (n >= max1) {
                max3 = max2;
                max2 = max1;
                max1 = n;
            } else if (n >= max2) {
                max3 = max2;
                max2 = n;
            } else if (n > max3) {
                max3 = n;
            }
        }
        return max(min1 * min2 * max1, max1 * max2 * max3);
    }
};
```