

89. 格雷编码

1. 题目描述

89. 格雷编码

2. 解法

(1) 最直观的幼稚写法

```
1  class Solution {
2  public:
3      vector<int> reversal(vector<int> num, int n) {
4          int i = 0, j = n - 1;
5          while (i < j) {
6              int temp = num[i];
7              num[i] = num[j];
8              num[j] = temp;
9              i++, j--;
10         }
11         return num;
12     }
13     vector<int> add(vector<int> num, int n) {
14         for (int i = 0; i < num.size(); i++) {
15             int temp = pow(2.0, n - 1);
16             num[i] = num[i] | temp;
17         }
18         return num;
19     }
20     vector<int> grayCode(int n) {
21         if (n == 1) {
22             return {0, 1};
23         } else {
24             vector<int> res = grayCode(n - 1);
25             vector<int> temp = reversal(res, res.size());
26             vector<int> res_end = add(temp, n);
27             res.insert(res.end(), res_end.begin(), res_end.end());
28             return res;
29         }
30     }
31 };
```

(2) 递归写法

```
1  class Solution {
2  public:
3      vector<int> grayCode(int n) {
4          if (n == 1) {
```

```

5         return {0, 1};
6     } else {
7         vector<int> res = grayCode(n - 1);
8         for (int i = res.size() - 1; i >= 0; i--) {
9             res.push_back(res[i] | (1 << (n - 1)));
10        }
11        return res;
12    }
13 }
14 };

```

(3) 成熟的标准答案

```

1 class Solution {
2
3 public:
4     vector<int> grayCode(int n) {
5         vector<int> res;
6         res.reserve(1 << n); //这个很重要哦，可以减少时间复杂度
7         res.push_back(0);
8
9         for (int i = 0; i < n; i++) {
10             int m = res.size();
11             for (int j = m - 1; j >= 0; j--) {
12                 res.push_back(res[j] | (1 << i));
13             }
14         }
15         return res;
16     }
17 };

```