一、题目说明

题目279. Perfect Squares，给定一个正整数n，找到m个数其平方和刚好是n。求m的最小值，难度是Medium！

二、我的解答

bfs算法：

```
class Solution{
    public:
        //bfs
        int numSquares(int n){
            queue<int> q;
            q.push(n);
            int sum=0;
            while(1){
                int l=q.size();
                for(int i=0;i<l;i++){
                    int f=q.front();
                    if(f==0) return sum;
                    for(int i=1;i*i<=f;i++) {
                        if(f-i*i==0) return sum+1;
                        q.push(f-i*i);
                    };
                    q.pop();
                }
                sum++;
            }
        }
};
```

性能如下：

```
Runtime: 132 ms, faster than 42.52% of C++ online submissions for Perfect
Squares.
Memory Usage: 53.2 MB, less than 5.77% of C++ online submissions for Perfect
Squares.
```

优化：

```
class Solution{
    public:
        //bfs
        int numSquares(int n){
            queue<int> q;
            q.push(n);
            int level = 0;
            vector<bool> visit(n + 1, false);
            while(!q.empty())
            {
                int size = q.size();
                level++;
                for(int i = 0; i < size; i++)
```

```
                {
                    int temp = q.front();
                    q.pop();
                    visit[temp] = true;
                    for(int i = 1; i * i <= temp; i++)
                    {
                        if(temp == i * i) return level;
                        if(!visit[temp - i * i]) q.push(temp - i * i);
                    }
                }
            }
            return level;
        }
};
```

```
Runtime: 124 ms, faster than 46.86% of C++ online submissions for Perfect
Squares.
Memory Usage: 29.7 MB, less than 11.54% of C++ online submissions for Perfect
Squares.
```

三、优化措施

dp:

```
class Solution{
    public:
        int numSquares(int n){
            vector<int> dp(n+1);
            for(int i=1;i<=n;i++){
                dp[i] = i;
            }
            for(int i=2;i<=n;i++){
                for(int j=1;j*j<=i;j++){
                    dp[i] = min(dp[i],dp[i-j*j]+1);
                }
            }
            return dp[n];
        }
};
```

性能如下:

```
Runtime: 108 ms, faster than 58.71% of C++ online submissions for Perfect
Squares.
Memory Usage: 11.4 MB, less than 61.54% of C++ online submissions for Perfect
Squares.
```