

# Assignment #8: 田忌赛马来了

Updated 1021 GMT+8 Nov 12, 2024

2024 fall, Compiled by 金俊毅, 物理学院

## 1. 题目

### 12558: 岛屿周长

matrices, <http://cs101.openjudge.cn/practice/12558/>

代码:

```
n, m = map(int, input().split())
mat = [[0 for _ in range(m+2)]]
for _ in range(n):
    mat.append([0]+list(map(int, input().split()))+[0])
mat.append([0 for _ in range(m+2)])
c = 0
for i in range(1, n+1):
    for j in range(1, m+1):
        if mat[i][j] == 1:
            if mat[i-1][j] == 0:
                c += 1
            if mat[i+1][j] == 0:
                c += 1
            if mat[i][j-1] == 0:
                c += 1
            if mat[i][j+1] == 0:
                c += 1
print(c)
```

代码运行截图 (至少包含有"Accepted")

#47177625提交状态

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状态: Accepted

源代码

```
n, m = map(int, input().split())
mat = [[0 for _ in range(m+2)]]
for _ in range(n):
    mat.append([0]+list(map(int, input().split()))+[0])
mat.append([0 for _ in range(m+2)])
c = 0
for i in range(1, n+1):
    for j in range(1, m+1):
        if mat[i][j] == 1:
            if mat[i-1][j] == 0:
                c += 1
            if mat[i+1][j] == 0:
                c += 1
            if mat[i][j-1] == 0:
                c += 1
            if mat[i][j+1] == 0:
                c += 1
print(c)
```

基本信息

#: 47177625  
题目: 12558  
提交人: 24n2400011454  
内存: 3716kB  
时间: 35ms  
语言: Python3  
提交时间: 2024-11-15 16:00:51

# LeetCode54.螺旋矩阵

matrice, <https://leetcode.cn/problems/spiral-matrix/>

与OJ这个题目一样的 18106: 螺旋矩阵, <http://cs101.openjudge.cn/practice/18106>

代码:

```
n = int(input())
k = 1
i = 1
j = 1
to = [[0, 1], [1, 0], [0, -1], [-1, 0]]
sym = 0
mat = [[str(-1) for _ in range(n+2)]] + [[str(-1)]+[str(0) for _ in range(n)]+[str(-1)] for _ in range(n)] + [[str(-1) for _ in range(n+2)]]
while k != n*n+1:
    mat[i][j] = str(k)
    if mat[i + to[sym][0]][j + to[sym][1]] != "0":
        sym += 1
        if sym == 4:
            sym = 0
        i += to[sym][0]
        j += to[sym][1]
        k += 1
for i in range(1, n+1):
    print(" ".join(mat[i][1:n+1]))
```

代码运行截图 == (至少包含有"Accepted") ==

#47187234提交状态

查看 提交 统计 提问

状态: Accepted

源代码

```
n = int(input())
k = 1
i = 1
j = 1
to = [[0, 1], [1, 0], [0, -1], [-1, 0]]
sym = 0
mat = [[str(-1) for _ in range(n+2)]] + [[str(-1)]+[str(0) for _ in range(n)]+[str(-1)] for _ in range(n)] + [[str(-1) for _ in range(n+2)]]
while k != n*n+1:
    mat[i][j] = str(k)
    if mat[i + to[sym][0]][j + to[sym][1]] != "0":
        sym += 1
        if sym == 4:
            sym = 0
        i += to[sym][0]
        j += to[sym][1]
        k += 1
for i in range(1, n+1):
    print(" ".join(mat[i][1:n+1]))
```

基本信息

#: 47187234

题目: 18106

提交人: 24n2400011454

内存: 3696kB

时间: 26ms

语言: Python3

提交时间: 2024-11-15 20:28:52

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English 帮助 关于

## 04133:垃圾炸弹

matrices, <http://cs101.openjudge.cn/practice/04133/>

代码:

```
d = int(input())
n = int(input())
mat = [[0 for _ in range(1025)] for _ in range(1025)]
for _ in range(n):
    x, y, num = map(int, input().split())
    for i in range(-d, d+1):
        for j in range(-d, d+1):
            if 0 <= x-i <= 1024 and 0 <= y-j <= 1024:
                mat[x-i][y-j] += num
m1 = 0
mn = 0
for i in range(1025):
    for j in range(1025):
        if mat[i][j] > m1:
            m1 = mat[i][j]
            mn = 1
        elif mat[i][j] == m1:
            mn += 1
print(mn, m1)
```

代码运行截图 (至少包含有"Accepted")

#47217465提交状态

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状态: Accepted

源代码

```
d = int(input())
n = int(input())
mat = [[0 for _ in range(1025)] for _ in range(1025)]
for _ in range(n):
    x, y, num = map(int, input().split())
    for i in range(-d, d+1):
        for j in range(-d, d+1):
            if 0 <= x-i <= 1024 and 0 <= y-j <= 1024:
                mat[x-i][y-j] += num
m1 = 0
mn = 0
for i in range(1025):
    for j in range(1025):
        if mat[i][j] > m1:
            m1 = mat[i][j]
            mn = 1
        elif mat[i][j] == m1:
            mn += 1
print(mn, m1)
```

基本信息

#: 47217465  
题目: 04133  
提交人: 24n2400011454  
内存: 12628kB  
时间: 281ms  
语言: Python3  
提交时间: 2024-11-17 14:22:01

## LeetCode376.摆动序列

greedy, dp, <https://leetcode.cn/problems/wiggle-subsequence/>

与OJ这个题目一样的, 26976:摆动序列, <http://cs101.openjudge.cn/routine/26976/>

代码:

```

n = int(input())
num = list(map(int, input().split()))
ct = 0
i = 1
while i < n-1:
    j = i-1
    while num[i] == num[i+1]:
        if i == n-2:
            break
        i += 1
    if (num[i] > num[j] and num[i] > num[i+1]) or (num[i] < num[j] and num[i] < num[i+1]):
        ct += 1
    i += 1
if n == 1:
    print(1)
else:
    s = num.count(num[0])
    if s == n:
        print(ct+1)
    else:
        print(ct+2)

```

代码运行截图 (至少包含有"Accepted")

#47218593提交状态

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状态: Accepted

源代码

```

n = int(input())
num = list(map(int, input().split()))
ct = 0
i = 1
while i < n-1:
    j = i-1
    while num[i] == num[i+1]:
        if i == n-2:
            break
        i += 1
    if (num[i] > num[j] and num[i] > num[i+1]) or (num[i] < num[j] and num[i] < num[i+1]):
        ct += 1
    i += 1
if n == 1:
    print(1)
else:
    s = num.count(num[0])
    if s == n:
        print(ct+1)
    else:
        print(ct+2)

```

基本信息

#: 47218593  
 题目: 26976  
 提交人: 24n2400011454  
 内存: 3664kB  
 时间: 29ms  
 语言: Python3  
 提交时间: 2024-11-17 14:56:35

## CF455A: Boredom

dp, 1500, <https://codeforces.com/contest/455/problem/A>

代码:

```

n = int(input())
num = sorted(list(map(int, input().split())))
ak = {num[0]: num[0]}
old = num[0]

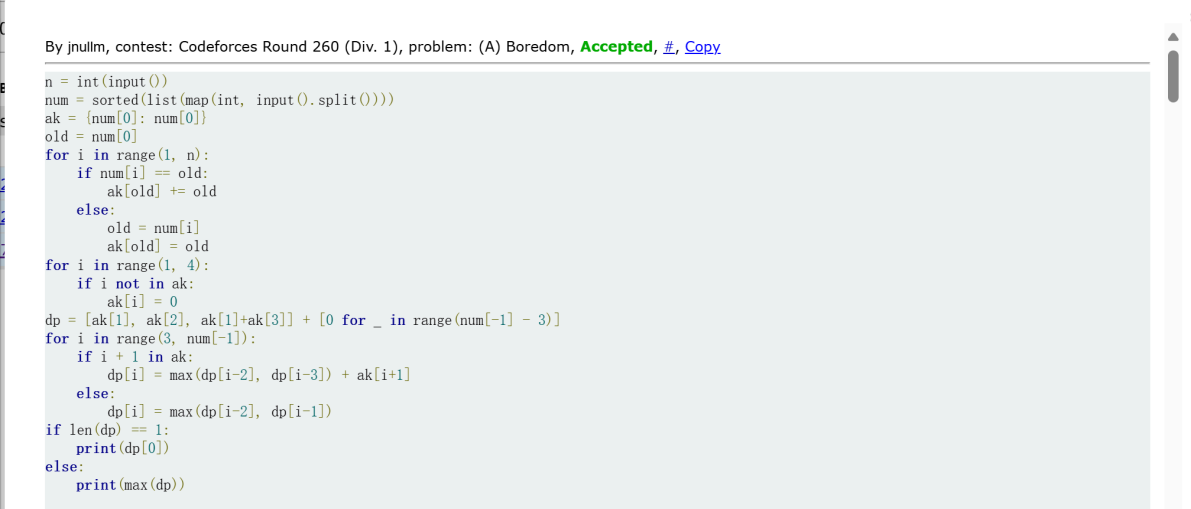
```

```

for i in range(1, n):
    if num[i] == old:
        ak[old] += old
    else:
        old = num[i]
        ak[old] = old
for i in range(1, 4):
    if i not in ak:
        ak[i] = 0
dp = [ak[1], ak[2], ak[1]+ak[3]] + [0 for _ in range(num[-1] - 3)]
for i in range(3, num[-1]):
    if i + 1 in ak:
        dp[i] = max(dp[i-2], dp[i-3]) + ak[i+1]
    else:
        dp[i] = max(dp[i-2], dp[i-1])
if len(dp) == 1:
    print(dp[0])
else:
    print(max(dp))

```

代码运行截图 (至少包含有"Accepted")



By jnullm, contest: Codeforces Round 260 (Div. 1), problem: (A) Boredom, **Accepted**, #, [Copy](#)

```

n = int(input())
num = sorted(list(map(int, input().split())))
ak = {num[0]: num[0]}
old = num[0]
for i in range(1, n):
    if num[i] == old:
        ak[old] += old
    else:
        old = num[i]
        ak[old] = old
for i in range(1, 4):
    if i not in ak:
        ak[i] = 0
dp = [ak[1], ak[2], ak[1]+ak[3]] + [0 for _ in range(num[-1] - 3)]
for i in range(3, num[-1]):
    if i + 1 in ak:
        dp[i] = max(dp[i-2], dp[i-3]) + ak[i+1]
    else:
        dp[i] = max(dp[i-2], dp[i-1])
if len(dp) == 1:
    print(dp[0])
else:
    print(max(dp))

```

## 02287: Tian Ji -- The Horse Racing

greedy, dfs <http://cs101.openjudge.cn/practice/02287>

代码:

```

def max_money(n, a, b):
    money = 0
    i = 0
    j = 0
    k = n-1
    p = n-1
    while i <= p:
        if a[j] < b[i]:
            k -= 1
            money += 200

```

```

        i += 1
    elif a[j] == b[i]:
        if a[k] > b[p]:
            p -= 1
            money += 200
        elif a[k] < b[p]:
            money -= 200
            i += 1
        else:
            if a[k] < b[i]:
                money -= 200
            i += 1
        k -= 1
    elif a[j] > b[i]:
        j += 1
        money += 200
        i += 1
    return money

```

```

while True:
    n1 = int(input())
    if n1 == 0:
        break
    a1 = list(map(int, input().split()))
    b1 = list(map(int, input().split()))
    a1.sort(reverse=True)
    b1.sort(reverse=True)
    print(max_money(n1, a1, b1))

```

代码运行截图 (至少包含有"Accepted")

状态: Accepted

源代码

```
def max_money(n, a, b):
    money = 0
    i = 0
    j = 0
    k = n-1
    p = n-1
    while i <= p:
        if a[j] < b[i]:
            k -= 1
            money -= 200
            i += 1
        elif a[j] == b[i]:
            if a[k] > b[p]:
                p -= 1
                money += 200
            elif a[k] < b[p]:
                money -= 200
                i += 1
            else:
                if a[k] < b[i]:
                    money -= 200
                    i += 1
                k -= 1
            elif a[j] > b[i]:
                j += 1
                money += 200
                i += 1
    return money

while True:
    n1 = int(input())
    if n1 == 0:
        break
    a1 = list(map(int, input().split()))
    b1 = list(map(int, input().split()))
    a1.sort(reverse=True)
```

基本信息

#: 46460835  
题目: 02287  
提交人: 24n2400011454  
内存: 3788kB  
时间: 48ms  
语言: Python3  
提交时间: 2024-10-13 15:31:30

## 2. 学习总结和收获

随着dp题做的多了，对于dp题目的感觉慢慢上来了，不再是得想好久才想的出来了。接下来这一个月更要加大力度练习。