

Assignment #D: 十全十美

Updated 1254 GMT+8 Dec 17, 2024

2024 fall, Compiled by 颜鼎堃 工学院

说明:...

- 1) 请把每个题目解题思路（可选），源码Python, 或者C++（已经在Codeforces/Openjudge上AC），截图（包含Accepted），填写到下面作业模版中（推荐使用 typora <https://typoraio.cn>，或者用word）。AC 或者没有AC，都请标上每个题目大致花费时间。
- 2) 提交时候先提交pdf文件，再把md或者doc文件上传到右侧“作业评论”。Canvas需要有同学清晰头像、提交文件有pdf、“作业评论”区有上传的md或者doc附件。
- 3) 如果不能在截止前提交作业，请写明原因。

1. 题目

02692: 假币问题

brute force, <http://cs101.openjudge.cn/practice/02692>

思路:

- 区区24种情况，这不直接枚举？

代码:

```
1  for i in range(int(input())): Python
2      coins = {'A': 0, 'B': 0, 'C': 0, 'D': 0, 'E': 0, 'F': 0, 'G': 0, 'H': 0,
3      'I': 0, 'J': 0, 'K': 0, 'L': 0}
4      trans = {"even": 0, "up": 1, "down": -1}
5      weight = {-1: "light", 1: "heavy"}
6      tests = [input().split() for i in range(3)]
7      for i in coins.keys():
8          for j in (-1, 1):
9              coins[i] = j
10             for k in tests:
11                 if sum([coins[_] for _ in k[0]]) - sum([coins[_] for _ in
12 k[1]]) != trans[k[2]]:
13                     break
14             else:
15                 print(f"{i} is the counterfeit coin and it is {weight[j]}")
16                 break
17         else:
18             coins[i] = 0
19             continue
20     break
```

代码运行截图 (至少包含有"Accepted")

OpenJudge

题目ID, 标题, 描述

24n2400011125

信箱

账号

 CS101 / 题库 (包括计概、数算题目)

[题目](#) [排名](#) [状态](#) [提问](#)

#47889729提交状态

[查看](#) [提交](#) [统计](#) [提问](#)

状态: Accepted

源代码

```
for i in range(int(input())):
    coins = {'A': 0, 'B': 0, 'C': 0, 'D': 0, 'E': 0, 'F': 0, 'G': 0, 'H': 0}
    trans = {"even": 0, "up": 1, "down": -1}
    weight = {-1: "light", 1: "heavy"}
    tests = [input().split() for i in range(3)]
    for i in coins.keys():
        for j in (-1, 1):
            coins[i] = j
            for k in tests:
                if sum([coins[_] for _ in k[0]]) - sum([coins[_] for _ in k[1]]) != j:
                    break
            else:
                print(f"{i} is the counterfeit coin and it is {weight[j]}.")
                break
        else:
            coins[i] = 0
            continue
    break
```

基本信息

#: 47889729

题目: 02692

提交人: 颜鼎堃(24n2400011125)

内存: 3560kB

时间: 21ms

语言: Python3

提交时间: 2024-12-22 10:21:13

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[English](#) [帮助](#) [关于](#)

01088: 滑雪

dp, dfs similar, <http://cs101.openjudge.cn/practice/01088>

思路:

- 遍历周围四个格子，开一个数组记录已知的最短路径，走过直接抄答案，没走过递归一下

代码:

```
1 DIRECTIONS = ((0, 1), (1, 0), (0, -1), (-1, 0))
2 def snowboarding(x, y):
3     max_slope = 0
4     for dx, dy in DIRECTIONS:
5         nx, ny = x + dx, y + dy
6         if 0 ≤ nx < R and 0 ≤ ny < C and zone[x][y] > zone[nx][ny]:
7             if not dist[nx][ny]:
8                 snowboarding(nx, ny)
9                 max_slope = max(max_slope, dist[nx][ny])
10        dist[x][y] = 1 + max_slope
11
12 R, C = map(int, input().split())
13 zone = [list(map(int, input().split())) for i in range(R)]
14 dist = [[0 for i in range(C)] for j in range(R)]
15 for i in range(R):
16     for j in range(C):
17         if not dist[i][j]:
18             snowboarding(i, j)
19 print(max(map(max, dist)))
```

Python

代码运行截图 (至少包含有"Accepted")

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 CS101 / 题库 (包括计概、数算题目)

题目

排名

状态

提问

#47799794提交状态

查看

提交

统计

提问

状态: Accepted

源代码

def snowboarding(x, y):
 max_slope = 0
 for dx, dy in DIRECTIONS:
 nx, ny = x + dx, y + dy
 if 0 <= nx < R and 0 <= ny < C and zone[nx][ny] > zone[x][y]:
 if not dist[nx][ny]:
 snowboarding(nx, ny)
 max_slope = max(max_slope, dist[nx][ny])
 dist[x][y] = 1 + max_slope

R, C = map(int, input().split())
zone = [list(map(int, input().split())) for i in range(R)]
dist = [[0 for i in range(C)] for j in range(R)]
for i in range(R):
 for j in range(C):
 if not dist[i][j]:
 snowboarding(i, j)
print(max(map(max, dist)))

基本信息

#: 47799794
题目: 01088
提交人: 颜鼎堃(24n2400011125)
内存: 4416kB
时间: 38ms
语言: Python3
提交时间: 2024-12-17 22:16:12

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English

帮助

关于

25572: 螃蟹采蘑菇

bfs, dfs, <http://cs101.openjudge.cn/practice/25572/>

思路:

- 被卡了一会
- 主要是解决左脚卡右脚的问题，每次记录一只脚的路径就好

代码:

1 DIRECTIONS = ((0, 1), (1, 0), (0, -1), (-1, 0))

2 def dfs(x1, y1, x2, y2):

3 maze[x1][y1] = 5

4 for dx, dy in DIRECTIONS:

5 nx1, nx2, ny1, ny2 = x1 + dx, x2 + dx, y1 + dy, y2 + dy

6 if maze[nx1][ny1] != 1 and maze[nx2][ny2] != 1 and maze[nx1][ny1] != 5:

7 if maze[nx1][ny1] == 9 or maze[nx2][ny2] == 9:

8 print("yes")

9 exit()

10 else:

11 dfs(nx1, ny1, nx2, ny2)

12 maze[x1][y1] = 0

13 n = int(input())

14 maze = [[1] * (n + 2)] + [[1] + list(map(int, input().split())) + [1] for i in

15 range(n)] + [[1] * (n + 2)]

16 x1, y1, x2, y2 = 0, 0, 0, 0

17 cnt = 0

18 for i in range(n + 2):

Python

```

18     if cnt != 2:
19         while 5 in maze[i]:
20             if cnt == 0:
21                 x1, y1 = i, maze[i].index(5)
22                 maze[x1][y1] = 1
23                 cnt += 1
24             else:
25                 x2, y2 = i, maze[i].index(5)
26                 maze[x2][y2] = 0
27                 cnt += 1
28                 break
29     dfs(x1, y1, x2, y2)
30     print("no")

```

代码运行截图 (至少包含有"Accepted")

OpenJudge
题目ID, 标题, 描述
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CS101 / 题库 (包括计概、数算题目)
题目 排名 状态 提问

#47818091提交状态
查看 提交 统计 提问

状态: Accepted

源代码

```

DIRECTIONS = ((0, 1), (1, 0), (0, -1), (-1, 0))
def dfs(x1, y1, x2, y2):
    maze[x1][y1] = 5
    for dx, dy in DIRECTIONS:
        nx1, nx2, ny1, ny2 = x1 + dx, x2 + dx, y1 + dy, y2 + dy
        if maze[nx1][ny1] != 1 and maze[nx2][ny2] != 1 and maze[nx1][ny2] != 1 and maze[nx2][ny1] != 1:
            if maze[nx1][ny1] == 9 or maze[nx2][ny2] == 9:
                print("yes")
                exit()
            else:
                dfs(nx1, ny1, nx2, ny2)
    maze[x1][y1] = 0
n = int(input())
maze = [[1] * (n + 2)] + [[1] + list(map(int, input().split())) + [1] for _ in range(n)]
x1, y1, x2, y2 = 0, 0, 0, 0
cnt = 0
for i in range(n + 2):
    if cnt != 2:
        while 5 in maze[i]:
            if cnt == 0:
                x1, y1 = i, maze[i].index(5)
                maze[x1][y1] = 1
                cnt += 1
            else:
                x2, y2 = i, maze[i].index(5)
                maze[x2][y2] = 0
                cnt += 1
                break
    dfs(x1, y1, x2, y2)
print("no")

```

基本信息
#: 47818091
题目: 25572
提交人: 颜鼎壁(24n2400011125)
内存: 3724kB
时间: 38ms
语言: Python3
提交时间: 2024-12-18 15:57:07

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English 帮助 关于

27373: 最大整数

dp, <http://cs101.openjudge.cn/practice/27373/>

思路:

- 最大最小整数和0-1背包的杂交体
- 就这还卡我半天

代码:

```

1 m = int(input())
2 n = int(input())
3 num = sorted(input().split(), key=lambda t: "" if not t else t * (40 //
4 g_int = [[] for i in range(m + 1)]

```

Python

```

5   for i in num:
6       for j in range(m, len(i) - 1, -1):
7           g_int[j] = max(g_int[j], g_int[j - len(i)] + [i], key=lambda t: -1 if
not t else int("".join(t)))
8   print(int("".join(g_int[m])))

```

代码运行截图（至少包含有"Accepted"）

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CS101 / 题库 (包括计概、数算题目)

题目 排名 状态 提问

#47890013提交状态 查看 提交 统计 提问

状态: Accepted

源代码

```

m = int(input())
n = int(input())
num = sorted(input().split(), key=lambda t: "" if not t else t * (40 //
g_int = [[] for i in range(m + 1)])
for i in num:
    for j in range(m, len(i) - 1, -1):
        g_int[j] = max(g_int[j], g_int[j - len(i)] + [i], key=lambda t:
print(int("".join(g_int[m])))

```

基本信息

#: 47890013
 题目: 27373
 提交人: 颜鼎壁(24n2400011125)
 内存: 3692kB
 时间: 357ms
 语言: Python3
 提交时间: 2024-12-22 10:32:46

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02811: 熄灯问题

brute force, <http://cs101.openjudge.cn/practice/02811>

思路:

- 感谢[lights out](#)
- 手动试出来了只关第一列某盏特定的灯的方法
- 剩下要做的就是灯全都赶到第一行去了
- 20ms运行完，能算是最快的了吗（）

代码:

```

1 DIRECTIONS = ((0, 0), (0, 1), (1, 0), (0, -1), (-1, 0))
2 def xor(change1, change2):
3     return [[change1[i][j] ^ change2[i][j] for j in range(6)] for i in
range(5)]
4 light = [list(map(int, input().split())) for i in range(5)]
5 ans = [[0 for i in range(6)] for j in range(5)]
6 change = [[[0,0,0,1,1,1],[1,0,1,0,1,0],[1,0,1,1,0,0],[0,0,1,0,0,0],
[1,1,0,0,0,0]],[[1,0,1,0,1,0],[1,0,1,0,1,1],[1,0,0,0,1,0],[0,1,1,1,0,0],
[0,0,1,0,0,0]],[[1,0,1,1,0,0],[1,0,0,0,1,0],[0,1,1,0,1,1],[1,0,0,0,1,0],
[1,0,1,1,0,0]],[[0,0,1,0,0,0],[0,1,1,1,0,0],[1,0,0,0,1,0],[1,0,1,0,1,1],

```

Python

```

[1,0,1,0,1,0]],[[1,1,0,0,0,0],[0,0,1,0,0,0],[1,0,1,1,0,0],[1,0,1,0,1,0],
[0,0,0,1,1,1]]]
7 for j in range(4, -1, -1):
8     for i in range(5):
9         if light[i][j + 1]:
10            ans[i][j] ^= 1
11            for dx, dy in DIRECTIONS:
12                nx, ny = i + dx, j + dy
13                if 0 ≤ nx < 5 and 0 ≤ ny < 6:
14                    light[nx][ny] ^= 1
15 for i in range(5):
16     if light[i][0]:
17         ans = xor(ans, change[i])
18 for i in range(5):
19     print(*ans[i], sep=" ")

```

代码运行截图（至少包含有"Accepted"）

OpenJudge

题目ID, 标题, 描述

24n2400011125 信箱 账号

CS101 / 题库 (包括计概、数算题目)

题目

排名

状态

提问

#47856248提交状态

查看 提交 统计 提问

状态: Accepted

源代码

```

DIRECTIONS = ((0, 0), (0, 1), (1, 0), (0, -1), (-1, 0))
def xor(change1, change2):
    return [[change1[i][j] ^ change2[i][j] for j in range(6)] for i in range(6)]
light = [list(map(int, input().split())) for i in range(5)]
ans = [[0 for i in range(6)] for j in range(5)]
change = [[[0,0,0,1,1,1],[1,0,1,0,1,0],[1,0,1,1,0,0],[0,0,1,0,0,0],[1,1,0,0,0,0]] for j in range(4, -1, -1):
    for i in range(5):
        if light[i][j + 1]:
            ans[i][j] ^= 1
            for dx, dy in DIRECTIONS:
                nx, ny = i + dx, j + dy
                if 0 <= nx < 5 and 0 <= ny < 6:
                    light[nx][ny] ^= 1
for i in range(5):
    if light[i][0]:
        ans = xor(ans, change[i])
for i in range(5):
    print(*ans[i], sep=" ")

```

基本信息

#: 47856248

题目: 02811

提交人: 颜鼎堃(24n2400011125)

内存: 3812kB

时间: 20ms

语言: Python3

提交时间: 2024-12-20 14:33:25

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English 帮助 关于

08210: 河中跳房子

binary search, greedy, <http://cs101.openjudge.cn/practice/08210/>

思路：

- 最后一次作业的最后题，我依然没能自己做出来，这是这次作业唯一一个看答案的题
- 一直想着每次选两个隔得最近的石头然后移走，但这样复杂度大概支持不住，想不到对 L 二分
- 问题转化也很值得好好理解
- 最后要注意的一点是二分模板得到的结果要减1

代码：

```
1 def check(dist):
2     t, num = 0, 0
3     for i in range(1, N + 2):
4         if stone[i] - t < dist:
5             num += 1
6         else:
7             t = stone[i]
8     return num > M
9 L, N, M = map(int, input().split())
10 stone = [0] + [int(input()) for i in range(N)] + [L]
11 lo, hi = 0, L
12 while lo < hi:
13     mid = (lo + hi) // 2
14     if check(mid):
15         hi = mid
16     else:
17         lo = mid + 1
18 print(lo - 1)
19
```

代码运行截图（至少包含有"Accepted"）

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CS101 / 题库 (包括计概、数算题目)

题目 排名 状态 提问

#47906279提交状态 查看 提交 统计 提问

状态: Accepted

源代码

```
def check(dist):
    t, num = 0, 0
    for i in range(1, N + 2):
        if stone[i] - t < dist:
            num += 1
        else:
            t = stone[i]
    return num > M
L, N, M = map(int, input().split())
stone = [0] + [int(input()) for i in range(N)] + [L]
lo, hi = 0, L
while lo < hi:
    mid = (lo + hi) // 2
    if check(mid):
        hi = mid
    else:
        lo = mid + 1
print(lo - 1)
```

基本信息

#:	47906279
题目:	08210
提交人:	颜鼎堃(24n2400011125)
内存:	6440kB
时间:	250ms
语言:	Python3
提交时间:	2024-12-22 23:17:48

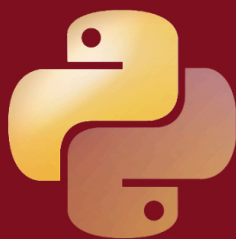
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2. 学习总结和收获

如果作业题目简单，有否额外练习题目，比如：OJ “计概2024fall每日选做”、CF、LeetCode、洛谷等网站题目。

下周机考，这两天尽早做好提纲，再做点往年题吧

图是看到网上别人p的，感觉挺有意思



「巳巳如意」

「生生不息」

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春节联欢晚会
2025 | 乙巳年