Assignment #C: 五味杂陈
Updated 1148 GMT+8 Dec 10, 2024
2024 fall, Complied by <mark>同学的姓名、院系</mark>

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

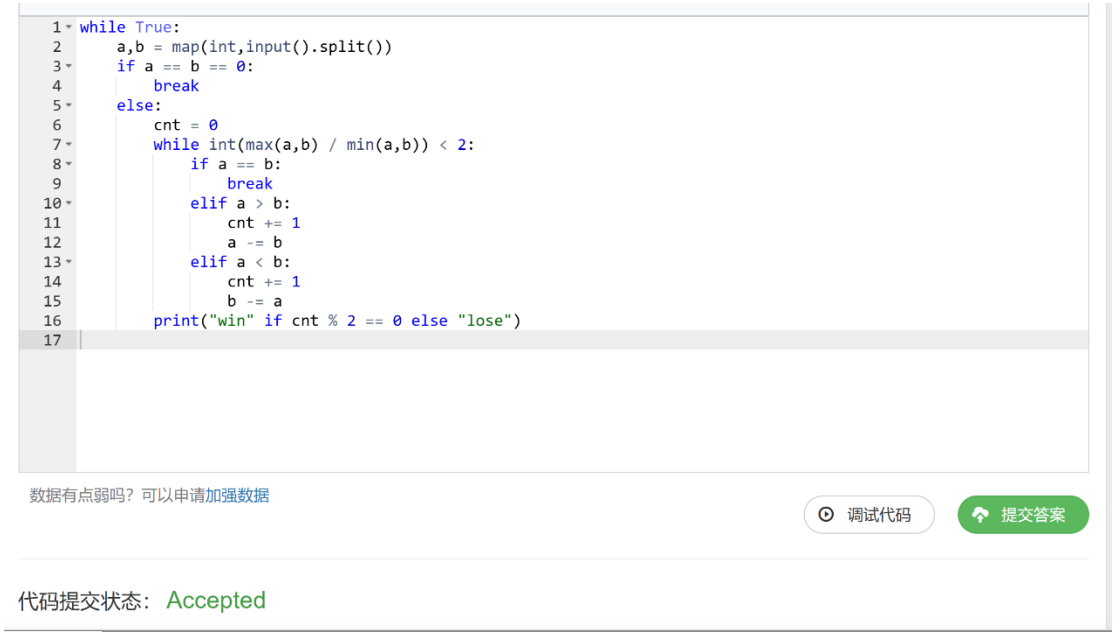
1115. 取石子游戏

dfs, https://www.acwing.com/problem/content/description/1117/

代码：

```
while True:
    a,b = map(int,input().split())
    if a == b == 0:
        break
    else:
        cnt = 0
        while int(max(a,b) / min(a,b)) < 2:
            if a == b:
                break
            elif a > b:
                cnt += 1
                a -= b
            elif a < b:
                cnt += 1
                b -= a
        print("win" if cnt % 2 == 0 else "lose")
```

代码运行截图 <mark>（至少包含有"Accepted"）</mark>



25570: 洋葱

Matrices, http://cs101.openjudge.cn/practice/25570

代码:

```
n = int(input())
matrix = [list(map(int, input().split())) for i in range(n)]
ans = 0
directions = [[1,0],[0,1],[-1,0],[0,-1]]
d = 0
for i in range(n // 2):
    col,row = i,i
    cnt = 0
    step = 0
    while not(col == i and row == i and step > 0):
        cnt += matrix[col][row]
        if row + directions[d][0] == n - i or col + directions[d][1] == n - i or row + directions[d][0] == i - 1 or col + directions[d][1] == i - 1:
            d = (d + 1) % 4
        row = row + directions[d][0]
        col = col + directions[d][1]
        step += 1
    ans = max(ans, cnt)
if n % 2 == 1:
    ans = max(ans, matrix[n // 2][n // 2])
print(ans)
```

代码运行截图 ==（至少包含有"Accepted"）==

状态: Accepted

源代码

```
n = int(input())
matrix = [list(map(int, input().split())) for i in range(n)]
ans = 0
directions = [[1,0],[0,1],[-1,0],[0,-1]]
d = 0
for i in range(n // 2):
    col,row = i,i
    cnt = 0
    step = 0
    while not(col == i and row == i and step > 0):
        cnt += matrix[col][row]
        if row + directions[d][0] == n - i or col + directions[d][1] ==
            d = (d + 1) % 4
        row = row + directions[d][0]
        col = col + directions[d][1]
        step += 1
    ans = max(ans, cnt)
if n % 2 == 1:
    ans = max(ans, matrix[n // 2][n // 2])
print(ans)
```

基本信息

#:	47769357
题目:	25570
提交人:	2400011037
内存:	4048kB
时间:	30ms
语言:	Python3
提交时间:	2024-12-16 15:58:41

1526C1. Potions(Easy Version)

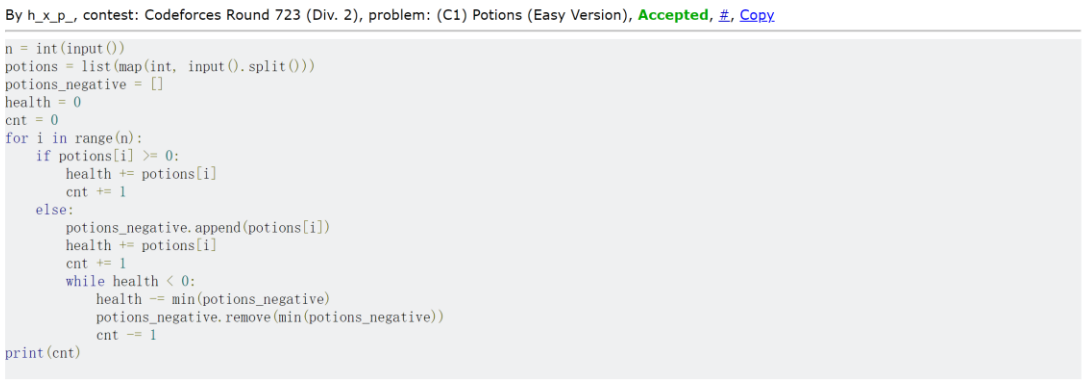
greedy, dp, data structures, brute force, *1500,

https://codeforces.com/problemset/problem/1526/C1

代码：

```
n = int(input())
potions = list(map(int, input().split()))
potions_negative = []
health = 0
cnt = 0
for i in range(n):
    if potions[i] >= 0:
        health += potions[i]
        cnt += 1
    else:
        potions_negative.append(potions[i])
        health += potions[i]
        cnt += 1
        while health < 0:
            health -= min(potions_negative)
            potions_negative.remove(min(potions_negative))
            cnt -= 1
print(cnt)
```

代码运行截图 <mark>（至少包含有"Accepted"）</mark>



By h_x_p_, contest: Codeforces Round 723 (Div. 2), problem: (C1) Potions (Easy Version), **Accepted**, #, Copy

```
n = int(input())
potions = list(map(int, input().split()))
potions_negative = []
health = 0
cnt = 0
for i in range(n):
    if potions[i] >= 0:
        health += potions[i]
        cnt += 1
    else:
        potions_negative.append(potions[i])
        health += potions[i]
        cnt += 1
        while health < 0:
            health -= min(potions_negative)
            potions_negative.remove(min(potions_negative))
            cnt -= 1
print(cnt)
```

22067: 快速堆猪

辅助栈，http://cs101.openjudge.cn/practice/22067/

代码：

```
pigs = []
min_pig = []
while True:
    try:
        s = str(input())
        if s[0:2] == "pu":
            pig = int(s[5:])
            pigs.append(pig)
            if min_pig:
                min_pig.append(min(pig,min_pig[-1]))
            else:
                min_pig.append(pig)
        if s[0:2] == "po":
            if pigs:
                pigs.pop()
                if min_pig:
                    min_pig.pop()
        if s[0:2] == "mi":
            if min_pig:
                print(min_pig[-1])
    except EOFError:
        break
```

代码运行截图 <mark>（至少包含有"Accepted"）</mark>

状态: Accepted

源代码

```
pigs = []
min_pig = []
while True:
    try:
        s = str(input())
        if s[0:2] == "pu":
            pig = int(s[5:])
            pigs.append(pig)
            if min_pig:
                min_pig.append(min(pig,min_pig[-1]))
            else:
                min_pig.append(pig)
        if s[0:2] == "po":
            if pigs:
                pigs.pop()
                if min_pig:
                    min_pig.pop()
        if s[0:2] == "mi":
            if min_pig:
                print(min_pig[-1])
    except EOFError:
        break
```

基本信息

#: 47787447
题目: 22067
提交人: 2400011037
内存: 6616kB
时间: 347ms
语言: Python3
提交时间: 2024-12-17 15:16:54

20106: 走山路

Dijkstra, http://cs101.openjudge.cn/practice/20106/

代码:

```
import heapq
def dijkstra(a,b,u,v):
    directions = [[0, 1], [1, 0], [-1, 0], [0, -1]]
    q = []
    dic = {(a,b):0}
    heapq.heappush(q, (0, a, b))
    while q:
        step, x, y = heapq.heappop(q)
        if x == u and y == v:
            return step
        for i in range(len(directions)):
            nx = x + directions[i][0]
            ny = y + directions[i][1]
            if 0 <= nx < m and 0 <= ny < n and matrix[nx][ny] != "#":
                new_step = step + abs(int(matrix[nx][ny]) - int(matrix[x][y]))
                if (nx,ny) not in dic or new_step < dic[(nx,ny)]:
                    dic[(nx,ny)] = new_step
                    heapq.heappush(q, (new_step, nx, ny))
    return "NO"
m,n,p = map(int,input().split())
matrix = [list(map(str,input().split())) for i in range(m)]
for _ in range(p):
    x1,y1,x2,y2 = map(int,input().split())
    if matrix[x1][y1] == "#" or matrix[x2][y2] == "#":
        print("NO")
    else:
        print(dijkstra(x1,y1,x2,y2))
```

代码运行截图 <mark>（至少包含有"Accepted"）</mark>

状态: Accepted

源代码

```
import heapq

def dijkstra(a,b):
    directions = [[0,1],[1,0],[-1,0],[0,-1]]
    q = []
    visited = [[False] * len(matrix[0]) for _ in range(n)]
    heapq.heappush(q,(0,a,b))
    while q:
```

基本信息

#:	47670694
题目:	20741
提交人:	2400011037
内存:	3716kB
时间:	37ms
语言:	Python3
提交时间:	2024-12-10 20:58:26

04129: 变换的迷宫

bfs, http://cs101.openjudge.cn/practice/04129/

代码:

```
from collections import deque
def bfs(a,b,m,n):
    directions = [[1,0],[0,1],[-1,0],[0,-1]]
    q = deque([(0,a,b)])
    in_queue = {(0,a,b)}
    while q:
        time,x,y = q.popleft()
        if x == m and y == n:
            return time
        for i in range(len(directions)):
            nx = x + directions[i][0]
            ny = y + directions[i][1]
            t = (time + 1) % k
            if 0 <= nx < r and 0 <= ny < c and (t,nx,ny) not in in_queue:
                if t == 0 or matrix[nx][ny] != "#":
                    q.append((time + 1,nx,ny))
                    in_queue.add((t,nx,ny))
    return "Oop!"
t = int(input())
for _ in range(t):
    r,c,k = map(int,input().split())
    matrix = [list(map(str,input())) for _ in range(r)]
    for i in range(r):
        for j in range(c):
            if matrix[i][j] == 'S':
                x1,y1 = i,j
            if matrix[i][j] == 'E':
                x2,y2 = i,j
    print(bfs(x1,y1,x2,y2))
```

代码运行截图 <mark>（至少包含有"Accepted"）</mark>

2. 学习总结和收获

<mark>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。</mark>

这周题目综合性强，让我有机会再次复习讲过的重要知识点。在时间足够的情况下能自己独立做出前 4 个题，后两题还需要参考题解，感觉跟模板略有不同就会有点手忙脚乱，有时候明白大致思路但是写不出能够解决问题的代码。以及 debug 真的很麻烦，这两题一开始死活过不去都是因为某些地方判断语句写错比如最后一题的 r,c 下意识写了 m,n 半天才查出来……感觉期末机考如果持平这个难度压力会很大。