Assignment #C: 五味杂陈

2024 fall, Complied by 吕金浩，物理学院

1. 题目

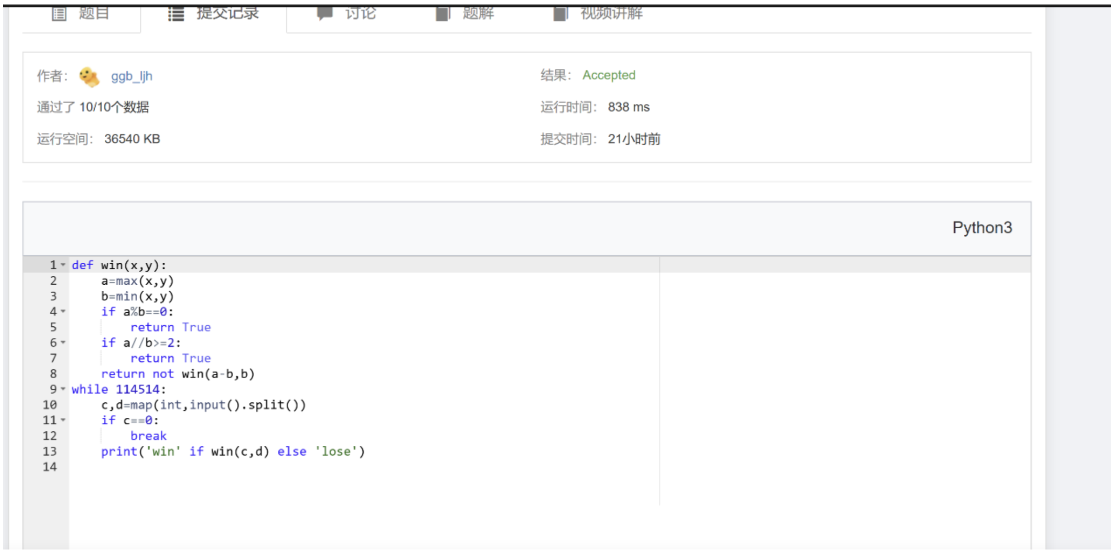
1115. 取石子游戏

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

思路：看到提示后就直接秒了

代码：

```
def win(x,y):
    a=max(x,y)
    b=min(x,y)
    if a%b==0:
        return True
    if a//b>=2:
        return True
    return not win(a-b,b)
while 114514:
    c,d=map(int,input().split())
    if c==0:
        break
    print('win' if win(c,d) else 'lose')
```



作者： ggb_ljh
结果： Accepted
通过了 10/10个数据
运行时间： 838 ms
运行空间： 36540 KB
提交时间： 21小时前

Python3

```
def win(x,y):
    a=max(x,y)
    b=min(x,y)
    if a%b==0:
        return True
    if a//b>=2:
        return True
    return not win(a-b,b)
while 114514:
    c,d=map(int,input().split())
    if c==0:
        break
    print('win' if win(c,d) else 'lose')
```

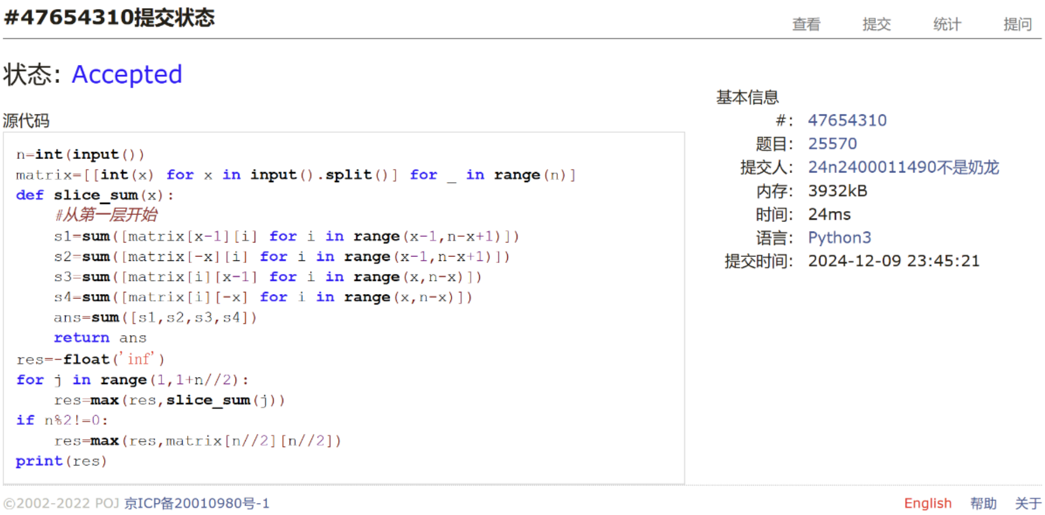
25570: 洋葱

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

思路：对于奇数层的情况，把中心单独拎出来讨论

代码：

```
n=int(input())
matrix=[[int(x) for x in input().split()] for _ in range(n)]
def slice_sum(x):
    #x 代表层数，从第 1 层开始
    s1=sum([matrix[x-1][i] for i in range(x-1,n-x+1)])
    s2=sum([matrix[-x][i] for i in range(x-1,n-x+1)])
    s3=sum([matrix[i][x-1] for i in range(x,n-x)])
    s4=sum([matrix[i][-x] for i in range(x,n-x)])
    ans=sum([s1,s2,s3,s4])
    return ans
res=-float('inf')
for j in range(1,1+n//2):
    res=max(res,slice_sum(j))
if n%2!=0:
    res=max(res,matrix[n//2][n//2])
print(res)
```



#47654310提交状态

状态: Accepted

源代码

```
n=int(input())
matrix=[[int(x) for x in input().split()] for _ in range(n)]
def slice_sum(x):
    #从第一层开始
    s1=sum([matrix[x-1][i] for i in range(x-1,n-x+1)])
    s2=sum([matrix[-x][i] for i in range(x-1,n-x+1)])
    s3=sum([matrix[i][x-1] for i in range(x,n-x)])
    s4=sum([matrix[i][-x] for i in range(x,n-x)])
    ans=sum([s1,s2,s3,s4])
    return ans
res=-float('inf')
for j in range(1,1+n//2):
    res=max(res,slice_sum(j))
if n%2!=0:
    res=max(res,matrix[n//2][n//2])
print(res)
```

基本信息

#:	47654310
题目:	25570
提交人:	24n2400011490不是奶龙
内存:	3932kB
时间:	24ms
语言:	Python3
提交时间:	2024-12-09 23:45:21

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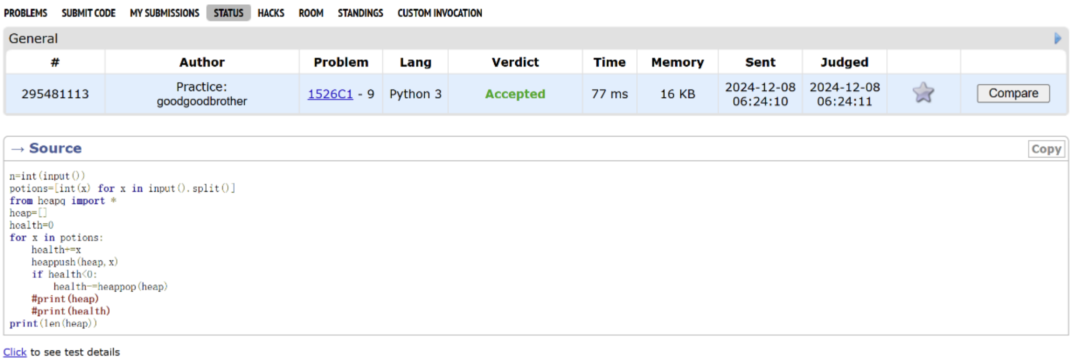
1526C1. Potions(Easy Version)

greedy, dp, data structures, brute force, *1500, https://codeforces.com/problemset/problem/1526/C1

思路：自己写了个 O(n^2)的 TLE 了（？？不理解），誊抄了答案。另外答案中 if heap 这一判断语句多余了。

代码：

```
n=int(input())
potions=[int(x) for x in input().split()]
from heapq import *
heap=[]
health=0
for x in potions:
    health+=x
    heappush(heap,x)
    if health<0:
        health-=heappop(heap)
print(len(heap))
```



General

#	Author	Problem	Lang	Verdict	Time	Memory	Sent	Judged		
295481113	Practice: goodgoodbrother	1526C1 - 9	Python 3	Accepted	77 ms	16 KB	2024-12-08 06:24:10	2024-12-08 06:24:11	☆	Compare

→ Source

```
n=int(input())
potions=[int(x) for x in input().split()]
from heapq import *
heap=[]
health=0
for x in potions:
    health+=x
    heappush(heap,x)
    if health<0:
        health-=heappop(heap)
    #print(heap)
    #print(health)
print(len(heap))
```

Click to see test details

22067：快速堆猪

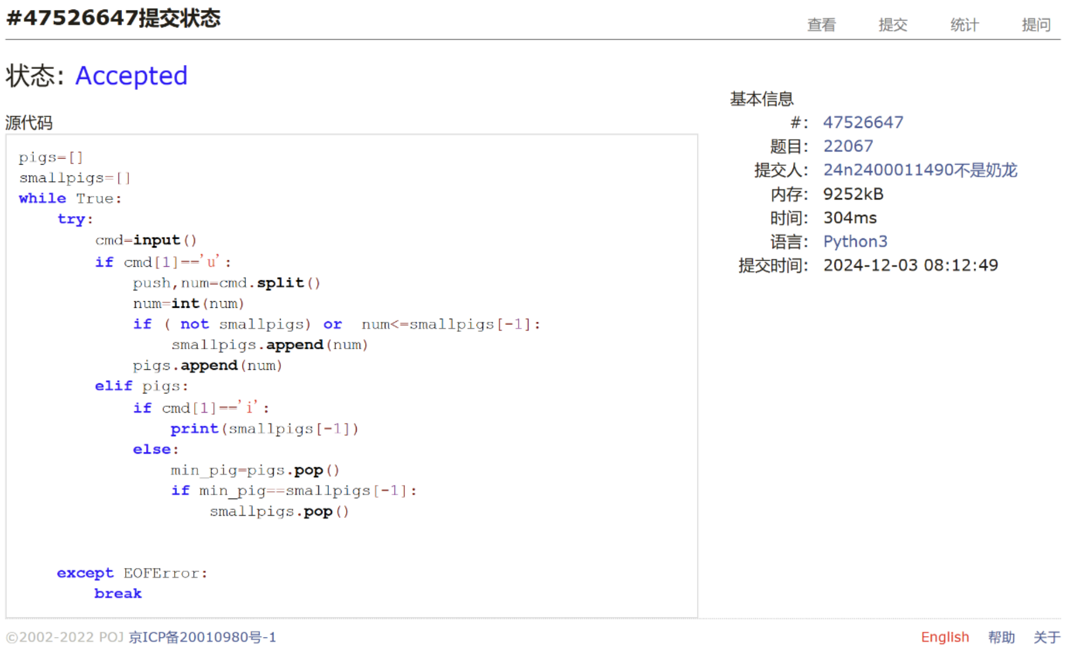
辅助栈，http://cs101.openjudge.cn/practice/22067/

代码：

```
pigs=[]
smallpigs=[]
while True:
    try:
        cmd=input()
        if cmd[1]=='u':
            push,num=cmd.split()
            num=int(num)
            if ( not smallpigs) or    num<=smallpigs[-1]:
                smallpigs.append(num)
            pigs.append(num)
        elif pigs:
            if cmd[1]=='i':
                print(smallpigs[-1])
            else:
                min_pig=pigs.pop()
                if min_pig==smallpigs[-1]:
                    smallpigs.pop()



    except EOFError:
        break
```



#47526647提交状态

查看 提交 统计 提问

状态: Accepted

源代码

```
pigs=[]
smallpigs=[]
while True:
    try:
        cmd=input()
        if cmd[1]=='u':
            push,num=cmd.split()
            num=int(num)
            if ( not smallpigs) or  num<=smallpigs[-1]:
                smallpigs.append(num)
            pigs.append(num)
        elif pigs:
            if cmd[1]=='i':
                print(smallpigs[-1])
            else:
                min_pig=pigs.pop()
                if min_pig==smallpigs[-1]:
                    smallpigs.pop()


    except EOFError:
        break
```

基本信息

#:	47526647
题目:	22067
提交人:	24n2400011490不是奶龙
内存:	9252kB
时间:	304ms
语言:	Python3
提交时间:	2024-12-03 08:12:49

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English 帮助 关于

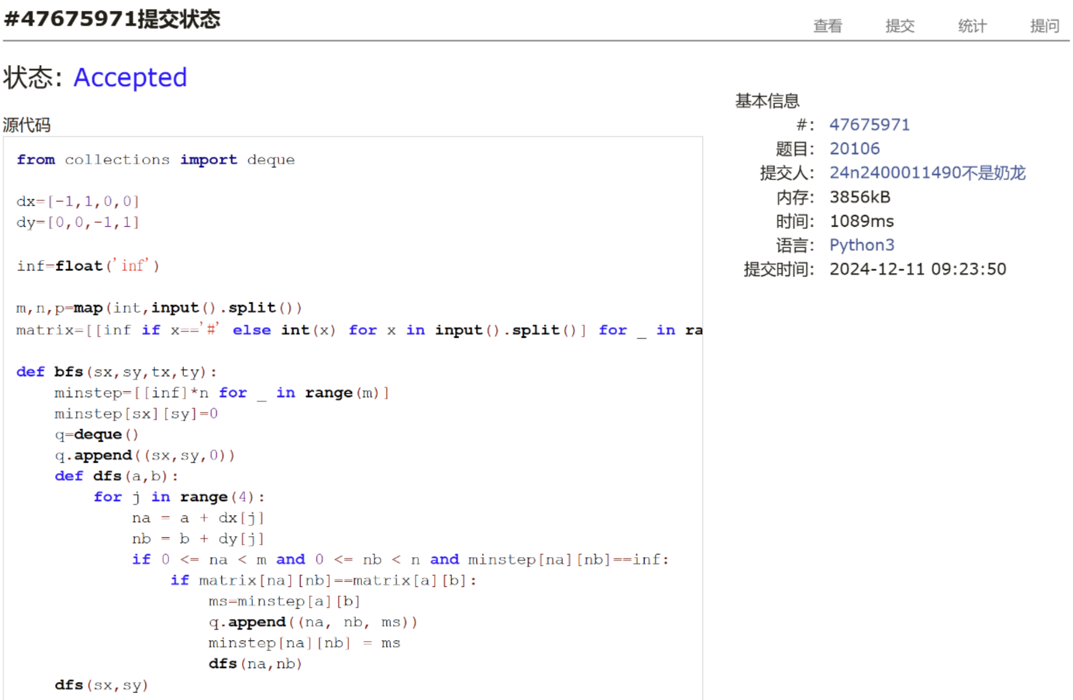
20106：走山路

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

思路：当走到一个地方时，dfs 搜索出所有和它等高的点。逐渐增加其对应的 step 直到能翻出去为止。

代码：

```
from collections import deque

dx=[-1,1,0,0]
dy=[0,0,-1,1]

inf=float('inf')

m,n,p=map(int,input().split())
matrix=[[inf if x=='#' else int(x) for x in input().split()] for _ in range(m)]

def bfs(sx,sy,tx,ty):
    minstep=[[inf]*n for _ in range(m)]
    minstep[sx][sy]=0
    q=deque()
    q.append((sx,sy,0))
    def dfs(a,b):
        for j in range(4):
            na = a + dx[j]
            nb = b + dy[j]
            if 0 <= na < m and 0 <= nb < n and minstep[na][nb]==inf:
                if matrix[na][nb]==matrix[a][b]:
                    ms=minstep[a][b]
                    q.append((na, nb, ms))
                    minstep[na][nb] = ms
                    dfs(na,nb)
    dfs(sx,sy)

    while q :
        x,y,step=q.popleft()
        if x==tx and y==ty:
            return step

        for i in range(4):
            nx=x+dx[i]
            ny=y+dy[i]

            if 0<=nx<m and 0<=ny<n and minstep[nx][ny]==inf:
                if step+1-minstep[x][y]>=abs(matrix[nx][ny]-matrix[x][y]):
                    q.append((nx,ny,step+1))
                    minstep[nx][ny]=step+1
                    dfs(nx,ny)
        if_plus = False
        for i in range(4):
            nx = x + dx[i]
            ny = y + dy[i]
            if 0 <= nx < m and 0 <= ny < n and minstep[nx][ny] == inf and matrix[nx][ny] != inf:
                if_plus = True
                break
        if if_plus:
            q.append((x, y, step + 1))

    return -1

for _ in range(p):
    x1,y1,x2,y2=map(int,input().split())
    if matrix[x1][y1]==inf or matrix[x2][y2]==inf:
        print('NO')
        continue
    res=bfs(x1,y1,x2,y2)
    print(res if res>=0 else 'NO')
```



#47675971提交状态

状态: Accepted

源代码

```
from collections import deque

dx=[-1,1,0,0]
dy=[0,0,-1,1]

inf=float('inf')

m,n,p=map(int,input().split())
matrix=[[inf if x=='#' else int(x) for x in input().split()] for _ in ra

def bfs(sx,sy,tx,ty):
    minstep=[[inf]*n for _ in range(m)]
    minstep[sx][sy]=0
    q=deque()
    q.append((sx,sy,0))
    def dfs(a,b):
        for j in range(4):
            na = a + dx[j]
            nb = b + dy[j]
            if 0 <= na < m and 0 <= nb < n and minstep[na][nb]==inf:
                if matrix[na][nb]==matrix[a][b]:
                    ms=minstep[a][b]
                    q.append((na, nb, ms))
                    minstep[na][nb] = ms
                    dfs(na,nb)
    dfs(sx,sy)
```

基本信息

#: 47675971
题目: 20106
提交人: 24n2400011490不是奶龙
内存: 3856kB
时间: 1089ms
语言: Python3
提交时间: 2024-12-11 09:23:50

04129: 变换的迷宫

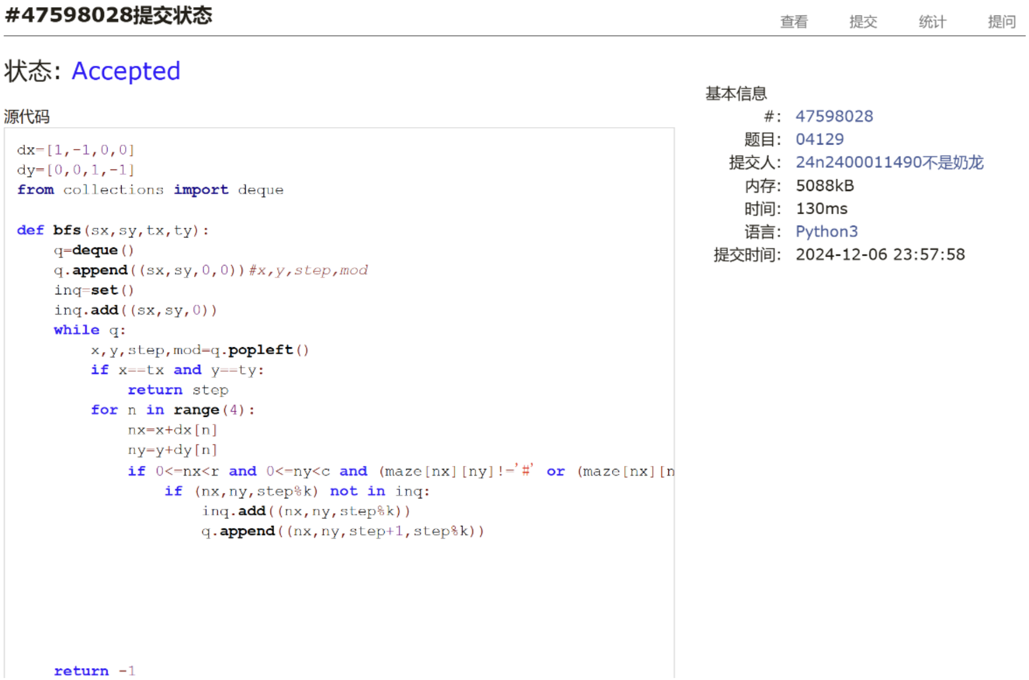
bfs, http://cs101.openjudge.cn/practice/04129/

思路: inq 集合中，记录下走到某一位置时的时间模上 k。另外我的答案里面 mod 这一变量多余了。

代码:

```
dx=[1,-1,0,0]
dy=[0,0,1,-1]
from collections import deque

def bfs(sx,sy,tx,ty):
    q=deque()
    q.append((sx,sy,0,0))#x,y,step,mod
    inq=set()
    inq.add((sx,sy,0))
    while q:
        x,y,step,mod=q.popleft()
        if x==tx and y==ty:
            return step
        for n in range(4):
            nx=x+dx[n]
            ny=y+dy[n]
            if 0<=nx<r and 0<=ny<c and (maze[nx][ny]!='#' or (maze[nx][ny]=='#' and (step+1)%k==0)):
                if (nx,ny,step%k) not in inq:
                    inq.add((nx,ny,step%k))
                    q.append((nx,ny,step+1,step%k))
    return -1
```

```
for _ in range(int(input())):
    r,c,k=map(int,input().split())

    maze=[list(input()) for _ in range(r)]
    s,e=0,0
    for i in range(r):
        for j in range(c):
            if maze[i][j]=='S':
                s=(i,j)
            if maze[i][j]=='E':
                e=(i,j)
    ans=bfs(s[0],s[1],e[0],e[1])
    print(ans if ans>=0 else 'Oop!')
```



#47598028提交状态

状态: Accepted

源代码

```
dx=[1,-1,0,0]
dy=[0,0,1,-1]
from collections import deque

def bfs(sx,sy,tx,ty):
    q=deque()
    q.append((sx,sy,0,0))#x,y,step,mod
    inq=set()
    inq.add((sx,sy,0))
    while q:
        x,y,step,mod=q.popleft()
        if x==tx and y==ty:
            return step
        for n in range(4):
            nx=x+dx[n]
            ny=y+dy[n]
            if 0<=nx<r and 0<=ny<c and (maze[nx][ny]!='#' or (maze[nx][n
                if (nx,ny,step%k) not in inq:
                    inq.add((nx,ny,step%k))
                    q.append((nx,ny,step+1,step%k))




    return -1
```

基本信息

#:	47598028
题目:	04129
提交人:	24n2400011490不是奶龙
内存:	5088kB
时间:	130ms
语言:	Python3
提交时间:	2024-12-06 23:57:58

2. 学习总结和收获

做多了 bfs 感觉并没有那么困难，模板性挺强的。

月考极大地打击了我的自信心，唉，符合作业标题。继续跟进每日选做，期待期末别考太难（和 Nov 月考差不多就行了球球了）