Assignment #C: 五味杂陈

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2024 fall, Complied by <mark>付耀贤，信息管理系</mark>

1. 题目

1115. 取石子游戏

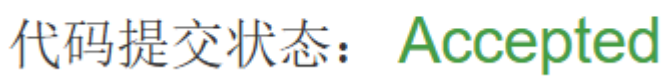
dfs, https://www.acwing.com/problem/content/description/1117/

思路：题目后面给了提示，这道题就显得不难了，用循环就能做。如果不给提示，恐怕我是怎么也想不出来。

代码：

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

思路：太绕了呜呜。自己写的时候心态已经崩溃了，看了题解更崩溃了，，这么简洁的代码怎么想到的。后来反思了一下，我是从圈出发，不断把每个数加进去；题解从数出发，考虑把数归类到圈里。这种思考视角的转变很有趣，很有用！

代码：

```
from math import ceil
n = int(input())
matrix=[list(map(int,input().split())) for i in range(n)]
re = [0] * ceil(n/2)
for i in range(n):
    for j in range(n):
        re[min(i, j, n-1-i, n-1-j)] += matrix[i][j]
print(max(re))
```

代码运行截图 ==（至少包含有"Accepted"）==

状态：Accepted

源代码

```
from math import ceil
n = int(input())
matrix=[list(map(int,input().split())) for i in range(n)]
re = [0] * ceil(n/2)
for i in range(n):
    for j in range(n):
        re[min(i, j, n-1-i, n-1-j)] += matrix[i][j]
print(max(re))
```

1526C1. Potions(Easy Version)

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

思路：没有用堆的解法也过了，就是将新数字与已经使用过的比较，不断更新所要使用的数字。

代码：

```
n = int(input())
potions = list(map(int, input().split()))
hp=0
c=0
used=[]
for potion in potions:
    if hp+potion>=0:
        hp+=potion
        used.append(potion)
```

```
            c+=1
        elif used and potion>min(used):
            out=min(used)
            used.remove(out)
            hp-=out
            hp+=potion
            used.append(potion)
    print(c)
```

代码运行截图 <mark>（至少包含有"Accepted"）</mark>

#	Author	Problem	Lang	Verdict	Time	Memory
296554350	Practice: aglint	1526C1 - 9	Python 3	Accepted	77 ms	12 KB

22067: 快速堆猪

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

思路：一步一步让 AI 拆解整个过程，通过这个题感受到了栈的具体应用

代码：

```
class PigStack:
    def __init__(self):
        self.main_stack = []  # 主栈，用于存储猪的重量
        self.min_stack = []   # 辅助栈，用于存储当前最轻的重量

    def push(self, n):
        self.main_stack.append(n)
        # 如果辅助栈为空，或者新重量小于等于辅助栈顶部的重量，推入辅助栈
        if not self.min_stack or n <= self.min_stack[-1]:
            self.min_stack.append(n)

    def pop(self):
        if self.main_stack:
            top = self.main_stack.pop()
            # 如果弹出的重量等于辅助栈栈顶，弹出辅助栈顶部
            if self.min_stack and top == self.min_stack[-1]:
                self.min_stack.pop()

    def get_min(self):
        if self.min_stack:
            return self.min_stack[-1]
        return None
```

```
import sys
pig_stack = PigStack()
for line in sys.stdin:
    command = line.strip()
    if command.startswith("push"):
        _, n = command.split()
        pig_stack.push(int(n))
    elif command == "pop":
        pig_stack.pop()
    elif command == "min":
        min_weight = pig_stack.get_min()
        if min_weight is not None:
            print(min_weight)
```

代码运行截图 <mark>（至少包含有"Accepted"）</mark>

状态: Accepted

源代码

```
class PigStack:
    def __init__(self):
        self.main_stack = []   # 主栈，用于存储猪的重量
        self.min_stack = []    # 辅助栈，用于存储当前最轻的重量
```

20106: 走山路

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

思路：真难啊。用堆来实现优先队列，快速找到当前消耗最小的节点。

代码：

```
import heapq
n, m, p = map(int, input().split())
mat = [list(input().split()) for _ in range(n)]
directions = [(1, 0), (0, 1), (0, -1), (-1, 0)]
anns = []
for _ in range(p):
    ans = 'NO'
    x, y, xx, yy = map(int, input().split())
    if mat[x][y] != '#' and mat[xx][yy] != '#':
        dist = {(x, y): 0}
        q = [(0, x, y)]
        while q:
            s, i, j = heapq.heappop(q)
```

```
            if i == xx and j == yy:
                ans = s
                break
            for a, b in directions:
                ii, jj = i + a, j + b
                if 0 <= ii < n and 0 <= jj < m and mat[ii][jj] != '#':
                    cost = s + abs(int(mat[ii][jj]) - int(mat[i][j]))
                    if (ii, jj) not in dist or cost < dist[(ii, jj)]:
                        dist[(ii, jj)] = cost
                        heapq.heappush(q, (cost, ii, jj))
    anns.append(ans)
for _ in anns:
    print(_)
```

代码运行截图 <mark>（至少包含有"Accepted"）</mark>

状态: Accepted

源代码

```
import heapq
n, m, p = map(int, input().split())
mat = [list(input().split()) for _ in range(n)]
directions = [(1, 0), (0, 1), (0, -1), (-1, 0)]
anns = []
```

04129: 变换的迷宫

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

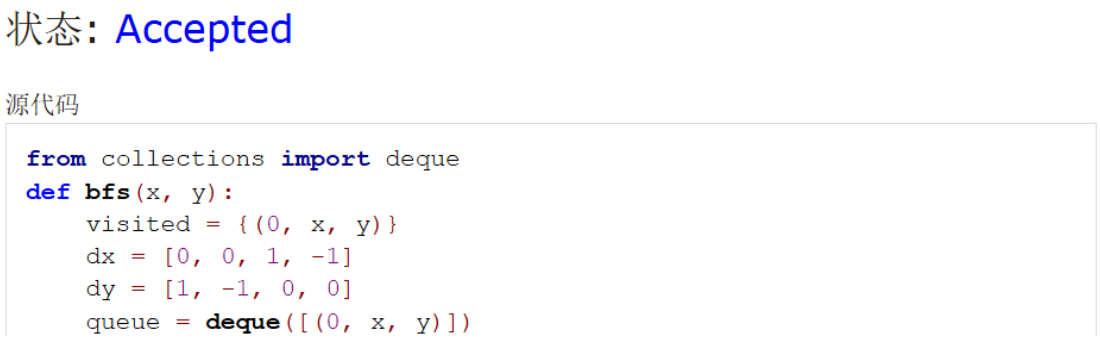
思路：三维结构，取模，处理得很妙。

代码：

```
from collections import deque
def bfs(x, y):
    visited = {(0, x, y)}
    dx = [0, 0, 1, -1]
    dy = [1, -1, 0, 0]
    queue = deque([(0, x, y)])
    while queue:
        time, x, y = queue.popleft()
        for i in range(4):
            nx, ny = x + dx[i], y + dy[i]
            temp = (time + 1) % k
            if 0 <= nx < r and 0 <= ny < c and (temp, nx, ny) not in
visited:
```

```
                cur = maze[nx][ny]
                if cur == 'E':
                    return time + 1
                elif cur != '#' or temp == 0:
                    queue.append((time + 1, nx, ny))
                    visited.add((temp, nx, ny))
    return 'Oop!'
t = int(input())
for _ in range(t):
    r, c, k = map(int, input().split())
    maze = [list(input()) for _ in range(r)]
    for i in range(r):
        for j in range(c):
            if maze[i][j] == 'S':
                print(bfs(i, j))
```

代码运行截图 <mark>（至少包含有"Accepted"）</mark>



2. 学习总结和收获

这周的正课闫老师讲了笔试部分，听起来没有写代码这么考验脑力（太好了是笔试，我们有救了），收获感满满。好害怕上机。好好复习，保持手感，放平心态，尽量多 AC M 难度的题目吧，尽力去做！