

Assignment #3: 惊蛰 Mock Exam

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2025 spring, Compiled by 金俊毅, 物理学院

说明:

1. **惊蛰月考**: AC6 (请改为同学的通过数)。考试题目都在“题库 (包括计概、数算题目)”里面, 按照数字题号能找到, 可以重新提交。作业中提交自己最满意版本的代码和截图。
2. **解题与记录**:
对于每一个题目, 请提供其解题思路 (可选), 并附上使用Python或C++编写的源代码 (确保已在OpenJudge, Codeforces, LeetCode等平台上获得Accepted)。请将这些信息连同显示“Accepted”的截图一起填写到下方的作业模板中。(推荐使用Typora <https://typoraio.cn> 进行编辑, 当然你也可以选择Word。)无论题目是否已通过, 请标明每个题目大致花费的时间。
3. **提交安排**: 提交时, 请首先上传PDF格式的文件, 并将.md或.doc格式的文件作为附件上传至右侧的“作业评论”区。确保你的Canvas账户有一个清晰可见的头像, 提交的文件为PDF格式, 并且“作业评论”区包含上传的.md或.doc附件。
4. **延迟提交**: 如果你预计无法在截止日期前提交作业, 请提前告知具体原因。这有助于我们了解情况并可能为你提供适当的延期或其他帮助。

请按照上述指导认真准备和提交作业, 以保证顺利完成课程要求。

1. 题目

E04015: 邮箱验证

strings, <http://cs101.openjudge.cn/practice/04015>

代码:

```
while True:
    try:
        a = input().strip()
    except EOFError:
        break

    if a[0:1] == "." or a[0:1] == "@" or a[-1:] == "." or a[-1:] == "@" or ("@"
not in a):
        print("NO")
    else:
        for i in range(len(a)):
            if a[i:i + 1] == "@":
                m = i
                break

            if ( "." not in a[m + 1:]) or a[m + 1:m + 2] == "." or a[m - 1:m] == "."
or ("@" in a[m + 1:]):
                print("NO")
            else:
```

```
print("YES")
```

代码运行截图 (至少包含有"Accepted")

#48462413提交状态

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状态: Accepted

源代码

```
while True:
    try:
        a = input().strip()
    except EOFError:
        break

    if a[0:1] == "." or a[0:1] == "@" or a[-1:] == "." or a[-1:] == "@" or a[-1:] == " ":
        print("NO")
    else:
        for i in range(len(a)):
            if a[i:i+1] == "@":
                m = i
                break
            if ( "." not in a[m+1:] ) or a[m+1:m+2] == "." or a[m-1:m] == ".":
                print("NO")
        else:
            print("YES")
```

基本信息

#: 48462413
题目: 04015
提交人: 24n2400011454
内存: 3616kB
时间: 30ms
语言: Python3
提交时间: 2025-03-06 18:10:11

M02039: 反反复复

implementation, <http://cs101.openjudge.cn/practice/02039/>

代码:

```
n = int(input())
s = input()
mat = []
ans = ""
for i in range(0, len(s)//n):
    if i % 2 == 0:
        mat.append(s[n*i:n*(i+1)])
    else:
        mat.append(s[n*(i+1)-1:n*i-1:-1])
for i in range(n):
    for j in range(len(mat)):
        ans += mat[j][i]
print(ans)
```

状态: Accepted

源代码

```
n = int(input())
s = input()
mat = []
ans = ""
for i in range(0, len(s)//n):
    if i % 2 == 0:
        mat.append(s[n*i:n*(i+1)])
    else:
        mat.append(s[n*(i+1)-1:n*i-1:-1])
for i in range(n):
    for j in range(len(mat)):
        ans += mat[j][i]
print(ans)
```

基本信息

#: 48462525
题目: 02039
提交人: 24n2400011454
内存: 7404kB
时间: 30ms
语言: Python3
提交时间: 2025-03-06 18:21:50

M02092: Grandpa is Famous

implementation, <http://cs101.openjudge.cn/practice/02092/>

代码:

```
while True:
    n, m = map(int, input().split())
    if n == 0:
        break
    rank = [list(map(int, input().split())) for _ in range(n)]
    dic = {}
    for i in range(n):
        for s in rank[i]:
            if s not in dic:
                dic[s] = 1
            else:
                dic[s] += 1
    mer = []
    for key in dic:
        if dic[key] not in mer:
            mer.append(dic[key])
    mer.sort()
    a = mer[-2]
    ans = []
    for key in dic:
        if dic[key] == a:
            ans.append(key)
    ans.sort()
    for i in range(len(ans)):
        if i != len(ans)-1:
            print(str(ans[i]), end=" ")
        else:
            print(str(ans[i]))
```

状态: Accepted

源代码

```
while True:
    n, m = map(int, input().split())
    if n == 0:
        break
    rank = [list(map(int, input().split())) for _ in range(n)]
    dic = {}
    for i in range(n):
        for s in rank[i]:
            if s not in dic:
                dic[s] = 1
            else:
                dic[s] += 1
    mer = []
    for key in dic:
        if dic[key] not in mer:
            mer.append(dic[key])
    mer.sort()
    a = mer[-2]
    ans = []
    for key in dic:
        if dic[key] == a:
            ans.append(key)
    ans.sort()
    for i in range(len(ans)):
        if i != len(ans)-1:
            print(str(ans[i]), end=" ")
        else:
            print(str(ans[i]))
```

基本信息

#: 48466946
题目: 02092
提交人: 24n2400011454
内存: 17696kB
时间: 212ms
语言: Python3
提交时间: 2025-03-06 23:41:00

M04133: 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)
```

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
m2 = 0
for i in range(1025):
    for j in range(1025):
        if mat[i][j] > m1:
            m1 = mat[i][j]
            m2 = 1
        elif mat[i][j] == m1:
            m2 += 1
print(m2, m1)
```

基本信息

#: 48462421
题目: 04133
提交人: 24n2400011454
内存: 12680kB
时间: 302ms
语言: Python3
提交时间: 2025-03-06 18:11:18

T02488: A Knight's Journey

backtracking, <http://cs101.openjudge.cn/practice/02488/>

代码:

```
dire = [(-2, -1), (-2, 1), (-1, -2), (-1, 2), (1, -2), (1, 2), (2, -1), (2, 1)]
ans = []
```

```
def dfs(ans, a, b, step):
    if step == a*b:
        return True
    else:
        x = ord(ans[step-1][0])-65
        y = int(ans[step-1][1:])
        for k in range(8):
            dx, dy = dire[k]
            if 0 <= x+dx < b and 1 <= y+dy <= a:
                if not visited[y+dy-1][x+dx]:
                    visited[y + dy-1][x + dx] = True
                    ans[step] = chr(65+x+dx) + str(y+dy)
                    if dfs(ans, a, b, step+1):
                        return True
                    visited[y + dy - 1][x + dx] = False
        return False
```

```
n = int(input())
for qw in range(n):
    p, q = map(int, input().split())
    ans = ["" for _ in range(p*q)]
    result = ""
    print("Scenario #" + str(qw+1) + ":")
    for j in range(q):
        for i in range(1, p+1):
            ans[0] = chr(65+j) + str(i)
```

```

        visited = [[False for _ in range(q)] for _ in range(p)]
        visited[i-1][j] = True
        if dfs(ans, p, q, 1):
            result = "".join(ans)
            break
    if result:
        break
if result:
    print(result)
else:
    print("impossible")
if qw != n-1:
    print()

```

代码运行截图 (至少包含有"Accepted")

#48472410提交状态

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状态: Accepted

源代码

```

dire = [(-2, -1), (-2, 1), (-1, -2), (-1, 2), (1, -2), (1, 2), (2, -1),
        (2, 1)]
ans = []

def dfs(ans, a, b, step):
    if step == a*b:
        return True
    else:
        x = ord(ans[step-1][0])-65
        y = int(ans[step-1][1:])
        for k in range(8):
            dx, dy = dire[k]
            if 0 <= x+dx < b and 1 <= y+dy <= a:
                if not visited[y+dy-1][x+dx]:
                    visited[y + dy-1][x + dx] = True
                    ans[step] = chr(65+x+dx) + str(y+dy)

```

基本信息

#: 48472410
 题目: 02488
 提交人: 24n2400011454
 内存: 4720kB
 时间: 486ms
 语言: Python3
 提交时间: 2025-03-07 17:22:15

T06648: Sequence

heap, <http://cs101.openjudge.cn/practice/06648/>

代码:

```

import heapq
import copy

T = int(input())
for _ in range(T):
    m, n = map(int, input().split())
    seq = [sorted(list(map(int, input().split())) for _ in range(m))]
    now = seq[0]
    for i in range(1, m):
        result = []
        pq = [(now[k]+seq[i][0], k, 0) for k in range(n)]
        for _ in range(n):
            small, p, j = heapq.heappop(pq)
            result.append(small)
            if j + 1 < n:
                heapq.heappush(pq, (now[p]+seq[i][j+1], p, j+1))
        now = copy.deepcopy(result)

```

```
for i in range(n):
    print(str(now[i]), end="")
    if i != n-1:
        print(" ", end="")
print()
```

代码运行截图 == (AC代码截图, 至少包含有"Accepted") ==

#48473551提交状态

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状态: **Accepted**

源代码

```
import heapq
import copy

T = int(input())
for _ in range(T):
    m, n = map(int, input().split())
    seq = [sorted(list(map(int, input().split())) for _ in range(m))]
    now = seq[0]
    for i in range(1, m):
        result = []
        pq = [(now[k]+seq[i][0], k, 0) for k in range(n)]
        for _ in range(n):
            small, p, j = heapq.heappop(pq)
            result.append(small)
            if j + 1 < n:
                heapq.heappush(pq, (now[p]+seq[i][j+1], p, j+1))
        now = copy.deepcopy(result)
    for i in range(n):
        print(str(now[i]), end="")
        if i != n-1:
            print(" ", end="")
    print()
```

基本信息

#: 48473551
题目: 06648
提交人: 24n2400011454
内存: 20504kB
时间: 1150ms
语言: Python3
提交时间: 2025-03-07 18:50:23

2. 学习总结和收获

骑士周游的思路算是学到了, 直接选择字典序最小的路径, 不用把所有路径找到(这样似乎会超时), 算是新学到了一些。