# Assignment #D: May月考

Updated 1654 GMT+8 May 8, 2024

2024 spring, Complied by ==黄源森, 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 <a href="https://typoraio.cn">https://typoraio.cn</a>,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。

#### 编程环境

== (请改为同学的操作系统、编程环境等) ==

操作系统: W11

环境: Spyder IDE 5.4.3

### 1. 题目

### 02808: 校门外的树

http://cs101.openjudge.cn/practice/02808/

思路:

```
#
L,M=map(int, input().split())
st=[]
num=0
for i in range(M):
    st.append(list(map(int, input().split())))
for m in range(L+1):
    for item in st:
        if item[0]<=m<=item[1]:
            num+=1
            break
    else:
        continue</pre>
```

```
print(L+1-num)
```

代码运行截图 == (至少包含有"Accepted") ==

状态: Accepted

```
基本信息
源代码
                                                                               #: 43966344
                                                                              题目: 02808
 L,M=map(int, input().split())
                                                                            提交人: 23n2300011031
 st=[]
                                                                             内存: 3616kB
 num=0
 for i in range (M):
                                                                             时间: 30ms
    st.append(list(map(int, input().split())))
                                                                             语言: Python3
 for m in range(L+1):
                                                                          提交时间: 2024-02-23 12:27:33
    for item in st:
        if item[0]<=m<=item[1]:</pre>
           num+=1
break
        else:
            continue
 print(L+1-num)
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```

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### 20449: 是否被5整除

http://cs101.openjudge.cn/practice/20449/

思路:

代码

```
s=input()
dp=[0]
for i in range(len(s)):
    dp.append((dp[-1]*2+int(s[i])))
ans=''
for u in dp[1:]:
    if u%5==0:
        ans+='1'
    else:
        ans+='0'
print(ans)
```

代码运行截图 == (至少包含有"Accepted") ==

#### 状态: Accepted

```
#: 44897486
                                                                                    题目: E20449
 s=input()
                                                                                  提交人: 23n2300011031
 dp=[0]
                                                                                    内存: 3600kB
 _ _.. _amge(len(s)):
    dp.append((dp[-1]*2+int(s[i])))
ans=''
                                                                                    时间: 19ms
                                                                                    语言: Python3
 for u in dp[1:]:
                                                                                 提交时间: 2024-05-08 15:18:05
     if u%5==0:
         ans+='1'
       ans+='0'
 print(ans)
                                                                                                     English 帮助 关于
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```

基本信息

### 01258: Agri-Net

http://cs101.openjudge.cn/practice/01258/

思路:

```
import heapq
while 1:
   try:
        n = int(input())
        1 = [list(map(int, input().split())) for _ in range(n)]
        vis = set([0])
        p = []
        al = 0
        for i in range(1, n):
            p.append((1[0][i], 0, i))
        heapq.heapify(p)
        while len(vis) < n:
            while 1:
                a, b, c = heapq.heappop(p)
                if not (b in vis and c in vis):
                    break
            al += a
            vis.add(c)
            for i in range(n):
                if i not in vis:
                    heapq.heappush(p, (1[c][i], c, i))
        print(al)
    except:
        break
```

代码运行截图 == (AC代码截图,至少包含有"Accepted") ==

#### 状态: Accepted

```
源代码
                                                                                #: 44897643
                                                                               题目: M01258
 import heapq
                                                                             提交人: 23n2300011031
                                                                              内存: 4436kB
 while 1:
                                                                               时间: 33ms
    try:
        n = int(input())
                                                                              语言: Python3
         l = [list(map(int, input().split())) for _ in range(n)]
                                                                           提交时间: 2024-05-08 15:27:05
         vis = set([0])
         al = 0
         for i in range(1, n):
            p.append((1[0][i], 0, i))
        heapq.heapify(p)
         while len(vis) < n:</pre>
            while 1:
                a, b, c = heapq.heappop(p)
                if not (b in vis and c in vis):
                    break
            al += a
            vis.add(c)
             for i in range(n):
                if i not in vis:
                    heapq.heappush(p, (l[c][i], c, i))
         print(al)
     except:
        break
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                                                                                              English 帮助 关于
```

### 27635: 判断无向图是否连通有无回路(同23163)

http://cs101.openjudge.cn/practice/27635/

思路:

```
def dfs(i):
    vis.add(i)
    for u in 1[i]:
        if u not in vis:
            dfs(u)
def dfs2(i):
    for u in l[i]:
        if u not in vis:
            vis[u]=i
            if not dfs2(u):
                return 0
        elif u in vis and vis[i]!=u:
            return 0
    return 1
n,m=map(int,input().split())
l=[[]for _ in range(n)]
```

```
for _ in range(m):
    a,b=map(int,input().split())
    1[a].append(b)
    1[b].append(a)
vis=set()
dfs(0)
if len(vis)<n:
    print('connected:no')
else:
    print('connected:yes')
f=1
for i in range(n):
    vis={i:i}
    if not dfs2(i):
        f=0
        break
if f:
   print('loop:no')
else:
   print('loop:yes')
```

代码运行截图 == (AC代码截图,至少包含有"Accepted") ==

#### 状态: Accepted

```
源代码
 def dfs(i):
     vis.add(i)
     for u in l[i]:
        if u not in vis:
            dfs(u)
 def dfs2(i):
     for u in l[i]:
         if u not in vis:
             vis[u]=i
             if not dfs2(u):
                 return 0
         elif u in vis and vis[i]!=u:
            return 0
    return 1
 n,m=map(int,input().split())
 l=[[]for _ in range(n)]
 for _ in range(m):
    a, b=map(int,input().split())
    l[a].append(b)
    l[b].append(a)
 vis=set()
 dfs(0)
 if len(vis)<n:</pre>
    print('connected:no')
 else:
    print('connected:yes')
 for i in range(n):
     vis={i:i}
     if not dfs2(i):
        f=0
        break
    print('loop:no')
    print('loop:yes')
```

#### 基本信息

#: 44898123 题目: M27635 提交人: 23n2300011031 内存: 3664kB 时间: 26ms 语言: Python3 提交时间: 2024-05-08 15:46:18

### 27947: 动态中位数

http://cs101.openjudge.cn/practice/27947/

思路:

代码

```
import heapq
for _ in range(int(input())):
    p=list(map(int,input().split()))
    ans=[p[0]]
    1=[p[0]]
    r=[]
    t=len(p)
    for i in range(1,t):
        if len(1)>len(r):
            x=heapq.heappop(1)
            if p[i]<x:</pre>
                heapq.heappush(r, -p[i])
                heapq.heappush(1, x)
            else:
                heapq.heappush(r, -x)
                heapq.heappush(1, p[i])
        else:
            x=-heapq.heappop(r)
            if x>=p[i]:
                heapq.heappush(1, x)
                heapq.heappush(r, -p[i])
            else:
                heapq.heappush(1,p[i])
                heapq.heappush(r,-x)
            a=heapq.heappop(1)
            ans.append(a)
            heapq.heappush(1, a)
    print(len(ans))
    print(*ans)
```

代码运行截图 == (AC代码截图,至少包含有"Accepted") ==

#### 状态: Accepted

```
源代码
                                                                                                       #: 44960269
                                                                                                     题目: 27947
 import heapq
                                                                                                   提交人: 23n2300011031
 for _ in range(int(input())):
     p=list(map(int,input().split()))
                                                                                                    内存: 11400kB
                                                                                                     时间: 421ms
      1 = [p[0]]
                                                                                                     语言: Python3
                                                                                                提交时间: 2024-05-14 14:55:41
      t=len(p)
for i in range(1,t):
    if len(1)>len(r):
                x=heapq.heappop(1)
if p[i]<x:</pre>
                     \verb|heapq.heappush(r, -p[i])|
                     heapq.heappush(1, x)
                    heapq.heappush(r, -x)
heapq.heappush(l, p[i])
                x=-heapq.heappop(r)
                if x>=p[i]:
                     heapq.heappush(1, x)
heapq.heappush(r, -p[i])
                     heapq.heappush(1,p[i])
                     heapq.heappush(r,-x)
                a=heapq.heappop(1)
ans.append(a)
                heapq.heappush(1, a)
      print(len(ans))
      print(*ans)
                                                                                                                        English 帮助 关于
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```

基本信息

28190: 奶牛排队

http://cs101.openjudge.cn/practice/28190/

思路:

```
n=int(input())
l=[int(input()) for _ in range(n)]+[-1]
mi = [0]
dp1=[0]*n
dp2=[0]*n
ma=[0]
for i in range(1,1+n):
    while mi and l[i]>l[mi[-1]]:
        a=mi.pop()
    if i==n:
        break
    if mi:
        dp2[i]=mi[-1]
    else:
        dp2[i]=-1
    mi.append(i)
for i in range(1,1+n):
    while ma and l[i] \le l[ma[-1]]:
        a=ma.pop()
        dp1[a]=i
    ma.append(i)
ans=0
```

```
for i in range(n):
    t=dp1[i]
    for j in range(i+1,t):
        if dp2[j] < i:
            ans=max(ans,j-i+1)
print(ans)</pre>
```

代码运行截图 == (AC代码截图,至少包含有"Accepted") ==

状态: Accepted

```
基本信息
源代码
                                                                                #: 44899478
                                                                              题目: T28190
 n=int(input())
                                                                             提交人: 23n2300011031
 l=[int(input()) for _ in range(n)]+[-1]
                                                                              内存: 4436kB
 dp1=[0]*n
                                                                              时间: 53ms
 dp2=[0]*n
                                                                              语言: Python3
 ma=[0]
                                                                           提交时间: 2024-05-08 16:39:37
 for i in range (1,1+n):
    while mi and l[i]>l[mi[-1]]:
        a=mi.pop()
    if i==n:
        break
    if mi:
        dp2[i]=mi[-1]
     else:
        dp2[i]=-1
    mi.append(i)
 for i in range (1, 1+n):
    while ma and 1[i]<=1[ma[-1]]:</pre>
       a=ma.pop()
        dp1[a]=i
    ma.append(i)
 for i in range(n):
    t=dp1[i]
    for j in range(i+1,t):
       if dp2[j]<i:
            ans=max(ans,j-i+1)
 print(ans)
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                                                                                              English 帮助
```

## 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"2024spring每日选做"、CF、LeetCode、洛谷等网站题目。==

动态中位数题考试没想出来,虽然看到heapq提示也没想到,菜还是得多练。。。奶牛排队要学习更好的nlgn算法