

# Assignment #5: cs201 Mock Exam

## 寒露第三天

Updated 1913 GMT+8 Oct 10, 2025

2025 fall, Compiled by 杨浩、化院

### 1. 1. 题目

#### 1.1 E29952: 咒语序列

Stack, <http://cs101.openjudge.cn/practice/29952/>

思路:

- 栈+动规

代码:

```
1  stack=[]
2  s=input()
3  dic={'(':')','{':'}','[':']'}
4  dp=[0]*len(s)
5  for i in range(len(s)):
6      if s[i]=='(':
7          stack.append('(')
8      elif s[i]=='[':
9          stack.append '[')
10     elif s[i]=='{':
11         stack.append('{')
12     else:
13         if not stack:
14             continue
15         if stack[-1]==dic[s[i]]:
16             stack.pop()
17             dp[i]=dp[i-1]+2
18             if i-dp[i]>=0:
19                 dp[i]+=dp[i-dp[i]]
20 print(max(dp))
```

Fence 1

代码运行截图 (至少包含有"Accepted")

#50297371提交状态

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状态: Accepted

源代码

```

stack=[]
s=input()
dic={'(':')','{','}','[':']','[':']','[':']'}
dp=[0]*len(s)
for i in range(len(s)):
    if s[i]=='(':

```

基本信息

#: 50297371  
 题目: E29952  
 提交人: 25n2400011769  
 内存: 4432kB  
 时间: 32ms  
 语言: Python3  
 提交时间: 2025-10-10 18:42:49

Figure 1

## 1.2 M01328: Radar Installation

greedy, <http://cs101.openjudge.cn/practice/01328/>

思路:

- 贪心

代码:

```

1  num=0
2  while True:
3      n,d=map(int,input().split())
4      num +=1
5      if n==0 and d==0:
6          break
7      alist=[]
8      blist=[]
9      maxi=0
10     for i in range(n):
11         alist.append(tuple(map(int,input().split())))
12         maxi=max(maxi,alist[-1][1])
13     if maxi>d:
14         res=-1
15     else:
16         for x,y in alist:
17             r=(d*d-y*y)**0.5
18             blist.append((x-r,x+r))
19         blist.sort(key=lambda x:x[1])
20         res=1
21         begin=blist[0][1]
22         for i in blist:
23             if i[0]>begin:
24                 res +=1
25                 begin=i[1]
26
27     print(f'Case {num}: {res}')
28     input()

```

Fence 2

## 代码运行截图 (至少包含有"Accepted")

#50296658提交状态

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状态: Accepted

源代码

```

num=0
while True:
    n,d=map(int,input().split())
    num +=1
    if n==0 and d==0:
        break
    alist=[]

```

基本信息

#: 50296658  
 题目: M01328  
 提交人: 25n2400011769  
 内存: 3792kB  
 时间: 46ms  
 语言: Python3  
 提交时间: 2025-10-10 18:18:25

Figure 2

## 1.3 M02754: 八皇后

dfs, <http://cs101.openjudge.cn/practice/02754/>

思路:

- 回溯

代码:

```

1  def dfs(deep):
2      if deep==8:
3          s=''.join(map(str,y))
4          s=int(s)
5          ans.append(s)
6          return
7      for k in range(1,9):
8          if k in y:
9              continue
10         else:
11             judge=True
12             dj=0
13             dk=1
14             for t in range(len(y)):
15                 dj=t-(deep)
16                 dk=y[t]-k
17                 if dj==dk or dj+dk==0:
18                     judge=False
19             if judge:
20                 y.append(k)
21                 dfs(deep+1)
22                 y.pop()
23
24  ans=[]
25  y=[]
26  dfs(0)
27  n=int(input())
28  for i in range(n):
29      a=int(input())

```

30

`print(ans[a-1])`

Fence 3

代码运行截图 (至少包含有"Accepted")

#50296276提交状态

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提交

统计

提问

状态: Accepted

源代码

```
def dfs(deep):
    if deep==8:
        s=' '.join(map(str,y))
        s=int(s)
        ans.append(s)
        return
    for k in range(1,9):
        .
```

基本信息

#: 50296276  
 题目: M02754  
 提交人: 25n2400011769  
 内存: 3652kB  
 时间: 25ms  
 语言: Python3  
 提交时间: 2025-10-10 18:08:11

Figure 3

## 1.4 M25570: 洋葱

matrices, <http://cs101.openjudge.cn/practice/25570/>

思路:

代码:

```
1  n=int(input())
2  l=[]
3  for i in range(n):
4      l.append(list(map(int,input().split())))
5  s=0
6  if n!=1:
7      s +=sum(l[0])
8      s +=sum(l[-1])
9      for i in range(1,n-1):
10         s=s+l[i][0]+l[i][-1]
11  maxi=s
12  if n%2==0:
13      for i in range(1,n//2):
14         s=0
15         s +=sum(l[i][i:-i])
16         s +=sum(l[-1-i][i:-i])
17         for j in range(i+1,n-i-1):
18             s +=l[j][i]
19             s +=l[j][-i-1]
20         maxi=max(maxi,s)
21  else:
22      for i in range(1,n//2):
23         s=0
24         s +=sum(l[i][i:-i])
25         s +=sum(l[-1-i][i:-i])
```

```

26         for j in range(i+1,n-i-1):
27             s +=l[j][i]
28             s +=l[j][-i-1]
29             maxi=max(maxi,s)
30             maxi=max(maxi,l[(n)//2][(n)//2])
31
32     print(maxi)

```

Fence 4

代码运行截图 (至少包含有"Accepted")

#50297165提交状态

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状态: Accepted

源代码

```

n=int(input())
l=[]
for i in range(n):
    l.append(list(map(int,input().split())))
s=0
if n!=1:
    s +=sum(l[0])
    s +=sum(l[-1])

```

基本信息

#: 50297165  
 题目: M25570  
 提交人: 25n2400011769  
 内存: 4000kB  
 时间: 21ms  
 语言: Python3  
 提交时间: 2025-10-10 18:35:36

Figure 4

## 1.5 M29954: 逃离紫罗兰监狱

bfs, <http://cs101.openjudge.cn/practice/29954/>

思路:

- bfs+集合优化队列时间和内存

代码

```

1  from collections import deque
2  def xieru(i,j,k,steps):
3      if l[i][j]=='.':
4          if (i,j,k) not in finishi_set:
5              duilie.append((i,j,k,steps+1))
6              finishi_set.add((i,j,k))
7      if l[i][j]=='#' and k>0:
8          if (i,j,k-1) not in finishi_set:
9              duilie.append((i,j,k-1,steps+1))
10             finishi_set.add((i,j,k-1))
11     if l[i][j]=='E':
12         return True
13     return False
14
15
16     r,c,k=map(int,input().split())
17     l=[]

```

```

18     for i in range(r):
19         l.append(input())
20         for j in range(c):
21             if l[-1][j]=='s':
22                 begin=(i,j)
23     duilie=deque([(begin[0],begin[1],k,0)])
24     finishi_set={(begin[0],begin[1],k)}
25     huitou_set=set()
26     delta=[(0,1),(0,-1),(1,0),(-1,0)]
27     while duilie:
28         t=duilie.popleft()
29         huitou_set.add((t[0],t[1]))
30         for di,dj in delta:
31             if 0<=di+t[0]<r and 0<=dj+t[1]<c:
32                 if (di+t[0],dj+t[1]) not in huitou_set:
33                     if xieru(di+t[0],dj+t[1],t[2],t[3]):
34                         print(t[3]+1)
35                         exit()
36
37     print(-1)

```

Fence 5

(至少包含有"Accepted")

#50315475提交状态

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状态: Accepted

源代码

```

from collections import deque
def xieru(i,j,k,steps):
    if l[i][j]=='.' :
        if (i,j,k) not in finishi_set:
            duilie.append((i,j,k,steps+1))
            finishi_set.add((i,j,k))
    if l[i][j]=='#' and k>0:
        if (i,j,k-1) not in finishi_set:
            duilie.append((i,j,k-1,steps+1))

```

基本信息

#: 50315475  
 题目: 29954  
 提交人: 25n2400011769  
 内存: 11428kB  
 时间: 259ms  
 语言: Python3  
 提交时间: 2025-10-11 20:15:49

Figure 5

## 1.6 T27256: 当前队列中位数

backtracking, <http://cs101.openjudge.cn/practice/27256/>

思路:

- 大小堆+惰性删除

代码

```

1     import heapq
2     class zhongwushu():
3         def __init__(self):
4             self.small_size=0
5             self.big_size=0

```

```

6         def pingdui(self):
7             while self.small_size>self.big_size+1:
8                 self.weihuduiding()
9                 t=heapq.heappop(small_heapq)
10                heapq.heappush(big_heapq,-t)
11                self.small_size -=1
12                self.big_size +=1
13                self.weihuduiding()
14            while self.small_size<self.big_size:
15                self.weihuduiding()
16                t=heapq.heappop(big_heapq)
17                heapq.heappush(small_heapq,-t)
18                self.small_size +=1
19                self.big_size -=1
20                self.weihuduiding()
21        def weihuduiding(self):
22            while small_heapq:
23                t=heapq.heappop(small_heapq)
24                if -t in laze_dic:
25                    laze_dic[-t] -=1
26                    if laze_dic[-t]==0:
27                        laze_dic.pop(-t)
28                else:
29                    heapq.heappush(small_heapq,t)
30                break
31            while big_heapq:
32                t=heapq.heappop(big_heapq)
33                if t in laze_dic:
34                    laze_dic[t] -=1
35                    if laze_dic[t]==0:
36                        laze_dic.pop(t)
37                else:
38                    heapq.heappush(big_heapq,t)
39                break
40        n=int(input())
41        l=[]
42        big_heapq=[]
43        small_heapq=[]
44        laze_dic={}
45        deadline=0
46        m=zhongwushu()
47        for i in range(n):
48            ru=input()
49            if ru[0]=='a':
50                l.append(int(ru[4:]))
51            if m.small_size==0:
52                heapq.heappush(small_heapq,-l[-1])
53                m.small_size +=1
54                m.pingdui()
55                continue
56            if l[-1]<=-small_heapq[0]:

```

```

57         heapq.heappush(small_heap, -l[-1])
58         m.small_size += 1
59     else:
60         heapq.heappush(big_heap, l[-1])
61         m.big_size += 1
62         m.pingdui()
63     elif ru[0]=='d':
64         lazy_dic.setdefault(l[deadline], 0)
65         lazy_dic[l[deadline]] += 1
66         if l[deadline]>-small_heap[0]:
67             m.big_size -= 1
68         else:
69             m.small_size -= 1
70         m.pingdui()
71         m.weihuduiding()
72         deadline += 1
73     else:
74         if m.small_size==m.big_size:
75             mid=(big_heap[0]-small_heap[0])/2
76             if mid==int(mid):
77                 mid=int(mid)
78             else:
79                 mid=-small_heap[0]
80         print(mid)

```

Fence 6

(至少包含有"Accepted")

#50303306提交状态

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状态: **Accepted**

源代码

```

import heapq
class zhongwushu():
    def __init__(self):
        self.small_size=0
        self.big_size=0
    def pingdui(self):
        while self.small_size>self.big_size+1:

```

基本信息

#: 50303306  
 题目: T27256  
 提交人: 25n2400011769  
 内存: 8548kB  
 时间: 465ms  
 语言: Python3  
 提交时间: 2025-10-10 22:00:10

Figure 6

## 2. 2. 学习总结和个人收获

月考的时候上来被第一题卡了一会，虽然是做过的题，但考试时动规写错了，还好后来修正过来了。后续的雷达，八皇后以及中位数都是DSA中有过的题，前两个都可以较快速的写出来，最后一个书写量太大了，考场上没写得下来。监狱和传统的bfs有点不同，直接用deque会超内存或者超时，要优化一下。