

Assignment #D: Dec 月考

Updated 1506 GMT+8 Dec 7, 2023

2023 fall, Compiled by 同学的姓名、院系

说明:

- 1) Dec 月考: AC6 (请改为同学的通过数)。题目都在“练习”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) 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, 学号), 填写到下面作业模版中(推荐使用 typora <https://typoraio.cn>, 或者用 word)。AC 或者没有AC, 都请标上每个题目大致花费时间。
- 3) 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、作业评论有md或者doc。
- 4) 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: macOS Ventura 13.4.1 (c)

Python编程环境: Spyder IDE 5.2.2, PyCharm 2023.1.4 (Professional Edition)

C/C++编程环境: Mac terminal vi (version 9.0.1424), g++/gcc (Apple clang version 14.0.3, clang-1403.0.22.14.1)

1. 题目

如果耗时太长, 直接看解题思路, 或者源码

18176: 2050年成绩计算

<http://cs101.openjudge.cn/practice/18176/>

思路:

代码

```
1 '''
2 2100017810 刘思瑞
3 '''
4 N=10001
5 isprime = [True for i in range(N)]
```

```

6 prime= []
7 def euler():
8     global N
9     isprime[1]=False
10    for i in range(2,N) :
11        if isprime[i]:
12            prime.append(i)
13        for j in prime:
14            if i*j>=N:
15                break
16            isprime[i*j] = False
17            if i%j == 0:
18                break
19
20 def calcu(grade):
21     global isprime
22     temp = []
23     for i in grade:
24         if i == int(i**0.5)**2:
25             if isprime[int(i**0.5)]:
26                 temp.append(i)
27     if temp == []:
28         print('0')
29     return
30     print('%.2f' % (sum(temp)/len(grade)))
31     return
32
33 euler()
34 m , n = map(int , input().split())
35 for i in range(m):
36     calcu(list(map(int , input().split())))

```

代码运行截图

状态: Accepted

源代码

```
'''
2100017810 刘思瑞
'''
N=10001
isprime = [True for i in range(N)]
prime= []
def euler():
    global N
    isprime[1]=False
    for i in range(2,N) :
        if isprime[i]:
            prime.append(i)
            for j in prime:
                if i*j>=N:
                    break
                isprime[i*j] = False
                if i%j == 0:
                    break

def calcu(grade):
    global isprime
    temp = []
    for i in grade:
        if i == int(i**0.5)**2:
            if isprime[int(i**0.5)]:
                temp.append(i)
    if temp == []:
        print('0')
        return
    print('%.2f' % (sum(temp)/len(grade)))
    return

euler()
m , n = map(int , input().split())
for i in range(m):
    calcu(list(map(int , input().split())))
```

18224: 找魔数

<http://cs101.openjudge.cn/practice/18224>

思路:

遍历

代码

```
1  from math import sqrt
2
3  def search(n):
4      q = int(sqrt(n/2))
5      for i in range(1,q+1):
6          p = n-i**2
7          if p == int(sqrt(p))**2:
8              print(bin(n),oct(n),hex(n))
9              return
10     return
11
12
13 m= int(input())
14 li = list(map(int,input().split()))
15 for i in li:
16     search(i)
```

代码运行截图

#42990313 提交记录

[查看](#) [提交](#) [统计](#)

状态: **Accepted**

源代码

```
from math import sqrt

def search(n):
    q = int(sqrt(n/2))
    for i in range(1,q+1):
        p = n-i**2
        if p == int(sqrt(p))**2:
            print(bin(n),oct(n),hex(n))
            return
    return

m= int(input())
li = list(map(int,input().split()))
for i in li:
    search(i)
```

基本信息

#: 42990313
题目: E18224
提交人: 23n2100017810
内存: 3612kB
时间: 23ms
语言: Python3
提交时间: 2023-12-07 15:43:33

19963: 买学区房

<http://cs101.openjudge.cn/practice/19963>

思路:

直接计算

代码

```
1 summ = 0
2 n = int(input())
3 pairs = [i[1:-1] for i in input().split()]
4 distances = [sum(map(int,j.split(','))) for j in pairs]
5 value = list(map(int,input().split()))
6 vxjbb = value[::]
7 vxjbb.sort()
8 if n %2 ==1:
9     midv = vxjbb[(n-1)//2]
10 else:
11     midv = (vxjbb[n//2]+vxjbb[n//2-1])/2
12 xjb = []
13 for i in range(n):
14     xjb.append(distances[i]/value[i])
15 xjbb = xjb[::]
16 xjbb.sort()
17 if n %2 ==1:
18     midxjb = xjbb[(n-1)//2]
19 else:
20     midxjb = (xjbb[n//2]+xjbb[n//2-1])/2
21 for i in range(n):
22     if xjb[i]>midxjb and value[i] < midv:
23         summ+=1
24 print(summ)
```

代码运行截图

状态: Accepted

源代码

```
summ = 0
n = int(input())
pairs = [i[1:-1] for i in input().split()]
distances = [sum(map(int,j.split(','))) for j in pairs]
value = list(map(int,input().split()))
vxjbb = value[::]
vxjbb.sort()
if n % 2 == 1:
    midv = vxjbb[(n-1)//2]
else:
    midv = (vxjbb[n//2]+vxjbb[n//2-1])/2
xjb = []
for i in range(n):
    xjb.append(distances[i]/value[i])
xjbb = xjb[::]
xjbb.sort()
if n % 2 == 1:
    midxjb = xjbb[(n-1)//2]
else:
    midxjb = (xjbb[n//2]+xjbb[n//2-1])/2
for i in range(n):
    if xjb[i]>midxjb and value[i] < midv:
        summ+=1
print(summ)
```

23806: 三数之和

<http://cs101.openjudge.cn/practice/23806/>

思路:

双指针

代码

```
1  '''
2  2100017810 刘思瑞
3  '''
4  num = list(map(int,input().split()))
5  num.sort()
6  n = len(num)
7  record = set()
8  for i in range(n):
9      if i != 0 :
10         if num[i] == num[i-1]:
11             continue
12         low = i+1
13         high = n - 1
14         while low < high:
15             if num[i] + num[low] + num[high] == 0:
16                 record.add((num[i],num[low],num[high]))
```

```

17         high -= 1
18         low+=1
19     elif num[i] + num[low] + num[high] > 0:
20         high -= 1
21     else:
22         low+=1
23 print(len(record))

```

代码运行截图

状态: Accepted

源代码

```

'''
2100017810 刘思瑞
'''
num = list(map(int, input().split()))
num.sort()
n = len(num)
record = set()
for i in range(n):
    if i != 0 :
        if num[i] == num[i-1]:
            continue
    low = i+1
    high = n - 1
    while low < high:
        if num[i] + num[low] + num[high] == 0:
            record.add((num[i], num[low], num[high]))
            high -= 1
            low+=1
        elif num[i] + num[low] + num[high] > 0:
            high -= 1
        else:
            low+=1
print(len(record))

```

25561: 2022决战双十一

<http://cs101.openjudge.cn/practice/25561/>

思路:

直接硬干就行

代码

```
1  '''
2  2100017810 刘思瑞
3  '''
4  def value(buynumber):
5      global boutique,maion
6      boutiquevalue = [0]*m
7      for i in range(n):
8          boutiquevalue[buynumber[i]]+=(boutique[i][buynumber[i]])
9      minusvalue = 0
10     for i in range(m):
11         summ = 0
12         if boutiquevalue[i] != 0:
13             for j in maion[i]:
14                 if j[1] > summ and j[0] <= boutiquevalue[i]:
15                     summ = j[1]
16             minusvalue += summ
17     return sum(boutiquevalue) - (50*(sum(boutiquevalue)//300)) - minusvalue
18 def bianli(i,buynumber):
19     global minn
20     if i == n:
21         minn = min(minn,value(buynumber))
22         return
23     for j in range(m):
24         buynumber.append(j)
25         bianli(i+1,buynumber)
26         buynumber.pop()
27     return
28
29 n,m = map(int,input().split())
30 boutique = []
31 maion = []
32 for i in range(n):
33     part = list(input().split())
34     _ = [10**6] * m
35     for x in part:
36         _[list(map(int,x.split(':')))[0]-1]= list(map(int,x.split(':')))[-1]
37     boutique.append(_)
38 for i in range(m):
39     part = list(input().split())
40     _ = [list(map(int,x.split('-')))] for x in part]
41     maion.append(_)
42 minn = value([0]*n)
43 bianli(0,[])
44 print(minn)
```

代码运行截图

状态: Accepted

源代码

```
'''
2100017810 刘思瑞
'''
def value(buynumber):
    global boutique,maion
    boutiquevalue = [0]*m
    for i in range(n):
        boutiquevalue[buynumber[i]]+=(boutique[i][buynumber[i]])
    minusvalue = 0
    for i in range(m):
        summ = 0
        if boutiquevalue[i] != 0:
            for j in maion[i]:
                if j[1] > summ and j[0] <= boutiquevalue[i]:
                    summ = j[1]
            minusvalue += summ
    return sum(boutiquevalue) - (50*(sum(boutiquevalue)//300)) - minusvalue
def bianli(i,buynumber):
    global minn
    if i == n:
        minn = min(minn,value(buynumber))
        return
    for j in range(m):
        buynumber.append(j)
        bianli(i+1,buynumber)
        buynumber.pop()
    return

n,m = map(int,input().split())
boutique = []
maion = []
for i in range(n):
    part = list(input().split())
    _ = [10**6] * m
    for x in part:
        _[list(map(int,x.split(':')))[0]-1]= list(map(int,x.split(':')))
    boutique.append(_)
for i in range(m):
```

08210: 河中跳房子

<http://cs101.openjudge.cn/practice/08210/>

思路:

二分查找

代码

```
1 '''
2 2100017810 刘思瑞
3 '''
4 L,n,m = map(int,input().split())
```

```
5 rock = [0]
6 for i in range(n):
7     rock.append(int(input()))
8 rock.append(L)
9 def check(p):
10     num = 0
11     N = 0
12     for i in range(1, n+2):
13         if rock[i] - N < p:
14             num += 1
15             if num > m:
16                 return True
17         else:
18             N = rock[i]
19     if num > m:
20         return True
21     else:
22         return False
23
24 low, high = 0, L+1
25 ans = -1
26 while low < high:
27     mid = (low + high) // 2
28     if check(mid):
29         high = mid
30     else:
31         ans = mid
32         low = mid + 1
33 print(ans)
```

代码运行截图

状态: Accepted

源代码

```
'''
2100017810 刘思瑞
'''
L,n,m = map(int,input().split())
rock = [0]
for i in range(n):
    rock.append(int(input()))
rock.append(L)
def check(p):
    num = 0
    N = 0
    for i in range(1, n+2):
        if rock[i] - N < p:
            num += 1
            if num > m:
                return True
        else:
            N = rock[i]
    if num > m:
        return True
    else:
        return False

low, high = 0, L+1
ans = -1
while low < high:
    mid = (low + high) // 2
    if check(mid):
        high = mid
    else:
        ans = mid
        low = mid + 1
print(ans)
```

01922: Ride to School

<http://cs101.openjudge.cn/practice/01922/>

思路:

在0之前出发的, 如果会被追上说明肯定不是最早, 因此只需要考虑0之后出发的, 根据策略, 只要是最快到达的就可以

代码

```
1  '''
2  2100017810 刘思瑞
3  '''
4  import math
5  while True:
6      N = int(input())
7      if N == 0:
8          break
9      summary = []
10     for i in range(N):
11         v,t = map(int,input().split())
12         summary.append([t,t+(4.5/v)*3600,v])
13     minn = 10**7
14     for i in summary:
15         if i[1]>0 and i[0]>=0:
16             minn = min(minn,i[1])
17     print(math.ceil(minn))
```

代码运行截图

状态: Accepted

源代码

```
'''
2100017810 刘思瑞
'''

import math
while True:
    N = int(input())
    if N == 0:
        break
    summary = []
    for i in range(N):
        v,t = map(int,input().split())
        summary.append([t,t+(4.5/v)*3600,v])
    minn = 10**7
    for i in summary:
        if i[1]>0 and i[0]>=0:
            minn = min(minn,i[1])
    print(math.ceil(minn))
```

2. 学习总结和收获

考试的时候感觉有思路并且写出来了，但是感觉这次题目比较复杂，好几个都debug没成功，回来再一看才发现问题，另一方面是第一题的时间卡的很慌。

