

Assignment #5: Greedy穷举 Implementation

Updated 1939 GMT+8 Oct 21, 2024

2024 fall, Compiled by 徐嘉期、地空

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 <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”区有上传的md或者doc附件。
- 4) 如果不能在截止前提交作业, 请写明原因。

1. 题目

04148: 生理周期

brute force, <http://cs101.openjudge.cn/practice/04148>

思路:

代码:

```
curr = 0
while True:
    p,e,i,d = map(int,input().split())
    curr += 1
    if p==-1:exit()
    while (p-e)%28 != 0:
        p+=23
    while (p-i)%33 != 0:
        p+=644
    if p <= d:
        p = p+21252 - d
    else:
        p -= d
    print(f'Case {curr}: the next triple peak occurs in {p} days.')
```

代码运行截图 (至少包含有"Accepted")

状态: **Accepted**

源代码

```
curr = 0
while True:
    p,e,i,d = map(int,input().split())
    curr += 1
    if p==1:exit()
    while (p-e)%28 != 0:
        p+=23
    while (p-i)%33 != 0:
        p+=644
    if p <= d:
        p = p+21252 - d
    else:
        p -= d
    print(f'Case {curr}: the next triple peak occurs in {p} days.')
```

基本信息

#: 46338692
题目: 04148
提交人: 24n2400012440徐嘉期
内存: 3612kB
时间: 23ms
语言: Python3
提交时间: 2024-10-07 12:15:16

18211: 军备竞赛

greedy, two pointers, <http://cs101.openjudge.cn/practice/18211>

思路:

代码:

```
money = int(input())
l1=list(map(int,input().split()))
l1.sort()
total = 0
i = 0
j = -1
check = [True]*len(l1)
for i in range(len(l1)):
    if money >= l1[i]:
        money -= l1[i]
        total += 1
    else:
        for j in range(-1,-len(l1),-1):
            if i == j:
                if money > l1[i]:
                    total += 1
                break
            if l1[j] + money >= l1[i] and check[j] and total > 0:
                money = money+l1[j] - l1[i]
                check[j] = False
                break
print(total)
```

代码运行截图 == (至少包含有"Accepted") ==

状态: Accepted

源代码

```
money = int(input())
l1=list(map(int,input().split()))
l1.sort()
total = 0
i = 0
j = -1
check = [True]*len(l1)
for i in range(len(l1)):
    if money >= l1[i]:
        money -= l1[i]
        total += 1
    else:
        for j in range(-1,-len(l1),-1):
            if i == j:
                if money > l1[i]:
                    total += 1
                break
            if l1[j] + money >= l1[i] and check[j] and total > 0:
                money = money+l1[j] - l1[i]
                check[j] = False
                break
print(total)
```

基本信息

#: 46439313
题目: 18211
提交人: 24n2400012440徐嘉期
内存: 3628kB
时间: 33ms
语言: Python3
提交时间: 2024-10-12 11:54:10

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21554: 排队做实验

greedy, <http://cs101.openjudge.cn/practice/21554>

思路:

代码:

```
n = int(input())
l1 = list(map(int, input().split()))
if n == 1:
    print('1')
    print('0.00')
else:
    l2 = sorted(range(1, n+1), key=lambda x: l1[x-1])
    l1.sort()
    sum1 = 0
    for i in range(n):
        sum1 += (n-i-1)*l1[i]
    average = format(sum1/n, '.2f')
    print(*l2)
    print(average)
```

代码运行截图 (至少包含有"Accepted")

状态: Accepted

源代码

```
n = int(input())
l1 = list(map(int, input().split()))
if n == 1:
    print('1')
    print('0.00')

else:
    l2 = sorted(range(1, n+1), key=lambda x: l1[x-1])
    l1.sort()
    sum1 = 0
    for i in range(n):
        sum1 += (n-i-1)*l1[i]
    average = format(sum1/n, '.2f')
    print(*l2)
    print(average)
```

基本信息

#: 46721638
题目: 21554
提交人: 24n2400012440徐嘉期
内存: 3940kB
时间: 23ms
语言: Python3
提交时间: 2024-10-25 08:45:47

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01008: Maya Calendar

implementation, <http://cs101.openjudge.cn/practice/01008/>

思路:

代码:

```
month = ['pop', 'no', 'zip', 'zotz', 'tzec', 'xul', 'yoxkin', 'mol', 'chen',
'yax', 'zac', 'ceh', 'mac',
'kankin', 'muan', 'pax', 'koyab', 'cumhu', 'uayet']
day = ['imix', 'ik', 'akbal', 'kan', 'chicchan', 'cimi', 'manik', 'lamat',
'muluk', 'ok', 'chuen',
'eb', 'ben', 'ix', 'mem', 'cib', 'caban', 'eznab', 'canac', 'ahau']
n = int(input())
print(n)
for _ in range(n):
    str1 = list(input().split(' '))
    str1[0] = str1[0].strip('.')
    days = int(str1[0])
    days += 20 * month.index(str1[1]) + 365*int(str1[2]) + 1
    years = (days-1) // 260
    days = days % 260
    print(days % 13 if days % 13 else '13', day[days % 20-1], years)
```

代码运行截图 (至少包含有"Accepted")

状态: Accepted

源代码

```
month = ['pop', 'no', 'zip', 'zotz', 'tzec', 'xul', 'yoxkin', 'mol', 'chen', 'ya',
         'kankin', 'muan', 'pax', 'koyab', 'cumhu', 'uayet']
day = ['imix', 'ik', 'akbal', 'kan', 'chicchan', 'cimi', 'manik', 'lamat', 'muluk',
       'eb', 'ben', 'ix', 'mem', 'cib', 'caban', 'eznab', 'canac', 'ahau']
n = int(input())
print(n)
for _ in range(n):
    str1 = list(input().split(' '))
    str1[0] = str1[0].strip('.')
    days = int(str1[0])
    days += 20 * month.index(str1[1]) + 365 * int(str1[2]) + 1
    years = (days - 1) // 260
    days = days % 260
    print(days % 13 if days % 13 else '13', day[days % 20 - 1], years)
```

基本信息

#: 46658646
题目: 01008
提交人: 24n2400012440徐嘉期
内存: 3596kB
时间: 28ms
语言: Python3
提交时间: 2024-10-22 15:25:07

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545C. Woodcutters

dp, greedy, 1500, <https://codeforces.com/problemset/problem/545/C>

思路:

代码:

```
n = int(input())
lx = []
lh = []
for _ in range(n):
    x, h = map(int, input().split())
    lx.append(x)
    lh.append(h)
if n == 1:
    print(1)
else:
    curr = lx[0]
    total = 1
    for i in range(1, n - 1):
        if lx[i] - lh[i] > curr:
            curr = lx[i]
            total += 1
            continue
        if lx[i] + lh[i] < lx[i + 1]:
            curr = lx[i] + lh[i]
            total += 1
            continue
        else:
            curr = lx[i]
    total += 1
    print(total)
```

代码运行截图 (至少包含有"Accepted")

PROBLEMSSUBMIT CODEMY SUBMISSIONSSTATUSHACKSROOMSTANDINGSCUSTOM INVOCATION

General

#	Author	Problem	Lang	Verdict	Time	Memory	Sent	Judged		
287845184	Practice: xjq123123	545C - 14	Python 3	Accepted	312 ms	9080 KB	2024-10-25 04:26:28	2024-10-25 04:26:28	★	<button>Compare</button>

→ Source

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```
n = int(input())
lx = []
lh = []
for _ in range(n):
    x, h = map(int, input().split())
    lx.append(x)
    lh.append(h)
if n == 1:
    print(1)
else:
    curr = lx[0]
    total = 1
    for i in range(1, n-1):
        if lx[i] - lh[i] > curr:
            curr = lx[i]
            total += 1
            continue
        if lx[i] + lh[i] < lx[i+1]:
            curr = lx[i] + lh[i]
            total += 1
            continue
        else:
            curr = lx[i]
            total += 1
    print(total)
```

[Click to see test details](#)

01328: Radar Installation

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

思路：

代码：

```
from math import sqrt
n,d = map(int,input().split())
curr = 1
while n:
    check = True
    l1=[]
    l2=[]
    for _ in range(n):
        x,y=map(int,input().split())
        if y > d:
            check = False
        else:
            l1.append(x-sqrt(-pow(y,2)+pow(d,2)))
            l2.append(x+sqrt(-pow(y,2)+pow(d,2)))
    if check == False:
        print(f"Case {curr}: -1")
    else:
        l2_sorted = sorted(l2)
        l1_sorted = [x for x,_ in sorted(zip(l1,l2),key=lambda pair:pair[1])]
        total = 1
        ed = l2_sorted[0]
        if n > 1:
            for i in range(1,n):
                if l1_sorted[i] > ed:
                    total += 1
                    ed = l2_sorted[i]
        print(f"Case {curr}: {total}")
    curr += 1
```

```
input()
n,d = map(int,input().split())
```

代码运行截图 (至少包含有"Accepted")

状态: Accepted

源代码

```
from math import sqrt
n,d = map(int,input().split())
curr = 1
while n:
    check = True
    l1=[]
    l2=[]
    for _ in range(n):
        x,y=map(int,input().split())
        if y > d:
            check = False
        else:
            l1.append(x-sqrt(-pow(y,2)+pow(d,2)))
            l2.append(x+sqrt(-pow(y,2)+pow(d,2)))
    if check == False:
        print(f"Case {curr}: -1")
    else:
        l2_sorted = sorted(l2)
        l1_sorted = [x for x,_ in sorted(zip(l1,l2),key=lambda pair:pair[1])]
        total = 1
        ed = l2_sorted[0]
        if n > 1:
            for i in range(1,n):
                if l1_sorted[i] > ed:
                    total += 1
                    ed = l2_sorted[i]
            print(f"Case {curr}: {total}")
        curr += 1
    input()
    n,d = map(int,input().split())
```

基本信息

#: 46789301
题目: 01328
提交人: 24n2400012440徐嘉期
内存: 3836kB
时间: 58ms
语言: Python3
提交时间: 2024-10-28 13:47:14

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“计概2024fall每日选做”、CF、LeetCode、洛谷等网站题目。

最近每日选做做得有点少了，感觉是期中逼近和题目难度上来导致，每道题都要想好一会（悲）

不过感觉学习算法、学习母题还是比较重要的，这次地雷达安装，如果课上没有听区间问题的五种类型，自己独立地做出来可能要花费比较久的时间，没有否定独立思考的重要性，但感觉自己目前学的代码知识还是比较少（？）很多时候比较难想到正确的解法

（还有个感觉是自己的脑袋目前有点像单线程的，打10大排序代码的时候遇到分治和递归的时候容易转不过弯，需要python tutor来可视化代码，自己想还是太难想到了