

Assignment #3: March月考

Updated 1537 GMT+8 March 6, 2024

2024 spring, Compiled by 田济维

说明:

- 1) The complete process to learn DSA from scratch can be broken into 4 parts:
 - Learn about Time and Space complexities
 - Learn the basics of individual Data Structures
 - Learn the basics of Algorithms
 - Practice Problems on DSA
- 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），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。

编程环境

(python pycharm)

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

02945: 拦截导弹

<http://cs101.openjudge.cn/practice/02945/>

思路:

代码

```

1  #
2  n = int(input())
3  Height = list(map(int,input().split()))
4  dp = [0 for i in range(n)]
5  dp[0] = 1
6  for i in range(1,n):
7      maxn = 1
8      for j in range(i):
9          if Height[j]>=Height[i]:
10             maxn = max(dp[j]+1,maxn)
11     dp[i] = maxn
12 print(max(dp))

```

代码运行截图 (至少包含有"Accepted")

状态: Accepted

源代码

```

n = int(input())
Height = list(map(int,input().split()))
dp = [0 for i in range(n)]
dp[0] = 1
for i in range(1,n):
    maxn = 1
    for j in range(i):
        if Height[j]>=Height[i]:
            maxn = max(dp[j]+1,maxn)
    dp[i] = maxn
print(max(dp))

```

基本信息

#: 44120799
 题目: 02945
 提交人: 23n2300011503
 内存: 3588kB
 时间: 23ms
 语言: Python3
 提交时间: 2024-03-08 19:06:44

04147:汉诺塔问题(Tower of Hanoi)

<http://cs101.openjudge.cn/practice/04147>

思路:

代码

```

1  #
2  def hannuo(k,a,b,c):
3      if k == 0:
4          return
5      hannuo(k-1,a,c,b)
6      print(f"{k}:{a}->{c}")
7      hannuo(k-1,b,a,c)
8
9  n,a,b,c = input().split()
10 hannuo(int(n),a,b,c)

```

代码运行截图 (至少包含有"Accepted")

状态: Accepted

源代码

```
def hannuo(k, a, b, c):  
    if k == 0:  
        return  
    hannuo(k-1, a, c, b)  
    print(f"{k}: {a}->{c}")  
    hannuo(k-1, b, a, c)  
  
n, a, b, c = input().split()  
hannuo(int(n), a, b, c)
```

基本信息

#: 44121050
题目: 04147
提交人: 23n2300011503
内存: 3512kB
时间: 20ms
语言: Python3
提交时间: 2024-03-08 19:17:50

03253: 约瑟夫问题No.2

<http://cs101.openjudge.cn/practice/03253>

思路:

代码

```
1  #  
2  from collections import deque  
3  while True:  
4      n,p,m = map(int,input().split())  
5      if n==0:  
6          break  
7      boy = deque()  
8      result = []  
9      for i in range(n):  
10         boy.append((p+i-1)%n+1)  
11     while boy:  
12         for i in range(m-1):  
13             boy.append(boy.popleft())  
14         result.append(boy.popleft())  
15  
16     for i in range(n-1):  
17  
18         print(result[i],end = "")  
19         print(", ", end="")  
20     print(result[-1])
```

代码运行截图 (AC代码截图, 至少包含有"Accepted")

状态: Accepted

源代码

```
from collections import deque
while True:
    n,p,m = map(int,input().split())
    if n==0:
        break
    boy = deque()
    result = []
    for i in range(n):
        boy.append((p+i-1)%n+1)
    while boy:
        for i in range(m-1):
            boy.append(boy.popleft())
            result.append(boy.popleft())

        for i in range(n-1):

            print(result[i],end = "")
            print(", ", end="")
        print(result[-1])
```

基本信息
#: 44121345
题目: 03254
提交人: 23n2300011503
内存: 3644kB
时间: 20ms
语言: Python3
提交时间: 2024-03-08 19:30:5

21554:排队做实验 (greedy)v0.2

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

思路:

代码

```
1 #
2 n = int(input())
3 Time = list(map(int,input().split()))
4 order = list(map(int,input().split()))
5 cnt = 0
6 for i in range(n):
7     cnt+=(n-i-1)*Time[order[i]-1]
8 print("%.2f"%(cnt/n))
```

代码运行截图 (AC代码截图, 至少包含有"Accepted")

状态: Accepted

源代码

```
n = int(input())
Time = list(map(int,input().split()))
Order = list(map(int,input().split()))
cnt = 0
for i in range(n):
    cnt+=(n-i-1)*Time[Order[i]-1]
print("%.2f"%(cnt/n))
```

基本信息
#: 43389252
题目: 21728
提交人: 23n2300011503
内存: 3632kB
时间: 24ms
语言: Python3
提交时间: 2023-12-26 23:45:32

19963:买学区房

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

思路:

代码

```
1  #
2  def zhong(seq):
3      m = len(seq)
4      if m%2 ==0:
5          return (seq[m//2-1]+seq[m//2])/2
6      else:
7          return seq[m//2]
8  n = int(input())
9  pairs = [i[1:-1] for i in input().split()]
10 distances = [sum(map(int,i.split(','))) for i in pairs]
11 money = list(map(int,input().split()))
12 xingjia = []
13 for x in range(n):
14     if money[x] !=0:
15         xingjia.append(distances[x]/money[x])
16     else:
17         xingjia.append(1000000000000)
18 rx = sorted(xingjia)
19 rm = sorted(money)
20 xz = zhong(rx)
21 mz = zhong(rm)
22 cnt = 0
23 for x in range(n):
24     if money[x]<mz and xingjia[x]>xz:
25         cnt+=1
26 print(cnt)
```

代码运行截图 (AC代码截图, 至少包含有"Accepted")

状态: Accepted

源代码

```
def zhong(seq):
    m = len(seq)
    if m%2 ==0:
        return (seq[m//2-1]+seq[m//2])/2
    else:
        return seq[m//2]
n = int(input())
pairs = [i[1:-1] for i in input().split()]
distances = [sum(map(int,i.split(','))) for i in pairs]
money = list(map(int,input().split()))
xingjia = []
for x in range(n):
    if money[x]!=0:
        xingjia.append(distances[x]/money[x])
    else:
        xingjia.append(100000000000)
rx = sorted(xingjia)
rm = sorted(money)
xz = zhong(rx)
mz = zhong(rm)
cnt = 0
for x in range(n):
    if money[x]<mz and xingjia[x]>xz:
        cnt+=1
print(cnt)
```

基本信息

#: 42991176
题目: M19963
提交人: 23n2300011503
内存: 4212kB
时间: 24ms
语言: Python3
提交时间: 2023-12-07 16:13:54

27300: 模型整理

<http://cs101.openjudge.cn/practice/27300>

思路:

代码

```
1  #
2  def parse(para):
3      a = para[-1]
4      b = float(para[:-1])
5      if a == "M":
6          return b
7      return 1000*b
8
9  from collections import defaultdict
10 n = int(input())
11 s = defaultdict(list)
12 for i in range(n):
13     x = input().split("-")
14     type = x[0]
15
16     s[type].append(x[1])
17
18 m = list(s.keys())
19 m.sort()
20 for x in m:
21     print(x+":",end = " ")
22     number = [y for y in s[x]]
23     number = sorted(number,key = lambda x:parse(x))
```

```
24
25     for y in number[::-1]:
26         print(y,end = ", ")
27     y = number[-1]
28     print(y)
```

代码运行截图 (AC代码截图, 至少包含有"Accepted")

状态: Accepted

源代码

```
def parse(para):
    a = para[-1]
    b = float(para[:-1])
    if a == "M":
        return b
    return 1000*b

from collections import defaultdict
n = int(input())
s = defaultdict(list)
for i in range(n):
    x = input().split("-")
    type = x[0]

    s[type].append(x[1])

m = list(s.keys())
m.sort()
for x in m:
    print(x+":",end = " ")
    number = [y for y in s[x]]
    number = sorted(number,key = lambda x:parse(x))

    for y in number[::-1]:
        print(y,end = ", ")
    y = number[-1]
    print(y)
```

基本信息

#: 44121921
题目: 27300
提交人: 23n2300011503
内存: 3648kB
时间: 21ms
语言: Python3
提交时间: 2024-03-08 19:58:00

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。

逐渐有难度了