

Assignment #A: dp & bfs

Updated 2 GMT+8 Nov 25, 2024

2024 fall, Compiled by 同学的姓名、院系

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。

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。

1. 题目

LuoguP1255 数楼梯

dp, bfs, <https://www.luogu.com.cn/problem/P1255>

思路:

代码:

```
n = int(input())
curr = 1
temp = 1
for _ in range(1,n):
    temp,curr = curr,curr+temp
print(curr)
```

代码运行截图 (至少包含有"Accepted")

应用 >>
题库
题单
比赛
记录
讨论
专栏

洛谷 / 评测记录 / 评测详情
R192466432 记录详情
Python 3 | 103B | 158ms | 3.73MB
测试点信息 源代码
源代码 复制
n = int(input())
curr = 1
temp = 1
for _ in range(1, n):
temp, curr = curr, curr + temp
print(curr)
benjaminxjq
所属题目 P1255 数楼梯
评测状态 Accepted
评测分数 100
提交时间 2024-12-02 18:21:06
在洛谷，
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Developed by the Luogu Dev Team
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27528: 跳台阶

dp, <http://cs101.openjudge.cn/practice/27528/>

思路：
感觉不用dp做，小小偷个懒
代码：

```
n = int(input())  
print(1 << n-1)
```

代码运行截图 (至少包含有"Accepted")

OpenJudge 题目ID, 标题, 描述 24n2400012440徐嘉期 信箱 账号

CS101 / 题库 (包括计概、数算题目)
题目 排名 状态 提问

#47519636提交状态
查看 提交 统计 提问
状态: Accepted
源代码
n = int(input())
print(1 << n-1)
基本信息
#: 47519636
题目: 27528
提交人: 24n2400012440徐嘉期
内存: 79900kB
时间: 116ms
语言: PyPy3
提交时间: 2024-12-02 18:24:03
English 帮助 关于

474D. Flowers

dp, <https://codeforces.com/problemset/problem/474/D>

思路:

代码:

```
n,k = map(int,input().split())
stack=[];max1=0
for _ in range(n):
    x,y = map(int,input().split())
    stack.append((x,y))
    max1 = max(max1,y)
dp=[1]*(max1+1)
sum1 = [0]*(1+max1)
for i in range(1,max1+1):
    if i < k:
        dp[i]=1
    else:
        dp[i] = (dp[i-1]+dp[i-k])%1000000007
        sum1[i] = (sum1[i-1]+dp[i])%1000000007
for _ in range(n):
    print((sum1[stack[_][1]]-sum1[stack[_][0]-1])%1000000007)
```

代码运行截图 (至少包含有"Accepted")

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HOME TOP CATALOG CONTESTS GYM PROBLEMSET GROUPS RATING EDU API CALENDAR HELP RAYAN

PROBLEMS SUBMIT CODE MY SUBMISSIONS STATUS HACKS ROOM STANDINGS CUSTOM INVOCATION

General

#	Author	Problem	Lang	Verdict	Time	Memory	Sent	Judged	
293383325	Practice: xjq123123	474D - 15	Python 3	Accepted	468 ms	21020 KB	2024-11-26 19:02:28	2024-11-26 19:02:28	<div>☆ Compare</div>

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```
n,k = map(int,input().split())
stack=[];max1=0
for _ in range(n):
    x,y = map(int,input().split())
    stack.append((x,y))
    max1 = max(max1,y)
dp=[1]*(max1+1)
sum1 = [0]*(1+max1)
for i in range(1,max1+1):
    if i < k:
        dp[i]=1
    else:
        dp[i] = (dp[i-1]+dp[i-k])%1000000007
        sum1[i] = (sum1[i-1]+dp[i])%1000000007
for _ in range(n):
    print((sum1[stack[_][1]]-sum1[stack[_][0]-1])%1000000007)
```

Click to see test details

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The only programming contests Web 2.0 platform

Server time: Dec/02/2024 18:29:24^{UTC+8} (h2).

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LeetCode5.最长回文子串

dp, two pointers, string, <https://leetcode.cn/problems/longest-palindromic-substring/>

思路:

代码:

```
class Solution(object):
    def longestPalindrome(self, s):
        """
        :type s: str
        :rtype: str
        """
        l1 = s
        ans = l1[0]
        max1 = 0
        len1 = len(l1)
        for i in range(len1):
            stack = [(i,i,1)]
            step = 1
            while i+step < len1 and l1[i] == l1[i+step]:
                stack.pop()
                stack.append((i,i+step,1+step))
                step += 1
            i = i+step -1
            while stack:
                x,y,k = stack.pop()
                if k > max1:
                    max1 = k
                    ans = ''.join(l1[x:y+1])
                if x -1 >=0 and y+1 < len1 and l1[x-1] == l1[y+1]:
                    stack.append((x-1,y+1,k+2))
        return ans
```

代码运行截图 (至少包含有"Accepted")

The screenshot shows a code editor interface with a sidebar on the left containing a table of submission records. The main area displays a Python code snippet for finding the longest palindrome. The code uses a stack-based approach to expand from each character in the string. The 'Run' button is highlighted in green. Below the code, the 'Test Results' section shows 'Case 1' with input 's = \"babad\"' and the output 'babad'.

所有状态	所有语言	执行用时	消耗内存	备注
通过 2024.11.28	Python	727 ms	12.4 MB	
解答错误 2024.11.28	Python	N/A	N/A	

```
20 .....
21 ..... x,y,k = stack.pop()
22 ..... if k > max1:
23 .....     max1 = k
24 .....     ans = ''.join(l1[x:y+1])
25 ..... if x -1 >=0 and y+1 < len1 and l1[x-1] == l1[y+1]:
26 .....     stack.append((x-1,y+1,k+2))
27 ..... return ans
```

行 27, 列 19 已存储

测试用例 >_ 测试结果

Case 1 Case 2 +

s =

"babad"

12029: 水淹七军

bfs, dfs, <http://cs101.openjudge.cn/practice/12029/>

思路:

代码:

```
import sys
sys.setrecursionlimit(300000)
input = sys.stdin.read
data = input().split()
index1 = 1
K = int(data[0])
dx = [1,-1,0,0]
dy = [0,0,1,-1]
result = []
def check(mat,x,y,m,n,h):
    if 0<=x and x < m and 0<= y and y < n and mat[x][y] < h: return True
    return False
for _ in range(K):
    M ,N = map(int,data[index1:index1+2])
    index1 += 2
    matrix = [[] for _ in range(M)]
    flooded = [[False]*N for _ in range(M)]
    cases=[]
    for i in range(M):
        matrix[i]=list(map(int,data[index1:index1+N]))
        index1+=N
    idx,idy = map(int,data[index1:index1+2])
    index1+=2
    p = int(data[index1])
    index1+=1
    stat = False
    for i in range(p):
        x,y = map(int,data[index1:index1+2])
        index1+=2
        cases.append((x,y))
    inq = set()
    for a,b in cases:
        if stat:break
        stack=[(a-1,b-1)]
        # print(stack)
        # print(flooded)
        height = matrix[a-1][b-1]
        while stack:
            x,y= stack.pop()
            inq.add((x,y))
            if x == idx -1 and y == idy -1:
                stat = True
                break
        for i in range(4):
            nx = x + dx[i]
            ny = y + dy[i]
```

```

        if check(matrix,nx,ny,M,N,height) and (nx,ny) not in inq:
            stack.append((nx,ny))

    result.append("Yes" if stat else "No")
sys.stdout.write("\n".join(result)+"\n")

```

代码运行截图 (至少包含有"Accepted")

CS101 / 题库 (包括计概、数算题目)

题目

排名

状态

提问

#47417637提交状态

查看 提交 统计 提问

状态: Accepted

源代码

```

import sys
sys.setrecursionlimit(300000)
input = sys.stdin.read
data = input().split()
index1 = 1
K = int(data[0])
dx = [1,-1,0,0]
dy = [0,0,1,-1]
result = []
def check(mat,x,y,m,n,h):
    if 0<=x and x<=m and 0<=y and y<=n and mat[x][y]<h: return True
    return False
for _ in range(K):
    M,N = map(int,data[index1:index1+2])
    index1 += 2
    matrix = [[] for _ in range(M)]
    flooded = [[False]*N for _ in range(M)]
    cases=[]
    for i in range(M):
        matrix[i]=list(map(int,data[index1:index1+N]))
        index1+=N
    idx,idx2 = map(int,data[index1:index1+2])
    index1+=2
    p = int(data[index1])
    index1+=1
    stat = False
    for i in range(p):
        x,y = map(int,data[index1:index1+2])
        index1+=2
        cases.append((x,y))
    inq = set()

```

基本信息

#: 47417637

题目: 12029

提交人: 24n2400012440徐嘉期

内存: 7788kB

时间: 81ms

语言: Python3

提交时间: 2024-11-27 00:58:38

02802: 小游戏

bfs, <http://cs101.openjudge.cn/practice/02802/>

思路:

代码:

```

from collections import deque
M,N = map(int,input().split())
test = 1
dx = [1,-1,0,0]
dy = [0,0,1,-1]
min1 = float("inf")

def check(x,y):
    if 0<=x and x<= M+1 and 0<= y and y <= N+1 and matrix[y][x] != 'X':return True
    return False

while M:
    matrix = [[0]*(M+2) for _ in range(N+2)]
    visited = [[False]*(M+2) for _ in range(N+2)]
    for i in range(N):
        matrix[1+i][1:M+1] = list(input())
    x1,y1,x2,y2 = map(int,input().split())

```

```

ans=[]
l = 0
# print(matrix)
while x1+x2+y1+y2:
    matrix[y2][x2] = ' '
    stack = deque()
    stack.append((x1,y1,-1,0))
    inq = set()
    inq.add((x1,y1))
    stat = False
    while stack:
        if stat:break
        x,y,dirc,k = stack.popleft()
        # print(x,y,k)
        if y == y2 and x == x2:
            # print(nx,ny,k + int(i!=dirc))
            ans.append(k)
            stat = True
            break
        # print(x,y,k)
        for i in range(4):
            nx = x+dx[i]
            ny = y+dy[i]
            while check(nx,ny) and (nx,ny) not in inq:
                stack.append((nx,ny,i,k+1))
                inq.add((nx,ny))
                nx += dx[i]
                ny += dy[i]
        if not stat:ans.append(0)
    matrix[y2][x2] = 'x'
    x1,y1,x2,y2 = map(int,input().split())
    l += 1
print(f"Board #{test}:")
for i in range(l):
    if ans[i]:
        print(f"Pair {i+1}: {ans[i]} segments.")
    else:
        print(f"Pair {i+1}: impossible.")
print()
test += 1
M,N = map(int,input().split())

```

代码运行截图 (至少包含有"Accepted")

OpenJudge

题目ID, 标题, 描述

24n2400012440徐嘉期 信箱 账号

CS101 / 题库 (包括计概、数算题目)

题目 排名 状态 提问

#47436445提交状态

查看 提交 统计 提问

状态: Accepted

源代码

```
from collections import deque
M,W = map(int,input().split())
test = 1
dx = [1,-1,0,0]
dy = [0,0,1,-1]
mini = float("inf")

def check(x,y):
    if 0<=x and x<= M+1 and 0<= y and y <= N+1 and matrix[y][x] != 'X':
        return False

while M:
    matrix = [[0]*(M+2) for _ in range(N+2)]
    visited = [[False]*(M+2) for _ in range(N+2)]
    for i in range(N):
        matrix[i+1][1:M+1] = list(input())
    x1,y1,x2,y2 = map(int,input().split())
    ans=[]
    l = 0
    # print(matrix)
    while x1+x2+y1+y2:
        matrix[y2][x2] = ' '
        stack = deque()
        stack.append((x1,y1,-1,0))
        inq = set()
        inq.add((x1,y1))
        stat = False
        while stack:
```

基本信息

#: 47436445

题目: 02802

提交人: 24n2400012440徐嘉期

内存: 45688kB

时间: 185ms

语言: PyPy3

提交时间: 2024-11-28 00:41:02

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。

审题时注意要不要取模，两次都忘了

debug能力有提高，尽管还是比较耗时，因此有点担心机考。另：感觉自己有时候过于依赖群里的测试数据了，形成思维上的懒惰，不自己构造数据、去想corner case，感觉应当提高一下这方面能力，但也担心考试的时候根本没有那么多的时间去构造数据，请问老师有没有什么建议