

Assignment #C : bfs & dp

Updated 1436 GMT+8 Nov 25, 2025

2025 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

sy321迷宫最短路径

bfs, <https://sunnywhy.com/sfbj/8/2/321>

思路：

代码：

```
class Node:

    def __init__(self, parent_node=None, value=None):

        self.parent_node = parent_node

        self.value = value

    def is_in(self, val):

        if val == self.value:

            return True

        elif self.parent_node is None:
```

```

        return False

    else:

        return self.parent_node.is_in(val)

def print(self):

    if self.parent_node is None:

        print(' '.join(map(str, self.value)))

    else:

        self.parent_node.print()

        print(' '.join(map(str, self.value)))

n, m = map(int, input().split())

a = []

for i in range(n):

    a.append(list(map(int, input().split()))))

c = [Node(value = (1,1))]

while True:

    c_t =[]

    end = False

    for i in c:

        x = i.value[0]

        y = i.value[1]

        if x+1 == n and y == m:

```

```

        Node(i, (x+1, y)).print()

        end = True

        break

    elif x == n and y+1 == m:

        Node(i, (x, y+1)).print()

        end = True

        break

    if x+1 <= n and a[x][y-1] == 0 and not i.is_in((x+1, y)):

        c_t.append(Node(i, (x+1, y)))

    if x-1 >= 1 and a[x-2][y-1] == 0 and not i.is_in((x-1, y)):

        c_t.append(Node(i, (x-1, y)))

    if y+1 <= m and a[x-1][y] == 0 and not i.is_in((x, y+1)):

        c_t.append(Node(i, (x, y+1)))

    if y-1 >= 1 and a[x-1][y-2] == 0 and not i.is_in((x, y-1)):

        c_t.append(Node(i, (x, y-1)))

    if end:

        break

c = c_t

```

代码运行截图 (至少包含有"Accepted")

完美通过

100% 数据通过测试

运行时长: 0 ms

语言: Python

```
1  class Node:
2      def __init__(self, parent_node=None, value=None):
3          self.parent_node = parent_node
4          self.value = value
5
6      def is_in(self, val):
7          if val == self.value:
8              return True
9          elif self.parent_node is None:
10             return False
11         else:
12             return self.parent_node.is_in(val)
13
14     def print(self):
15         if self.parent_node is None:
16             print(' '.join(map(str, self.value)))
17         else:
18             self.parent_node.print()
19             print(' '.join(map(str, self.value)))
20
21 n, m = map(int, input().split())
22 a = []
23 for i in range(n):
24     a.append(list(map(int, input().split())))
25 c = [Node(value = (1,1))]
26 while True:
27     pass
```

sy324多终点迷宫问题

bfs, <https://sunnywhy.com/sfbj/8/2/324>

思路:

代码:

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

a = []

for i in range(n):

    mid = list(map(int, input().split()))

    for j in range(m):

        mid[j] = -mid[j]

    a.append(mid)

step = 1

c = {(0,0)}

while True:

    c_t = set()

    while len(c) != 0:

        mid = c.pop()

        a[mid[0]][mid[1]] = step

        if mid[0] - 1 >= 0 and a[mid[0] - 1][mid[1]] == 0:

            c_t.add((mid[0] - 1, mid[1]))

        if mid[1] - 1 >= 0 and a[mid[0]][mid[1] - 1] == 0:

            c_t.add((mid[0], mid[1] - 1))

        if mid[0] + 1 < n and a[mid[0] + 1][mid[1]] == 0:

            c_t.add((mid[0] + 1, mid[1]))
```

```
        if mid[1] + 1 < m and a[mid[0]][mid[1] + 1] == 0:

            c_t.add((mid[0], mid[1] + 1))

    step += 1

    if len(c_t) == 0:

        break

    else:

        c = c_t

for i in range(n):

    for j in range(m):

        if a[i][j] == 0:

            a[i][j] = -1

        elif a[i][j] > 0:

            a[i][j] -= 1

for i in range(n):

    print(*a[i])
```

代码运行截图 (至少包含有"Accepted")

完美通过

100% 数据通过测试

运行时长: 0 ms

语言: Python

```
1  n, m = map(int, input().split())
2  a = []
3  for i in range(n):
4      mid = list(map(int, input().split()))
5      for j in range(m):
6          mid[j] = -mid[j]
7      a.append(mid)
8  step = 1
9  c = {(0,0)}
10 while True:
11     c_t = set()
12     while len(c) != 0:
13         mid = c.pop()
14         a[mid[0]][mid[1]] = step
15         if mid[0] - 1 >= 0 and a[mid[0] - 1][mid[1]]:
16             c_t.add((mid[0] - 1, mid[1]))
17         if mid[1] - 1 >= 0 and a[mid[0]][mid[1] - 1]:
18             c_t.add((mid[0], mid[1] - 1))
19         if mid[0] + 1 < n and a[mid[0] + 1][mid[1]]:
20             c_t.add((mid[0] + 1, mid[1]))
21         if mid[1] + 1 < m and a[mid[0]][mid[1] + 1]:
22             c_t.add((mid[0], mid[1] + 1))
23     step += 1
24     if len(c_t) == 0:
25         break
26     else:
27         c = c_t
```

M02945: 拦截导弹

dp, greedy <http://cs101.openjudge.cn/pctbook/M02945>

思路:

代码:

```
k = int(input())
nums = list(map(int, input().split()))
dp = [1] * k
for i in range(1, k):
    for j in range(i):
        if nums[i] <= nums[j]:
            dp[i] = max(dp[i], dp[j] + 1)
print(max(dp))
```

代码运行截图 (至少包含有"Accepted")

#51431052提交状态

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状态: Accepted

源代码

```
k = int(input())
nums = list(map(int, input().split()))
dp = [1] * k
for i in range(1, k):
    for j in range(i):
        if nums[i] <= nums[j]:
            dp[i] = max(dp[i], dp[j] + 1)
print(max(dp))
```

基本信息

#: 51431052
题目: M02945
提交人: 25n2510307130(miko)
内存: 3608kB
时间: 21ms
语言: Python3
提交时间: 2025-12-21 02:36:36

189A. Cut Ribbon

brute force/dp, 1300, <https://codeforces.com/problemset/problem/189/A>

思路:

代码:

```
n, a, b, c = map(int, input().split())
dp = [-1] * (n + 1)
dp[0] = 0
for i in range(1, n + 1):
    if i >= a and dp[i - a] != -1:
        dp[i] = max(dp[i], dp[i - a] + 1)
    if i >= b and dp[i - b] != -1:
        dp[i] = max(dp[i], dp[i - b] + 1)
    if i >= c and dp[i - c] != -1:
```



```
dp[i] = max(dp[i], dp[i - c] + 1)
print(dp[n])
```

代码运行截图（至少包含有"Accepted"）

PROBLEMS SUBMIT CODE MY SUBMISSIONS STATUS HACKS ROOM STANDINGS CUSTOM INVOCATION

General										
#	Author	Problem	Lang	Verdict	Time	Memory	Sent	Judged		
343086018	Practice: mikomeow	189A - 39	Python 3	Accepted	77 ms	60 KB	2025-10-11 10:16:09	2025-10-11 10:16:09	★	<button>Compare</button>

→ Source

Copy

```
n, a, b, c = map(int, input().split())
dp = [-1] * (n + 1)
dp[0] = 0
for i in range(1, n + 1):
    if i >= a and dp[i - a] != -1:
        dp[i] = max(dp[i], dp[i - a] + 1)
    if i >= b and dp[i - b] != -1:
        dp[i] = max(dp[i], dp[i - b] + 1)
    if i >= c and dp[i - c] != -1:
        dp[i] = max(dp[i], dp[i - c] + 1)
print(dp[n])
```

M01384: Piggy-Bank

dp, <http://cs101.openjudge.cn/practice/01384/>

思路：

代码：

```
for _ in range(int(input())):
    E, F = map(int, input().split())
    weight = F - E
    coins = []
    for i in range(int(input())):
        P, W = map(int, input().split())
        coins.append((W, P))
    coins.sort()
    v = [float('inf')] * (weight + 1)
    v[0] = 0
    for i in range(weight):
        if v[i] != float('inf'):
            try:
                for W, P in coins:
                    v[i + W] = min(v[i + W], v[i] + P)
            except:
                pass
    if v[weight] == float('inf'):
        print('This is impossible.')
    else:
        print('The minimum amount of money in the piggy-bank is ' +
              str(v[weight]) + '.')
```

代码运行截图（至少包含有"Accepted"）

#51411282提交状态

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状态: Accepted

源代码

```
for _ in range(int(input())):
    E, F = map(int, input().split())
    weight = F - E
    coins = []
    for i in range(int(input())):
        P, W = map(int, input().split())
        coins.append((W, P))
    coins.sort()
    v = [float('inf')] * (weight + 1)
    v[0] = 0
    for i in range(weight):
        if v[i] != float('inf'):
            try:
                for W, P in coins:
                    v[i + W] = min(v[i + W], v[i] + P)
            except:
                pass
    if v[weight] == float('inf'):
        print('This is impossible.')
    else:
        print('The minimum amount of money in the piggy-bank is ' + str(v[weight]))
```

基本信息

#: 51411282
题目: 01384
提交人: 25n2510307130(miko)
内存: 38472kB
时间: 409ms
语言: PyPy3
提交时间: 2025-12-19 20:38:27

M02766: 最大子矩阵

dp, kadane, <http://cs101.openjudge.cn/pctbook/M02766>

思路:

代码:

```
import sys

data = list(map(int, sys.stdin.read().split()))
N = data[0]
matrix = [[0]*N for i in range(N)]
for i in range(N):
    for j in range(N):
        matrix[i][j] = data[i*N+j+1]
m = float('-inf')
for i in range(N):
    nums = [0]*N
    for j in range(i, N):
        for k in range(N):
            nums[k] += matrix[j][k]
        t_m = float('-inf')
        for k in range(N):
            t_m = max(t_m+nums[k], nums[k])
        m = max(m, t_m)

print(m)
```

代码运行截图（至少包含有"Accepted"）

状态: Accepted

源代码

```
import sys
data = list(map(int, sys.stdin.read().split()))
N = data[0]
matrix = [[0]*N for i in range(N)]
for i in range(N):
    for j in range(N):
        matrix[i][j] = data[i*N+j+1]
m = float('-inf')
for i in range(N):
    nums = [0]*N
    for j in range(i, N):
        for k in range(N):
            nums[k] += matrix[j][k]
            t_m = float('-inf')
            for k in range(N):
                t_m = max(t_m+nums[k], nums[k])
            m = max(m, t_m)
print(m)
```

基本信息

#: 51410888
题目: M02766
提交人: 25n2510307130(miko)
内存: 37060kB
时间: 154ms
语言: PyPy3
提交时间: 2025-12-19 20:16:14

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。

无额外练习

- 1.用了整活做法，但最后用时比答案给的做法要少，很神奇
- 2.无，当然我现在bfs不这么写了
- 3.无
- 4.我记得这题做过来着
- 5.pypy3神力，同样的代码python跑TLE了
- 6.学到了kadane