Problem1:

```
问题    输出    终端    调试控制台

Windows PowerShell
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安装最新的 PowerShell，了解新功能和改进！https://aka.ms/PSWindows

PS C:\Users\何老板\Desktop\Project4-20220417T041430Z-001\Project4\Problem_1> & C:/Python310/python.exe c:/Users/何老板/Desktop/Project4
lem_1/problem_1.py
The top 20 betweenness centrality vertices in the road network are:
760,590,859,757,858,1021,374,92,931,857,758,393,496,775,1093,932,1094,835,589,751,
PS C:\Users\何老板\Desktop\Project4-20220417T041430Z-001\Project4\Problem_1>
```

Problem2:

1. Branch & bound one-D array:

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL                                  Python

/usr/local/bin/python3 "/Users/peilinhe/Documents/MS Homework/Algorithm/Project4/Problem_2/branch_and_bound.py"
peilinhe@MacBookPro_M1Max Problem_2 % /usr/local/bin/python3 "/Users/peilinhe/Documents/MS Homework/Algorithm/Project4/Problem_2/branch_and_bound.py"

The shortest path for one-D array is: [0, 9, 10, 16, 20, 8, 15, 22, 18, 23, 17, 19, 6, 7, 12, 5, 4, 3, 2, 13, 14, 11, 21, 1, 0]

The minimum distance is: 6733

peilinhe@MacBookPro_M1Max Problem_2 %
```

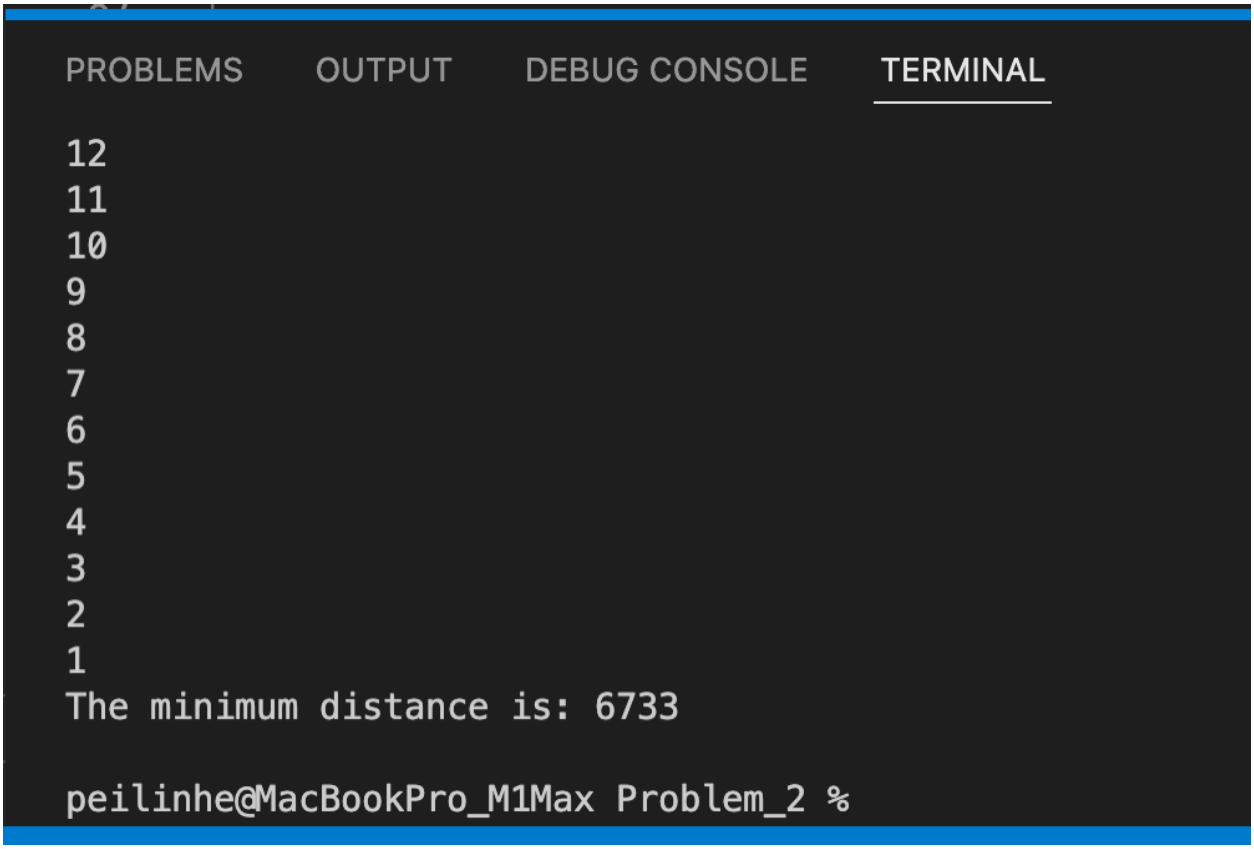
2. Branch & bound Two-D array:

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL                                  Python

/usr/local/bin/python3 "/Users/peilinhe/Documents/MS Homework/Algorithm/Project4/Problem_2/branch_and_bound.py"
peilinhe@MacBookPro_M1Max Problem_2 % /usr/local/bin/python3 "/Users/peilinhe/Documents/MS Homework/Algorithm/Project4/Problem_2/branch_and_bound.py"

The shortest path for Two-D array is: [0, 9, 10, 16, 20, 8, 15, 22, 18, 23, 17, 19, 6, 7, 12, 5, 4, 3, 2, 13, 14, 11, 21, 1, 0]

The minimum distance is: 6733

peilinhe@MacBookPro_M1Max Problem_2 %
```

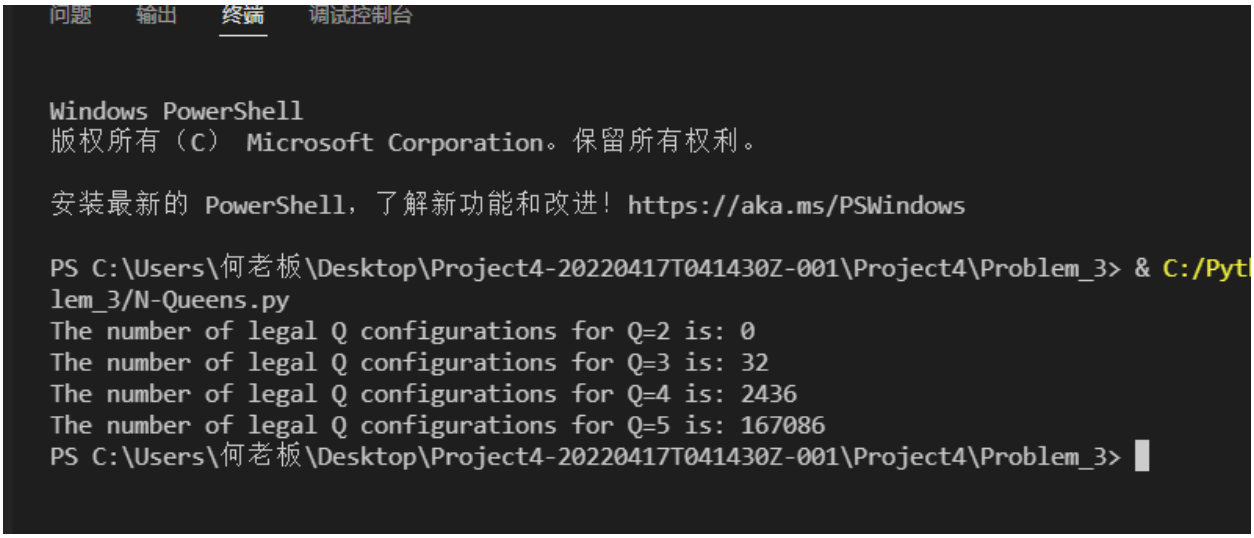
1. Dynamic Programming one-D array:

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL

8
7
6
5
4
3
2
1
The minimum distance is: 6733

peilinhe@MacBookPro_M1Max Problem_2 %
```

2. Dynamic Programming two-D array:



Problem3:



PS:
Problem 1 and problem 3 were ran by win11, intel i5 processor, ASUS, problem 2 was ran by M1 Max processor, Apple.