YONSEI UNIVERSITY

CSI3108-01 2015. 10. 26

Programming HW#5

Max 40 points

Due on Nov. 6 (Friday), 2015, by 5 pm

Write a Java program that solves the symmetric Traveling Salesman Problem by implementing the dynamic programming algorithm discussed in class. You are given ***n*** cities, labelled 0, 1, 2, ..., ***n***-1. Assume that you start from city 0 and ***n*** is a positive integer greater than or equal to 5.

Input

The input consists of a sequence of 20 test cases. Each test case consists of ***n*** + 1 lines, where ***n*** is the number of cities. In the first line, ***n*** is given. In the next ***n*** lines, the inter-city distances are given as an ***n***x***n*** matrix. If an element of matrix has '-1', there is no edge connected. Assume each of other elements is non-negative integer no greater than 1,000.

Output

There should be one line of output for each test case in the input file. For each test case, print out a single integer, indicating the length of an optimal route.

Sample Input

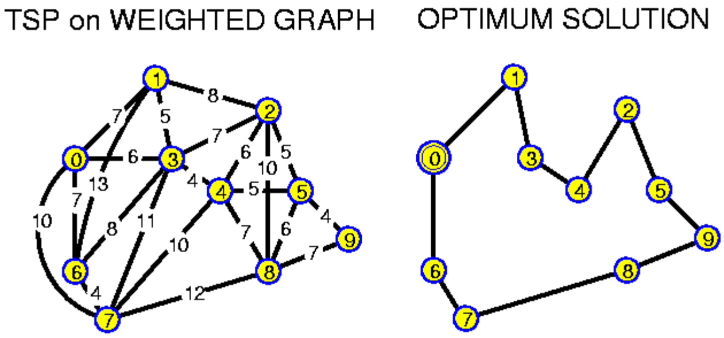
```
20     // number of test cases
10     // n =10 test case #1
-1 7 -1 6 -1 -1 7 10 -1 -1     // 10x10 matrix is given
7 -1 8 5 -1 -1 13 -1 -1 -1
-1 8 -1 7 6 5 -1 -1 10 -1
6 5 7 -1 4 -1 8 11 -1 -1
-1 -1 6 4 -1 5 -1 10 7 -1
-1 -1 5 -1 5 -1 -1 -1 6 4
```

```
7 13 -1 8 -1 -1 -1 4 -1 -1
10 -1 -1 11 10 -1 4 -1 12 -1
-1 -1 10 -1 7 6 -1 12 -1 7
-1 -1 -1 -1 -1 4 -1 -1 7 -1
5     // // n =5 test case #2
...
```

Sample Output

```
61     // optimal length of test case #1
...
```

Figure for Sample Input/Output


TSP on WEIGHTED GRAPH
OPTIMUM SOLUTION
1
8
2
7
5
7
6
10
5
0
6
3
4
4
5
5
13
7
10
8
11
10
7
6
4
9
7
6
8
4
7
12
0
1
3
4
2
5
9
6
8
7