### **SIENA COLLEGE**

**27th Annual** High School Programming Contest

##### **April 27, 2015**

###### Problem #6: TOLL BOOTHS

Background Information: In your normal route to work, you must traverse cities streets labeled A, B, C, D, E, F, G, H, I, and J, along with 10 cross streets named 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10. You happen to start at location A1, and your work lies in J10. Unfortunately in your city, each intersection has a toll booth, at which you must pay an unavoidable toll. Your job is to move horizontally or vertically, from A1 to J10 by paying the minimum amount of tolls. A representation of the toll booth costs are located in the grid below.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **A** | **B** | **C** | **D** | **E** | **F** | **G** | **H** | **I** | **J** |
| **1** | 0 | 2 | 2 | 8 | 7 | 7 | 2 | 9 | 7 | 6 |
| **2** | 2 | 3 | 7 | 7 | 7 | 9 | 7 | 1 | 6 | 1 |
| **3** | 1 | 6 | 4 | 4 | 1 | 3 | 3 | 6 | 8 | 8 |
| **4** | 3 | 5 | 2 | 1 | 3 | 6 | 4 | 8 | 6 | 6 |
| **5** | 6 | 1 | 8 | 2 | 5 | 5 | 8 | 9 | 2 | 3 |
| **6** | 1 | 4 | 4 | 1 | 3 | 7 | 6 | 1 | 4 | 9 |
| **7** | 1 | 7 | 3 | 3 | 4 | 4 | 4 | 7 | 6 | 6 |
| **8** | 5 | 3 | 2 | 2 | 5 | 6 | 3 | 6 | 3 | 2 |
| **9** | 5 | 2 | 1 | 3 | 5 | 4 | 3 | 1 | 3 | 2 |
| **10** | 6 | 1 | 6 | 4 | 4 | 6 | 7 | 8 | 7 | 0 |

Rules for toll booths:

1. All toll booth costs are non-negative integers < 10. A1 and J10 are the only zero toll booths.
2. You may only move from one toll booth to another adjacent one in north, south, east, or west directions. No jumping, diagonal movement, or moving off the city street boundaries is permitted.
3. Each time you move to an adjacent intersection regardless of direction – whether you have previously visited it or not – you must pay the toll associated with that location. For example, moving from I4 to I5 requires a payment of 2 (the number at I5); moving from J5 to I5 would also cost 2.
4. The input for this problem will be 10 lines of integers, each line representing the rows 1 through 10. In the above case, the first line of input would be **0 2 2 8 7 7 2 9 7 6**.

Programming Problem:

Input: 10 lines with 10 integers (from 0-9 inclusive) each, separated by single spaces

Output: The minimum cost of traveling from A1 to J10.

###### Example:

######  Input:  0 2 2 8 7 7 2 9 7 6

######  2 3 7 7 7 9 7 1 6 1

 1 6 4 4 1 3 3 6 8 8

 3 5 2 1 3 6 4 8 6 6

 6 1 8 2 5 5 8 9 2 3

 1 4 4 1 3 7 6 1 4 9

 1 7 3 3 4 4 4 7 6 6

 5 3 2 2 5 6 3 6 3 2

 5 2 1 3 5 4 3 1 3 2

 6 1 6 4 4 6 7 8 7 0

###### Output: 43