D: Enterprising Escape

Time Limit: 3 second(s)

The Enterprise is surrounded by Klingons! Find the escape route that has the quickest exit time, and print that time.

Input is a rectangular grid; each grid square either has the Enterprise or some class of a Klingon warship. Associated with each class of Klingon warship is a time that it takes for the Enterprise to defeat that Klingon. To escape, the Enterprise must defeat each Klingon on some path to the perimeter. Squares are connected by their edges, not by corners (thus, four neighbours).

Input

Input consists of a single test case and will start with a line containing three numbers k, w, and h. The value for k is the number of different Klingon classes and will be between 1 and 25, inclusive. The value for w is the width of the grid and will be between 1 and 1000, inclusive. The value for h is the height of the grid and will be between 1 and 1000, inclusive.

Following that will be k lines. Each will consist of a capital letter used to label the class of Klingon ships followed by the duration required to defeat that class of Klingon. The label will not be "E". The duration is in minutes and will be between 0 and 100,000, inclusive. Each label will be distinct.

Following that will be h lines. Each will consist of w capital letters (with no spaces between them). There will be exactly one "E" across all h lines, denoting the location of the Enterprise; all other capital letters will be one of the k labels given above, denoting the class of Klingon warship in the square.

Output

Output should be a single integer value indicating the time required for the Enterprise to escape.

Sample Input and Output

Sample Input 1	Output for Sample Input
6 3 3 A 1 B 2 C 3 D 4 F 5 G 6 ABC FEC DBG	2

Sample Input 2	Output for Sample Input
2 6 3 A 100 B 1000 BBBBBB AAAAEB BBBBBB	400