



# CS 124 Problem Set 2

Logged in as [sidharthsingh@fas.harvard.edu](#)**Due:** Wednesday, February 18, 2015 11:59 pm EST (**deadline passed**)[Problems](#) | [Scores](#) | [Submit](#) | [Help](#) | [Log Out](#)

## Problems

### [Problem A - Snake](#)

#### Problem A

"Snake" used to be a very popular mobile game. In it, you played as a snake that moved around on a grid, and ate apples to increase both your score and the length of the snake. In this particular version, there are obstacles, and the speed of the snake steadily increases over time, so it is important to get to the apple as quickly as possible.

Your goal is to determine the fewest number of steps needed to get the head of the snake to the apple given a description of the grid. Note that in addition to not being able to pass through obstacles, the snake also cannot pass through itself.

#### CONSTRAINTS

Cases 1-4:

$1 \leq m, n \leq 5$

$k = 1$

Cases 5-7:

$1 \leq m, n \leq 8$

$3 \leq k \leq 5$

Cases 8-9:

$1 \leq m, n \leq 10$

$3 \leq k \leq 7$

Case 10:

$1 \leq m, n \leq 10$

$3 \leq k \leq 9$

#### TIME LIMIT

Cases 1-9: 100 ms

Case 10: 700 ms

5x for Java, 10x for Python

#### INPUT FORMAT

The first line contains three space-separated integers  $m$ ,  $n$ , and  $k$ , which are the number of rows and columns, and the length of the snake, respectively. The next  $m$  lines describe the game. The meanings of the characters are as follows:

X - obstacle

A - apple

. - empty square

There will also be characters that are digits, and these identify the snake. 1 corresponds to the head of the snake, 2 the second square, etc.

## OUTPUT FORMAT

Print a single integer representing the minimum number of steps needed to get the snake to the apple. If it is impossible, print -1.

## SAMPLE INPUT

```
4 5 4
XX...
..1XA
432X.
...X.
```

## SAMPLE OUTPUT

```
4
```

## SAMPLE INPUT

```
3 5 5
12345
X....
....A
```

## SAMPLE OUTPUT

```
-1
```

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Based on the "Ultra Cool Programming Contest Control Centre" v1.7b by Sonny Chan  
Modified for CS 124 by [Neal Wu](#), with design help from Martin Camacho