

University of Scranton
ACM Student Chapter / Computing Sciences Department
28th Annual High School Programming Contest (2018)

Practice Problem 1: Reverse the Words

Develop a program that, given as input a line of text interpreted to contain a sequence of words, outputs those words in reverse order. Within a line of text, a word is defined to be any maximal space-free substring. That is, a substring is a word if (and only if) it

1. includes no spaces, and
2. occurs at the beginning of the line or is preceded by a space, and
3. occurs at the end of the line or is followed by a space.

Input: The first line contains a positive integer n indicating how many lines of text are to be processed. Each of the following n lines contains some text which is to be interpreted as being a sequence of words. (Adjacent words are separated by one or more spaces.)

Output: For each line of text, display the sequence of words that it includes, but in reverse order. That is, the last word appearing in the input line should appear first on the output line, and so on. Also, each pair of adjacent words should be separated by a single space.

Sample input:

```
-----  
2  
the cat   in the hat  
  Monkey see, monkey do
```

Resultant output:

```
-----  
hat the in cat the  
do monkey see, Monkey
```

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Practice Problem 2: Holey Squares

A *holey square* is a square matrix each element of which is either a decimal digit or a “hole” (i.e., unoccupied). The digit in the first column of the first row (upper lefthand corner) is called the *starting digit*. As you scan the rows from top to bottom, each row from left to right, you find that the digits occur in succession (0 is followed by 1, which is followed by 2, ..., which is followed by 9, which is followed by 0). You also find that a hole appears immediately after each occurrence of a particular digit, called the *holey digit*. To illustrate, here is the holey square of size 5 (i.e., having 5 rows and 5 columns) having 7 as its starting digit and 9 as its holey digit:

```
7 8 9 0
1 2 3 4 5
6 7 8 9
0 1 2 3 4
5 6 7 8 9
```

Develop a program that produces a holey square, given as input its size, starting digit, and holey digit.

Input: The first line contains a positive integer n indicating how many instances of the problem are described thereafter. Each instance of the problem is described on one line containing a positive integer giving the size of the square and two nonnegative integers, each less than 10, giving the starting digit and the holey digit, respectively.

Output: For each holey square described by the input data, display it, followed by a blank line.

Sample input and output are on next page.

Sample input:

2

9 5 5

6 3 8

Resultant output:

5 6 7 8 9 0 1 2

3 4 5 6 7 8 9 0

1 2 3 4 5 6 7 8

9 0 1 2 3 4 5 6

7 8 9 0 1 2 3 4 5

6 7 8 9 0 1 2 3

4 5 6 7 8 9 0 1

2 3 4 5 6 7 8 9

0 1 2 3 4 5 6 7

3 4 5 6 7 8

9 0 1 2 3

4 5 6 7 8

9 0 1 2 3 4

5 6 7 8 9

0 1 2 3 4 5