### SIENA COLLEGE

**24th Annual**

### High School Programming Contest

##### April 8, 2011

###### **Problem #4: Card Shuffle**

Background Information: A deck of N cards, numbered from 1 to N, is put on a table. The cards are arbitrarily ordered. A single player “shuffles the deck” by repeatedly doing the following:

**See the number K written on the top card and move the Kth card to the top of the deck. Stop when the top card is 1.**

For example, if there are six cards in top to bottom order 4, 3, 6, 5, 2, 1 then the “shuffle” will change the order as follows:

Original: 4 3 6 5 2 1

After

1st iteration 5 4 3 6 2 1

2nd iteration 2 5 4 3 6 1

3rd iteration 5 2 4 3 6 1

4th iteration 6 5 2 4 3 1

5th iteration 1 6 5 2 4 3

###### Programming Problem:

Input: N a positive integer between 1 and 16 followed by the

first N positive integers that have been randomly “shuffled”.

Output: The number of iterations it takes for 1 to reach the “top of the deck”

followed by the digits in the “shuffled deck” after the last iteration.

This output must fit on one line.

###### Example 1: Input: 6 4 3 6 5 2 1

###### Output: 5 iterations 1 6 5 2 4 3

###### Example 2: Input: 5 1 3 5 2 4

###### Output: 0 iterations 1 3 5 2 4

###### Example 3: Input: 16 2 4 6 8 10 12 14 16 15 13 11 9 7 5 3 1

###### Output: 4 iterations 1 16 8 4 2 6 10 12 14 15 13 11 9 7 5 3