Gold Problem #5: The Locker Game.

Background Information: The Locker Game is a challenge sometimes presented to a sports team with N players numbered 1 to N. Each player has a jersey with her number on it and there is a locker room with N lockers numbered 1 to N. The jerseys are randomly placed in the lockers, one jersey per locker. The players do not the placements of the jerseys. In playing the game, the first player enters the locker room and may open half the lockers. Assume there are an even number of players, jerseys, and lockers. If she finds her jersey she is successful. She does not move any jerseys. After she exits the locker room, the lockers are shut. The second player enters the locker room. She may also open half the lockers. She is successful if she finds her jersey which is jersey number 2. This continues until all N players have looked for their jerseys. The team is successful if every player is successful. To improve the teams chance of success the players follow the following strategy. Player 1 opens locker 1. If jersey 5 is in that locker then player 1 opens locker 5 and then continues to open subsequent lockers based on the jersey number found until she finds her jersey. Player 2 does the same thing but starts in locker 2. All N players follow this pattern. It turns out that if there is no cycle of length greater than half the number of players, the team will be successful.

For this problem, we want to computer the length of the longest and shortest cycles N players follow. Consider the following 10 lockers containing the indicated jersey numbers.

Locker #	1	2	3	4	5	6	7	8	9	10
Jersey	3	8	6	2	9	10	7	4	5	1

Player 1 will open lockers 3, 6, 10, and 1.   Player 6 will open lockers 10, 1, 3, and 6.
Player 2 will open lockers 2, 8, and 4.Player 7 will open locker 7.
Player 3 will open lockers 3, 6, 10, and 1.   Player 8 will open lockers 8, 4, and 2.
Player 4 will open lockers 4, 2, and 8.Player 9 will open lockers 9, and 5.
Player 5 will open lockers 5, and 9   Player 10 will open lockers 10, 1, 3, and 6.
So the longest cycle is of length 4 and the length of the shortest cycle is 1.

Programming Problem:

Input: Two lines, the first with the number of players N an integer between 1 and 30.
         The second line will be a list of the jersey numbers that are in lockers 1 to N..

Output: The length of the longest cycle and the shortest cycle.

Example 1:   Input: 9
                          1 2 3 4 5 6 7 8 9
             Output: 1 1

Example 2:   Input: 9
                          2 3 4 5 6 7 8 9 1
             Output: 9 9

Example 3:   Input: 10
                          3 8 6 2 9 10 7 4 5 1

Output: 4 1