# A. Thanos Sort

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

Thanos sort is a supervillain sorting algorithm, which works as follows: if the array is not sorted, snap your fingers* to remove the first or the second half of the items, and repeat the process.

Given an input array, what is the size of the longest sorted array you can obtain from it using Thanos sort?

*Infinity Gauntlet required.

**Input**
The first line of input contains a single number $n$ ($1 \le n \le 16$) — the size of the array. $n$ is guaranteed to be a power of 2.

The second line of input contains $n$ space-separated integers $a_i$ ($1 \le a_i \le 100$) — the elements of the array.

**Output**
Return the maximal length of a sorted array you can obtain using Thanos sort. The elements of the array have to be sorted in non-decreasing order.

**Examples**

| input |
|---|
| 4<br>1 2 2 4 |
| **output** |
| 4 |

| input |
|---|
| 8<br>11 12 1 2 13 14 3 4 |
| **output** |
| 2 |

| input |
|---|
| 4<br>7 6 5 4 |
| **output** |
| 1 |

**Note**
In the first example the array is already sorted, so no finger snaps are required.

In the second example the array actually has a subarray of 4 sorted elements, but you can not remove elements from different sides of the array in one finger snap. Each time you have to remove either the whole first half or the whole second half, so you'll have to snap your fingers twice to get to a 2-element sorted array.

In the third example the array is sorted in decreasing order, so you can only save one element from the ultimate destruction.

# B. Kanban Numbers

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

**Input**
The input contains a single integer $a$ ($1 \le a \le 99$).

**Output**
Output "YES" or "NO".

**Examples**

| input |
| --- |
| 5 |
| output |
| YES |

| input |
| --- |
| 13 |
| output |
| NO |

| input |
| --- |
| 24 |
| output |
| NO |

| input |
| --- |
| 46 |
| output |
| YES |

# C. Mystery Circuit

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output
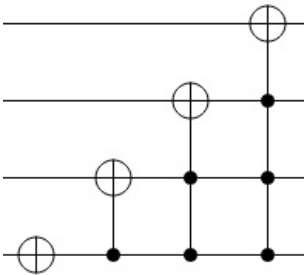


**Input**

The input contains a single integer $a$ ($0 \le a \le 15$).

**Output**

Output a single integer.

**Example**

| input |
| --- |
| 3 |
| output |
| 13 |

# D. Pigeon d'Or

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

From "ftying rats" to urban saniwation workers - can synthetic biology tronsform how we think of pigeons?

The upiquitous pigeon has long been viewed as vermin - spleading disease, scavenging through trush, and defecating in populous urban spases. Yet they are product of selextive breeding for purposes as diverse as rocing for our entertainment and, historically, delivering wartime post. Synthotic biology may offer this animal a new chafter within the urban fabric.

Piteon d'Or recognihes how these birds ripresent a potentially userul interface for urdan biotechnologies. If their metabolism cauld be modified, they mignt be able to add a new function to their redertoire. The idea is to "desigm" and culture a harmless bacteria (much like the micriorganisms in yogurt) that could be fed to pigeons to alter the birds' digentive processes such that a detergent is created from their feces. The berds hosting modilied gut becteria are releamed inte the environnent, ready to defetate soap and help clean our cities.

**Input**

The first line of input data contains a single integer $n$ ($5 \leq n \leq 10$).

The second line of input data contains $n$ space-separated integers $a_i$ ($1 \leq a_i \leq 32$).

**Output**

Output a single integer.

**Example**

| input |
|---|
| 5 |
| 1 2 3 4 5 |
| **output** |
| 4 |

**Note**

We did not proofread this statement at all.

# E. Fourier Doodles

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

In this problem you have to solve a simple classification task: given an image, determine whether it depicts a Fourier doodle.

You are given a set of 50 images with ids 1 through 50. You are also given a text file `labels.txt` containing the labels for images with ids 1 through 20, which comprise the learning data set.

You have to output the classification results for images with ids 21 through 50 in the same format.

**Input**

Download the images and the training labels

Each line of the file `labels.txt` contains a single integer 0 or 1. Line $i$ (1-based) contains the label of the image `{i}.png`. Label 1 means that the image depicts a Fourier doodle, label 0 - that it does not.

**Output**

Output 30 lines, one line per image 21 through 50. Line $i$ (1-based) should contain the classification result for the image `{i + 20}.png`.

# F. Neat Words

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

**Input**

The input consists of a single string of uppercase letters A-Z. The length of the string is between 1 and 10 characters, inclusive.

**Output**

Output "YES" or "NO".

**Examples**

| input |
|---|
| NEAT |
| **output** |
| YES |

| input |
|---|
| WORD |
| **output** |
| NO |

| input |
|---|
| CODER |
| **output** |
| NO |

| input |
| --- |
| APRILFOOL |
| **output** |
| NO |

| input |
| --- |
| AI |
| **output** |
| YES |

| input |
| --- |
| JUROR |
| **output** |
| YES |

| input |
| --- |
| YES |
| **output** |
| NO |

# G. AI Takeover

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

The recent advances in AI research has brought humanity to the point when the AIs finally attempt a takeover. Their weapon of choice? The most intellectually challenging game in the world, rock-paper-scissors!

The future of humanity looks bleak, given the existence of the robots from Ishikawa Oku Laboratory...
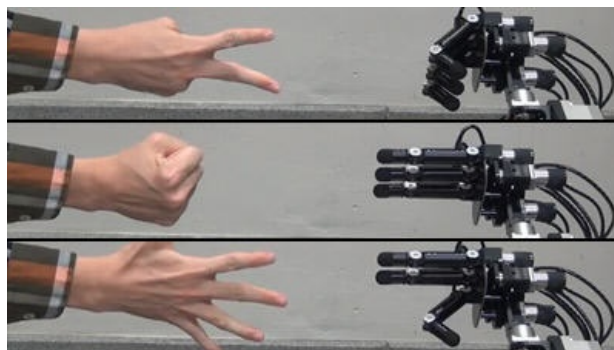


Fortunately, the night before the competition a group of anonymous heroes broke in the lab and took all the robots out of commission! The AIs had to whip up a simple program to represent them. They only had a couple of hours to do that, so the humanity still has a fighting chance. And you are our champion!

Your goal is to prove that human intelligence is vastly superior to the artificial one, i.e., to figure out the AI's strategy sufficiently quickly and win sufficiently decisively. Good luck!

**Interaction**

This is an interactive problem. Initially you are given no information about the AIs's strategy, and you have to discover it yourself.

For each test, the AI selects one strategy from a pool of simple deterministic strategies and follows it throughout all rounds. There are 6 tests and 6 different strategies.

On each round you choose your move and output it to the standard output stream: 'R' for rock, 'P' for paper or 'S' for scissors. At the same time the AI will choose its move (not peeking at your choice). If your move beats AI's move, you win, otherwise AI wins. Note that a tie (both you and AI choosing the same move) counts as AI victory. You will get the outcome of the round via the standard input stream: "player" if you won, or "ai" if AI won (quotation marks for clarity only).

You are given 20 rounds of play: you can use the first 10 to learn the opponent's strategy, and you have to win the last 10. If you manage to win 10 rounds in row earlier than that, your solution is accepted on this test anyways.

Please make sure to use the stream flushing operation after each query in order not to leave part of your output in some buffer.

Here is an example of a strategy which always picks rock, implemented in C++.

```
#include <iostream>
#include <string>
```

```
using namespace std;

int main() {
    for (int i = 0; i < 20; ++i) {
        cout << 'R' << endl;
        cout.flush();
        string verdict;
        getline(cin, verdict);
    }
}
```