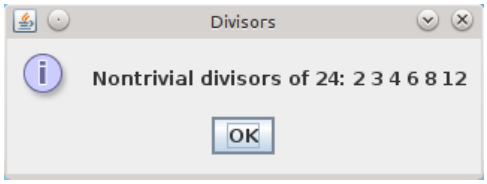
Problem 1

Write a program which reads a natural number n and displays in one graphical box



all its nontrivial divisors (i.e., from the interval $[2, n-1]$). If there are no nontrivial divisors, the message should state that the number is prime.

Problem 2

Write a program which finds digits in the binary system (starting with the least significant) of a number given in decimal system. For example, for number 67_{10} (which is binary 1000011_2), program should display $1, 1, 0, 0, 0, 0, 1$.

Problem 3

Write a program which asks the user, in a loop, to enter a positive integer until the user enters 0. Then the program prints one number from those which have been read in — the one for which the sum of digits is the largest (and this sum of digits).

Example of a run of the program:

```
enter a natural number (0 if done): 23
enter a natural number (0 if done): 59
enter a natural number (0 if done): 78
enter a natural number (0 if done): 91
enter a natural number (0 if done): 0
Max sum of digits was 15 for 78
```

Note: Do not use arrays, strings and any other kind of collection.

Problem 4

Write a program which plays the '20 Questions' game with the user. The user chooses (in his/her mind) a number from the interval $[1, 1\,000\,000]$. The program asks in a loop *Is this n ?*, and the user responds with a letter

- `s` (as in *s*mall) if n is smaller than the chosen number;
- `b` (as in *b*ig) if n is bigger than the chosen number;
- `y` (as in *y*es) if n is equal to the chosen number;

(to compare strings, use **equals**!).

At the end the program should print something like

```
Number that you think of is ...
```

and provide the correct answer and number of trials. Do not use arrays.
