Ministry of Education of Republic of Moldova
Technical University of Moldova

Report

on Computer Programming

Laboratory Work Nr. 5

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Verified by lect.univ **Gaidău M.**

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Topic: Composed or structured variable. One-dimensional and two-dimensional arrays in C/C++ languages

Purpose of the laboratory work: Accumulation of practical skills for developing and programming computational processes and program testing skills.

Condition of the problem:
(Codeforces. Problem 31A, https://codeforces.com/problemset/problem/55/A**)**

A. Flea travel

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

A flea is sitting at one of the n hassocks, arranged in a circle, at the moment. After minute number k the flea jumps through $k - 1$ hassocks (clockwise). For example, after the first minute the flea jumps to the neighboring hassock. You should answer: will the flea visit all the hassocks or not. We assume that flea has infinitely much time for this jumping.

Input

The only line contains single integer: $1 \le n \le 1000$ — number of hassocks.

Output

Output "YES" if all the hassocks will be visited and "NO" otherwise.

Examples

input	Copy
1	
output	Copy
YES	

input	Copy
3	
output	Copy
NO	

Work processing:

General

#	Author	Problem	Lang	Verdict	Time	Memory	Sent	Judged		
134745350	Practice: CristianBrinza	55A - 17	GNU C11	Accepted	15 ms	3620 KB	2021-11-09 13:32:33	2021-11-09 13:32:35	☆	Compare

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```
#include<stdio.h>
int arr[1005];
int main()
{
    int n, k = 1, tmp = 0;;
        scanf("%d",&n);
    arr[0]=1;
    for(int i=n-1;i>0;i--){
        tmp = (tmp + i)%n;
        if(arr[tmp]==0){
            arr[tmp]=1;
            k++;
        }
    }
    if(k==n)printf("YES\n");
    else printf("NO\n");
}
```

General knowlede used:

- #include<stdio.h> : stdio. h is a header file which has the necessary information to include **the input/output related functions in our program**. Example printf, scanf etc. If we want to use printf or scanf function in our program, we should include the stdio.Explanation:

1. We read from constole (`scanf("%d",&n);`)) the variable "n" from condution $1 \leq n \leq 1000$ — number of hassocks, we initialize the virst variale of a precreated array "arr" with value "1" and with a for loop changing the value to the tyemporary variable "tmp" with the formula "`tmp = (tmp + i)%n;`", while each iteration cheching with "if" - `if(arr[tmp]==0){` - the value of the tmp's alocateg value of the array, in positive cases atribuiting the value on to this position, and incrementint the temporary variable "k".

   at the end we print the answer while checking the for loop final results "`if(k==n)printf("YES\n");`
   `else printf("NO\n");`"

Tests:

1

Time: 0 ms, **memory**: 3604 KB

Verdict: OK

Input
1

Participant's output
YES

Jury's answer
YES

Checker comment
ok YES

2

Time: 15 ms, **memory**: 3612 KB

Verdict: OK

Input
3

Participant's output
NO

Jury's answer
NO

Checker comment
ok NO

3

Time: 0 ms, **memory**: 3608 KB

Verdict: OK

Input
2

Participant's output
YES

Jury's answer
YES

Checker comment
ok YES

82

Time: 0 ms, **memory**: 3612 KB

Verdict: OK

Input
256

Participant's output
YES

Jury's answer
YES

Checker comment
ok YES

83

Time: 15 ms, **memory**: 3600 KB

Verdict: OK

Input
512

Participant's output
YES

Jury's answer
YES

Checker comment
ok YES

35

Time: 30 ms, **memory**: 3632 KB

Verdict: OK

Input
```
4
303 872 764 401
```

Participant's output
```
-1
```

Jury's answer
```
-1
```

Checker comment
```
ok
```

36

Time: 0 ms, **memory**: 3632 KB

Verdict: OK

Input
```
3
807 452 355
```

Participant's output
```
-1
```

Jury's answer
```
-1
```

Checker comment
```
ok
```

37

Time: 0 ms, **memory**: 0 KB

Verdict: OK

Input
```
3
863 630 333
```

Participant's output
```
1 3 2
```

Jury's answer
```
1 3 2
```

Checker comment
```
ok
```

38

Time: 30 ms, **memory**: 3640 KB

Verdict: OK

Input
```
3
2 2 4
```

Participant's output
```
3 2 1
```

Jury's answer
```
3 2 1
```

Checker comment
```
ok
```

39

Time: 0 ms, **memory**: 0 KB

Verdict: OK

Input
```
3
2 4 100
```

Participant's output
```
-1
```

Jury's answer
```
-1
```

Checker comment
```
ok
```

Conclusion:

It's very interesting to see what you are creating by writing code. It's like art based on code. Skills were developed to compile, run and test a simple program in the C++ programming language.

As a result of the elaboration of the given paper, the basis was applied for the practical application of the theoretical knowledge.

The structures/concepts/algorithms used in this problem, after writing, compiling the program severaltimes and sending to Codeforces server.

Thus one can judge about the wide possibilities offered by the Java language regarding data manipulation. In this practical work I realized the knowledge accumulated during the theoretical and practical classes, I consolidated the material and in some places I learned new things. It allowed the assessment of knowledge in writing style both for the grade and personally. It allowed us to correct mistakes and possible future misunderstandings. Under the guidance of the teacher, we conducted the first individual study on this subject, this facilitating the adaptation to the knowledge of the use of theoretical material.

The verification of the results confirms that the elaborated program works correctly.

Linear algorithms can be used to calculate mathematical expressions.

Where drawn conclusions about comments, characters, strings, names (identifiers) in C/C++. As in the end I can say that the study had a positive impact on my personal education.

Bibliography:

1) https://en.cppreference.com/w/cpp/container/vector;
2) https://www.geeksforgeeks.org/c-plus-plus/;
3) https://en.cppreference.com/w/cpp/language/goto;
4) https://www.geeksforgeeks.org/vector-in-cpp-stl/;
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6) https://www.geeksforgeeks.org/selection-sort/;
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