ФЕДЕРАЛЬНОЕ ГОСУДАРСТВЕННОЕ АВТОНОМНОЕ ОБРАЗОВАТЕЛЬНОЕ УЧРЕЖДЕНИЕ ВЫСШЕГО ОБРАЗОВАНИЯ
САНКТ-ПЕТЕРБУРГСКИЙ НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ УНИВЕРСИТЕТ ИНФОРМАЦИОННЫХ ТЕХНОЛОГИЙ, МЕХАНИКИ И ОПТИКИ

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ЛАБОРАТОРНАЯ РАБОТА № _3_

ПО ДИСЦИПЛИНЕ «Система языкового программирования»

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9.1.16 Assignment: Scalar Product

The solution should consist of

- Two global arrays of int of the same size.
- A function to compute the scalar product of two given arrays.
- A main function which calls the product computations and outputs its results.

9.1.17 Assignment: Prime Number Checker

You have to write a function to test the number for primarity. The interesting thing is that the number will be of the type unsigned long and that it will be read from stdin.

- You have to write a function int is_prime(unsigned long n), which checks whether n is a prime number or not. If it is the case, the function will return 1; otherwise 0.
- The main function will read an unsigned long number and call is_prime function on it. Then, depending on its result, it will output either yes or no.

Read man scanf and use scanf function with the format specifier %lu. Remember, is_prime accepts unsigned long, which is not the same thing as unsigned int!

Scalar Product

```
#include <stdio.h>

#define MAXN 20

int arr1[MAXN];
int arr2[MAXN];
int n;
void input(){
   scanf("%d",&n);
   for(int i=0; i < n*2 ; i++){
      if (i<n) scanf("%d",&arr1[i]);
      else scanf("%d",&arr2[i-n]);
   }
}

long scalarPro(int* arr1, int* arr2){
   long res=0;
   for(int i =0;i<n;i++){
      res+= (long)arr1[i] * (long)arr2[i];
   }
   return res;
}

int main(int argc, char** argv){
   input();
   printf("The scalar product is %d\n"
,scalarPro(arr1,arr2));
   return 0;
}
```

Prime Number Checker

```
#include <stdio.h>

unsigned long n ;

void input(){
   scanf("%lu",&n);
}

int is_prime(unsigned long n){
   if (n<2) return 0;
   if (n<4) return 1;
   if (n%2==0 || n%3==0) return 0;
   size_t i = 5;
   size_t w = 2;
   while (i*i<=n){
      if (n%i == 0) return 0;

      i+=w;
      w= 6-w;
   }
   return 1;
}

int main(int argc, char** argv){
   input();
   if (is_prime(n) == 0) printf("NO");
   else printf("YES");
   return 0;
}
```