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БЕЛОРУССКИЙ ГОСУДАРСТВЕННЫЙ УНИВЕРСИТЕТ
ИНФОРМАТИКИ И РАДИОЭЛЕКТРОНИКИ

Факультет компьютерных систем и сетей

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Лабораторная работа № 3
«Одномерные массивы»

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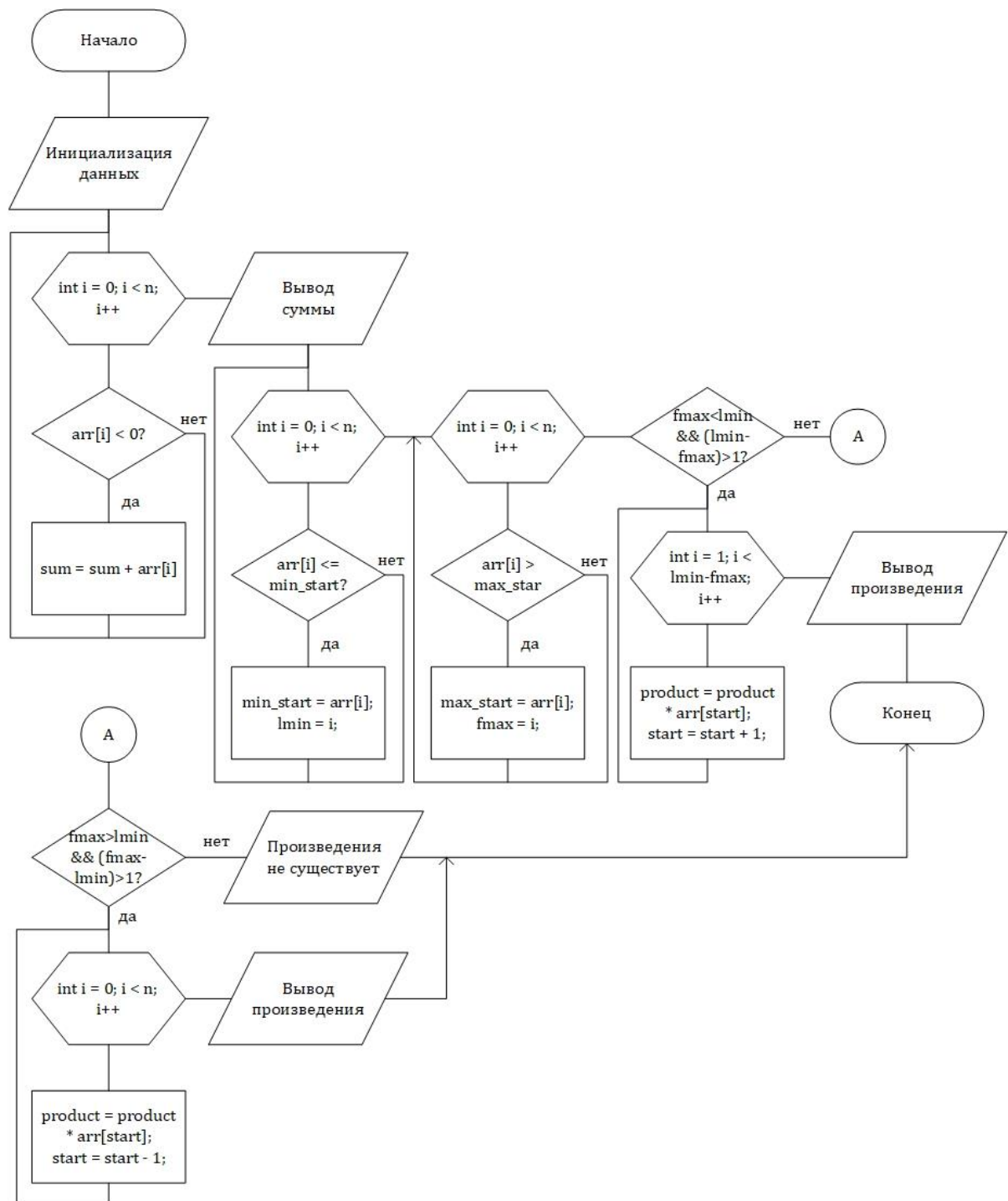
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Задача 1

1. В одномерном массиве, состоящем из n вещественных элементов, вычислить:

- сумму отрицательных элементов массива;
- произведение элементов массива, расположенных между максимальным и минимальным элементами.

Блок-схема:



Код программы:

```
void task1()
{
    double arr[100];
    int n, vvod;
    srand((unsigned int)time(NULL));
    printf(" Task 1:\n");
    printf(" -----
-----\n ");
    printf(" In a one-dimensional array consisting of n real
elements, calculate:\n");
    printf(" - the sum of the negative elements of the
array;\n");
    printf(" - the product of the array elements located
between\n");
    printf(" the maximum and minimum elements.\n");
    printf(" -----
-----\n");
    printf(" Enter the number n (from 1 to 100) of elements in
the array,\n");
    printf(" or enter '0' to initialize the number randomly: ");
    while (1)
    {
        int numread = scanf_s("%i", &n);
        char nextchar = getchar();
        if (numread == 1 && (n <=100 && n >= 0) && (nextchar ==
'\n' || nextchar == ' '))
            break;
        if (nextchar != '\n')
        {
            while (getchar() != '\n')
                continue;
        }
        printf(" Incorrect input, try again\n");
    }
    if (n == 0)
    {
        n = rand() % 100 + 1;
    }
    printf(" n = %i\n", n);
    printf(" -----
-----\n");
    printf(" '1' if you want to enter the array by yourself\n");
    printf(" '0' if you want to initialize the array
randomly\n");
    printf(" Select the action: ");
    while (1) //проверка на ввод только 1 или 0
    {
        int numread = scanf_s("%i", &vvod);
        char nextchar = getchar();
```

```

        if (numread == 1 && (vvod == 1 || vvod == 0) &&
(nextchar == '\n' || nextchar == ' '))
            break;
        if (nextchar != '\n')
        {
            while (getchar() != '\n')
                continue;
        }
        printf(" Incorrect input, try again\n");
    }
    printf(" -----
-----\n");
    if (vvod == 1)    //ВВОД МАССИВА ПОЛЬЗОВАТЕЛЕМ
    {
        printf(" Enter the elements of the array:\n");
        for (int i = 0; i < n; i++)
        {
            printf(" %i element: ", i+1);
            while (1)    //проверка ввода пользователем
            {
                int numread = scanf_s("%lf", &arr[i]);
                char nextchar = getchar();
                if (numread == 1 && (nextchar == '\n' ||
nextchar == ' '))
                    break;
                if (nextchar != '\n')
                {
                    while (getchar() != '\n')
                        continue;
                }
                printf(" Incorrect input, try again\n");
                printf(" %i element: ", i+1);
            }
        }
        printf(" -----
-----\n");
    }
    else    //инициализация случайным образом
    {
        for (int i = 0; i < n; i++)
        {
            arr[i] = (double) rand()/RAND_MAX * 20 - 10;
        }
        printf(" The elements of the array:\n");    //ВЫВОД ВСЕХ
элементов массива на экран
        for (int i = 0; i < n; i++)
        {
            printf(" %i element = %.3lf\n", i+1, arr[i]);
        }
        printf(" -----
-----\n");
    }
}

```

```

double sum = 0;
for (int i = 0; i < n; i++)
{
    if (arr[i] < 0)
        sum = sum + arr[i];
}
printf(" The sum of the negative elements of the array is
%.3lf\n", sum);
printf(" -----
-----\n");
int lmin=0;
double min_start = arr[0];
for (int i = 0; i < n; i++) //находим последний минимум
{
    if (arr[i] <= min_start)
    {
        min_start = arr[i];
        lmin = i;
    }
}
int fmax = 0;
double max_start = arr[0];
for (int i = 0; i < n; i++) //находим первый максимум
{
    if (arr[i] > max_start)
    {
        max_start = arr[i];
        fmax = i;
    }
}
printf(" First maximum element is %d element: %.3f\n",
fmax+1, arr[fmax]);
printf(" Last minimum element is %d element: %.3f\n",
lmin+1, arr[lmin]);
printf("\n");
double product = 1;
if (fmax<lmin && (lmin-fmax)>1)
{
    int start = fmax + 1;
    for (int i = 1; i < lmin-fmax; i++)
    {
        printf(" %.3f * %.3f = ", product, arr[start]);
        product = product * arr[start];
        printf("%.3f\n", product);
        start = start + 1;
    }
    printf("\n The product of the array elements located
between the maximum\n and minimum elements is: %.3f\n",
product);
}
else if (fmax>lmin && (fmax-lmin)>1)
{


```

```

int start = fmax - 1;
for (int i = 1; i < fmax-lmin; i++)
{
    printf(" %.3f * %.3f = ", product, arr[start]);
    product = product * arr[start];
    printf("%.3f\n", product);
    start = start - 1;
}
printf("\n The product of the array elements located
between the maximum\n and minimum elements is: %.3lf\n",
product);
}
else
{
    printf(" There are no elements between the first maximum
and\n the last minimum elements\n");
}
printf(" -----
-----\n ");
}

```

Вывод программы:

 D:\vs\LAB_3\Debug\LAB_3.exe

Task 1:

In a one-dimensional array consisting of n real elements, calculate:

- the sum of the negative elements of the array;
- the product of the array elements located between the maximum and minimum elements.

Enter the number n (from 1 to 100) of elements in the array,
or enter '0' to initialize the number randomly: 5
n = 5

'1' if you want to enter the array by yourself
'0' if you want to initialize the array randomly
Select the action: 0

The elements of the array:

1 element = -6.749
2 element = -6.250
3 element = 5.193
4 element = -9.764
5 element = -7.588

The sum of the negative elements of the array is -30.351

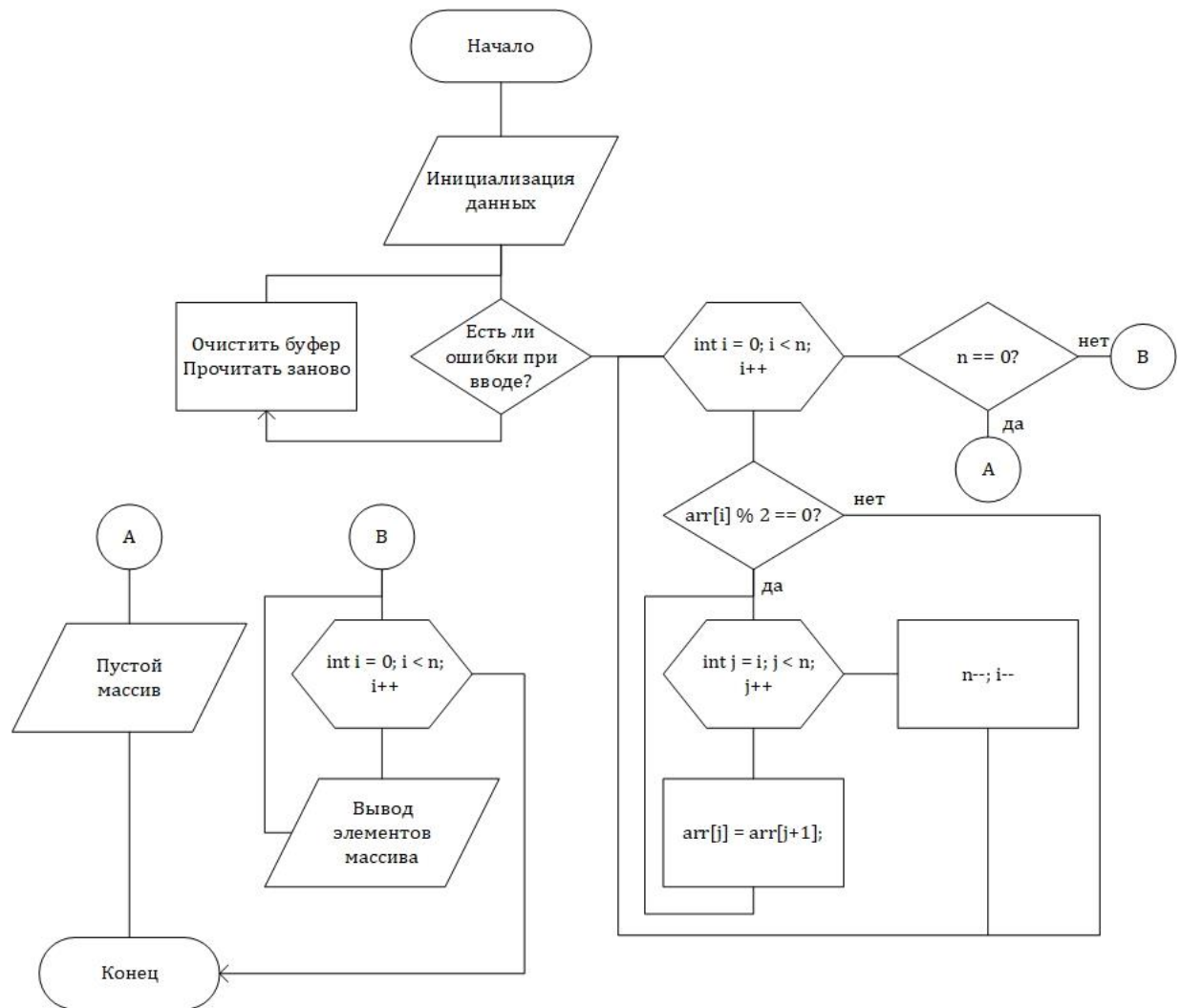
First maximum element is 3 element: 5.193
Last minimum element is 4 element: -9.764

There are no elements between the first maximum and
the last minimum elements

Задача 2

1. В массиве из n элементов удалить все четные элементы

Блок-схема:



Код программы:

```
void task2 ()
{
    int arr[100];
    int n, vvod;
    srand((unsigned int)time(NULL));
    printf(" Task 2:\n");
    printf(" -----
    -----\n ");
    printf(" In an array of n elements, delete all even
elements.\n");
    printf(" -----
    -----\n");
    printf(" Enter the number n (from 1 to 100) of elements in
the array,\n");
    printf(" or enter '0' to initialize the number randomly: ");
    while (1)
    {
        int numread = scanf_s("%i", &n);
```

```

        char nextchar = getchar();
        if (numread == 1 && (n <= 100 && n >= 0) && (nextchar ==
'\n' || nextchar == ' '))
            break;
        if (nextchar != '\n')
        {
            while (getchar() != '\n')
                continue;
        }
        printf(" Incorrect input, try again\n");
    }
    if (n == 0)
    {
        n = rand() % 100 + 1;
    }
    printf(" n = %i\n", n);
    printf(" -----
-----\n");
    printf(" '1' if you want to enter the array by yourself\n");
    printf(" '0' if you want to initialize the array
randomly\n");
    printf(" Select the action: ");
    while (1)    //проверка на ввод только 1 или 0
    {
        int numread = scanf_s("%i", &vvod);
        char nextchar = getchar();
        if (numread == 1 && (vvod == 1 || vvod == 0) &&
(nextchar == '\n' || nextchar == ' '))
            break;
        if (nextchar != '\n')
        {
            while (getchar() != '\n')
                continue;
        }
        printf(" Incorrect input, try again\n");
    }
    printf(" -----
-----\n");
    if (vvod == 1)    //ввод массива пользователем
    {
        printf(" Enter the elements of the array:\n");
        for (int i = 0; i < n; i++)
        {
            printf(" %i element: ", i + 1);
            while (1)    //проверка ввода пользователем
            {
                int numread = scanf_s("%i", &arr[i]);
                char nextchar = getchar();
                if (numread == 1 && (nextchar == '\n' ||
nextchar == ' '))
                    break;
                if (nextchar != '\n')

```




```

        {
            while (getchar() != '\n')
                continue;
        }
        printf(" Incorrect input, try again\n");
        printf(" %i element: ", i + 1);
    }
}
printf(" -----
-----\n");
}
else //инициализация случайным образом
{
    for (int i = 0; i < n; i++)
    {
        arr[i] = rand() % 201 - 100;
    }
}
printf(" The elements of the array:\n"); //Вывод всех
элементов массива на экран
for (int i = 0; i < n; i++)
{
    printf(" %i element = %i\n", i + 1, arr[i]);
}
printf(" -----
-----\n");
for (int i = 0; i < n; i++)
{
    if (arr[i] % 2 == 0)
    {
        for (int j = i; j < n; j++)
        {
            arr[j] = arr[j+1];
        }
        n--;
        i--;
    }
}
printf(" New array:\n");
if (n == 0)
{
    printf(" An empty array.\n");
}
else
{
    for (int i = 0; i < n; i++){
        printf(" %i element = %i\n", i + 1, arr[i]);
    }
}
printf(" -----
-----\n");}

```

Вывод программы:

 D:\vs\LAB_3\x64\Debug\LAB_3.exe

Task 2:

In an array of n elements, delete all even elements.

Enter the number n (from 1 to 100) of elements in the array,
or enter '0' to initialize the number randomly: 6

n = 6

'1' if you want to enter the array by yourself
'0' if you want to initialize the array randomly
Select the action: 0

The elements of the array:

1 element = -87
2 element = 62
3 element = 31
4 element = -66
5 element = 70
6 element = -59

New array:

1 element = -87
2 element = 31
3 element = -59

Задача 3

1. Дан массив A размера n, не содержащий нулевых элементов. Необходимо получить массив A, в которой вначале идут положительные элементы, а затем отрицательные. Дополнительные массивы не использовать.

Код программы:

```
void task3()
{
    int arr[100];
    int n, vvod;
    srand((unsigned int)time(NULL));
    printf(" Task 3:\n");
    printf(" -----  
-----\n");
    printf(" Given an array A of size n that does not contain  
zero elements. It is\n");
    printf(" necessary to get an array A, in which there are  
positive elements\n");
    printf(" first, and then negative ones. Do not use  
additional arrays.\n");
    printf(" -----  
-----\n");
    printf(" Enter the number n (from 1 to 99) of elements in  
the array,\n");
    printf(" or enter '0' to initialize the number randomly: ");
    while (1)
```

```

{
    int numread = scanf_s("%i", &n);
    char nextchar = getchar();
    if (numread == 1 && (n <= 99 && n >= 0) && (nextchar ==
'\n' || nextchar == ' '))
        break;
    if (nextchar != '\n')
    {
        while (getchar() != '\n')
            continue;
    }
    printf(" Incorrect input, try again\n");
}
if (n == 0)
    n = rand() % 99 + 1;
printf(" n = %i\n", n);
printf(" -----
-----\n");
printf(" '1' if you want to enter the array by yourself\n");
printf(" '0' if you want to initialize the array
randomly\n");
printf(" Select the action: ");
while (1)    //проверка на ввод только 1 или 0
{
    int numread = scanf_s("%i", &vvod);
    char nextchar = getchar();
    if (numread == 1 && (vvod == 1 || vvod == 0) &&
(nextchar == '\n' || nextchar == ' '))
        break;
    if (nextchar != '\n')
    {
        while (getchar() != '\n')
            continue;
    }
    printf(" Incorrect input, try again\n");
}
printf(" -----
-----\n");
if (vvod == 1)    //ВВОД массива пользователем
{
    printf(" Enter the elements of the array:\n");
    for (int i = 0; i < n; i++)
    {
        printf(" %i element: ", i + 1);
        while (1)    //проверка ввода пользователем
        {
            int numread = scanf_s("%i", &arr[i]);
            char nextchar = getchar();
            if (numread == 1 && arr[i] != 0 && (nextchar ==
'\n' || nextchar == ' '))
                break;
            if (nextchar != '\n')

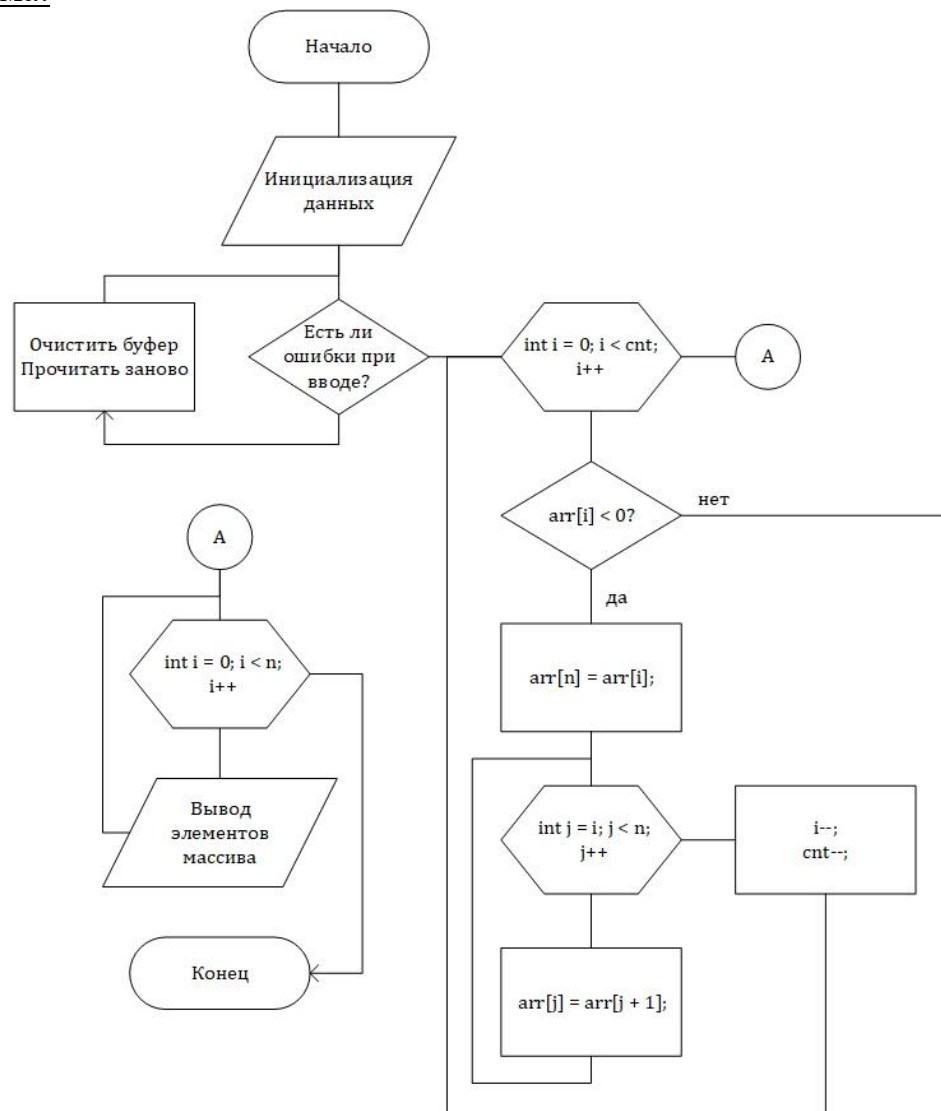
```

```

        {
            while (getchar() != '\n')
                continue;
        }
        printf(" Incorrect input, try again\n");
        printf(" %i element: ", i + 1);
    }
}
printf(" -----
-----\n");
}
else //инициализация случайным образом от -100 до 100 НЕ
включая 0
{
    for (int i = 0; i < n; i++)
    {
        arr[i] = -100 + 101 * ((rand() % 2)) + rand() % 100;
    }
    printf(" The elements of the array:\n"); //Вывод всех
элементов массива на экран
    for (int i = 0; i < n; i++)
    {
        printf(" %i element = %i\n", i + 1, arr[i]);
    }
    printf(" -----
-----\n");
    int cnt=n;
    for (int i = 0; i < cnt; i++)
    {
        if (arr[i] < 0)
        {
            arr[n] = arr[i];
            for (int j = i; j < n; j++)
            {
                arr[j] = arr[j + 1];
            }
            i--;
            cnt--;
        }
    }
    printf(" New array:\n");
    for (int i = 0; i < n; i++)
    {
        printf(" %i element = %i\n", i + 1, arr[i]);
    }
    printf(" -----
-----\n");
}

```

Блок-схема:



Вывод программы:

D:\vs\LAB_3\x64\Debug\LAB_3.exe

Task 3:

Given an array A of size n that does not contain zero elements. It is necessary to get an array A, in which there are positive elements first, and then negative ones. Do not use additional arrays.

Enter the number n (from 1 to 99) of elements in the array,
or enter '0' to initialize the number randomly: 4
n = 4

'1' if you want to enter the array by yourself
'0' if you want to initialize the array randomly
Select the action: 0

The elements of the array:

1 element = 54
2 element = -62
3 element = 47
4 element = -38

New array:

1 element = 54
2 element = 47
3 element = -62
4 element = -38