

**МІНІСТЕРСТВО ОСВІТИ ТА НАУКИ УКРАЇНИ**  
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**Звіт з лабораторної роботи 2.5**

**Тема: «Пошук даних»**

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## 1.Алгоритм послідовного пошуку.

Код програми:

```
#include <iostream>
#include <algorithm>
#include <vector>
using namespace std;

void Print(vector<int> arr) {
    for(int i = 0; i < arr.size(); ++i) cout << arr[i] << '\t';
    cout << endl;
}

int Linear(vector<int> arr, int el, int& ch)
{
    for(int i = 0; i < arr.size(); ++i) {
        ch++;
        if(arr[i] == el) return i; }
    return -1; }

int main() {
    int size, mode, ch = 0, el;
    cout << "Enter size of array: "; cin >>
size;
    vector<int>
arr(size);
    cout << "0. Random fill\n"
        "1. Manualfill\n"
        "Choose mode: "; cin >> mode;
    switch(mode) {
        case 0: for(int i = 0 ;i < size; ++i) arr[i] = rand()%100;
            cout << "Generated array: ";
            sort(begin(arr), end(arr));
            Print(arr);
            break;
        case 1: cout << "Enter array: ";
            for(int i = 0; i < size; ++i)
                cin >> arr[i];
            break;
        default: break; }
    cout << "Enter item to search: ";
    cin >> el;
    int ind = Linear(arr, el, ch);
    cout << "Key: " << ind << endl;
    cout << "Comparison: " << ch;
    return 0;
}
```

```
Enter size of array: 10
0. Random fill
1. Manualfill
Choose mode: 0
Generated array: 7 9 23 30 44 49 58 72 73 78
Enter item to search: 2
Key: -1
Comparison: 10
Process finished with exit code 0
|
```

```
Enter size of array: 10
0. Random fill
1. Manualfill
Choose mode: 0
Generated array: 7 9 23 30 44 49 58 72 73 78
Enter item to search: 58
Key: 6
Comparison: 7
Process finished with exit code 0
|
```

## 2.Алгоритм бінарного пошуку.

Код програми :

```
#include <iostream>
#include <vector>
#include <cmath>
#include <algorithm>
using namespace std;

void Print(vector<int> arr)
{
    for(int i : arr)
        cout << i << " ";
    cout << endl;
}

int Binary(vector<int>& arr, int beg, int end, int el, int& ch)
{
    ch++;
```

```

    if (end < beg) return -1;
    int med = floor(beg + (end - beg) / 2);
    if (el == arr[med]){
        return med;}
    else if (el < arr[med]){
        Binary(arr, beg, med - 1, el, ch);}
    else if (el > arr[med]){
        Binary(arr, med + 1, end, el, ch);}
    }
}
int main() {
    int size, mode, ch = 0, el;
    cout << "Enter size of array: "; cin >> size;
    vector<int> arr(size);
    cout << "1. Random fill\n"
            "2. Manual fill\n"
            "Choose mode: ";
    cin >> mode;
    switch(mode) {
        case 1: for(int i = 0; i < size; ++i) arr[i] = rand()%100;
                cout << "Generated array: ";
                sort(begin(arr), end(arr));
                Print(arr);
                break;
        case 2: cout << "Enter array: ";
                for(int i = 0; i < size; ++i) cin >> arr[i];
                break; default: break;
    }
    cout << "Enter item to search: ";
    cin >> el;
    int ind = Binary(arr, 0, arr.size()-1, el, ch);
    cout << "Key: " << ind << endl;
    cout << "Compares: " << ch;
    return 0;
}

```

Вивід на екран :

```

Enter size of array: 10
1. Random fill
2. Manual fill
Choose mode: 1
Generated array: 7 9 23 30 44 49 58 72 73 78
Enter item to search: 58
Key: 7
Compares: 2Program ended with exit code: 0

```

```

Enter size of array: 10
1. Random fill
2. Manual fill
Choose mode: 1
Generated array: 7 9 23 30 44 49 58 72 73 78
Enter item to search: 3
Key: -1
Compares: 5Program ended with exit code: 0|

```

### 3.Алгоритм прямого пошуку у рядку

#### Код програми :

```
#include <iostream>
#include <string>
using namespace std;

int Straight(string source, string phrase, int& check)
{
    int c = 0, match = 0;
    for(int i = 0; i < source.size() - phrase.size(); ++i)
    {
        match = 0;
        for(int j = 0; j < phrase.size(); ++j)
        {
            check++;
            if(source[i + j] == phrase[j]) match++;
            else break;
        }
        if (match == phrase.size()) c++;
    }
    return c;
}

int main() {
    string source, phrase;
    int check = 0;
    cout << "Enter text: ";
    getline(cin, source);
    cout << "Enter text to search: ";
    getline(cin, phrase);
    cout << "Number of phrases in the source string: " << Straight(source, phrase, check) << endl;
    cout << "Comparison: " << check << "\n";
    return 0;
}
```

#### Вивід на екран :

```
Enter text: how is it going
Enter text to search: it
Number of phrases in the source string: 1
Comparison: 16
Program ended with exit code: 0|
```

```
Enter text: i don't know what am i doing
Enter text to search: cow
Number of phrases in the source string: 0
Comparison: 25
Program ended with exit code: 0|
```