

## LAB: SEARCHING (Page 147 & 148)

Given the Program 6.4, type and run the program to perform the tasks given below.

```
// Program 6.4
#include <iostream>
using namespace std;

int SequentialSearch(int [], int, int);

void main()
{
    int num[100];
    int k, target, j;
    char ans = 'y';

    cout << "Please enter size of the array:";
    cin >> k;
    for (int i = 0; i < k; i++)
    {
        cout << "num[" << i << "]=";
        cin >> num[i];
    }

    do {
        cout << "\nEnter the search key :";
        cin >> target;
        j = SequentialSearch(num, k, target);
        if (j == -1)
            cout << "Failed" << endl;
        else
            cout << "Found at num[" << j << "]\n";
            cout << "Find another number?:";
            cin >> ans;
    } while (ans == 'y');
}

int SequentialSearch(int a[], int n, int target)
{
    int i;
    for (i = 0; i < n; i++)
        if (a[i] == target)
            return i;
    return -1;
}
```

- a. Read the input for **num** array which has the following 10 unsorted numbers:

	[0]	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
num	8	4	10	5	20	4	15	23	12	11

Figure 6.8 Unsorted data.

- b. Perform searching with the following key values: **5, 4, and 25**.  
c. What are the output be when performing a search for the values?

Refer to the given Program 6.4 in Lab 1, replace the **SequentialSearch()** function with **BinarySearch()** function as in Program 6.5.

```
// Program 6.5
int BinarySearch(int a[], int n, int target)
{
    int first = 0;
    int last = n - 1;
    int mid;
    while (first <= last)
    {
        mid = (first + last) / 2;
        if (target == a[mid])
            return mid;
        else if (target < a[mid])
        {
            last = mid - 1;
            cout << "Middle value: " << mid <<
                "\tfirst:" << first << "\tlast:"
                << last << endl;
        }
        else
        {
            first = mid + 1;
            cout << "Middle value: " << mid <<
                "\tfirst:" << first << "\tlast:"
                << last << endl;
        }
    }
    return -1;
}
```

Based on the program in Program 6.4 and the function in Program 6.5, perform the following tasks:

- a. Read num array input with the following 10 ascending numbers:

	[0]	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
num	2	5	6	8	10	12	15	16	20	21

Figure 6.9 Sorted data for **num** array.

- b. Perform searching with key values **5**, **20** and **25**. What will be the output?