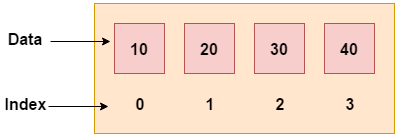
C++ Arrays

Like other programming languages, array in C++ is a group of similar types of elements that have contiguous memory location.

In C++ std::array is a container that encapsulates fixed size arrays. In C++, array index starts from 0. We can store only fixed set of elements in C++ array.

A collection of related data items stored in adjacent memory places is referred to as an array in the C/C++ programming language or any other programming language for that matter. Elements of an array can be accessed arbitrarily using its indices. They can be used to store a collection of any type of primitive data type, including int, float, double, char, etc. An array in C/C++ can also store derived data types like structures, pointers, and other data types, which is an addition. The array representation in a picture is provided below.



Advantages of C++ Array

* Code Optimization (less code)
* Random Access
* Easy to traverse data
* Easy to manipulate data
* Easy to sort data etc.

Disadvantages of C++ Array

* Fixed size

C++ Array Types

There are 2 types of arrays in C++ programming:

1. Single Dimensional Array
2. Multidimensional Array

C++ Single Dimensional Array

Let's see a simple example of C++ array, where we are going to create, initialize and traverse array.

1. #include <iostream>
2. using namespace std;
3. int main()
4. {
5. int arr[5]={10, 0, 20, 0, 30};  //creating and initializing array
6. //traversing array
7. for (int i = 0; i < 5; i++)
8. {
9. cout<<arr[i]<<"\n";
10. }
11. }

Output:

10

0

20

0

30

C++ Array Example: Traversal using foreach loop

We can also traverse the array elements using foreach loop. It returns array element one by one.

1. #include <iostream>
2. using namespace std;
3. int main()
4. {
5. int arr[5]={10, 0, 20, 0, 30}; //creating and initializing array
6. //traversing array
7. for (int i: arr)
8. {
9. cout<<i<<"\n";
10. }
11. }

Output:

10

20

30

40

50

Why do we need arrays?

With a limited number of objects, we can use regular variables (v1, v2, v3,..), but when we need to hold many instances, managing them with normal variables becomes challenging. To represent numerous instances in one variable, we use an array.

What happens if we try to access out of bound array?

The array's elements will be numbered 0 through 9 if we define an array of size 10.

We will have Undefined Behaviour if we attempt to access an element at an index higher than 10, though.

C++ array with empty members

The maximum number of elements that can be stored in an array in C++ is n. What will happen, though, if we store fewer than n elements?

For example,

1. // store only 3 elements in the array
2. int x[6] = {19, 10, 8};

The array x in this case is 6 elements wide. But we've only given it a three-element initialization.

When that happens, the compiler fills in the empty spaces with random values. This random value frequently appears as 0.

Important things to remember while using arrays in C++

1. The array's indexes begin at 0. Meaning that the first item saved at index 0 is x[0].
2. The final element of an array with size n is kept at index (n-1). This example's final element is x[5].
3. An array's elements have sequential addresses. Consider the scenario where x[0beginning ]'s address is 2120.

The address of the subsequent element, x[1], will then be 2124, followed by x[2], 2128, and so forth.

Each element in this case has a four-fold increase in size. This is due to the fact that int has a 4 byte capacity.

What is two-dimensional array?

Each element in this kind of array is described by two indexes, the first of which denotes a row and the second of which denotes a column.

As you can see, the components are arranged in a two-dimensional array using rows and columns; there are I number of rows and j number of columns.

What is a multi-dimensional array?

A two-dimensional array is the most basic type of multidimensional array; it also qualifies as a multidimensional array. There are no restrictions on the array's dimensions.

How to insert it in array?

1. int mark[5] = {19, 10, 8, 17, 9}
2. // change 4th element to 9
3. mark[3] = 9;
4. // take input from the user
5. // store the value at third position
6. cin >> mark[2];
7. // take input from the user
8. // insert at ith position
9. cin >> mark[i-1];
11. // print first element of the array
12. cout << mark[0];
13. // print ith element of the array
14. cout >> mark[i-1];

How to display the sum and average of array elements?

1. #include <iostream>
2. using namespace std;
3. int main() {
4. // initialize an array without specifying the size
5. double numbers[] = {7, 5, 6, 12, 35, 27};
6. double sum = 0;
7. double count = 0;
8. double average;
9. cout << "The numbers are: ";
10. //  print array elements
11. // use of range-based for loop
12. for (const double &n : numbers) {
13. cout << n << "  ";
14. //  calculate the sum
15. sum += n;
16. // count the no. of array elements
17. ++count;
18. }
19. // print the sum
20. cout << "\nTheir Sum = " << sum << endl;
21. // find the average
22. average = sum / count;
23. cout << "Their Average = " << average << endl;
25. return 0;
26. }

Output:

The numbers are: 7 5 6 12 35 27

Their Sum = 92

Their Average = 15.3333

How to display array elements?

1. #include <iostream>
2. using namespace std;
3. int main() {
4. int numbers[5] = {7, 5, 6, 12, 35};
5. cout << "The numbers are: ";
6. //  Printing array elements
7. // using range-based for loop
8. for (const int &n : numbers) {
9. cout << n << "  ";
10. }
11. cout << "\nThe numbers are: ";
12. //  Printing array elements
13. // using traditional for loop
14. for (int i = 0; i < 5; ++i) {
15. cout << numbers[i] << "  ";
16. }
17. return 0;
18. }

Output:

The numbers are: 7 5 6 12 35

The numbers are: 7 5 6 12 35

**Stack overflow**

[How to find factors of each number in an array](https://stackoverflow.com/questions/54712363/how-to-find-factors-of-each-number-in-an-array)

[Ask Question](https://stackoverflow.com/questions/ask)

Asked 4 years, 4 months ago

Modified [4 years, 4 months ago](https://stackoverflow.com/questions/54712363/how-to-find-factors-of-each-number-in-an-array?lastactivity)

Viewed 3k times

1

I have an array of numbers input by the user, the program then sorts it in ascending order. I just need to find a way to get the factors of each number in the array and have it be printed out

#include "stdafx.h"

#include <iostream>

#include <limits>

#define MAX 200

using namespace std;

int arr[MAX];

int n, i, j, k;

int temp;

int main()

{

//array declaration

int arr[MAX];

int n, i, j;

int temp;

//read total number of elements to read

cout << "Enter total number of numbers to read: ";

cin >> n;

//check bound

if (n<0 || n>MAX)

{

cout << "Input valid range!!!" << endl;

return -1;

}

//read n elements

for (i = 0; i < n; i++)

{

cout << "Enter element [" << i + 1 << "] ";

cin >> arr[i];

cout << endl;

}

//print input elements

cout << "Unsorted Array elements:" << endl;

for (i = 0; i < n; i++)

cout << arr[i] << "\t";

cout << endl;

//sorting - ASCENDING ORDER

for (i = 0; i<n; i++)

{

for (j = i + 1; j < n; j++)

{

if (arr[i]>arr[j])

{

temp = arr[i];

arr[i] = arr[j];

arr[j] = temp;

}

}

}

//print sorted array elements

cout << endl;

cout << "Sorted (Ascending Order) Array elements:" << endl;

for (i = 0; i < n; i++)

cout << arr[i] << "\t";

cout << endl <<endl;

//trying to find factors

cout << "Factors of " << arr[i] << " are: " << endl;

for (k = 1; k <= arr[i]; ++i)

{

if (arr[i] % k == 0)

cout << k << endl;

}

system ("pause")

return 0;

}

I want it to print each number from the array with "The factors of (number) are ...' "The factors of (next number) are ..."

and so on

* [c++](https://stackoverflow.com/questions/tagged/c%2b%2b)

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asked Feb 15, 2019 at 15:25

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[Toni Oluwole](https://stackoverflow.com/users/11034508/toni-oluwole)

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* After the last } is system ("pause"); then return 0;

– [Toni Oluwole](https://stackoverflow.com/users/11034508/toni-oluwole)

[Feb 15, 2019 at 15:26](https://stackoverflow.com/questions/54712363/how-to-find-factors-of-each-number-in-an-array#comment96210353_54712363)

* 2

1) "*After the last } is system ("pause"); then return 0;*" You can [edit](https://stackoverflow.com/posts/54712363/edit) your question, to include such details. 2) Shouldn't if (arr[i] % k == 0) cout << i << endl; be if (arr[i] % k == 0) cout << k << endl;? Isn't it a typo?

– [Algirdas Preidžius](https://stackoverflow.com/users/5440453/algirdas-preid%c5%beius" \o "1,769 reputation)

[Feb 15, 2019 at 15:27](https://stackoverflow.com/questions/54712363/how-to-find-factors-of-each-number-in-an-array#comment96210376_54712363)

* Did you upload your full source code? I don’t see } for main function.

– [Loc Tran](https://stackoverflow.com/users/3344587/loc-tran)

[Feb 15, 2019 at 15:30](https://stackoverflow.com/questions/54712363/how-to-find-factors-of-each-number-in-an-array#comment96210505_54712363)

* And what is your issue now? Compiler error or incorrect output?

– [Loc Tran](https://stackoverflow.com/users/3344587/loc-tran)

[Feb 15, 2019 at 15:31](https://stackoverflow.com/questions/54712363/how-to-find-factors-of-each-number-in-an-array#comment96210563_54712363)

* @LocTran The full code is now in the question I just need to know how to do something, no issue.

– [Toni Oluwole](https://stackoverflow.com/users/11034508/toni-oluwole)

[Feb 15, 2019 at 15:36](https://stackoverflow.com/questions/54712363/how-to-find-factors-of-each-number-in-an-array#comment96210742_54712363)

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2 Answers

Sorted by:



2

The final for-loop should be loop with k and you forgot to increment k. You should also write i-loop:

//trying to find factors

for (i = 0; i < n; i++)

{

cout << "Factors of " << arr[i] << " are: " << endl;

for (k = 1; k <= arr[i]; ++k)

{

if (arr[i] % k == 0)

cout << k << endl;

}

}

In addition, as pointed out by @LocTran, the upper bound of outer loop should be n-1. Alternatively, you can easily sort arr using std::sort as follows:

std::sort(arr, arr+n);

Then your code would well work for you:

[**Live Demo**](https://wandbox.org/permlink/NDvSYP7TAEkJ8OhH)

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answered Feb 15, 2019 at 15:46

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[Hiroki](https://stackoverflow.com/users/10420039/hiroki)

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* 1

Thanks man! both of your answers were good! appreciate you taking the time

– [Toni Oluwole](https://stackoverflow.com/users/11034508/toni-oluwole)

[Feb 15, 2019 at 16:22](https://stackoverflow.com/questions/54712363/how-to-find-factors-of-each-number-in-an-array#comment96212293_54712706)

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1

There are some issues with your source code.

1> Sorting problem with for outer loop

//sorting - ASCENDING ORDER

for (i = 0; i < (n-1); i++)

{

for (j = i + 1; j < n; j++)

{

if (arr[i] > arr[j])

{

temp = arr[i];

arr[i] = arr[j];

arr[j] = temp;

}

}

}

The upper bound of outer loop should be (n-1), not n as following but maybe you're lucky you won't see the problem when n < MAX. In case of n == MAX you will see the problem

//sorting - ASCENDING ORDER

//for (i = 0; i < n; i++)

for (i = 0; i < (n-1); i++)

{

for (j = i + 1; j < n; j++)

{

if (arr[i] > arr[j])

{

temp = arr[i];

arr[i] = arr[j];

arr[j] = temp;

}

}

}

2> The print functionality for entire array, you should add the outer loop for index of your array, and change the i++ by k++ in your loop as well

//trying to find factors

cout << "Factors of " << arr[i] << " are: " << endl;

for (k = 1; k <= arr[i]; ++i)

{

if (arr[i] % k == 0)

cout << k << endl;

}

should be replaced by

//trying to find factors

for (i = 0; i < n; i++)

{

cout << "Factors of " << arr[i] << " are: " << endl;

//for (k = 1; k <= arr[i]; ++i)

for (k = 1; k <= arr[i]; ++k)

{

if (arr[i] % k == 0)

cout << k << endl;

}

}

Here is my solution based on modified source code

#include <iostream>

#include <limits>

#define MAX 200

using namespace std;

int arr[MAX];

int n, i, j, k;

int temp;

int main()

{

//array declaration

int arr[MAX];

int n, i, j;

int temp;

//read total number of elements to read

cout << "Enter total number of numbers to read: ";

cin >> n;

//check bound

//if (n<0 || n>MAX)

if (n<0 || n>MAX)

{

cout << "Input valid range!!!" << endl;

return -1;

}

//read n elements

for (i = 0; i < n; i++)

{

cout << "Enter element [" << i + 1 << "] ";

cin >> arr[i];

cout << endl;

}

//print input elements

cout << "Unsorted Array elements:" << endl;

for (i = 0; i < n; i++)

cout << arr[i] << "\t";

cout << endl;

//sorting - ASCENDING ORDER

//for (i = 0; i < n; i++)

for (i = 0; i < (n-1); i++)

{

for (j = i + 1; j < n; j++)

{

if (arr[i] > arr[j])

{

temp = arr[i];

arr[i] = arr[j];

arr[j] = temp;

}

}

}

//print sorted array elements

cout << endl;

cout << "Sorted (Ascending Order) Array elements:" << endl;

for (i = 0; i < n; i++)

cout << arr[i] << "\t";

cout << endl << endl;

//trying to find factors

for (i = 0; i < n; i++)

{

cout << "Factors of " << arr[i] << " are: " << endl;

//for (k = 1; k <= arr[i]; ++i)

for (k = 1; k <= arr[i]; ++k)

{

if (arr[i] % k == 0)

cout << k << endl;

}

}

return 0;

}