

Computer Programming

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Session: Arrays in C++





- Need to handle a large number of values
- Instead of many variables with different names, we need
 - A single name to represent a set of variables
 - Individual elements should be accessed using an index





- Array data structure in C++, and its properties
- Accessing elements of an array
 - Index expressions
- Example of use of arrays in a C++ program



- Array is a collection of elements of the same type
 - It has a name, chosen by us, and a fixed size (number of elements)
- Declaring an array

int marks[500], roll_numbers[500]; float distances[25];

- Only one element participates in an operation
 - Input or output
 - As an operand in an expression
 - As a location on LHS of an assignment statement



- Index expression is used to refer to an element
 - Written in square brackets [], immediately after the array name
 - the value of index expression is the actual reference.
- Thus when we use a[i]
 - if i is equal to 5 at that point, refers to 5th element
 - if i is equal to 123, 123rd element
- C++ array index starts with 0



	T
A[0]	
A[1]	
A[2]	
A[3]	
A[4]	
A[99]	

- Array A has 100 int elements int A[100];
- Suppose it stores 5 values

53, 79, 41, 94, 38

A[0] = 53 A[1] = 79 A[2] = 41 A[3] = 94 A[4] = 38



- Index can be any expression, which will be evaluated first, the resulting integer value is used to identify a particular element.
- An index expression must result in a value in the range 0 to size-1, where size is as declared in the definition
 - If not, the results are **unpredictable**



Index for the first element is 0, for next element it is 1, etc.
A[j], for j = 86 means 86th element
A[k-m+52], for k = 1200, m=1240
the index value evaluates to 12
A[x/5.0] for x = 7.0, expression evaluates to 1
for x = 22.5, it evaluates to 4

A program to find sum of marks of N students



```
int main(){
 // program to find the sum of N marks
 int marks[600], sum = 0, count, N;
 cin >> N;
 for (count =1; count <= N; count = count +1){
    cin >> marks[count]; sum = sum + marks[count];
 cout << sum;
return 0;
```



```
int main(){
 // program to find the sum of N marks
 int marks[600], sum = 0, count, N;
 cin >> N;
 for (count =0; count < N; count = count +1){
    cin >> marks[count]; sum = sum + marks[count];
 cout << sum;
return 0;
```



Program to find the value of largest element

```
int main(){
    int a[1000], max, N, i;
    cin >> N;
    for (i=0; i < N; i++) {cin >> a[i];}
    max = a[0];
    for (i=1; i < N; i++) {
       if (a[i] > max) \{ max = a[i]; \}
     cout << "maximum Value is "<< max << endl;
     return 0;
```





- We have learnt how to declare arrays in C++
 - Must declare its name and size. Size must be an integer value
- We have learnt how to use an array
 - Using an index expression
 - must evaluate to an integer value between 0 and size-1
- We can iterate over an index variable, to successively scan/process all elements of the array