Programming In C++

Course 2: Lecture 1, Arrays

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Arrays

- An array allows you to store and work with multiple values of the same data type.

- An array's size declarator must be a constant integer expression with a value greater than zero. It can be either a literal, as in the previous example, or a named constant, as shown in the following:

  const int NUM_DAYS = 6;

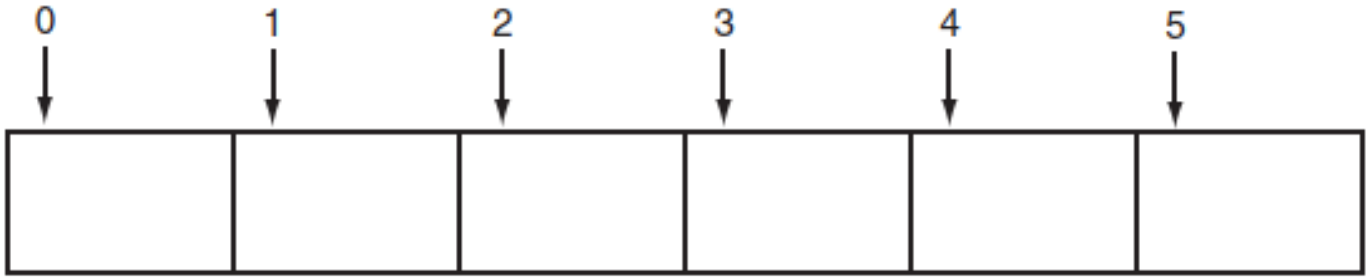
  int days[NUM_DAYS];

Or we can define an array directly: float temperatures[100];

Accessing arrays elements

Even though an entire array has only one name, the elements may be accessed and used as individual variables.

The first element is assigned the subscript 0, the second element is assigned 1, and so forth. The six elements in the array hours would have the subscripts 0 through 5.



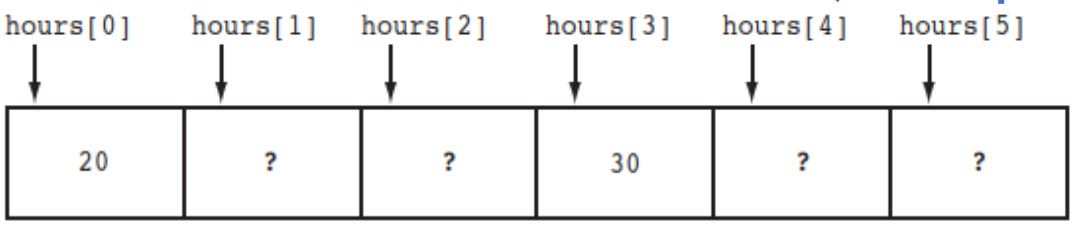
To get the value of the first element of the array, write the name of the array then the index which is zero. As seen in the following example.

Ex: X= arr[0]

Declarator and Subscript

int hours[6]; → size

subscript



The number inside the brackets of an array definition is the size declarator.

The number inside the brackets of an assignment statement or any statement that works with the contents of an array is a subscript.

Hours[0] = 20;

Inputting and Outputting Array Content

Three ways to assign values to arrays

1- cin by using loop
2- cin for each element
3- assign values directly during the declaration

1-
```
int arr [5];
for (i = 0 ; i < 5 ; i++)
  cin>>arr[i];
```

2-
```
int arr [5];
cin>>arr[0];
cin>>arr[1];
cin>>arr[2];
cin>>arr[3];
cin>>arr[4];
```

3-
```
int arr [5]={10,20,30,40,50};
```

Check points

Define the following arrays:

A) empNums, a 100-element array of ints

```
int empNums[100];
```

B) payRates, a 25-element array of floats

```
float payRates[25]
```

C) miles, a 14-element array of longs

```
long miles[14]
```

D) cityName, a 26-element array of string objects

```
string cityName[26];
```

E) lightYears, a 1,000-element array of doubles

```
double lightYears[1000]
```

Check point

What's wrong with the following array definitions?

int readings[-1];

The size negative number

float measurements[4.5];

The size here is float

int size;

string names[size];

The size variable is not constant

Check point

What is the output of the following code?

```
int values[5], count;
for (count = 0; count < 5; count++)
    values[count] = count + 1;

for (count = 0; count < 5; count++)
    cout << values[count] << endl;
```

The output is

1
2
3
4
5

Arrays

A program to read 1-D array with 10 elements. The program computes the average of the array.

```
1   #include <iostream>
2
3   using namespace std;
4
5   int main()
6   {
7       int arr[10],s=0,i;
8       for(i=0;i<10;i++)
9           cin>>arr[i];
10
11      for(i=0;i<10;i++)
12          s+=arr[i];
13
14      cout<<s/10.0;
15
16      return 0;
17  }
18
```

Arrays

A program to assign elements for 1-D array of 10 elements. The program creates two arrays: the first one involves even numbers. The second array includes odd numbers

```
3   using namespace std;
4
5   int main()
6   {
7      int arr[10]={40,60,55,54,88,99,33,22,32,11},i,j=0,k=0;
8      int evenarr[10],oddarr[10];
9      for(i=0;i<10;i++)
10        if(arr[i]%2==0)
11           evenarr[j++]=arr[i];
12        else
13           oddarr[k++]=arr[i];
14  cout<<"The even array elements are: ";
15     for(i=0;i<j;i++)
16        cout<<evenarr[i]<<" ";
17
18        cout<<endl;
19  cout<<"The odd array elements are: ";
20     for(i=0;i<k;i++)
21        cout<<oddarr[i]<<" ";
22     return 0;
23  }
24
```

Arrays

A program to assign elements for two 1-D arrays. The program combines these arrays into one array.

a

10	20	30	40

b

50	60	70

```
1  #include <iostream>
2  using namespace std;
3
4  int main()
5  {
6     int a[4]={10,20,30,40},i,j=0;
7     int b[3]={50,60,70},c[7];
8     for(i=0;i<4;i++)
9        c[j++]=a[i];
10
11       for(i=0;i<3;i++)
12       c[j++]=b[i];
13 cout<<"The output is: ";
14    for(i=0;i<j;i++)
15       cout<<c[i]<<" ";
16    return 0;
17 }
18
```

The output is

c

10	20	30	40	50	60	70

Arrays

HW1: program to combine two arrays in one array. The combining is done by placing the first element from the first array to be the first element in the output array. And, the first element of the second array will be the second element in the output array and so forth.

10	20	30	40

50	60	70

The output is

10	50	20	60	30	70	40

Hw2: program to reverse the element of an array.

The End