

CSC 201 CSC 150

C++ Programming

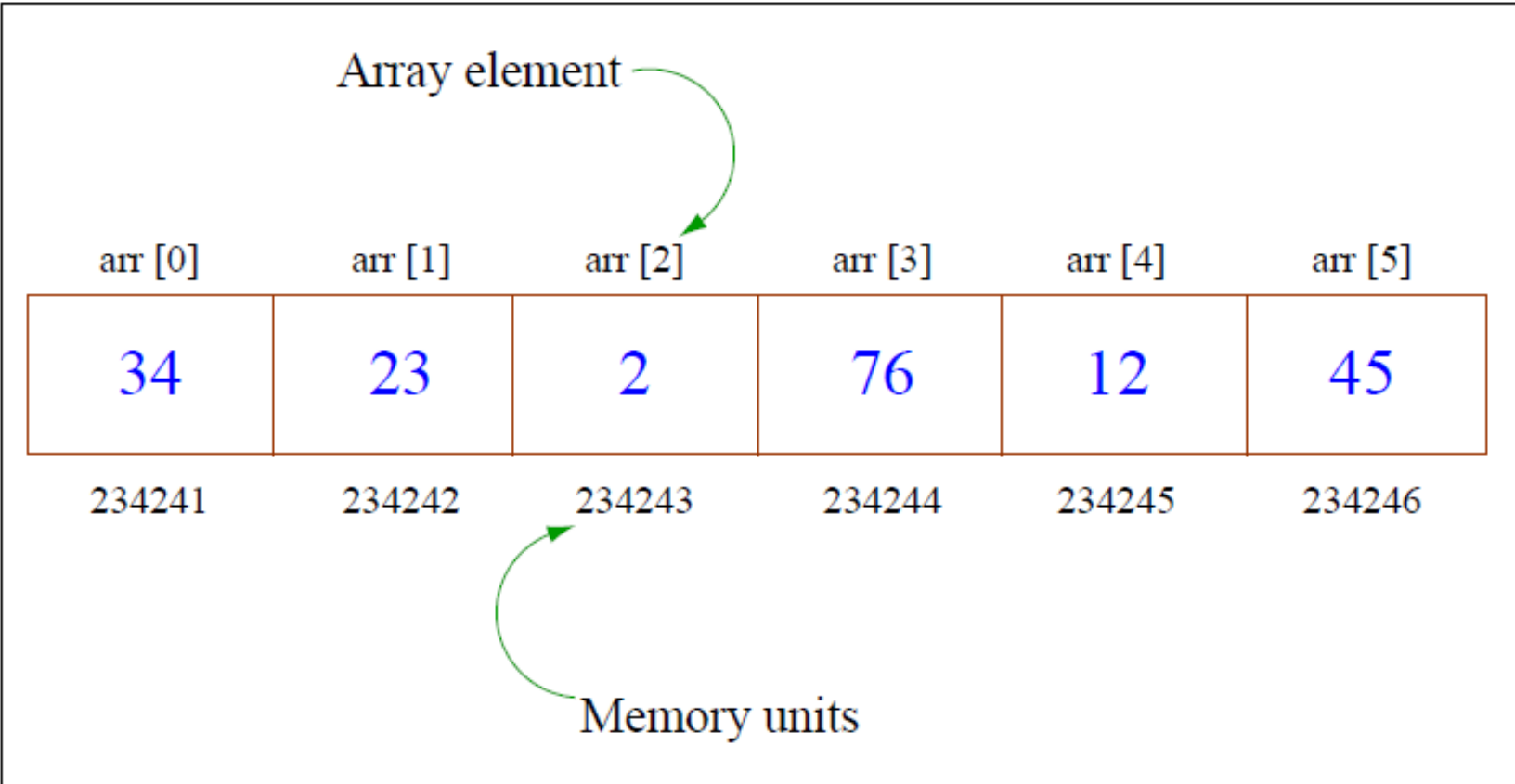
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Lecture 3: Arrays

- A collection of a fixed number of variables of the same type stored sequentially in the memory
- Element → an item in the array
- Dimension → size of the array



Declaring arrays in C++

- `type varName [size];`
- `int arr[10] ; char alphabet [26];`
- An array of the **int** datatype called '**arr**' composed of **10** elements

Initializing arrays

- Elements must be initialized before usage

- `int arr [5] = { 2, 43, 32, 34, 13 };`

- `char arr [] = { 'r', 'T', 'g', 'B' };`

- `char arr[50];`
`for (int i=0; i<50 ;i++)`
`arr[i] = ' ';`

Entering data in an array

- ```
#include <iostream>
using namespace std;
int main()
{
 int arr[5];
 cout<<"Enter 5 integers: "<<endl;

 for (int i=0; i<5; i++)
 {
 cin>>arr[i];
 }

 cout<<"Data has now been recorded!";
 return 0;
}
```

# Working with arrays

- Number inside [ ] must be a positive integer less than the dimension of the array
- Indexes : first element ----> 0  
last element ----> N-1  
(where N is the total number of elements)
- `arr [i+2]`  
`arr [i*j]`
- Treat `arr[i]` just like any other variable

# Printing an array

```
#include <iostream>
using namespace std;
int main()
{
 int arr[5] = {23, 234, 1234, 14, 11} ;
 cout<<"The elements of the array are:"<<endl;

 for (int i=0; i<5; i++)
 {
 cout<<arr[i]<<' ';
 }

 return 0;
}
```



# Example

```
// Program to copy the contents of an array into the other
```

```
#include <iostream>
using namespace std;
int main()
{
 int iMarks[4] = {78, 64, 66, 74};
 short newMarks[4];

 for(int i=0; i<4; i++)
 newMarks[i]=iMarks[i];

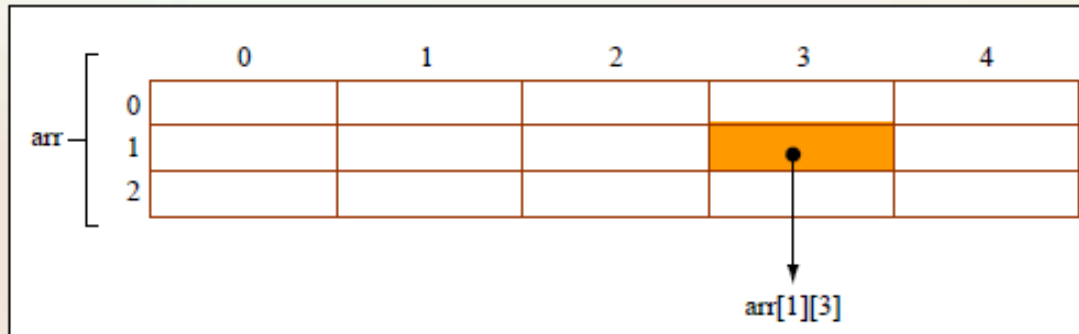
 cout<<"The new array is :"<<endl;

 for(int j=0; j<4; j++)
 cout<<newMarks[j]<<endl;

 return 0;
}
```

# Multidimensional arrays

- Multidimensional array: 'an array of arrays'
- `char century [100][365][24][60][60];`
- `int arr[3][5];`



# Example

- Here is a sample program that stores roll numbers and marks obtained by a student side by side in matrix

```
int main ()
{
int stud [4] [2];
int i, j;
for (i =0; i < =3; i ++)
{ cout<< "Enter roll no. and marks");
 cin>>stud [i] [0]>>stud [i] [1] ;
}

for (i = 0; i < = 3; i ++)
 cout<<stud [i] [0]<< stud [i] [1]);

return 0;
}
```

## Initializing multidimensional arrays:

The examples of multidimensional arrays in lecture did not give the syntax for initializing them. The way to assign a multidimensional array in the array declaration is as follows:

```
int matrix[2][3] = { {1, 2, 3}, {4, 5, 6} };
```

Inside the inner braces, commas still separate individual numbers. Outside, they separate rows of the array. After this declaration, `matrix[0][1]` will return the value 2.

Each one of the rows is initialized like a regular array. For instance, if instead of `{1, 2, 3}` we'd put `{1}`, the second and third elements of the first row would have been initialized to 0.