Arrays

Arrays

- C++ provides a data structure, the **array**, which **stores a fixed-size sequential collection of elements of the same type**.
- Instead of declaring individual variables, such as `number0`, `number1`, ..., and `number99`, you declare one array variable such as `numbers` and use `numbers[0]`, `numbers[1]`, and ..., `numbers[99]` to represent individual variables. A specific element in an array is accessed by an index.

Declaring Arrays

- To declare an array in C++, the programmer specifies the type of the elements and the number of elements required by an array as follows:

```
type arrayName [ arraySize ];
```

- This is called a single-dimension array. The `arraySize` must be an integer constant greater than zero and type can be any valid C++ data type.
- E.g., to declare a 10-element array called `balance` of type `double`, use this statement:

```
double balance[10];
```

Initializing Arrays

- You can initialize C++ array elements either
  - one by one

```
double balance[5];
balance[0] = 1000.0;
balance[1] = 2.0;
balance[2] = 3.4;
balance[3] = 7.0;
balance[4] = 50.0;
```

NOTE: In C++ the index starts from 0 not from 1
e.g. length of an array = 5.
Indices = 0,1,2,3,4.

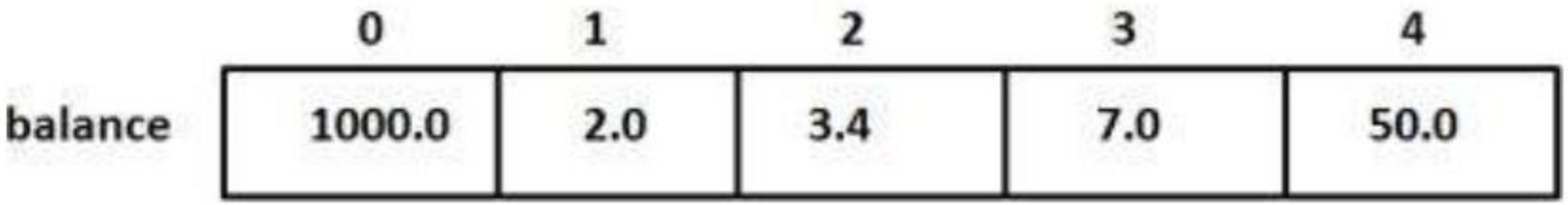
  - Or using a single statement as follows:

```
double balance[5] = {1000.0, 2.0, 3.4, 7.0, 50.0};
```

Initializing Arrays

- If you omit the size of the array, an array just big enough to hold the initialization is created.

```
double balance[] = {1000.0, 2.0, 3.4, 7.0, 50.0};
```



Accessing Array Elements

- An element is accessed by indexing the array name. This is done by placing the index of the element within square brackets after the name of the array. For example:

```
double salary = balance[9];
```

Arrays - examples

```
int main()
{
    int n = 5;
    double b[n] = {1,2,3,4,5};
    for (int i=0;i<n;i++)
        cout<<b[i]<<endl;
}
```

output

```
1
2
3
4
5
```

```
int main()
{
    int n = 5;
    double b[n];
    b[0] = 1;
    b[1] = 2;
    b[2] = 3;
    b[3] = 4;
    b[4] = 5;
    for (int i=0;i<n;i++)
        cout<<b[i]<<endl;
}
```