**Pointers and arrays.**

­­The concept of arrays is related to that of pointers. In fact, arrays work very much like pointers to their first elements, and, actually, an array can always be implicitly converted to the pointer of the proper type. For example, consider these two declarations:

|  |  |  |
| --- | --- | --- |
| 1 2 | int myarray [20];  int \* mypointer; |  |

The following assignment operation would be valid:

|  |  |  |
| --- | --- | --- |
|  | mypointer = myarray; |  |

After that, *mypointer* and *myarray* would be equivalent and would have very similar properties. The main difference being that *mypointer* can be assigned a different address, whereas *myarray* can never be assigned anything, and will always represent the same block of 20 elements of type int. Therefore, the following assignment would not be valid:

|  |  |  |
| --- | --- | --- |
|  | myarray = mypointer; |  |

Let's see an example that mixes arrays and pointers:

|  |  |  |  |
| --- | --- | --- | --- |
| 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 | // more pointers  #include <iostream>  using namespace std;  int main ()  {  int numbers[5];  int \* p;  p = numbers; \*p = 10;  p++; \*p = 20;  p = &numbers[2]; \*p = 30;  p = numbers + 3; \*p = 40;  p = numbers; \*(p+4) = 50;  for (int n=0; n<5; n++)  cout << numbers[n] << ", ";  return 0;  } | 10, 20, 30, 40, 50, | [Edit & Run](https://www32.cplusplus.com/doc/tutorial/pointers/) |

Pointers and arrays support the same set of operations, with the same meaning for both. The main difference being that pointers can be assigned new addresses, while arrays cannot.

In the chapter about arrays, brackets ([]) were explained as specifying the index of an element of the array. Well, in fact these brackets are a dereferencing operator known as *offset operator*. They dereference the variable they follow just as \* does, but they also add the number between brackets to the address being dereferenced. For example:

|  |  |  |
| --- | --- | --- |
| 1 2 | a[5] = 0; // a [offset of 5] = 0  \*(a+5) = 0; // pointed to by (a+5) = 0 |  |

These two expressions are equivalent and valid, not only if a is a pointer, but also if a is an array. Remember that if an array, its name can be used just like a pointer to its first element.