* **T\*:** It is read as ‘pointer to T’. A variable of type T\* can hold the address of an object of type T.

A black rectangle with a black line

Description automatically generated

* **Dereferencing**: The fundamental operation on a pointer. Refers to the object pointed to by a pointer. Also called **indirection.**

A close-up of a message

Description automatically generated

* To store smaller values more compactly, one can use bitwise logical operations, bit-fields in structures, or a bitset.
* \* as a prefix is a dereferencing operator.
* \* as a suffix means ‘pointer to’ a type name.

A blue text on a white background

Description automatically generated

* **void\*:** Read as ‘pointer to an object of unknown type’. Used when we occasionally need to store or pass along an address of a memory location without actually knowing what type of object is stored there.
* A pointer to any type of *object* can be assigned to a variable of type *void\**, but a pointer to a *function* or a *pointer* to a member cannot.
* A *void* can be assigned to another void.
* *void\**s can be compared for equality and inequality.
* A *void\** can be explicitly converted to another type.
* In general, it is not safe to use a pointer that has been converted to a type that differs from the object being pointed to. Consequently, the notation used, *static\_cast* was designed to be ugly and easy to find in code.

A computer code with blue text

Description automatically generated

* Occurrences of *void\**s at higher levels of the system should be viewed with great suspicion because they are likely indicators of design errors.
* Before nullptr was used, 0 was used to denote nullptr.

A blue text on a white background

Description automatically generated

* Also, it has been popular to define a macro NULL to represent a null pointer. However, definitions of NULL are different in different implementations.
* In C, NULL is typically (void\*)0, which makes it illegal in C++.



* Using nullptr makes code more readable than alternatives and avoids confusion.
* **T[size]**: An array of size elements of type T.
* The elements are indexed from 0 to *size-1*.
* The number of elements in the array, the array bound, should be a constant expression.

Blue text on a white background

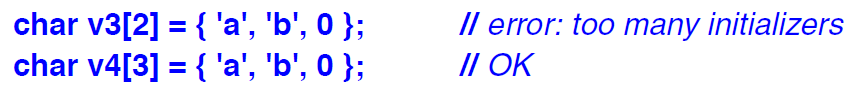
Description automatically generated

* If what one wants is a simple fixed-length sequence of objects of a given type in memory, an array is the ideal solution. For any other need, an array has serious problems.
* Arrays can be allocated statically, on the stack, or on free store.

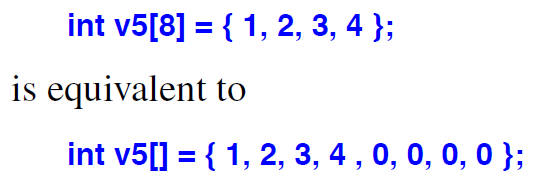
A close-up of a white background

Description automatically generated

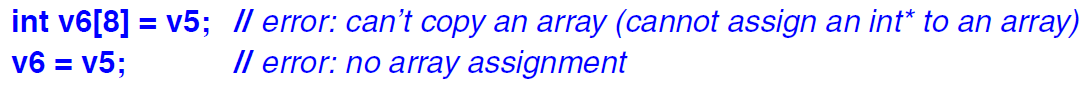
* Avoid arrays in interfaces, e.g. as function arguments, because implicit conversion to pointer is the root cause of many errors in C code and C-style C++ code.
* If an array is allocated on free store, be sure to *delete[]* its pointer once only and only after its last use.
* One of the most widely used kinds of arrays is the zero-terminated array of *char*, also called C-style string.
* Often a *char\** or a *const char\** is assumed to point to a zero-terminated sequence of characters, even in C++.
* An **array** can be **initialised** by a list of values.
* When an array is initialised without a specific size but with an initialiser list, the size of the array is calculated by counting the number of elements in the initialiser list.
* If the size is explicitly specified, it is an error to give surplus elements in an initialiser list.



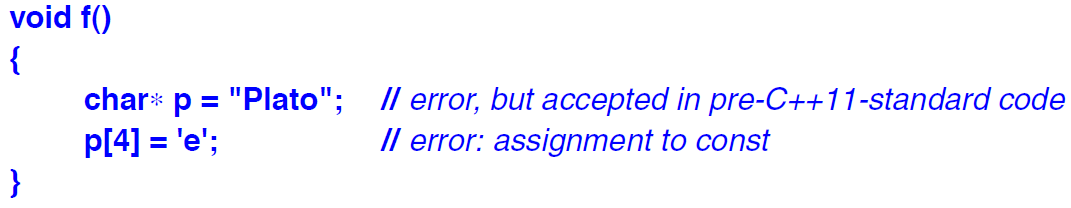
* If the initialiser supplies too few elements for the list, the rest is populated with zero.



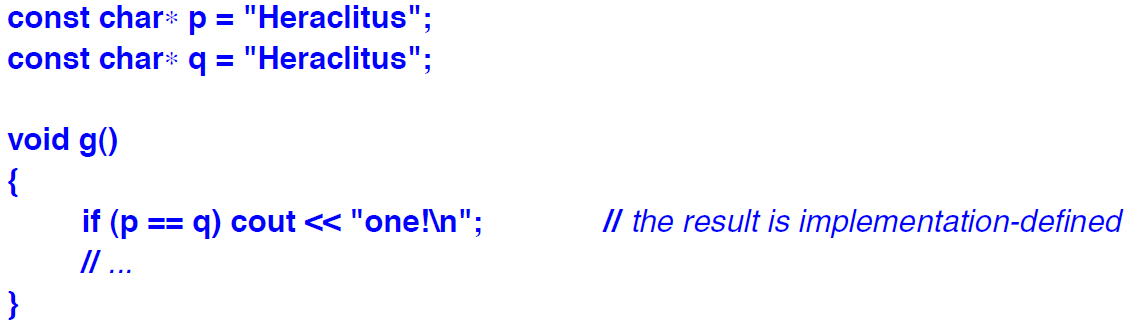
* There is no built-in copy operation for arrays.
* One array cannot be assigned with another, not even of exactly the same type.
* There is no array assignment.



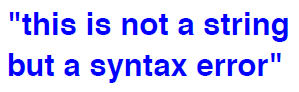
* Arrays cannot be passed by value.
* **String literal:** A character sequence enclosed within double quotes.
* A string literal contains one more character than it appears to have. It is terminated by the ‘\0’ character with a value 0.
* The type of string literal is ‘an array of appropriate number of const characters.’

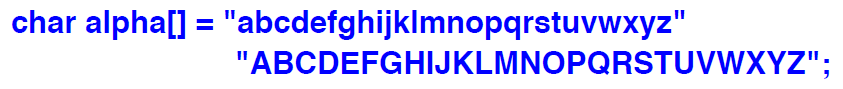


* Whether two identical string literals are allocated as one array or as two is implementation-defined.



* The empty string is represented as a pair of adjacent “” and has the type const char[1]. The one character is ‘\0’.
* The backslash convention makes it possible to use characters such as double quotes (“) or backslash (\) within a string.
* It is mostly used to represent non-graphic characters, such as \n (newline) or \a (alert with a beep sound).
* Long strings can be broken by white space to make the program neat. The first example is wrong whereas the second is correct.

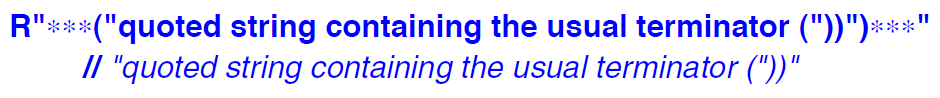




* It is possible to have null character in a string but most programs will ignore any characters after it. For example, “Khazad\0Dum” will be read as “Khazad” by functions such as strcpy() and strlen().
* **Raw string literal:** A string literal where a blackslash is just a backslash and a double quote is just a double quote.



* We can add personalised delimiters before and after () in a raw string.



* Unless one works with regular expressions, raw string literals are probably just a curiosity.



* In contrast to nonraw string literals, raw string literals can be spread over multiple lines.

A white background with blue text

Description automatically generated