

Simplification of gl/prvalue

This section further touches upon the concept of glvalue/prvalue in C++ 17.

WE'LL COVER THE FOLLOWING ^

- Writing pr/gl value Expressions
- Let's look at gl/pr values in C++17

Writing pr/gl value Expressions

To support Copy Elision, the authors of the proposal provided the updated definitions of **glvalue** and **prvalue**. From [the Standard](#):

- **glvalue** - A **glvalue** is an expression whose evaluation computes the location of an object, bit-field, or function
- **prvalue** - A **prvalue** is an expression whose evaluation initialises an object, bit-field, or operand of an operator, as specified by the context in which it appears

For example:

```
class X { int a; };  
X{10}    // this expression is prvalue  
X x;     // x is lvalue  
x.a      // it's lvalue (location)
```



In short: **prvalues** perform initialisation, **glvalues** describe locations.

Let's look at gl/pr values in C++17

The C++17 Standard specifies that when there's a **prvalue** initialising some **glvalue**, then there's no need to create a temporary and we can defer its materialisation.

In C++17 Copy Elision/Deferred Temporary Materialization happens when:

- in initialisation of an object from a `prvalue`: `Type t = T()`
- in a function call where the function returns a `prvalue` - like in our examples.

There are several exceptions where the temporary is still needed:

- when a `prvalue` is bound to a reference
- when member access is performed on a class `prvalue`
- when array subscripting is performed on an array `rvalue`
- when an array `prvalue` is decayed to a pointer
- when a derived-to-base conversion is performed on a class `prvalue`
- when a `prvalue` is used as a discarded value expression

Extra Info: The change was proposed in: [P0135R0](#)(reasoning) - and [P0135R1](#)(wording).

The next lesson will touch upon the topic of Dynamic Memory Allocation for Over-Aligned data in C++ 17.