

## Section 3.2 C++14

**decltype(auto)**

```
#include <utility> // std::move

decltype(auto) v11; // Error, no initializer
decltype(auto) v12 = f1(), v13 = std::move(i1); // OK, deduced as int&&
decltype(auto) v14 = 5, v15 = f1(); // Error, ambiguous deduction
```

A **nonstatic data member** cannot be declared using **decltype(auto)**, even if provided with a **default member initializer** (see Section 2.1. “Default Member Init” on page 318):

```
struct C1
{
    decltype(auto) d_data = f(); // Error, decltype(auto) for data member
};
```

A **constexpr** static data member (see Section 2.1. “constexpr Variables” on page 302) that is initialized at the point of declaration can be declared using **decltype(auto)**, but a non**constexpr** static data member cannot, simply because non**constexpr** static **members** must be initialized outside the class definition, independently of the **decltype(auto)** feature:

```
constexpr int f2() { return 5; }

struct C2
{
    static constexpr decltype(auto) s_mem1 = f2(); // OK
    static decltype(auto) s_mem2 = f2(); // Error, in-class init
};
```

A variable with **static storage duration** (either in namespace or class scope) can be declared using an explicit type and then redeclared and initialized using **decltype(auto)**. Note, however, that some popular compilers reject these redeclarations<sup>1</sup>:

```
extern int gi; // forward declaration

struct C3
{
    static decltype(f2()) s_mem1; // type int
};

decltype(auto) gi = f2(); // OK, compatible redeclaration
decltype(auto) C3::s_mem1 = f2(); // OK, compatible redeclaration
```

<sup>1</sup>GCC 10.2 (c. 2020) and MSVC 19.29 (c. 2021), among many other compilers, reject **auto** redeclaration of previously declared variables; see GCC bug 60352 ([pluzhnikov14](#)). However, nothing in the C++14 Standard appears to disallow such redeclarations, and an example in the C++20 Standard suggests that they are valid.