

## Section 2.1 C++11

## extern template

2. A **free-function** template, `swap`, that operates on objects of corresponding specialized `Vector` type
3. A **const C++14 variable template**, `vectorSize`, that represents the number of **bytes** in the **footprint** of an object of the corresponding specialized `Vector` type

Any use of these templates by a client might and typically will trigger the depositing of equivalent **definitions** as object code in the client **translation unit**’s resulting `.o` file, irrespective of whether the **definition** being used winds up getting inlined.

To eliminate object code for **specializations** of **entities** in the `my_vector` component, we must first decide where the unique **definitions** will go; see *Annoyances — No good place to put definitions for unrelated classes* on page 373. In this specific case, we own the **component** that requires **specialization**, and the **specialization** is for a ubiquitous built-in type; hence, the natural place to generate the specialized **definitions** is in a `.cpp` file corresponding to the component’s header:

```
// my_vector.cpp:
#include <my_vector.h> // We always include the component's own header first.
// By including this header file, we have introduced the general template
// definitions for each of the explicit-instantiation declarations below.

namespace my // namespace for all entities defined within this component
{

template class Vector<int>;
// Generate object code for all nontemplate member functions and definitions
// of static data members of template my::Vector having int elements.

template std::size_t Vector<double>::length() const; // BAD IDEA
// In addition, we could generate object code for just a particular member
// function definition of my::Vector (e.g., length) for some other
// argument type (e.g., double).

template void swap(Vector<int>& lhs, Vector<int>& rhs);
// Generate object code for the full specialization of the swap free-
// function template that operates on objects of type my::Vector<int>.

template const std::size_t vectorSize<int>; // C++14 variable template
// Generate the object-code-level definition for the specialization of the
// C++14 variable template instantiated for built-in type int.

template std::size_t Vector<int>::s_count;
// Generate the object-code-level definition for the specialization of the
// static data member of Vector instantiated for built-in type int.

} // close namespace my
```