

## extern template

## Chapter 2 Conditionally Safe Features

explicit-instantiation declaration in the `c.h` file will inflate the size of the `c.o` file with no possibility of reducing code bloat in client code:

```
// c.h:
#ifndef INCLUDED_C // internal include guard
#define INCLUDED_C

template <typename T> void f(T v) { /*...*/ } // general template definition

extern template void f<int>(int v); // OK, matched in c.cpp
extern template void f<char>(char c); // Error, unmatched in .cpp file

#endif

// c.cpp:
#include <c.h> // incorporate own header first

template void f<int>(int v); // OK, matched in c.h
template void f<double>(double v); // Bug, unmatched in c.h file

// client.cpp:
#include <c.h>

void client()
{
    int i = 1;
    char c = 'a';
    double d = 2.0;

    f(i); // OK, matching explicit-instantiation directives
    f(c); // Link-Time Error, no matching explicit-instantiation definition
    f(d); // Bug, size increased due to no matching explicit-instantiation
        // declaration.
}

```

In the example above, `f(i)` works as expected, with the linker finding the definition of `f<int>` in `c.o`; `f(c)` fails to link because no definition of `f<char>` is ~~guaranteed to be found~~ anywhere; and `f(d)` accidentally works by silently generating a *redundant* local copy of `f<double>` in `client.o`, while another, identical definition is generated explicitly in `c.o`. These extra instantiations do not result in multiply-defined symbols because they still reside in their own **sections** and are marked as *weak* symbols. Importantly, note that **extern template** has *absolutely no effect* on overload resolution ~~because~~ the call to `f(c)` ~~did not resolve~~ to `f<int>`.