CS 216

Lecture 6

February 21st, 2014

Administrivia

Toolchain

In Windows,
people usually
use an IDE

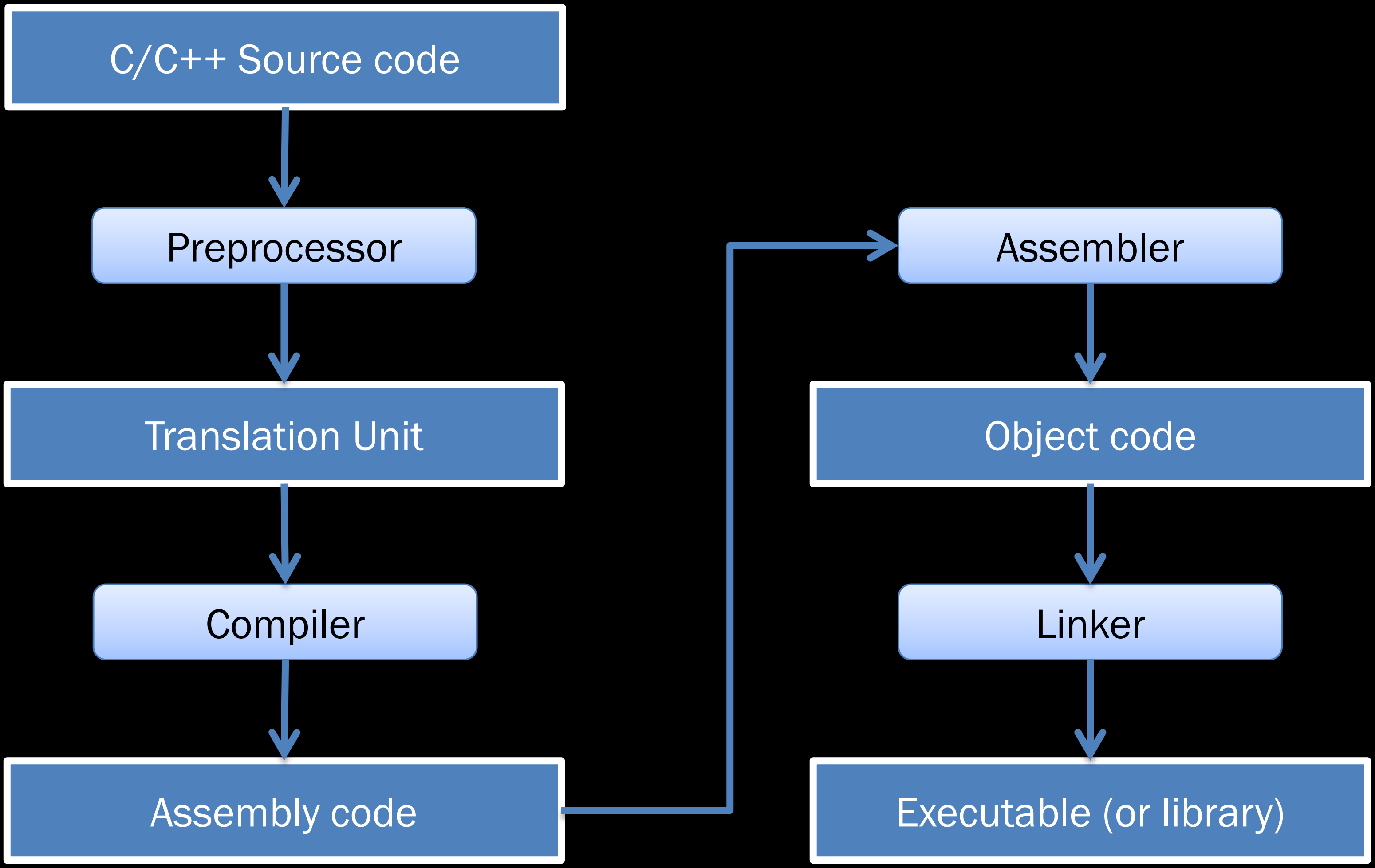
In the Linux world, IDEs are available, but command line toolchain use is common.

In all cases the same steps are followed!

The only difference is how much is automated.

And as it turns out, we automate a lot in Linux, too.

But first, let's talk about how we actually get from code to executatble.



C/C++ Source code
Preprocessor
Translation Unit
Compiler
Assembly code
Assembler
Object code
Linker
Executable (or library)

Text editor
(nano, vi, emacs)

Compiler

GCC

g++

(preprocessor is included here!)

Preprocessor

#include
(plus include
guards)

This prepares the source code file for compilation

The prepared file is called a "translation unit"

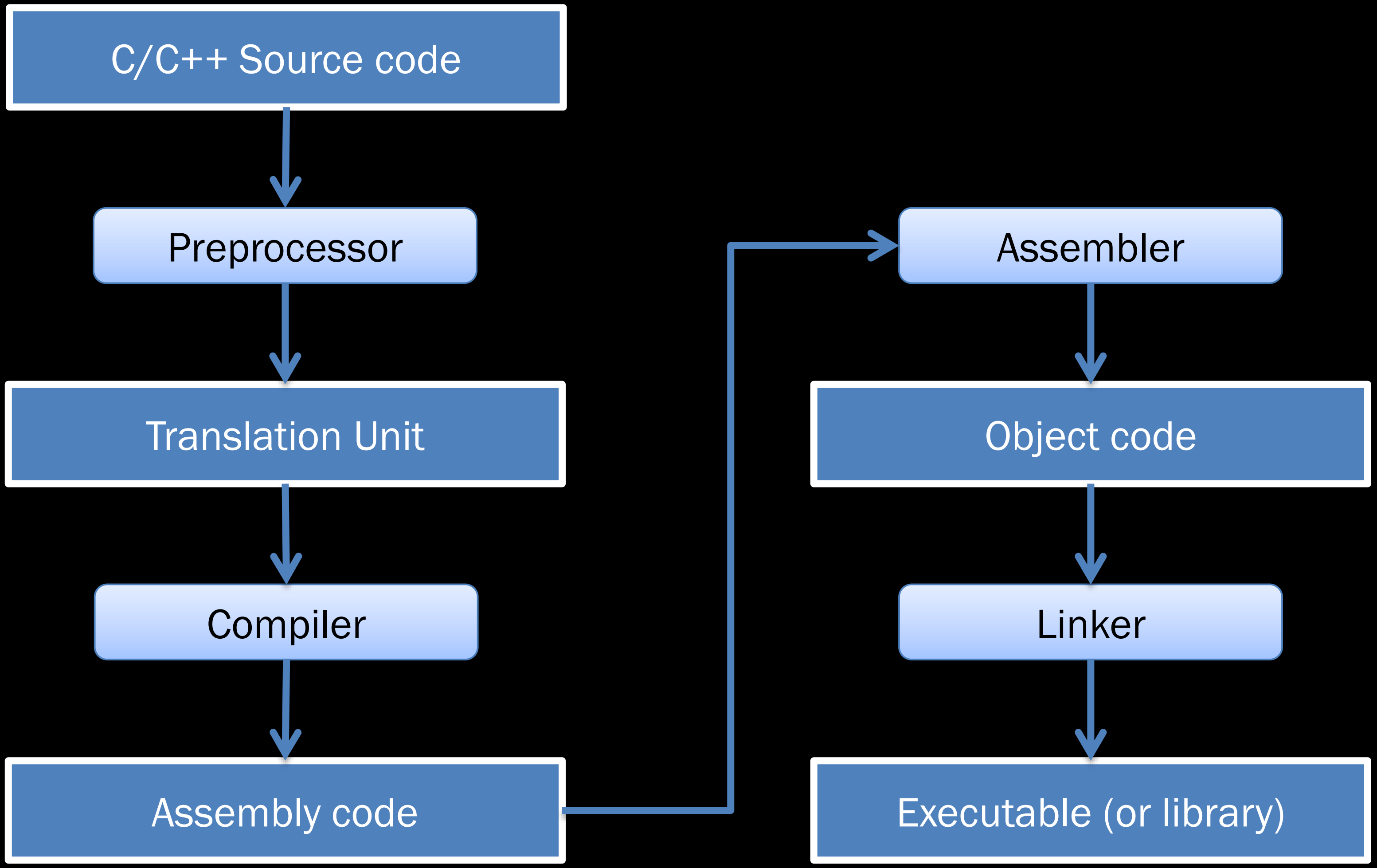
The #includes let the compiler know what functions and classes exist in files that will be linked later.

This is why include guards are important! C++ only lets you define something once – so there can only be one definition in a translation unit!

Assembler
as

Linker

ld



C/C++ Source code

Preprocessor

Translation Unit

Compiler

Assembly code

Assembler

Object code

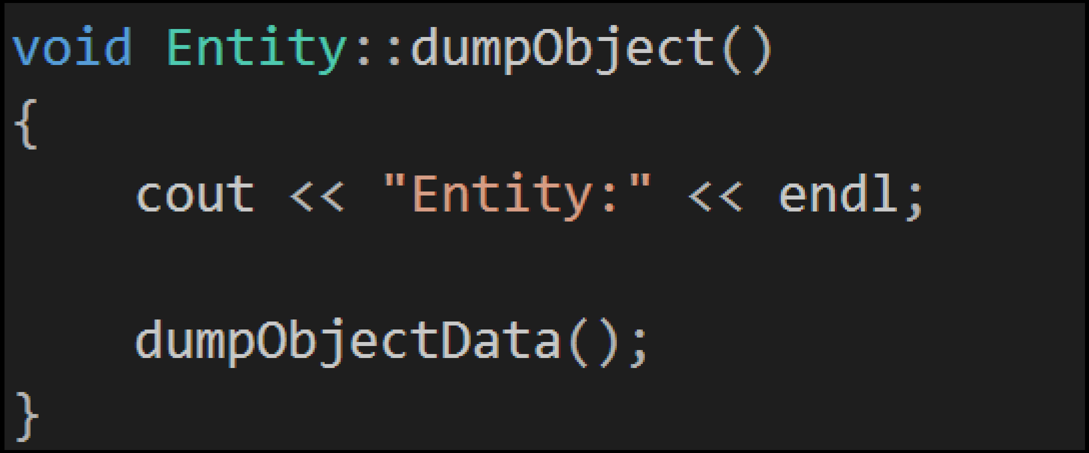
Linker

Executable (or library)

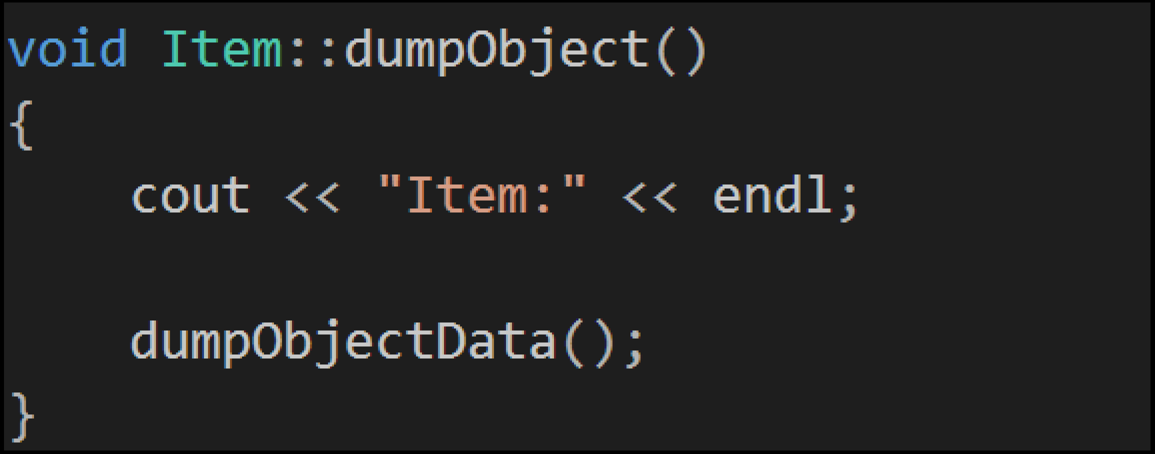
Debugger
gdb

make

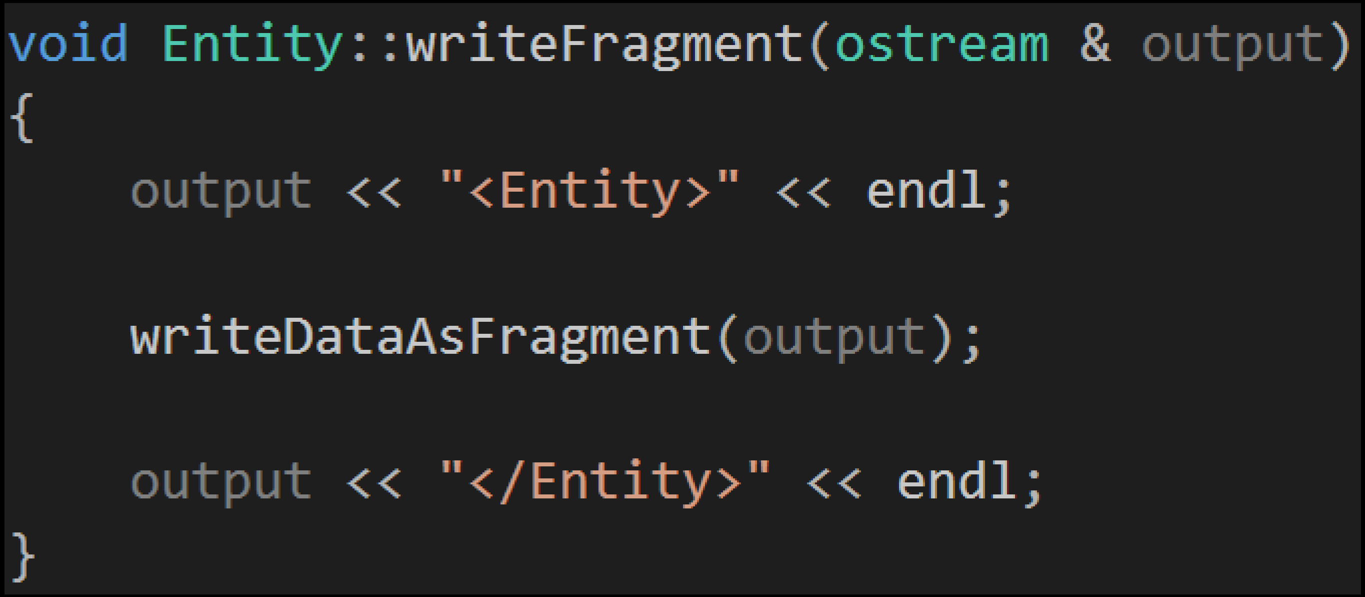
PA1.2 stuff



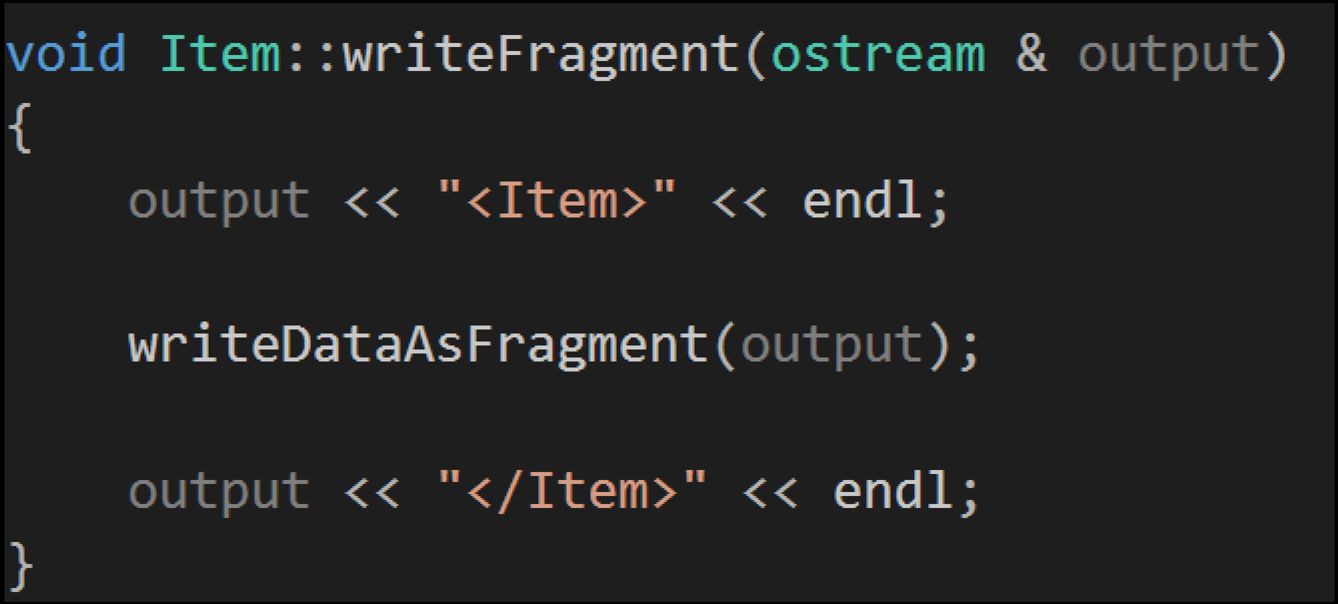
```cpp
void Entity::dumpObject()
{
    cout << "Entity:" << endl;

    dumpObjectData();
}
```



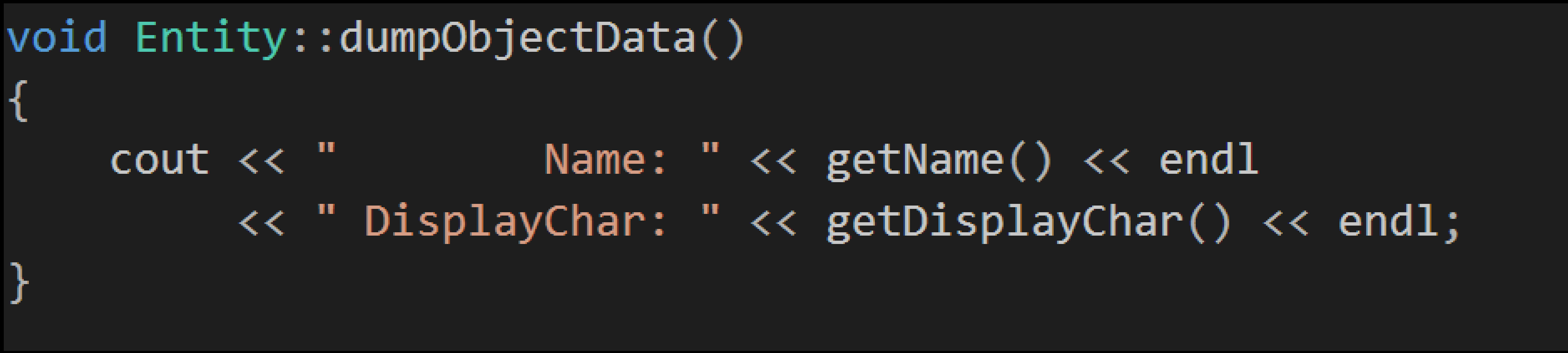
```cpp
void Item::dumpObject()
{
    cout << "Item:" << endl;

    dumpObjectData();
}
```



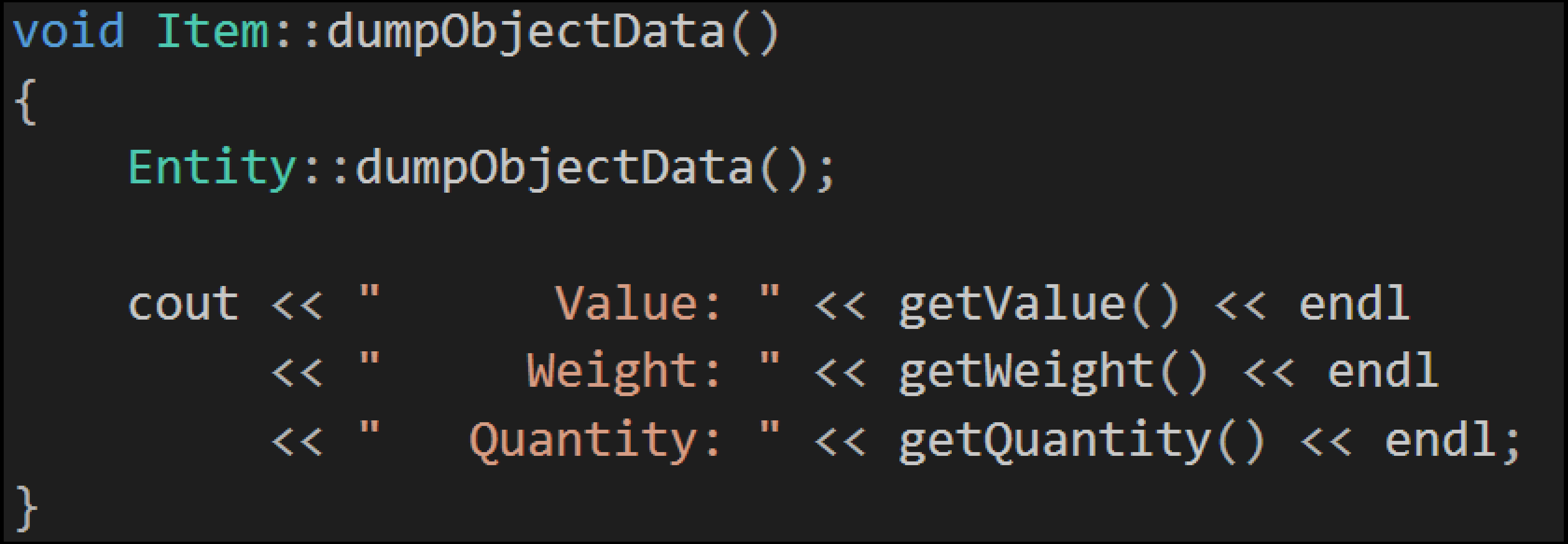
```
void Entity::writeFragment(ostream & output)
{
    output << "<Entity>" << endl;

    writeDataAsFragment(output);

    output << "</Entity>" << endl;
}
```



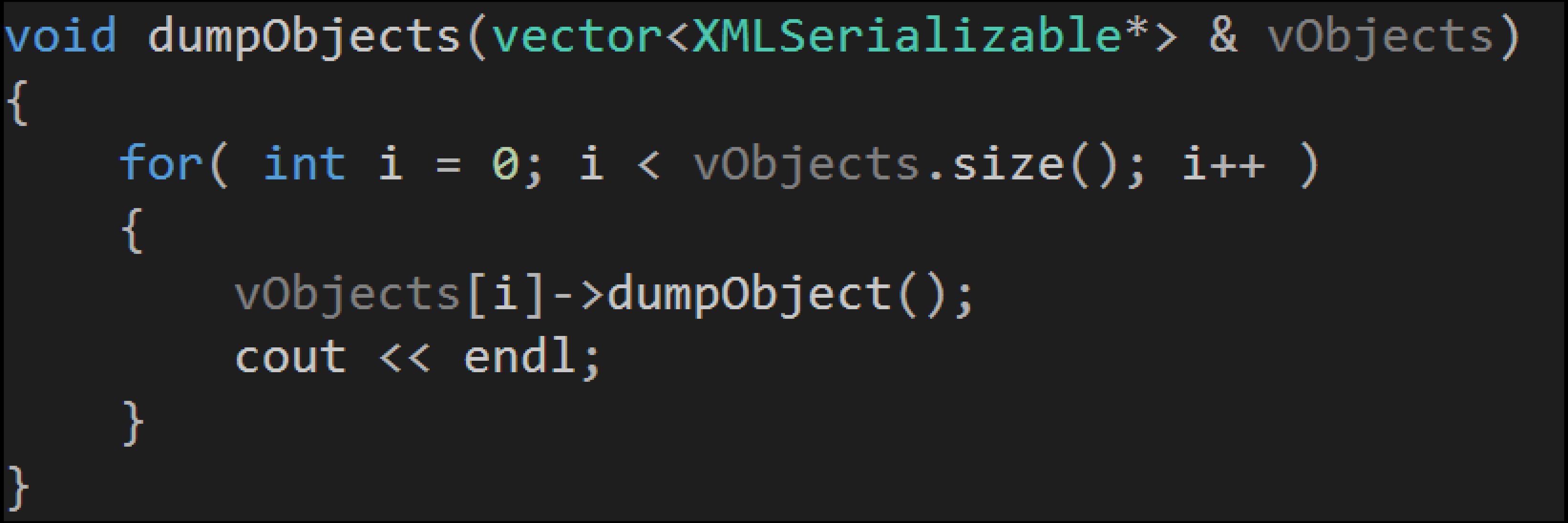
```
void Item::writeFragment(ostream & output)
{
    output << "<Item>" << endl;

    writeDataAsFragment(output);

    output << "</Item>" << endl;
}
```



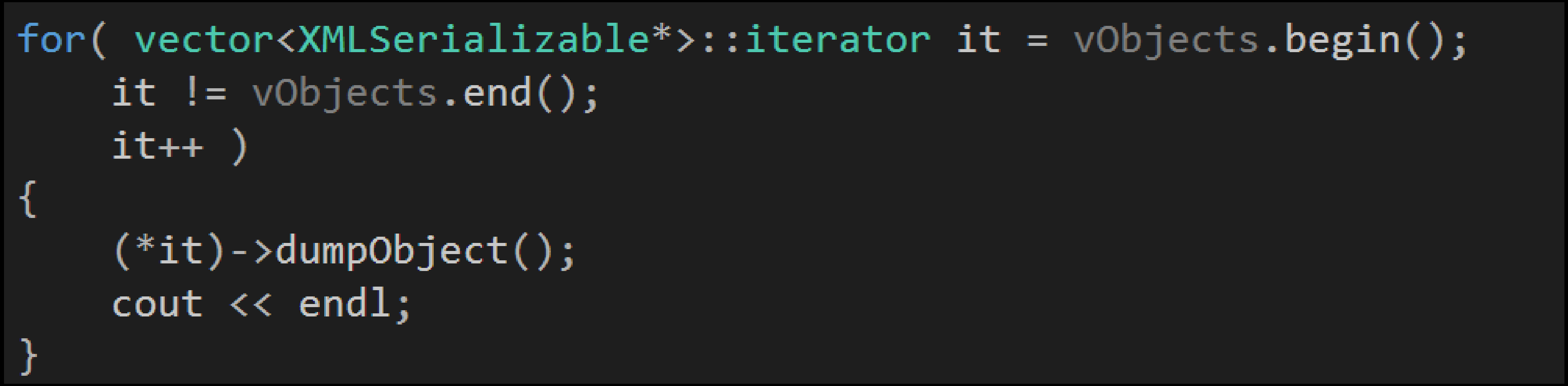
```
void Entity::dumpObjectData()
{
    cout << "        Name: " << getName() << endl
         << " DisplayChar: " << getDisplayChar() << endl;
}
```



```
void Item::dumpObjectData()
{
    Entity::dumpObjectData();

    cout << "      Value: " << getValue() << endl
         << "     Weight: " << getWeight() << endl
         << "   Quantity: " << getQuantity() << endl;
}
```



```
void dumpObjects(vector<XMLSerializable*> & vObjects)
{
    for( int i = 0; i < vObjects.size(); i++ )
    {
        vObjects[i]->dumpObject();
        cout << endl;
    }
}
```

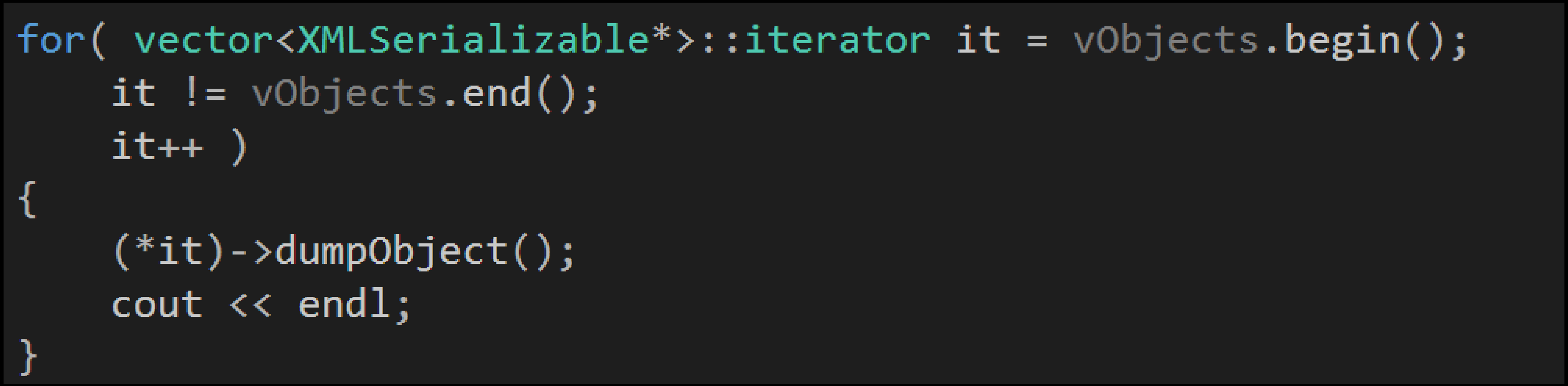


```cpp
for( vector<XMLSerializable*>::iterator it = vObjects.begin();
    it != vObjects.end();
    it++ )
{
    (*it)->dumpObject();
    cout << endl;
}
```

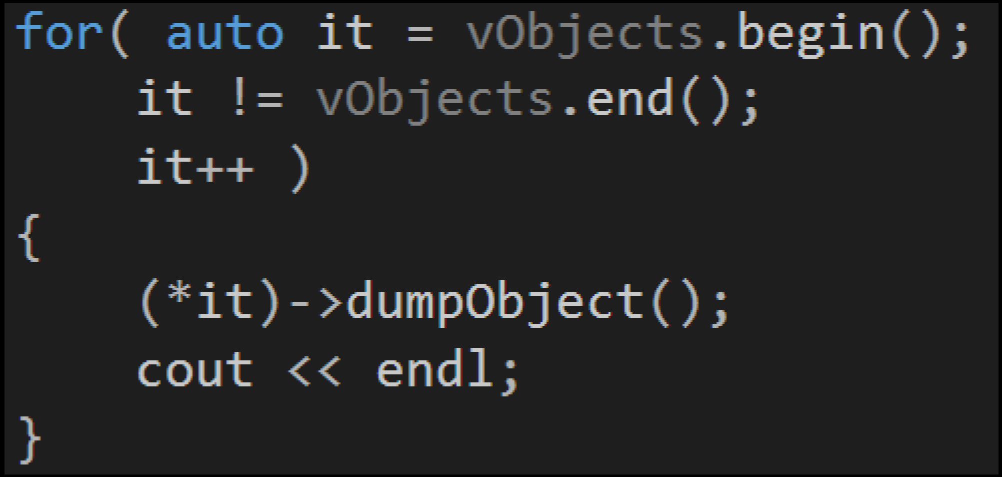
auto keyword

Used to declare a variable. It declares the variable to be the type of the expression assigned to the variable.

Everything is an expression. Expressions have both type and value.



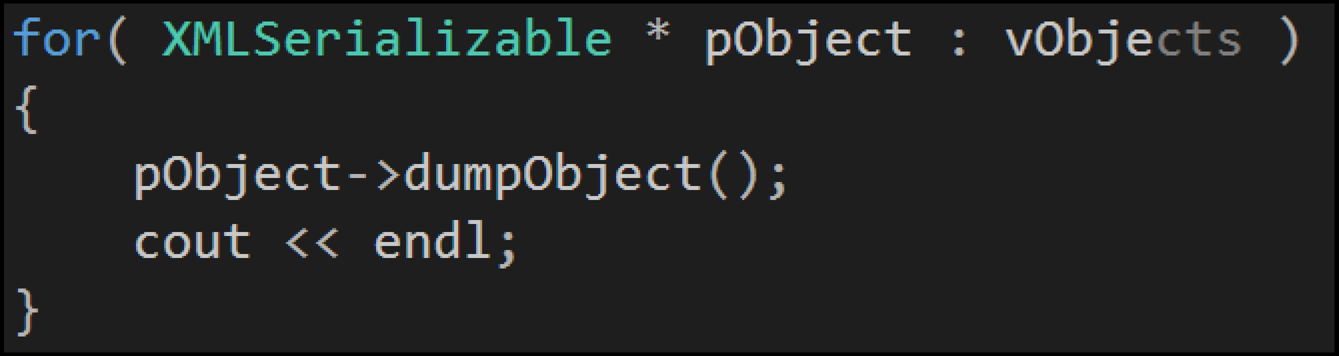
```
for( vector<XMLSerializable*>::iterator it = vObjects.begin();
    it != vObjects.end();
    it++ )
{
    (*it)->dumpObject();
    cout << endl;
}
```



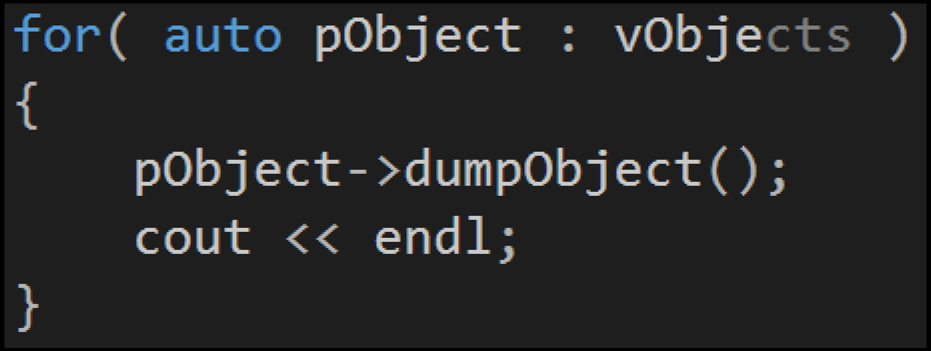
```
for( auto it = vObjects.begin();
    it != vObjects.end();
    it++ )
{
    (*it)->dumpObject();
    cout << endl;
}
```

But this is still clunkier than we’d like

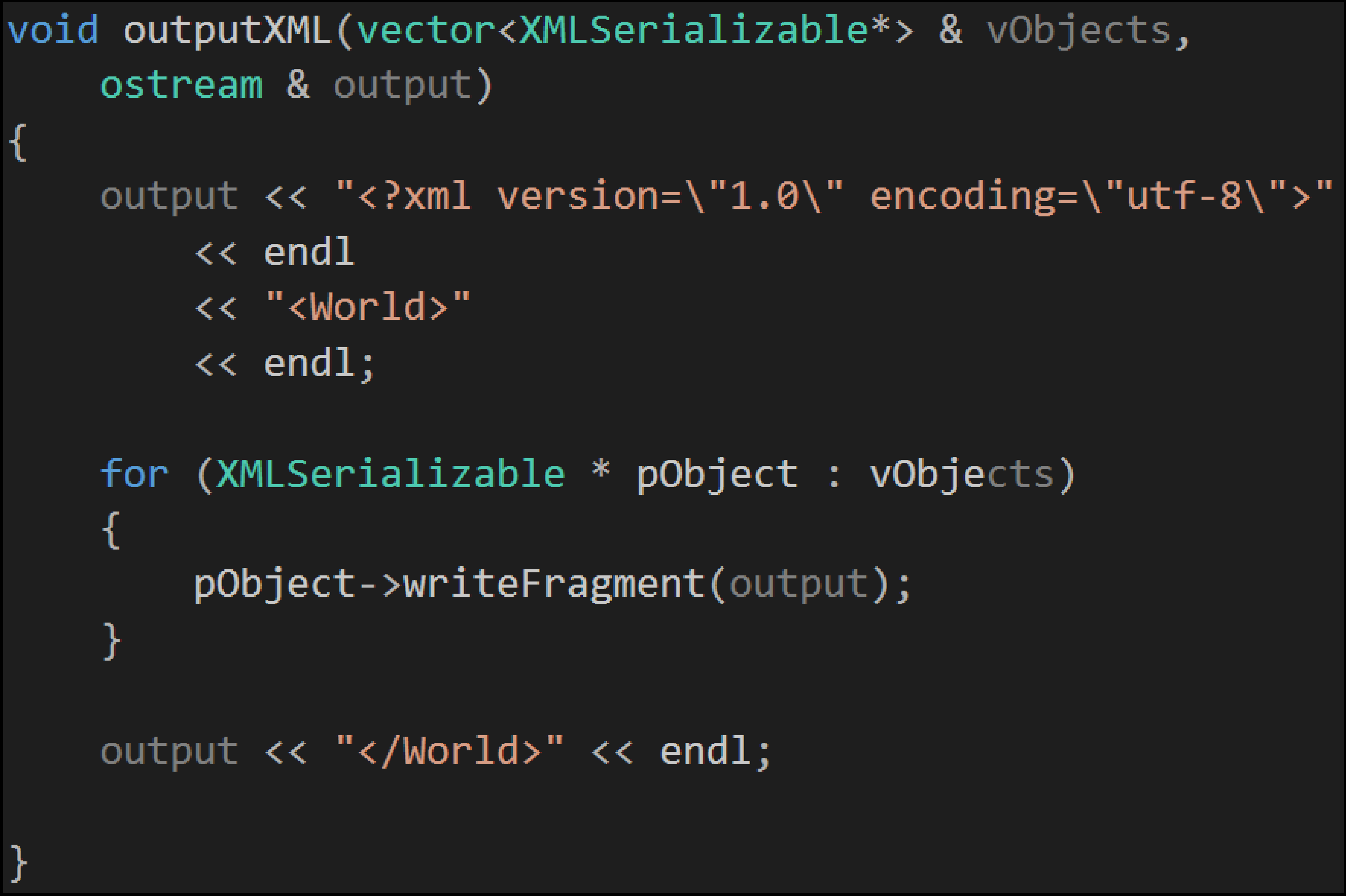
But there’s another C++11 feature – range based for



```
for( XMLSerializable * pObject : vObjects )
{
    pObject->dumpObject();
    cout << endl;
}
```



```
for( auto pObject : vObjects )
{
    pObject->dumpObject();
    cout << endl;
}
```



```
void outputXML(vector<XMLSerializable*> & vObjects,
    ostream & output)
{
    output << "<?xml version=\"1.0\" encoding=\"utf-8\">"
        << endl
        << "<World>"
        << endl;

    for (XMLSerializable * pObject : vObjects)
    {
        pObject->writeFragment(output);
    }

    output << "</World>" << endl;

}
```