C++ Static and Dynamic Libraries

Administrative

- Test next Thursday 10/13/16
- **Readings,Lectures,Examples: up to the red cutoff**

Outline

- Why bother?
- Static verses Dynamic Linking

Why Bother?

- How most team based projects are managed
- Given interface and expected behavior
- Produce a library that delivers requirements
- Also reusable
- Excellent encapsulation, I code to the interface your library has, I don’t care how its implemented
- Also how most 3rd party software is delivered for programmer use.

Whats an interface?

- Public access to your library.
- Typically provided via header files.
- For instance here is the interface to a static library that I will discuss today for the library StaticLibrary;

```
#pragma once

namespace KP_StaticLib{
    int getint();
}
```

Static Verses Dynamic

Static linkage

LibraryStatic
(.a on eclipse .lib on MSVS)

```
Void myfunc(){
std::cout<<“In library”;
}
```

MyApp
(uses LibraryStatic)

```
Void myfunc(){
std::cout<<“In library”;
}
```

AnotherApp
(uses LibraryStatic)

```
Void myfunc(){
std::cout<<“In library”;
}
```

Shared linkage

LibraryShared
(.dll)

```
Void myfunc(){
std::cout<<“In library”;
}
```

MyApp
(uses LibraryShared)

Void myfunc();

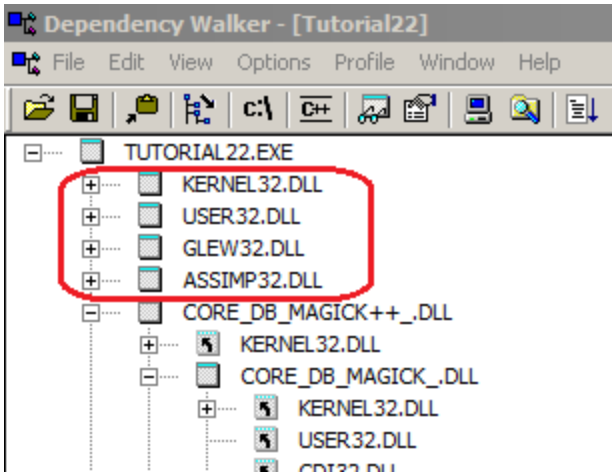
MyApp 2
(uses LibraryShared)

Void myfunc();

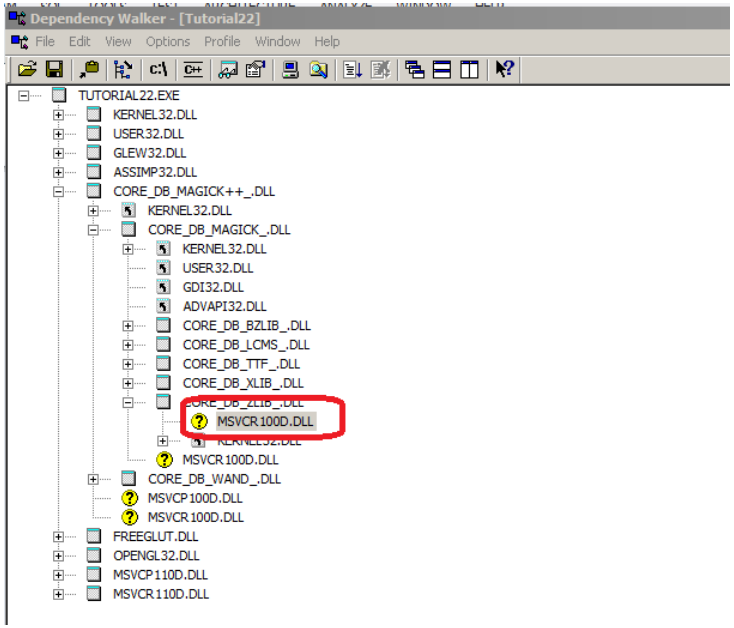
MyApp3
(uses LibraryShared)

Void myfunc();

How it appears in Dependency Walker Dynamic Link

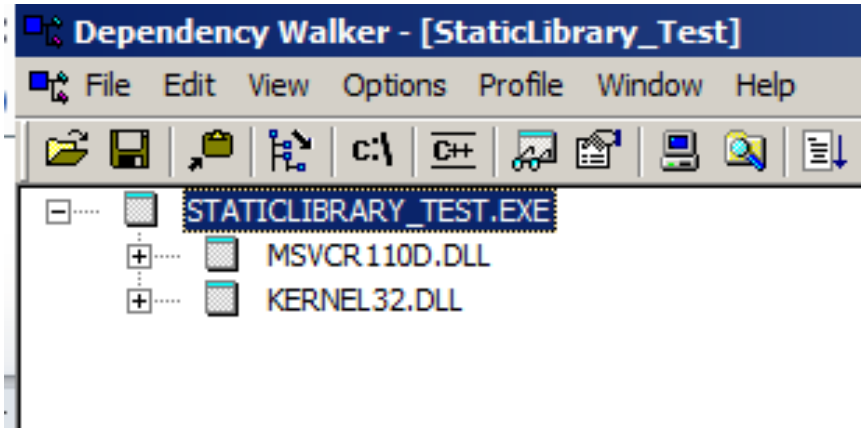


DLL – When things go wrong



Missing MSVCR100D.DLL

How it appears in Dependency Walker Static Link



You don’t see it as its compiled in

Summary

- Easier to use static linkage
- Sacrifice flexibility and a little space
- But, If you change the library need to recompile all apps that use it
- Static linking eliminates a host of dynamic problems
  - missing dynamic libraries
  - libraries that are the wrong version

- Lets build a library

- Set up project (.lib and tester.exe)
- Putting all includes in one place for sharing
- Linking library to tester
- Namespaces – cause you don’t know what other libraries are being used and whether their function/class names are the same as yours
- Then dependencies (build the lib first then the tester)