CS 270 - Computer Organization

C Programming for Java Folk

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Quote of the Day

C is quirky, flawed, and an enormous success.

- Dennis Ritchie

C programs vs. Java programs

Imagine taking a Java class, turning it inside-out, and dumping the fields and methods into a file.

Now, remove all the access modifiers.

Congratulations! You now have a C program (almost).

Classes and Encapsulation

In Java, the class is the unit of *encapsulation;* object attributes and the methods that operate on them are packaged into one unit of computation.

C was designed before concepts like *class* became popular. The unit of encapsulation in C is the *file.*

Actually, programmers usually divide their (object-like) data structures into two or three separate files.

Encapsulation in C

C programmers design data structures by separating *declarations* from *definitions.* The fields are packaged into a unit called a struct which is saved in a *header file* (a file with a **.h** extension).

The operations on this data are called *functions* and are saved separately in the *implementation file* (a file with a **.c** extension).

Typically, we write a separate implementation file to test the functions. As in Java, to make a program executable there must be a main function.

Compiler Directives

While it is better for a programmer to keep declarations and definitions separate, the compiler requires that they all be in a single file, or *compilation unit.*

The compiler directive **#include** is used to tell the compiler to combine the contents of one file with another. We never see this happen, the compiler creates large intermediate files during a preprocessing step, and compiles the intermediate.

```
#include "point.h"   // read the contents of point.h at this point
```

When compilation is done, any intermediate files are automatically deleted, so they don't clutter up our directories.

System Libraries

We also get access to the C system libraries using **#include.** This is similar to using import in Java to access the class libraries.

The syntax to include a system header file is different:

```
#include <stdio.h>   // include the standard IO library header file
```

This form tells the compiler to search first in the system directories for the named header file. The previous form tells it to search first in the current working directory.

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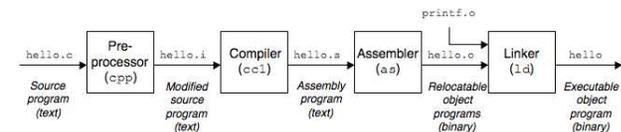
The compilation steps and files produced by executing the command:

```
cpp -o hello hello.c
```

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