Procedural Programming in C++

Core C++ skills:

- basic syntax and semantics
- built-in data types (int, char, double, string, etc.)
- control structures
- pointers and dynamic memory management (new, delete)
- I/O streams (cin, cout, file streams, string streams)
- parsing input files (tab delimited, otherwise structured)
- functions (return mechanism, parameter passing modes)
- separate compilation issues
- use of new-style headers

CS 1044 provides an introduction to basic C++ programming from a procedural perspective.

CS 1704 introduces dynamic memory management, separate compilation, and classes.

OO Support in C++

OO C++ language mechanisms:

- basic syntax and semantics
- access control (public, protected, private)
- constructors
- destructors (dynamic memory management)
- shallow vs deep copy issue (copy constructor, assignment overload)
- inheritance (when to use it, when not to use it)
- polymorphism (what it is, how to achieve it)
- templates

CS 2704 provides an introduction to designing classes, class relationships, inheritance and polymorphism, templates, etc.

Internal Documentation

See the Programming Standards page on the course website.

Function header documentation:

- purpose of function
- logical significance of parameters and return value (if any)
- who calls this function?
- who does this function call?
- preconditions — what does this function assume is true when it is called?
- postconditions — what does this function guarantee is true when it terminates (assuming the preconditions hold)?

Inline comments:

- describe purpose and design of local variables, constants, etc.
- describe purpose and design of major logical blocks

External Documentation

Class diagrams to model class relationships:

- indicate associations
- indicate aggregations
- indicate inheritance relationships

See the Programming Standards page on the course website.

CS 2704 provides an introduction to class diagrams and class/operation forms.

Class/Operation forms:

- describe structure and features of class
- describe purpose and design of class member functions

References

For Core C++ skills:

CS 1044 notes: http://courses.cs.vt.edu/~cs1044/notes.html

CS 1704 notes: http://courses.cs.vt.edu/~cs1704/oldindex.html

Parsing Tutorial on CS 2604 website

For OO background:

CS 2704 notes:
http://courses.cs.vt.edu/~cs2704/spring00/mcquain/Slides.html

For documentation and design:

Elements of Programming Style

A Practical Introduction to Software Design with C++, Stephen Reiss