Names, source files, and binaries

- ☐ Name management
  - ☐ Need to determine meaning of names at compile time
    - ☐ Many languages support short names in addition to fully qualified names
      - ☐ Java: xtc.oop.Point versus Point
      - ☐ C++: xtc::oop::Point versus Point
  - ☐ Java organizes classes, interfaces, and enums into packages
    - ☐ Declare package at top of file
      - ☐ package xtc.oop;
    - ☐ Import classes etc. with import declarations
      - ☐ import xtc.tree.Node;
      - ☐ import xtc.tree.*;
  - ☐ C++ organizes classes etc. into namespaces
    - ☐ Wrap declarations in namespace declarations
      - ☐ namespace xtc { namespace oop { ... } }
    - ☐ Declare what names are being used
      - ☐ using std::cout;
      - ☐ using namespace std;
- ☐ Source file management
  - ☐ Need to find referenced names at compile time
    - ☐ Make sure the classes etc. are used correctly
  - ☐ Java relies on a convention
    - ☐ One class per file, files arranged in directory hierarchy mirroring package names
    - ☐ Compiler automatically looks up source files, but we need to tell compiler root of source files hierarchy
      - ☐ -sourcepath command line flag
  - ☐ C++ relies on preprocessor
    - ☐ Header provides declaration, source file provides implementation
    - ☐ Dependencies need to be explicitly included; preprocessor actually includes text into source file before compilation
      - ☐ #include "Point.h"
        - ☐ Double quotes for application headers
      - ☐ #include <iostream>
        - ☐ less-than, greater-than signs for system headers
- ☐ Binary file management
  - ☐ Need to find code at runtime
    - ☐ Statically linked code includes ALL dependencies in one binary
    - ☐ Dynamically linked code resolves dependencies on demand
  - ☐ Java relies on dynamic linking
    - ☐ Each class compiles into a single class file
      - ☐ Again, directory hierarchy mirrors package names
    - ☐ Optionally, several class files may be grouped into a jar file
      - ☐ Jar file really is a zip file with some extra information
        - ☐ I.e., a compressed directory and file tree
    - ☐ Java virtual machine can automatically find binaries, but we need to tell it where to look
      - ☐ classpath provided by CLASSPATH environment variable and/or -cp command line flag
  - ☐ C++ relies on operating system
    - ☐ Code of several classes can be grouped into one library
      - ☐ All standard library code usually in one library
    - ☐ Libraries loaded from library search path of operating system