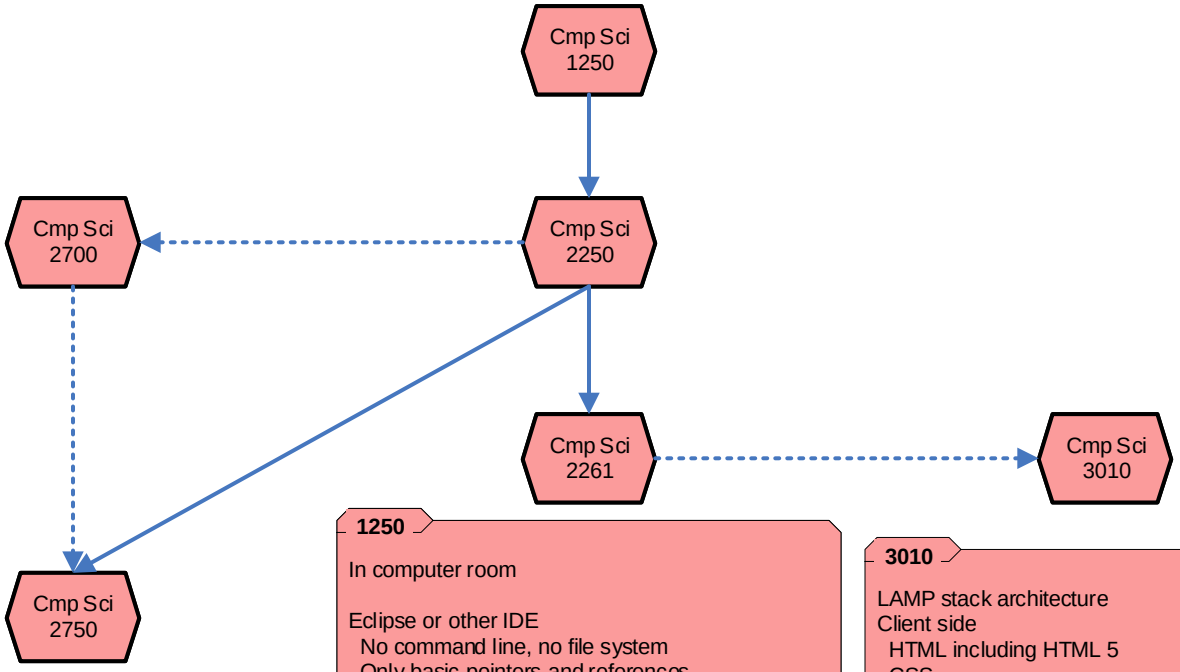
v2/9/2021

UMSL: Cmp Sci Introductory Courses

Topics for the required sequence of first six courses.
All listed courses required for any computing BS degree.



1250

In computer room

Eclipse or other IDE
- No command line, no file system
- Only basic pointers and references

C++ strings only
Computer-based problem solving
C++ basics, decisions, loops, 1-d arrays
Functions, overloaded functions, default parameters
Basic standard IO, text file IO, sequential access

3010

LAMP stack architecture
Client side
- HTML including HTML 5
- CSS
- JavaScript with jQuery
- Security

Server side
- PHP
- Database connectivity
- Security

Introduction to Python

2700

Data representation
Computer organization
Memory hierarchy
CPU fetch cycle
Basic assembly programming including stack

2250

Eclipse or other IDE (same as 1250)
- No command line
- No OS/file system
- No C strings with minor exceptions

C++ striing
Recursion
Pointers (no array access by pointers)
Dynamic memory including 1-d arrays
Class, no inheritance
Operator overloading
Multiple files, header files
Internal vs. external linkage, static global variables
Basic preprocessor
List, stack, queue – implemented from scratch
STL: vector, deque, stack, queue
Exceptions if time permits
Friends if time permits
Binary search tree
- properties, implementation, balancing if possible

More text file sequential processing
Binary files, basic operations
Basic searching/sorting

2750

In computer room

Unix/Linux File system
- directories
- permissions
- relative and absolute names
- basic system variables, changing env
- command line invocations and shell concept
- compilation vs interpretation for programs
- utilities and tools basics: find, grep, sort

regular expressions with sed examples
Vi/vim editor, basics only
Bash and scripting
- variables, sequence, condition and loops

Debugging
- concepts
- command-line gdb

Source control
- git local + serverl, intro to collaboration

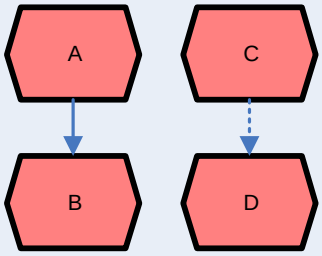
System pipe/redirection
Makefile, dependencies as time permits
Static vs dynamic libraries as time permits

C vs. C++, standards
Pointer vs. array, processing array by pointer
Malloc and dynamic memory
C strings, diff from STL string
Command line arguments
Preprocessor
- multiple inclusion, symbolic constants, macros
- cond compilation

System call
Fork/exec as time permits
Binary files as time permits

2261

Eclipse + IDE debugging + git
Basic Java syntax: variables, data, loops, decision, basic file operations (quick,1-2 weeks)
Class, inheritance, abstract, interface class
UML
Collections, generics
Java FX
Exceptions handling
Command line invocation
Binary files
Polymorphism
+ more advanced features



A solid-line arrow, as shown on the left, means that A must be taken before B (prerequisite). A dashed-line arrow means that C must be taken before or concurrently with D (co-requisite).

Students with an introductory programming background, but without 1250 transferred in, can request to start with 2250. They will have 1250 credited upon successful completion of 2250 and they can also request to register for 2700 concurrently with 2250.

1250 and 2250 can be taken in one semester as a combo course (one after another in half semesters).