CSE 333 – SECTION 10

Final Review

The Rest of C++

- Templates – template definitions vs instatiation
- STL, containers and iterators.
  - vector, list, map
- Smart pointers, using with STL.
  - auto_ptr (transfers ownership)
  - shared_ptr (reference counting)
  - scoped_ptr (no copy or assignment, manages memory only)
  - weak_ptr (using to break cycles and why this is needed)
- Subclasses, inheritance, virtual functions, dynamic vs static dispatch (function calls), vtables, constructors and destructors in subclasses
- Pure virtual functions and abstract classes
- Using class hierarchies with STL and smart pointers, assignment slicing, value vs pointer semantics
- C++ casts

Network Programming

- Basic network layers: physical, IP, TCP, application
- Packets, and packet encapsulation across layers
- IP addresses, address families (IPv4, IPv6), DNS, ports
- Stream sockets, file descriptors, read, write
- Client steps:
  - address resolution, create socket, connect socket to server, read/write (including retries), close
- Server steps:
  - determine address and port, create socket, bind socket to address/port, listen (and how the OS queues pending connections), accept connection, read/write, close
- Very basic HTTP and HTML

Concurrency

- Multiple processes and fork() (mostly CSE351 review), shared file descriptors and close() in forked processes
- Threads - concurrent execution inside a single process; know a few of the pthread basics (i.e., what it means to create a thread and start execution in a function)
- Use of concurrency to improve throughput and resource utilization
- ~~Non-blocking I/O and select - basic concepts~~

The Pre-Midterm Topics

- Don't forget the first half of the class, the final is cumulative!
- Brief summary:
- C programming, pointers and memory management
- POSIX libraries
  - read, write, open, close, etc.
- The beginning of C++
  - classes/modularity, references, operator overloading, and other differences from C