

## Final Exam Review

## Did I happen to mention?

- Final exam
  - The date for the Final has been decided:
  - Saturday, November 16<sup>th</sup>
  - 8am – 10am
  - 01-2000
- No makeup finals!

## Project Notes

- Parking Lot Problem: due tonight
- Team Evaluations: due tomorrow night

## Today

- Grand tour through CS4

## UML

- Class Diagrams
  - Note about associations
- Sequence Diagrams
- Use cases

## C++ Basics

- #include files
  - .C and .h files
- Variable types
  - Automatic
  - References
  - Pointers

## C++ Basics

- Functions
  - Pass by value
- Arrays
  - Arrays == pointers
  - No bounds checking

## C++ classes

- const
  - const functions
  - const arguments
  - const variables
- static
- Function / operator overloading
  - $A + b$  equivalent to  $A.operator+(B)$
  - operator=

## C++ classes

- Constructors
  - Default constructor
  - Copy constructor
  - operator=
  - Initializer list
- Destructor
  - Called when delete
  - Called when local variable goes out of scope.

## C++ other features

- Assertions
- Enumerated types
- This was the end of Exam 1

## Memory Management

- Storage types
  - Automatic (local) – stack
  - Static (global)
  - Dynamic (heap) – free store
    - new / delete / delete []
- Memory Woes
  - Memory Leak
  - Dangling Pointer
    - Reference to local variable
  - Pointer Ownership
  - Overwriting Arrays

## Inheritance

- Initializer list
- Polymorphism
  - Works only with pointers and references
  - Slicing
  - virtual functions
    - Pure virtual functions
  - Abstract class
    - Implicit not explicit
- Multiple inheritance

## Testing

- White box vs. black box
- Unit / integration / system test
- Programming by contract

## Templates

- Correct syntax
  - template <class X, class Y> not
  - template <X,Y>
- Class and function templates
- Test 2 ended here

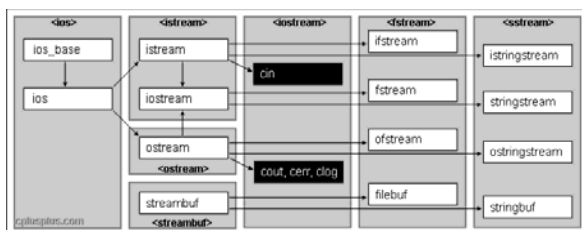
## STL

- Containers
- Iterators
  - Type::iterator
  - Const iterators
  - Traversing collections with iterators
- The deal with maps
  - pair<>
  - value\_type
- STL strings vs. char \*

## IOStreams

- Extraction
  - Read / operator>>
  - Read white space then read value
  - Check for error after read
- Insertion
  - Write / operator<<
  - Manipulators
- Formatted vs. Unformatted
- IO State (good(), bad(), fail(), eof())

## IOStream



## Exceptions

- Can throw anything
- Catching Exceptions
  - try/catch block ordering
- Exception specifications
- Stack unwinding
  - Dynamic memory & exceptions
- Exceptions vs. assertions

## File Organization

- Organization schemes
  - Sequential
  - Indexed
  - Indexed Sequential
  - Multi-indexed
- B-Trees
  - Insertion only

## Ethics

- No exam questions

## Questions?

## Once again...

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## Course evaluations...