

Final Exam Review

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X. Data Structures

B. Queues

1. enqueue operation
2. dequeue operation

C. Trees

1. Terminology (root, leaf, child node)
2. Binary Trees
3. Inorder, preorder and postorder traversals

D. Stacks

1. Push
2. Pop

E. Hashing

1. Two examples of using hashing
2. Hash functions
3. Linear probing
4. Chaining

F. Using Queues to model network packet transmissions

1. packet transmission time
2. propagation time
3. response time

XI. Introduction to C++

A. Syntax difference with C

1. Classes
2. Stream insertion and extraction operators
3. Header files
4. Inline functions
5. bool type
6. references (aliases)
 - a. returning from function (static only)
7. default arguments
8. unary scope resolution operator

B. Overloaded Functions

C. Function Templates

XII. Classes and Objects

A. Class Definitions and Objects

1. access-specifiers: public, private, protected

B. Member functions

1. Gradebook Example
 - a. string type, getline function

C. Data members

1. Get and Set functions
 - a. accessing private data members
2. Constructors

- a. default constructors
 - b. Constructor Example
 - c. overloading constructor functions
 - D. Placing Classes in Separate Files
 - E. Separating interface from implementation
 - 1. .h and .cpp files
 - a. Member function prototypes
 - 2. Binary scope resolution
 - 3. Using “driver” .cpp files for modular testing
 - F. Data validation with set functions
 - 1. Ensure that data in an object is in a particular format or range.
- XIII. More C++ Classes
- A. Preprocessor Wrapper
 - 1. #ifndef
 - B. Time Class Case Study
 - 1. setfill, setw
 - C. Class Scope and Assessing Class Members
 - 1. accessing class members externally with handles
 - 2. reentrant code
 - D. Access and Utility Functions
 - 1. Scope issues (file versus class scope)
 - 2. Dot member selection operator
 - 3. Arrow member selection operator
 - 4. private utility functions
 - E. Destructors
 - 1. exit and abort
 - F. Calling Constructors and Destructors
 - 1. Implicit calls by compiler
 - 2. call order
 - 3. Destructor Example
- XIV. Deeper into Classes
- A. const objects and const member functions
 - 1. const Example
 - 2. member initializer
 - B. Composition
 - 1. Composition Example
 - C. friend functions and friend classes
 - 1. friend function Example
 - D. this pointer
 - 1. implicitly and explicitly
 - 2. this Example
 - 3. cascaded member-function calls
 - E. Dynamic memory management
 - 1. new operator
 - a. dynamic allocation

- 2. delete operator
 - F. Static class members and static member functions
 - XV. Operator Overloading
 - A. Fundamentals of Operator Overloading
 - 1. keyword operator
 - 2. three operator exceptions (= & ,)
 - B. Restrictions on Operator Overloading
 - 1. precedence
 - 2. associativity
 - 3. number of operand
 - C. Operator Functions as Class Members vs. Global Functions
 - D. Overloading Stream Insertion and Stream Extraction Operators
 - E. Overloading Unary Operators
 - F. Overloading Binary Operators
 - G. Array Overloading Example
 - XVI. Inheritance
 - A. Introduction – definitions
 - 1. public, private and protected
 - B. Base Classes and Derived Classes
 - C. Five Examples of Base Class and Derived Class Relationships
 - 3. inheritance hierarchy with private members
 - 4. inheritance hierarchy with public members
 - 5. inheritance hierarchy with private members accessed through public member functions
 - D. Constructors and Destructors in Derived Classes
 - 1. components not inherited
 - 2. chain of constructor calls
 - 3. constructor/destructor in derived classes Example
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