Test 2 Exam Topics (Front)

(You may have 2 aid sheets front and back written in your own handwriting)

C++ Basics
> Namespace and scope resolution operator
> using namespace std
> Fundamental data types: bool, char, int, float, double…
> Declaring and initializing variables
> C control structures: if, else, while, do, for, switch, break
> C operators: +, -, *, /, --, ++, >>, <<,&&, ||, ^, %...
> Type conversions and typecasting
> Preprocessor directives: #include, #define, and inclusion guards
> I/O using cout, cin
> I/O stream manipulators: setw, setfill, hex, oct, dec, fixed, scientific, setprecision
> Post- and pre-increment and decrement
> Global and local variables, variable scope rules
> Storage class – automatic vs. static
> Standard c libraries (e.g. #include<cmath>)
> Standard math library functions: ceil, floor, fabs, exp, log, cos,sin, sqrt, tan, rand…
> Functions, function prototypes, argument coercion, overloading
> Default arguments in functions
> Pass-by-value and pass-by-reference
> Recursion (Fibonacci vs. Factorial)
> Order of precedence (I will provide for you!)
> Mixed expressions, integer division
> Arrays: size, initialization, passing to function
> Using function templates
> Pointers: declarations, initialization, dereferencing, arithmetic, arrays, strings, functions,
> Address operator &, dereferencing operator *, member access operator ->
> References vs. pointers
> Use of const keyword
> Know fstream objects – ifstream and ofstream objects – sequential text file manipulation
> C++ string objects vs. pointer base strings

Classes
> Constructors and Destructors – when are they used and how they are written
> Overloading constructors, initializer lists. etc…
> Class composition
> Member functions: public vs. private
> Set and get member functions
> Data members: Public and Private
> Friend functions and classes, const data members and functions
> Use of the "this" pointer in classes
> Operator overloading – member function vs. global operator function
> Function templates and class templates
> Using a vector and lists from the Standard Template Library (STL)
> STL – containers, iterators, and algorithms

Test 2 Exam Topics (Back)

Dynamic Memory Management
        C++ memory management features – new and delete operators
        Using dynamic memory management in class objects
        The rule of three

Inheritance
        Using a base class and a derived class
        Constructors, destructors, and member functions
        Inheritance constructor calls in initializer list
        Public inheritance
        Protected data members

Polymorphism
        Pointing base pointers at derived classes
        Using derived classes through a base reference
        Virtual and pure virtual functions
        Polymorphic datastructures (i.e. dynamic array of base pointers)
        Polymorphic functions (i.e. passing base pointer or base reference)

Using C++ and C strings and string functions
        Ability to use the member functions and operators (esp. + , ==, >, <)
        You will have to write some code to manipulate strings
        size();
        find ();
        rfind ();
        find_first_of ();
        find_last_of ();
        find_first_not_of ();
        c_str();
        substr();
        erase();
        insert();

Material from Labs
        State machines implemented in software
        Complex number objects
        Matrix objects