

CIS 15 Final Study Guide

This study guide intends to give a brief overview of some of the topics we covered in class. It can be used as a check list, however **you should know everything that we have covered even if it is not mentioned here.**

Topics

Unit IV

The study sources for this unit: Chapters 8 & 11 from Pohl textbook and lecture notes posted on the course website. Be sure to understand topics covered in Unit II before studying for this unit.

- What are *public*, *private*, *protected* keywords mean and what are they used for?
- What is derivation (inheritance) and composition?
- How do you derive from another class in C++ (syntax)?
- How do you form a compositional relationship with another class in C++ (syntax)?
- Difference between public and private inheritance.
- What is function overriding and how is it different than overloading?
- What is an abstract class and pure virtual function? How do you define an abstract class in C++?
- What is a header file, what does it contain?
- How do you (only) compile a source code in g++ to output an object file?
- How do you link object files in g++ to output an executable? Difference between compilation and linking.

Unit V

The study sources for this unit: Chapter 3 from Pohl textbook and lecture notes posted on the course website.

- What are pointers and references? How are pointers and references are declared as native types (e.g. int, char etc.) or as user-defined types (e.g. as suspect pointer or reference).
- How are pointers and references initialized and used? What does *dereferencing* means?
- What happens when you increment a pointer? What happens if you increment a reference?
- What is a generic pointer? How can you declare one?
- What is the difference between calling a function by value and by reference? How can you call a function by reference using pointers and references?
- What does the name of an array represent? What happens when you pass an array as an argument to a function?

- What are *new* and *delete* keywords mean? How is *new* used to dynamically determine an arrays size during run-time? How is *delete* used to deallocate the space once the array is no longer necessary?

Unit VI

The study sources for this unit: Lecture notes posted on the course website.

- What is recursion? What is the difference between iteration and recursion?
- Be able to rewrite a given function, which uses iteration, using recursion.
- What is the difference between linear and binary search techniques? What are the advantages and disadvantages of these techniques?
- Be able to write/modify functions that performs linear and binary search on arrays given a key.

Unit VII

The study sources for this unit: Related chapters from Pohl textbook and lecture notes posted on the course website and online reference <http://www.cppreference.com/>.

- What is a *template*? How are class and function templates declared (syntax)?
- Be able to write a template class/function given the instructions and be able to use it in the program by declaring an object with a type.
- What are containers? Name the containers in Standard Template Library (STL). What are *vector*, *list*, *set*, *map* containers used for?
- Be able to use *vector* and *list* templates to hold data of a given type. Specifically know:
 - how to include the library
 - how to create an object of given container (e.g. declare an integer vector object)
 - how to add/delete elements from the container using functions (`push_back()`, `pop_back()` etc.)
 - how to use the iterators