Administrative Unit: Computer and Mathematical Sciences Department

Course Prefix and Number: CISS 242

Course Title: Programming II

Number of Credit Hours: 3
Lecture Hours: 3
Laboratory Hours: 0

Catalog Description: A continuation of CISS 241. Topics include strings, pointers, recursion, classes, methods, and operator overloading. Prerequisite: Grade of C or better in CISS 241.

Prerequisite(s)/Corequisite(s): Grade of C or better in CISS 241.

Text(s): Most current edition of the following:

Dietel, H. M. & Dietel, P. J. C++ How to Program. Prentice Hall.

Course Objectives:

- To extend the language constructs and programming techniques available to the student.
- To use arrays, both one- and multi-dimensional.
- To work with strings and pointers, write simple recursive functions, and understand encapsulation using the object-oriented paradigm.

Measurable Learning Outcomes:

- Declare and initialize one- and two-dimensional arrays.
- Pass arrays as parameters to function.
  E. Write a function that will accept a two-dimensional double array parameter and print the values on the upper-right to lower-left diagonal.
  E. Write a function that will sort an array of characters.
  E. Write a template for a function that will sort an array into ascending order. Write a driver program that uses the function to sort an integer, float, and char array.
- Understand and implement a class.
- Understand, use and define constructors with or without initializer list.
  Q: What is a copy constructor and how would it be used?
  E: Demonstrate how a constructor can provide default values and show how to invoke such a constructor.
  Q: Is it possible to have a constant data member in a class? If you answer yes, demonstrate how such a data member would be initialized.
- Understand and create destructors.
  Q: When should a default destructor not be used?
- Understand and explain the difference between...
• Understand, use and write get and set methods.
  Q: What methods might be appropriate for an employee class that recorded basic information for a corporation's employees?
  Q: What are set and get methods?
• Understand, use and write static members.
  Q: Is it possible to access a static class data member even though no objects of the class have been instantiated? Explain.
• Understand, use and write constant methods.
  Q: What does it mean when a class method is declared as constant?
  Q: In general, which class methods should be declared constant and why?
• Understand the use of a pointer in a method.
  E: Demonstrate how you would use a pointer to print the private data members of a class.
• Understand and provide class support for constant objects.
• Understand and write friend functions.
• Understand and write friend classes.
• Understand and write overloaded operators.
  Q: Is it possible to overload both the pre- and post-increment operators? If you answer yes, explain how the compiler is able to distinguish the function signatures since the operator is the same in both cases.
  Q: Can brackets, ( ), be overloaded?
  Q: Can parentheses, ( ), be overloaded?
  Q: Under what circumstances must an overloaded operator be declared as a friend class?
  Q: For the questions below assume the existence of a simple Name class that stores first and last names as character strings using dynamically acquired memory. Private data members will consist of two pointers, one to the first name, firstNamePtr. and one to the last name, lastNamePtr.
• Show how to overload the stream insertion operator to print a Name object.
• Write a destructor for the class.
• Can the default assignment operator be used for this class or is it necessary to explicitly overload the assignment operator?
• Under what circumstances is it necessary for the programmer to explicitly code a destructor?
• Given objects N1 and N2 of the Name class, write one or more class methods that would support the following syntax:
  if (N1 < N2) …
  if (N1 < “Marry Sue”) …
  if (“Marry Sue” < N1) …

Topical Outline (major areas of coverage):
  • Arrays
  • Array parameters
• Sorting arrays
• Pointers and strings
• Pointers and arrays
• Structures and structure definitions
• Classes and class definitions
• Static class members
• Static class members
• Dynamic memory management in class objects
• Operator overloading

Recommended maximum class size for this course: 20

Library Resources: Online databases are available at http://www.ccis.edu/offices/library/resources.asp. You may access them from off-campus using your eServices login and password when prompted.

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Date: February 1, 2005

NOTE: The intention of the master syllabus is to provide an outline of the contents of this course, as specified by the faculty of Columbia College, regardless of who teaches the course, when it is taught or where it is taught. Faculty members teaching this course for Columbia College are expected to facilitate learning pursuant to the course objectives and cover the subjects listed in the topical outline. However, instructors are also encouraged to cover additional topics of interest so long as those topics are relevant to the course’s subject. The master syllabus is, therefore, prescriptive in nature but also allows for a diversity of individual approaches to course material.

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