Carleton University

Department of Systems and Computer Engineering

SYSC 2002 **Data Structures and Algorithms** **Winter 2011**

Week by Week Plan

Key for References:

- Notes: SYSC 2002 Notes by John Bryant and Lynn Marshall (available through IEEE)
- 09Notes: SYSC 2002 Notes from Fall 2009 / Winter 2010
- ECOR Notes: ECOR 1606 Notes by John Bryant (available through IEEE)
- M&S = Data Structures and Other Objects Using C++, 4th Edition, Michael Main and Walter Savitch (SYSC 2002 secondary reference)

Week 1: Overview of term / Review of ECOR 1606 Material

- course outline, goals of course, important dates
- references: course outline, week by week plan
- ifs, while, functions (pass by value and reference), arrays
- references: Notes Ch 1, 2; ECOR Notes Ch 6, 8

Week 2: Structures

- purpose, syntax, examples
- reference: Notes Ch 3; 09Notes Ch 1

Week 3: Introduction to Abstract Data Types

- information hiding, separation of concerns, example (treasury bills), Projects in Dev-C++, C++ classes
- assignment #1 due: ECOR 1606 Practical Exam Question
- lab test #1: ECOR 1606 Concepts
- references: Notes: Ch 4; 09Notes: Ch 2; M&S Ch 2

Week 4: Using a C++ Class

- purpose, examples (using Date Class, using String Class), main program syntax
- assignment #2 due: Structures
- references: Notes: Ch 5 part 1, Ch 6; 09Notes Ch 3 part 1, Ch 4; M&S Ch 2

Week 5: Writing a C++ Class

- purpose, example (writing Date Class), class syntax
- assignment #3 due: ADTs
- references: Notes Ch 5 part 2, Ch 7, Ch 8; 09Notes Ch 3 part 2, Ch 5, Ch 6; M&S Ch 2

Week 6: Introduction to Collections

- purpose, general collections, example (Bag of ints)
- assignment #4 due: Using a Class
- lab test #2: Using a Class
- midterm exam
- references: Notes Ch 9; 09Notes Ch 7; M&S Ch 3.1

Week 7: Collections and Pointers

- continue Bag of ints collection example, purpose of pointers, examples, C++ syntax
- assignment #5 due: Writing a Class
- references: Notes Ch 9, 10; 09Notes Ch 8, 9; M&S Ch 3.1, 4.1, 4.2

Week 8: Advanced Collections

- dynamically allocated arrays, destructors, deep copying, example (Bag of ints, stacks)
- assignment #6 due: Basic Collection
- lab test #3: Writing a Class
- references: Notes Ch 11, 13; 09Notes Ch 9, 11; M&S Ch 4.3, 7

Week 9: Linked Lists

- purpose, advantages/disadvantages, examples (Bag of ints, stacks), C++ syntax,
- assignment #7 due: Dynamic Arrays
- references: Notes: Ch 12, 13; 09Notes Ch 10, 11; M&S Ch 5.1, 5.2, 5.3, 5.5, 7

Week 10: Recursion

- purpose, lots of examples
- assignment #8 due: Linked Lists
- lab test #4: Pointers and Collections
- references: Notes Ch 14; 09Notes Ch 12; M&S Ch 9.1, 9.3

Week 11: Trees

- purpose, binary trees, tree operations, examples, other trees
- assignment #9 due: Recursion
- references: Notes Ch 15; 09Notes Ch 13; M&S Ch 10

Week 12: Queues

- purpose, queue as linked list, queue as ring array
- assignment #10 due: Binary Trees
- lab test #5: Recursion
- references: Notes Ch 16; 09Notes Ch 16; M&S Ch 8

Week 13: Review