Boston University Metropolitan College

Data Structures with C++

CS 341 C1, Fall 2017
Course Format: On Campus Face-to-Face

Instructor: John S. Maslanka, Ph.D.   **Classroom:** SHA 202
email: maslanka@bu.edu
Office hours: before class or by appointment
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Course Description

The student is expected to gain an Object-Oriented understanding of Data Structures using the C++ Programming Language. Topics include data abstraction, encapsulation, information hiding, and the use of recursion, also creation and manipulation of various data structures: searching and sorting algorithms lists, stacks, queues, trees, hashing, and graphs. Programming methods for accessing these structures are at the heart of understanding the subject matter of this course. Students are encouraged to assist in the development and enhancement of course materials.

Preliminary Expectations:

All students have successfully completed MET CS 231 or the equivalent in an academic environment. Also, all students are expected to be acquainted with the usage of a full-capability IDE such as MS Visual Studio, Oracle NetBeans, IBM Eclipse, MacOSX XCode, etc.
Homework assignments are to be completed on a system such as Windows-2000, -NT or –XP or Windows-7 or -10, or a UNIX or linux-based system or Apple OS system, which supports the ANSI-98 Standard version of C++ or higher. The current version is C++11, ratified and published in 2011.
All students are expected to participate in class discussions.

TextBooks:
- **DATA STRUCTURES & Other Objects Using C++, 4th edition,** by Michael Main and Walter Savitch, Pearson Addison-Wesley, 2011, ISBN13: 978-0-13-212948-0.
- **Professor's Class Notes and Programs on Blackboard.** (See Courseware.)

References:
- **Introduction to Programming in C++**, edition 1, by John Maslanka, publisher Kendall-Hunt, 2009, ISBN 978-0-75475-6465-7.
- **C++ How To Program**, 9th edition, by Harvey and Paul Deitel, Pearson, ISBN 978-0-13-337871-9, 2014.

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Courseware:
Online **Blackboard** will be used in conjunction with this course. The CS341 Fall 2015 website will be self-enrolling and you are expected to review its contents frequently.

Course Policies

1) Attendance & Absences – All students are expected to attend every class. Please inform me by email as soon as possible if you need to be absent from a class. The student is expected to make up all work from the missed class or classes including class notes, exams and homework assignments.

2) Assignment Completion & Late Work – All homework assignments are due on the dates specified in the attached course calendar. The Midterm exam will be a takehome exam and will be distributed in class and made available on Blackboard on the date specified in the course calendar. It will be due on the due date specified in the calendar. The Final Exam will be given in class on the date during the Final Exam period of the semester, which is specified in the course calendar. All other course work and assignments must be completed and submitted before the date of the Final Exam.

3) **Code of Academic Conduct** – Academic Integrity is required of all students. Cheating and plagiarism will not be tolerated in any Metropolitan College course. Such actions will result in no credit for the assignment or examination and may lead to disciplinary actions. Please take time to review the Student Academic Conduct Code:
http://www.bu.edu/met/metropolitan_college_people/student/resources/conduct/code.html.
The Academic Code of Conduct should not be understood as a discouragement for discussing the course material or your particular approach to a problem solution with other students in the class or from forming and participating in study groups. On the contrary – you may share your thoughts, questions and solutions with your classmates. Nevertheless, if you choose to work in a group, you as the individual student will be expected to produce your own original solutions to homework and exam problems.

Grading Criteria:

Midterm Exam: 25%, Final Exam 25%, Assigned Homework Problems: 50%. There will be five homework/lab assignments, for which the due dates are specified in the course calendar. Additional assignments will be made available on a per-request basis. The problem statements for these assignments will be approved by the Professor. The students will email their completed **source.cpp** programs for the homework solutions, as well as Midterm and Final Exam, to the professor at maslanka@bu.edu. All homework assignments and the Midterm should be emailed to the professor prior to 6:00PM on the due dates listed in the course calendar.

Dr. Maslanka is a professional writer of computer language compilers and run-time systems. He is retired from Hewlett Packard Company/Compaq Computer Corporation/ Digital Equipment Corporation, having worked in their Marlboro, MA, and Nashua, NH, facilities from 1975 to 1984 and from 1991 until his retirement in 2002. Also, he has been Adjunct Faculty in the BU MET College Computer Science Department since 1973.

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Course Calendar Fall 2017:   Class Meeting Dates, Lecture Topics and Due Dates

Date	Topic	Readings	Assignments due
Sep 6	**Course Introduction and Overview of Course Topics, Review of C++ classes Keyboard and text file IO. Homework Statement 1 available.**	**Ch 1, Appendices A-L, Blackboard**	**None**
Sep 13	**Pointers, References and Dynamic Arrays, Recursion, Inheritance, Aggregation, Abstract Data Types**	**Ch 2, 4, 9, 14, Blackboard**	**Homework 1 due in email by 6:00PM**
Sep 20	**Sorting Agorithms – Bubble, Merge, Selection; Homework Stmt 2 available**	**Ch 12, 13**	**None**
Sep 27	**Sorting Algorithms (cont), Big-O notation, Programmatic Efficiency**	**Ch 1, 12, 13**	**Homework 2 due in email by 6:00PM**
Oct 4	**Singly Linked Lists, Container classes Homework Statement 3 available**	**Ch 3, 5**	**None**
Oct 11	**Discussion of Potential Midterm Content; Use of Containers with Singly Linked Lists, Stacks**	**Ch 5, Blackboard**	**None**
Oct 18	**Midterm take-home Exam distributed; Hashing; C++ Template functions and classes, STL and Iterators**	**Ch 6**	**Homework 3 due in email by 6:00PM,**
Oct 25	**Discussion of Midterm; Doubly linked Lists, Queues, Homework Stmt 4 avail.**	**Ch 6, 7, 8**	**Midterm Exam due in email by 6:00PM**
Nov 1	**Introduction to Trees; Building Binary Trees -- Traversals and Searches**	**Ch 11**	
Nov 8	**Building Binary Trees -- Reorganizations -- AVL and Full**	**Ch 11**	**None**
Nov 15	**Binary Trees – Removals Homework Statement 5 available**	**Ch 11, 12**	**Homework 4 due in email at 6:00PM**
Nov 22	**Thanksgiving Holiday – no class**	**None**	**None**
Nov 29	**Introduction to Graphs / Networks – Creation of Graphs, Traversals**	**Ch 15**	**None**
Dec 6	**More Graphs – examination of algorithms; Overview for Final**	**Ch 15 All**	**Homework 5 due in email at 6:00PM**
Dec 13	**Reading Period – no class**	**All**	**None**
Dec 20	**Final Exam in-class 6:00 – 8:00PM**	**All**	**Final due date for all outstanding work***

*Note: All outstanding assignments are due to the Professor in email by 6:00PM on the evening of the Final Exam. Any gradables which are received after that time will not be graded. My final course grades are due to the Registrar by 5:00PM, Dec 22.