Boston University Metropolitan College

Data Structures with Java

MET CS 342 A1
Course Format - On Campus
Fall 2021

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Office hours: by appointment or after class

Class Time: Monday - 6:00 p.m. – 8:45 p.m.
Class Location: MCS B37

Course Description

This course is designed to familiarize and instruct students in the concepts of data structures, data abstraction, information hiding, and software interaction, as utilized in software engineering. The course will describe the concepts listed above and will demonstrate their usage in modern software engineering, with Java. An emphasis is placed on the implementation of these techniques and the management of their usage.

Text

Michael Main "Data Structures & Other Objects Using Java™", Fourth Edition,
Prentice Hall, 2012 (*Required Text Book, available at BU Bookstore*)

Courseware

http:// learn.bu.edu

BU Community COVID-19 Public Health Policies

All students returning to campus will be required to be vaccinated against COVID-19, and upload information about their status (including applications for a medical or religious exemption or an extension) to the Patient Connect portal. In addition to the vaccine requirement, students must follow all other safety protocols, including the face covering policy, and screening, contact tracing, and testing requirements. At the beginning of each class you will be asked to show a green Healthway compliance badge on your mobile device to the instructor, and wear your face mask over your mouth and nose at all times.

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Class Format and Grading Policy Policies

New material will be presented in weekly lectures. Reviews, exercises, and homework solutions will be covered during lectures. Student participation is highly recommended, although not mandatory, and it is possible for participation to lead to extra credit.

Weekly (more or less) Homework problems will be assigned, in addition to 3 programming assignments. Homework will be assigned weekly and is due the following week. Late homework and programs will not be accepted unless permission by the instructor was granted prior to the due date. A mid-term and final exam will be completed in class, and the breakdown of grading for the course is as follows:

Homework:	15%
Programming Assignments:	45% (1st 10%, 2nd 15%, 3rd 20%)
Mid-term Exam:	15%
Final Exam:	25%

This course is an intensive analysis of Software Engineering "tools". The student should be prepared to spend sufficient time and energy on this course to allow for successful completion of the course work.

The intent of this course is to allow the student to learn to build data structures, under no circumstances should (non-student created) already existing data structures be used in any assignments. No collection types from **java.util.*** should be used. **Use of packages such as ArrayList, HashMap, LinkedList, Dictionary, Stack, etc. will result in failure of assignments.** Use of facilities in Java.util.*, such as **Scanner, Random**, etc. is allowed.

Academic Conduct Code – Work handed in by students should be of that student's design. Discussion of approach to problems with other students is encouraged, but the actual work on a project should be of an individual nature. Cheating and plagiarism will not be tolerated in any Metropolitan College course. They will result in no credit for the assignment or examination and may lead to disciplinary actions. Please take the time to review the Student Academic Conduct Code: http://www.bu.edu/met/metropolitan_college_people/student/resources/conduct/code.html.

Class Meetings, Lectures & Assignments

Lectures, Readings, and Assignments subject to change, and will be announced in class as applicable within a reasonable time frame.

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Week		Topic	Reference
(1)	13 Sep 21	Introduction, Administrative Issues. Software Design, Tools (Compilers, IDEs, etc.), Runtime analysis, Big O Notation, Test and Debugging. Java Review, Methods, expressions, control flow. Classes, Packages, Parameters	Chapters 1, 2
(2)	20 Sep 21	Collection Classes - Methods, Static vs. Dynamic objects,	Chapter 3
(3)	27 Sep 21	Linked Lists – Arrays, Bag Abstract Data Type, Nodes, Node tools, and Linked List Tools	Chapter 4
(4)	4 Oct 21	Generics – Wrapper Classes, and Autoboxing. Generic Classes, Generic Nodes, Interfaces, and Iterators	Chapters 5
(5)	12 Oct 21	TUESDAY! - Stacks – Introduction, Applications, Abstract Data Types, Array-based, Linked-list Based Stacks	Chapter 6
(6)	18 Oct 21	Queues – Introduction, Applications Abstract Data Types. Linked Queue implementations, array-based queue implementations.	Chapters 7
(7)	25 Oct 21	In Class Lab. Review for Midterm.	
(8)	1 Nov 21	Midterm Exam	
(9)	8 Nov 21	Recursive Thinking - Examples, theory implementations of recursion.	Chapter 8
(10)	15 Nov 21	Trees – Binary Trees, Linked and Array based representations Traversals, In-Order, Pre-Order, Post Order	Chapters 9
(11)	22 Nov 21	Searching – Serial searching, Binary searching, Open Address Hashing, Chained Hashing	Chapter 11
(12)	29 Nov 21	Sorting – Quadratic Sorting Algorithms, Recursive Sorting Algorithms, Heaps	Chapter12
(13)	6 Dec 21	Graphs – Directed, and undirected Graphs, Dijkstra's Shortest Path Algorithm. Review for Final.	Chapter14
(14)	13 Dec 20	Final Exam	

rev 9-1-21
This syllabus is subject to change