

Instructor: Ari Mermelstein

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Email address for homework submissions:

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Course Web page: www.sci.brooklyn.cuny.edu/~mermelstein

Class meeting hours: TY9: Tuesdays and Thursdays 9:05-10:45 AM in room 4141 N

Office hour and room: Tuesdays 12:30 - 1:30PM and 5:00 - 6:00PM in 532 NE
or by appointment.

Note: It is okay for any of my students to come to either office hour, but I will give preference to night students in the night office hour.

Required Textbook

Data Structures with C++ Using STL Second Edition by William Ford and William Topp.
ISBN: 01308580-1.

Prerequisite

CISC 3110 - Advanced Programming Techniques

Information most needed from CISC 3110:

1. How to allocate, use, and deallocate memory from the heap
2. Pointer arithmetic
3. Recursion
4. Classes- including:
 - accessors/mutators
 - Constructors / Destructors
 - Copy constructors/default constructors
 - operator overloading

Course Objectives

After successfully completing this course, students will be able to

1. Demonstrate understanding of the abstract properties of various data structures such as stacks, queues, lists, and vectors and be able to use these classes effectively in application programs.
2. Demonstrate ability to use the STL data structures, and understand the advantages and disadvantages of each one, including the applications of the various data structures.
3. Discuss different possible implementations for various data structures in more than one way, compare the different implementations and explain the advantages and disadvantages of the different implementations.
4. Demonstrate understanding of and be able to program various sorting algorithms, and be able to compare the efficiency of these algorithms in terms of both time and space.
5. Trace and code recursive functions, especially those used to implement the data structures discussed above.

Academic Integrity

The faculty and administration of Brooklyn College support an environment free from cheating and plagiarism. Each student is responsible for being aware of what constitutes cheating and plagiarism and for avoiding both. The complete text of the CUNY Academic Integrity Policy and the Brooklyn College procedure for policy implementation can be found at www.brooklyn.cuny.edu/bc/policies. If a faculty member suspects a violation of academic integrity and, upon investigation, confirms that violation, or if the student admits the violation, the faculty member *must* report the violation.

Non-Attendance Because Of Religious Observance

The state law regarding non-attendance because of religious beliefs is on p. 53 in the Bulletin. Please let me know now if you have to miss an exam.

Center for Student Disability Services

In order to receive disability-related academic accommodations students must first be registered with the Center for Student Disability Services. Students who have a documented disability or suspect they may have a disability are invited to set up an appointment with the Director of the Center for Student Disability Services, Ms. Valerie Stewart-Lovell at (718) 951-5538. If you have already registered with the Center for Student Disability Services, please provide your professor with the course accommodation form and discuss your specific accommodation with him/her.

Important Dates For the Spring 2017 Semester

Friday, February 2 : Last day to add a course.

Monday, February 5: Last day to file for elective course Pass/Fail.

Monday, February 12: College is closed.

Thursday, February 15: Last day to file for Spring 2018 graduation.

Friday, February 16: Last day to drop a course without a grade.

Monday, February 19: College is closed.

Tuesday, February 20: Conversion Day / Monday schedule

Friday, April 6 : Last day to resolve incompletes from Fall 2017 and Winter 2018.

March 30-April 8: Spring Recess

Wednesday, April 11: Conversion day / Friday Schedule

Monday, April 16: Last day to drop a course with a W grade.

Thursday, May 17: Reading day.

Grades

First Test - 25%
Second Test - 25 %
Final Exam- 30%
Homework - 15%
Participation- 5%

Final grade calculation

Your letter grade will be determined as follows:

A+ : 98-100
A : 93-97
A- : 90-92
B+: 87-89
B: 83-86
B-: 80-82
C+: 77-79
C : 73-76
C- : 70 - 72
D+: 67-69
D: 63 - 66
D- : 60 - 62
F : < 60

Exam Dates - Tentative

The first exam will be held on Tuesday March 13.
The second exam will be held on Tuesday May 1.

Each exam will last only 1 hour and 40 minutes.

The final exam (not tentative) for TY9 will be on Thursday, May 24 at **8:00 AM (NOT 9:05!)
room TBA.**

Note: The final exam will be cumulative, and I am not allowed to give any more time than 2 hours.

Homework

Homework will be assigned every 1-2 weeks, and you will typically have 2 weeks to complete assignments. Assignments will typically include multiple files. You may use any operating system you like, but please don't rely on system dependencies. (I.e. #include all files that are necessary, whether or not it compiles or works without it.) Please don't email executable files; just code. **Only code that is commented and documented, explaining what the code does will be marked fully correct. If I can't ascertain the correctness of your solution, I can not possibly grade it properly.**

Homework must be emailed to the homework email address, with the subject line:

CISC 3130 Homework # <number> - <Full name>

When you submit your homework, you should get an automated message saying "Homework submitted." Please hold on to this receipt in case there's a dispute over me receiving your homework. Please don't zip your files together.

The homework assignments will be graded out of 10.

Late homework will not be accepted, unless you have spoken to me ahead of time, explaining why you need an extension. I am more than happy to grant extensions if you are honest with me.

Note: I have found that students that don't do the homework when assigned do very poorly on the exams and in the course.

Topics List

1. Review of CISC 3110.
2. The MyArray class
3. The STL vector template class
 - different constructors and their uses
 - the vector operations push_back(), operator[], and pop_back().
 - uses for vectors
4. Implementing a vector class
5. Algorithm Analysis and Big Oh Notation.
6. The STL list template class.
 - different constructors and their uses
 - the list operations push_back(), push_front(), pop_back(), pop_front().
 - list iterators to go through a list.
 - uses for lists.
7. Implementing a list class
 - list node structures

- how to link these nodes into a linked list structure.
 - how to write functions to insert, remove, and print all nodes in a linked list.
 - doubly linked lists.
8. STL stacks and queues
 - operations push(), pop(), empty(), and what these operations do
 - uses for stacks and queues.
 9. Implementing stacks and queues
 10. STL priority queues
 - operations push(), pop(), empty(), and what these operations do.
 - uses for priority queues.
 11. Implementing a priority queue.
 - what a maximum heap is and how to implement it.
 - how to implement the functions insert() and removeMax().
 12. Sorting algorithms and their complexities
 13. STL set template class.
 - the set operations insert(), find(), and erase().
 - uses for sets.
 14. STL map template class.
 - the map operation [] for lookups and inserts.
 15. Implementing maps and sets
 - Binary search trees
 - Hash Tables.
 16. Graphs and Graph traversals
 - Adjacency Matrices
 - Adjacency Lists
 - DFS (Depth first traversal)
 - BFS (Breadth first traversal)
 17. Functional Programming and the <algorithm> header file
 - Templates with functions
 - how to use iterators to leverage the standard library set.