0 Summary of Changes

All interactions will be online after Spring Break. Special rules for “Remote Learning” are going away to be replaced with general online rules. One homework assignment will be waived.

1 Introduction

This course serves as introduction to data structure and algorithms via programming in an object-oriented language. It serves as a gateway into graduate study in Computer Science.

2 Desired Outcomes

Students will be competent in object-oriented programming in Java, more specifically, they will be

- able to use and implement standard data structures (dynamic arrays, linked lists, binary search trees and hash tables), standard abstract data types (sequences, tables, maps, graphs, stacks, queues) and simple algorithms (insertion sort, merge sort, binary search, depth-first search, breadth-first search);
- able to use inheritance and overriding to implement designs using dynamic-dispatch for polymorphism;
- able to use and implement generic containers and iterators following the design of the “collections” hierarchy.

3 Requirements

Students must have received a ‘C’ or better in CompSci 251. This course assumes that you are familiar with and have mastered the material from CompSci 251. In particular, this class assumes students are

1. able to write, compile, and execute Java programs;
2. able to debug Java programs using the Eclipse debugger;
3. able to use control structures, including methods, recursion, and exceptions;
4. able to use standard datatypes including arrays, strings, and array lists;
5. able to define classes with information hiding: abstract data types (ADTs);
6. able to use object-oriented techniques like class and object variables and methods, inheritance, and polymorphism;
7. familiar with different kinds of testing, especially JUnit.

4 Texts

The required textbook for the course is


5 Grading

The grade for the course will be computed from the following parts:

0% Collaboration Quiz
You must pass a collaboration quiz in lecture.

40% Exams
There will be a week of midterm examinations worth 20% of the grade; these will take place during regular lecture and lab hours. There will be one final exam worth 20% of the grade.

39% Homework
There will be a homework due every week (13 in all), partly programming and partly text. Each homework is due at **10:00 pm on Mondays** Note that this is a hard deadline, since the solutions will be posted at the same time. No late homework will be accepted. Additional plugins or software may be required for completing the homework assignments. After all homeworks are graded, the lowest grade will be dropped and replaced with a “free” 100% homework. This policy is in place to give students flexibility in times of personal emergencies. Do not misuse it.

11% Labs
There will be twelve or more lab assignments that should be done during lab. You are recommended to attend or do the exercise on your own, but these are not graded for CompST 751 students. Instead, you must find and summarize (250–500 words) in your own words a recent (less than 20 years old) academic paper on the same topic as the lab this week. Make sure that your summary describes how the paper connects to the topics of the lab. Don’t waste words detailing aspects of the paper irrelevant to the lab topic. You must submit a URL to the paper in the ACM digital library along with your summary in Canvas. This must be completed by Friday 10pm.

10% Quizzes
Over the course of the semester, there will be 12 (or more) graded quizzes during lecture. Quizzes are related to material covered during lectures. Each quiz counts 1% of the total grade and the ten best quiz scores will be counted. There is no way to make up a missed quiz. After Spring break, quizzes will be done online through Canvas.

Exceptions to these rules can be made only in extraordinary circumstances. Advance notice of a need for an exception should be given whenever possible.
5.1 Criteria

Programs and written assignments will be graded for correctness, suitability, style, clarity and practicality. Projects with compiler errors, or which import non-standard packages may be penalized. Although we may provide solutions to some assignments, there are usually a wide variety of correct answers to any particular assignment.

5.2 Academic Honesty

All graded assignments must be your own work (your own words), but you may work with other people as long as you list their names prominently on the first page of the assignment, and/or in a comment at the top of the assignment, for example:

// Wendy Lee, Homework #6, CS 351
// I discussed this assignment with Sam White,  
// and Pat Long. We looked at each other’s design notes, 
// but did not exchange the copies.

For this course, verbal communication and collaboration using non-code text or hand-written code is permitted, as long as it is properly documented. Documentation must also be made for help from anyone not in the course, such as a tutor, friend, or relative, and for information off the Web. You must also document any help that you gave to another person—be very careful that you do not tell them the steps they need to use. When in doubt, have them contact an instructor or authorized tutor.

For this course’s homework assignments, you are required to show your work, not just show the final product. This is done using git by committing after every stage of your coding, and at least every day that you do work on the program. So before you make changes to your code during debugging (for instance), please commit your code if you haven’t committed lately. Showing your work is your best defence against allegations of misconduct; you can show how you gradually reached your solution.

Please delete any copies of assignments from previous semesters. (You may first copy the files to a removable disk ("USB key") labeled with your name/login and give that to the instructor for safe-keeping to be returned at the end of the semester.) Any use of the work from previous semesters of this class is not permitted and is grounds for failing the class.

You may not make copies of assignments through email, messaging, USB drives or any other automatic copying technique, except where specifically indicated in an assignment. Even a screenshot of code may not be sent, except to the class instructors or authorized tutors. Similarly, you may not make xerographic copies of portions of homework, or give people print-outs of your programs. At the very least, you must write every word in your assignments. If you are unsure whether something is permitted, please check with an instructor or TA. If you turn in a program which is an electronic copy (or a variation of a copy) of other people’s, then the source and people who give credit to the source will receive zero for the assignment, while those who do not give credit may be given an ‘F’ grade for the course. Do not send your programs by to other people! It will not help them learn and they will turn in your code or a minor variation as their own.

For this course, we will use Piazza as a place where you can ask and answer questions. Our page is located at www.piazza.com/class/uwm/cs351. The same rules apply: never share code, and don’t let anyone else do your work for you. Do discuss concepts, ideas, and general strategies. Students who are giving good help on Piazza, and the right kind of help, will get small amounts of extra credit in the course.

Whether or not you have permission of the other, submitting someone else’s work as your own is plagiarism, a serious instance of academic misconduct. Everyone is responsible for learning the material themselves. Some of the assignments may be graded in person, especially in cases where the individual contribution to the assignment is not clear. If you are graded in person, you will be expected to demonstrate that you have mastered techniques used in the material you submitted.

5.3 Grade equivalents

All assignments will be assigned a numeric grade. Often, however, letter grades will be used. This table shows how these letter grades are converted into numeric values.
A grade written _ is not yet available; it does not mean zero. A grade of I means there is some work the student has not yet done. If this work is not turned in, the grade may revert to a grade of zero.

5.4 Course Grades

At the end of the course, the numeric grade will be converted into a letter grade according to the following scale:

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>A+</th>
<th>A</th>
<th>AB</th>
<th>B</th>
<th>BC</th>
<th>C</th>
<th>CD</th>
<th>D</th>
<th>DF</th>
<th>F</th>
<th>P</th>
<th>IP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equivalent Score</td>
<td>100</td>
<td>95</td>
<td>90</td>
<td>85</td>
<td>80</td>
<td>75</td>
<td>70</td>
<td>65</td>
<td>60</td>
<td>40</td>
<td>100</td>
<td>50</td>
</tr>
</tbody>
</table>

There is no curve, but the instructors reserve the right to increase a grade if they believe it would not reflect the student’s mastery of the material. A grade can only be decreased for academic dishonesty.

6 Workload

This course meets weekly for 60 contact hours. You also have required reading of about 500 pages, which we estimate will take approximately 50 hours. There are thirteen required homework assignments, each of which will take 10 or more hours. This yields a total estimated workload of 240 hours.

7 Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Relevant reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/20</td>
<td>Abstract Data Types</td>
<td>Ch. 2</td>
</tr>
<tr>
<td>1/27</td>
<td>Dynamic Arrays</td>
<td>Ch. 3</td>
</tr>
<tr>
<td>2/3</td>
<td>Iterators</td>
<td>Lecture notes</td>
</tr>
<tr>
<td>2/10</td>
<td>Linked Lists</td>
<td>Ch. 4</td>
</tr>
<tr>
<td>2/17</td>
<td>Linked List Variations</td>
<td>Lecture Notes</td>
</tr>
<tr>
<td>2/24</td>
<td>Generics, Linked Iterators</td>
<td>Ch. 5</td>
</tr>
<tr>
<td>3/2</td>
<td>Stacks and Queues</td>
<td>Ch. 6, 7</td>
</tr>
<tr>
<td>3/9</td>
<td>MIDTERM EXAMINATIONS</td>
<td>Ch. 2–7</td>
</tr>
<tr>
<td>3/16</td>
<td>SPRING BREAK</td>
<td></td>
</tr>
<tr>
<td>3/23</td>
<td>Extended SPRING BREAK</td>
<td></td>
</tr>
<tr>
<td>3/30</td>
<td>Binary Search Trees</td>
<td>Ch. 9</td>
</tr>
<tr>
<td>4/6</td>
<td>Navigating Trees</td>
<td>Lecture Notes</td>
</tr>
<tr>
<td>4/13</td>
<td>Maps</td>
<td>Ch 5.7, Oracle’s Map tutorial</td>
</tr>
<tr>
<td>4/20</td>
<td>Hashing</td>
<td>Ch. 11</td>
</tr>
<tr>
<td>4/27</td>
<td>Graphs</td>
<td>Ch. 14</td>
</tr>
<tr>
<td>5/4</td>
<td>Sorting</td>
<td>Ch. 12</td>
</tr>
<tr>
<td>5/11</td>
<td>Final Examination (Friday May 15, 3:00-5:00pm)</td>
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8 Notes

After Spring Break, all interactions will be online. Office hours will proceed online and lecture and lab times will be converted into synchronous sessions (using Collaborate/Ultra within Canvas). Some lectures and discussions will have posted materials (videos or documents) to complement the synchronous sessions.

If you will be needing any accomodation in this course for any reason, please contact the instructor. Please also be aware of the standard University policies: http://www.uwm.edu/Dept/SecU/SyllabusLinks.pdf