Syllabus

Course Information
Name: CS315E Introduction to Algorithms
Semester: Fall 2006
Time and Location:
- Online
  - No face-to-face scheduled time
  - Live online session opened one hour/week at scheduled times
- Hybrid
  - Tuesday 5:30 to 7:30 PM in STH135 Computer Lab
  - Includes live online session one hour/week at scheduled times

Instructor
Mihaela Sabin, Ph.D.
Associate Professor of Computer Science
Office: Regis 305
Office hours on campus:
- Regis Annex, Room 305 and Conference Room
  - Tuesday and Thursday
    - 11:00 AM to 11:45 AM
  - Tuesday: 1:00 PM to 2:30 PM
  - Thursday 1:00 PM to 3:00 PM
  - Monday and Wednesday by appointment
- STH135 Computer lab:
  - Tuesday and Thursday 7:30 PM to 8:30 PM

Course Description
An introduction to algorithm analysis and design with focus on using both mathematical tools and object-oriented principles. Techniques of theoretical and experimental analysis and algorithmic strategies are introduced using object-oriented programming in Java. Emphasis on recursion, search, sorting, trees, and graphs algorithms, and on implementation and applications of various algorithmic strategies.

Prerequisites: CS250 and MA310 or equivalent with the instructor’s permission.

Objectives: Upon completion of this course, students should be able to:
- Analyze the statement of a computing problem and design an object-oriented algorithmic solution
- Be proficient in Java programming
- Apply Java programming skills to implement problem solution designs
- Determine the efficiency of your algorithmic solution
- Document your design and code in a professional manner by using UML and javadoc tools
- Adhere to standard programming style conventions

Course Overview: The course will cover
- Object-oriented programming: encapsulation, polymorphism, and inheritance
- Array-based and linked structures
- Analysis of algorithms: asymptotic notation and counting
- Searching and sorting
- Trees and sets: ordered lists, binary search trees, and hash tables
- Graphs
- Memory management
Course Schedule
Lists class activities, homework and reading assignments, and tests:
   • Assigned reading (R#) and assigned homework (H#)
   • Tests (Test#)
   • Class labs (L#)
   • Due dates for all assigned work
The schedule web page on the Blackboard course web site is organized by weeks. Weekly postings include class agendas, feedback to graded assignments, and class presentations.

Check every class schedule in Blackboard and your Rivier email prior to class. Check your own class notes for additional information regarding next class. There are occasions when the web site might not be accessible or might not have the latest updates announced in class. If you have questions, email me at msabin@rivier.edu. I'm always one email away.

A copy of the schedule is included at the end of this document.

Course Requirements
1. Participation
2. Reading and Homework Assignments
3. Laboratory Projects
4. Projects
5. Examinations
6. Academic Honesty and Collaboration
7. Portfolio
8. Attendance
9. Late Assignments, Make-Up Exams, Missed Classes

This course emphasizes participation and learning through direct engagement, in and outside the class, with your peers and the course instructor.

This course has a very strong practical component that requires daily practice of programming skills and application of concepts. Reading and homework assignments are assigned every class and are due next class.

Students work on lab projects that are assigned and conducted in class. You are expected to finish these projects in class or before next class.

There are four projects in which students demonstrate their own understanding of the course material, application of concepts, and programming practices.
There are two take-home tests and one take-home final exam.

The examinations and projects are entirely students' individual work.

Participation in class becomes tangible, sharable, and transferable through the course portfolio. Students develop and maintain course portfolios that collect all the work produced by students and instructor in this course.

Missed classes contradict the strong participatory character of the class. Therefore, class attendance is not optional.

The policy for late assignments, missed labs, and make-up exams is very strict and applies only in exceptional cases of student illness, accident, or emergencies that are properly and PROMPTLY documented.

1. Participation [priceless]
   Participation is essential to this course. Students participate in class discussions that are conducted both in and outside the classroom.

   The Blackboard communication tools are designed to monitor and reflect all the dialog generated by the course material presented in class, by class activities and assigned reading, homework, and project assignments. These tools are:
   - Announcements
   - Discussion Board
   - Drop box
   - Email

   With student permission, an emailing list will be created to keep us all just one email away. Rivier email addresses are part of the list. You are required to check your Rivier email daily, and necessarily PRIOR TO each class. Course emails should be managed in your Rivier email account.

   Create a course subfolder in your Rivier email Inbox. Save all course-related emails in it. You can uses your Rivier email to email yourself work you have done at home. This way you'll have it available in the lab when you come to class. Another efficient way to transfer and synchronize work that you have in your Rivier computer account and home computer is to use a USB memory key.

   Install the VPN client on your home machine to have direct access to your Rivier network drive, then map the Rivier network drive to a logical drive on your machine. The VPN client works only you have a broadband Internet connection (cable or DSL).

   Make sure you know the path of your Rivier network drive. It's usually \pds\students\ followed by the first initial of your login name, followed by \ (backslash), and followed by your login name. If you live on campus, you simply need to map the network drive to a logical drive on your machine. Check regularly that all the work you do on your machine gets saved to the network drive.

2. Reading Assignments [priceless]
   Are essential to:
   - Understand and learn the material presented in class
   - Complete the class projects
Work on the class lab projects
Do well on tests.

Reading assignments are assigned every class and cover the material to be presented in the next class. Details on reading assignments are in the class agendas in the corresponding Week # folders on the Schedule web page.

3. Homework Assignments [18 points]

There are six homework assignments. Homework assignments are graded as follows:

- 3 points for very good solutions.
- 2 points for solutions ranging from fair to good.
- 1 point for poor solutions.
- 0 points for no submission or no attempt to work on the assigned work.

Occasionally, decimal points are given if performance falls in between the rubric values.

**Deadline for Homework Assignments.** Homework assignments are given every class and are due the following class. No late submissions are accepted, unless you comply with the “Late Assignment, Make-Up Exams, and Missed Classes” policy.

The homework assignments schedule is in the course schedule document on the Schedule web page. Details on homework assignments are in the class agendas in the corresponding Week # folders on the Schedule web page.

IMPORTANT! Always check your personal class notes and Rivier email to make sure that you have the latest information about homework. This is absolutely necessary when the course web site is temporarily down or you don’t have access to it.

4. Laboratory Projects [priceless]

All classes include lab projects that are designed and implemented individually or by teams. There are occasions when hard copies of the .java files and project documentation are given to the instructor at the end of the class.

Lab projects are not individually graded. They do contribute though to the credit students earn for the portfolios they develop during the semester. They are also essential to student performance on tests and homework and programming assignments.

5. Projects [20 points]

There are four project assignments written in Java. Each represents 5 points of the final grade.

Although collaboration is allowed to discuss assignment specifications, language constructs, test data, Java library features, and conceptual aspects of the solution design, the Java programs and program documentation you submit must be entirely your own work.

**Deadlines for Project Assignments:** Project assignments are ”starred” homework assignments (denoted H#*), and are due the following class. No late submissions are accepted, unless you comply with the “Late Assignment, Make-Up Exams, and Missed Classes” policy.

If you want to receive prompt feedback, start early on writing the program, participate in class and
online communication, and always submit your assignment on time. If your program does not compile, list the compilation errors in the documentation file.

For each project assignment you have to submit a project write-up in the Blackboard digital dropbox. The projects are submitted PRIOR to the beginning of the class. See project submission Guidelines for more information.

The project assignments schedule is in the course schedule document on the Schedule web page. Details on project assignments are in the class agendas in the corresponding Week # folders on the Schedule web page.

6. Examinations [55 points]
   There are two tests (15 points each) and a final examination (25 points).

   All course examinations are open texts, notes, and Web courseware. No collaboration is allowed while taking these examinations, that includes email or other Internet-enabled exchanges among students. Questions are addressed to the instructor and will be answered for the benefit of the entire class.

   The examinations schedule is in the course schedule document on the Schedule web page.

   The tests are in electronic format and are ready for download from the digital drop box at scheduled times. Tests are graded electronically and dropped in each student's drop box.

7. Academic Honesty and Collaboration [priceless]
   Collaboration is encouraged and supported in the classroom through lab activities and discussion, and outside the classroom via emails, course bulletin board posts, and interaction among students to understand an assignment description, course concepts and their application, programming features, debugging errors, outcome requirements. However, the Java programs, program documentation, homework write-ups you submit must be entirely your own work.

   You are expected to abide by the College policy on Academic Honesty (see the statement at the end of this document).

8. Portfolio [7 points]
   You are expected to maintain a course portfolio in which you assemble all the work produced during the course by you, your peers, and instructor. The portfolio becomes an indispensable resource for your learning of the subject matter. It is also a means of expressing yourself professionally in the field: materials are timely filed, well organized for easy access, and presented in a high-quality format.

   The student portfolio is maintained in electronic format. Create a course folder in your Rivier computer account on the network drive. The folder has the following subfolders: Homework, Labs, Projects, and Tests. When you work on a Java project that is a homework assignment or a project assignment or a lab, the folder that contains all the files has the name H3 or L5. See project submission Guidelines for more information.

   You earn 3 points for partial portfolio submissions when you take a test, and a final 1 point at the time of the final examination. Zipped portfolios are submitted in the digital drop box prior to the class when an examination is taken.

9. Attendance [priceless]
Attendance is taken every class. Students are responsible to attend all classes. Although there is no penalty for absences in this course, failure to attend impacts negatively the quality of your performance and the quality of our class as a whole.

Reading and homework assignments or project assignments are due every class. Teams develop lab projects every class. Except for exceptional situations you should not miss any class. In one sentence: attendance is not optional. It is really, truly (I cannot emphasize it enough!) priceless!

You are expected to abide by the College policy on attendance. See the Statement on Attendance at the end of this document.

10. Late Assignments, Make-Up Exams, Missed Classes [not a choice!]
Policies for late assignments and make-up exams are very strict and they apply only in exceptional cases of student illness, accident, or emergencies that are properly documented. Paraphrasing the attendance policy, on time submission of assignments is not an option.

A late submission may be granted ONLY IF you:
- Let me know ahead of time that the deadline will be missed.
- Provide proof or explanation that serious medical, personal, or family circumstances prevented you from meeting the deadline.
- A minimal submission is presented at the due date.

There is no penalty for late submissions IF AND ONLY IF you comply with the late submission policy. If you omit to inform me about a missing deadline and do not present a minimal submission, you receive no credit for your assignment. Granted late submissions are due the following class.

It is your responsibility to make arrangements with the instructor for make-up exams before the class that follows the missed class.

If you miss a class, it is your responsibility to get informed about class presentation and activities. Use the web site and contact your peers. I will meet with you to answer your questions only after you have prepared for and got informed about the missed class.

Grading
Final grades are broken up as follows:
- Homework assignments: 6 submissions x 3 points each = 18 points
- Projects: 4 submissions x 5 points each = 20 points
- Tests: 2 tests x 15 points each = 30 points
- Portfolio: 7 points
- Final Exam: 25 points

Scheduled Work and Activities

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<tr>
<th>W #</th>
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<th>Due Reading, Lab Activity, Test Taking</th>
<th>Assigned Homework &amp; Next Class Reading</th>
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<tr>
<td>1</td>
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<td>Sep 12</td>
<td>R1</td>
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<td>• Ch1 Encapsulation</td>
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| | | | | - Ch 3 Inheritance  
| | | | | - Ch 4 Stacks and Queues  
| | | | |   o 4.1 Stack Interface  
| | | | |   o 4.3 Exceptions  
| | | | |   o 4.4 Queue Interface  
| | | | | - Ch 5 Array-Based Structures  
| | | | |   o 5.1 Shrinking and Stretching Arrays  
| | | | |   o 5.3 List Interface  
| | | | | L2 |
| 3 | T | Sep 26 | R3 | L2 |
| | | | | - Ch 5 Array-Based Structures (5.4 to 5.5)  
| | | | | - Ch 6 Linked Structures  
| | | | | L3 |
| 4 | T | Oct 3 | R4 | L3 |
| | | | | - Ch 7 Analysis of Algorithms  
| | | | |   o 7.1 Timing  
| | | | |   o 7.2 Asymptotic Notation  
| | | | |   o 7.3 Counting Steps  
| | | | |   o 7.4 Best and Worst Cases  
| | | | | - Ch 8 Searching and Sorting  
| | | | | L4 |
| 5 | T | Oct 10 | R5 | L4 |
| | | | | Test 1  
| | | | | R5 Review  
| | | | | No Lab  
| | | | | No homework assigned  
| | | | | R6 |
| 6 | T | Oct 17 | R6 | L5 |
| | | | | - Ch 9 Recursion  
| | | | |   o 9.1 Thinking Recursively  
| | | | |   o 9.2 Analyzing Recursive Algorithms  
| | | | |   o 9.3 Merge Sort  
| | | | | - Ch 10 Trees  
| | | | | L6 |
| | | | | Mid term grades due Friday, Oct 20. |
| 7 | T | Oct 24 | R7 | L6 |
| | | | | - Ch 11 Sets  
| | | | |   o 11.1 The Set Interface  
| | | | |   o 11.2 Ordered Lists  
| | | | |   o 11.3 Binary Search Trees  
| | | | | L7 |
| 8 | T | Oct 31 | R8 | L7 |
| | | | | - Ch 11 Sets  
| | | | |   o 11.4 Hash Tables  
| | | | |   o The Java Collection Framework  
| | | | | L8 |
| 9 | T | Nov | R9 | L8 |

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Americans with Disabilities Act (ADA)
Rivier College wants to provide reasonable accommodations to students with disabilities. To accomplish this goal effectively and to ensure the best use of our resources, the College expects students to provide timely notice of a disability to the Office of Special Services for verification and for evaluation of available options. Any student whose disabilities fall within ADA should inform the instructor within the first two weeks of the term of any special needs or equipment necessary to accomplish the requirements for the course. To obtain current information on this procedure, contact the Office of Special Services at telephone extension 8497.

Academic Honesty

Plagiarism and cheating are serious breaches of academic honesty. In general, plagiarism is defined as the presentation of someone else’s work in whatever form: copyrighted material, notes, film, artwork, reports, statistics, bibliographies, and the like, as one’s own, and failing to acknowledge the true source. Quoting word-for-word, or almost so, or using the argumentation of another source without acknowledging this dependence also constitutes plagiarism. Cheating is defined as the giving or attempting to give or to receive unauthorized information or assistance during an examination or in
completing an assigned project. Submission of a single work for two separate courses without the permission of the instructors involved is also a form of cheating.

If students are unsure whether a specific course of action would constitute plagiarism or cheating, they should consult with their instructor in advance.

Penalties for plagiarism and cheating vary with the degree of the offense and may take the form of the following academic sanctions:

- the grade of F for the work in question;
- the grade of F for the course;
- notification of the department chair and/or Academic Dean of the College of the misconduct of the student;
- recommendations that the student be suspended or dismissed from the College.

Statement on Attendance

The classroom is the heart of the educational experience at Rivier College because it provides, uniquely, a formal setting for the important exchanges among faculty and students. Regular and punctual attendance at all classes, essential for maximum academic achievement, is a major responsibility of Rivier College students. Failure to attend and contribute to the classroom environment significantly and demonstrably reduces the quality of the educational experience for everyone in the classroom. As a result, absences almost always impact the quality of performance.

As part of its commitment to a quality educational experience for all members of the Rivier community, the College formally requires specific attendance policies to be developed by its professors and reviewed by the Division Head and Academic Dean. Any attendance policy used by an individual professor as a criterion for evaluation must be specified in the course syllabus and presented to students during the first week of classes. These policies can be found in respective course syllabi, and may include reasonable penalties and sanctions for excessive absences.

In the event of prolonged illness, accident, or similar emergency, it is the responsibility of the student to notify both the professor and the Office of the Academic Dean. Students must remember that it is always their responsibility to make up the work they may have missed during an absence from class. Students are directed to confer with their professors when their absences jeopardize satisfactory progress. Whenever a professor is absent without notification, students are expected to wait fifteen minutes before leaving and to sign an Attendance List, which a class member delivers to the Office of the Academic Dean.

Instructors are required to record attendance and alert the Registrar when a student fails to attend the equivalent of two weeks of courses (2 absences for a course meeting once a week, 4 absences for a course meeting twice a week, 6 absences for a course meeting three times a week). The student will then be alerted that he/she is in danger of falling under the 'habitual non-attendance policy" (see below).

**Habitual Non-Attendance Policy**
Habitual non-attendance is defined as an absence in any course (for any reason whatsoever) equating to three full weeks of missed class sessions (3 absences for a course meeting once a week, 6 absences for a course meeting twice a week, 9 absences for a course meeting three times a week).

It is the responsibility of the student to notify the College of any intention to withdraw from a course or withdraw from the College. The College will attempt to resolve the issue of habitual non-attendance with the student; however, the College reserves the right to withdraw students who are no longer attending classes. Habitual non-attendance in one or more classes may result in administrative withdrawal from the class or classes affected, withdrawal from the College or, in cases with extenuating circumstances, an administrative leave of absence. In such cases a grade of W or NF will be assigned to the classes affected according to the appropriate date published in the academic calendar.

Students who have attended no class sessions of a course or courses from which they are registered by the end of the drop/add period will be dropped from each class not attended. If a student never attended any courses during the drop/add period, the student will be withdrawn from his/her full schedule of courses.