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Computer Science 170

Fundamentals of Computer Science II

Lecture: 10:50 – 11:50 MWF, Trex 363
Lab: 2:50 – 5:50 Tue, Trex 263

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Instructor:	Dr. Stephen Hughes
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e-mail:	hughes@roanoke.edu
Phone	375-4901
Office Hours:	Mon: 2:30 – 4:30
	Tue: 10:00 – 11:00
	Wed: 3:30 – 4:30
	Appointment or Open Door

COURSE OBJECTIVES

This course is part two of a three part introduction to the discipline of computer science. The course focuses on the design and use of data structures and algorithms and their implementation in the programming language Java. Programming topics include arrays, linked structures, lists, stacks, queues, recursion, and object-oriented programming. Theoretical topics include computational complexity and mathematical induction, which will be used to reason about algorithms and programs.

COURSE CONTENT

Texts
Java Software Solutions: Foundations of Program Design, 5th Edition, by John Lewis and William Loftus, Addison-Wesley, 2006.

Java Software Structures: Designing and Using Data Structures, by John Lewis and Joseph Chase, Addison-Wesley, 2004.

Quizzes & Exams
Short quizzes will be given weekly to assess your progress in the course. These are designed to ensure that you are keeping up with the pace of the class and to give you a sense of the level of mastery that is expected. Quizzes will generally be given at the beginning of Friday's class, however you should be prepared for each class. No make-up quizzes will be offered. The lowest quiz score will be dropped from your final grade. There will be three midterm exams and a comprehensive final exam.

Lab
This course has a required three-hour lab every Tuesday afternoon from 2:50 until 5:50. The purpose of the lab is to give the student a structured experience in software design, implementation, and testing, and to increase the student's ability to use and understand the tools available for software development in the Linux environment. Some labs will have a pre-lab assignment designed to prepare the student for lab.
Unless otherwise specified:

- Pre-lab assignments must be handed in at the beginning of lab.
- The lab itself should be worked on for the duration of the lab session and turned in before leaving. If the lab cannot be completed in the allotted time, I will accept it at the beginning of the following class session.

Programming Projects

Programming projects are designed to give the student the opportunity to put into practice the problem solving and programming skills they have learned. As such they are one of the most important aspects of the course both for student learning and for assessment. There will be approximately four projects during the semester to be handed in for a grade. You are encouraged to start on your projects immediately when assigned and get help from the instructor as needed.

Important: Projects are to be done individually. You may ask class members, lab assistants, and others for help with system questions (e.g., "How do I save a file in emacs?", "How do I run my Java program?") or general information about a topic covered in class (e.g. "What is the symbol for boolean AND?") provided you can do so without divulging or receiving information specific to the solution of the programming project. *You may not discuss any aspect of the design or coding of a programming project with anyone except me*. This policy will be strictly enforced; see the section on Academic Integrity below.

MCSP Conversations

The Math, Computer Science and Physics department offers a series of discussions that appeal to a broad range of interests related to these fields of study. These co-curricular sessions will engage the community to think about ongoing research, novel applications and other issues that face our discipline. A list of these conversations will be maintained on the course home page.

Members of this class are invited be involved with all of these meetings; however, participation in at least two of these sessions is mandatory. For each of the required sessions, students will submit a one-page paper reflecting on the discussion. This should not simply be a regurgitation of the content, but rather a *substantive* personal contemplation of the experience. These papers are due within one week of the session.

Grading

The course grade will be based on 3 tests, lab work (including pre and post lab assignments), programming projects, and a comprehensive final examination.

30%	Tests	10%	Quizzes
12%	Lab	3%	MCSP Conversation
25%	Projects	20%	Final Exam

	$87 \leq$ B+ < 90	$77 \leq$ C+ < 80	$67 \leq$ D+ < 70	
$93 \leq$ A	$83 \leq$ B < 87	$73 \leq$ C < 77	$63 \leq$ D < 67	F < 60
$90 \leq$ A- < 93	$80 \leq$ B- < 83	$70 \leq$ C- < 73	$60 \leq$ D- < 63	

Tentative Test Dates: (Test dates are subject to change with at least one week's notice.)

Test Dates:		
Test #1	Friday,	Feb 8
Test #2	Friday,	Feb 29
Test #3	Friday,	Mar 28
Final Exam	Monday Apr 28	(8:30 – 11:30)

COURSE TOPICS AND TENTATIVE SCHEDULE

Topic	Sections in text
Arrays	L&L 7.0-7.7
Inheritance and abstract classes; GUIs	L&L 8.1-8.5
Polymorphism Searching (linear, binary) Sorting(selection, insertion)	L&L 9.1-9.6 class notes and handouts
More searching and sorting	L&L Ch 9
Computational complexity Functions (poly, exp, log) Applications in searching, sorting	Class notes and handouts
Recursion	L&L Ch 11
Exceptions	L&L Ch 10
Mathematical induction	Class notes and handouts
Recurrence relations	Class notes and handouts
Software engineering, collections	L&C Ch 1, 2
Linked structures	L&C Ch 3
Stacks	L&C Ch 6
Queues and lists	L&C Ch 7, 8

COURSE POLICIES

Attendance Policy
Class attendance is vital to your success in this course; material covered during missed sessions is the responsibility of the student. Conversations held in class illuminate the published class materials and are subject to evaluation on subsequent tests and quizzes. Moreover, quizzes and in-class assignments are not available for make-up.

Late Assignments
I understand that circumstances conspire against us all, and occasionally, deadlines cannot be met. If you need to hand in an assignment late, you must contact me via e-mail 24 hours in advance of the due date to *negotiate* a new submission date. Any late submission without prior approval will be penalized 10% per day. Electronic "glitches" do not waive your responsibility to submit your work in a timely manner.

Academic Integrity
Honesty and integrity are qualities we value in ourselves and in others. Therefore, you are expected to be fully aware of your responsibility to maintain the highest degree of integrity in all of your work. It is accepted that you have read and understood the standards for academic integrity at Roanoke College.

The Guidelines for Computer Use as stated on page 15 of the Academic Integrity Handbook are particularly relevant to this course. In the electronic age, source code is often available on the Internet or through CD-ROMs that supplement textbooks. If you use code from any other source, you are required to cite the source by adding comments to the top of your files. At no time should there be an electronic transfer of class-related code between students.

You should also be aware that much of your work will be done in a public computer lab. You are responsible for keeping your work confidential. This includes logging out of your account when you are finished working on a terminal and making sure that print-outs of your code are not left behind.

By submitting work under your name, you are indicating that **you** have completed the assignment. This means that you should be able to completely explain all the details of your work, i.e. every line of code in computer programs. Failure to be able to account for your decisions (to my satisfaction) will result in referral to the Academic Integrity Council.

Office Hours
Office hours are an opportunity for you to clarify details you may have missed in class. If you come to office hours with a problem on the assignment, you should come prepared to answer questions, as well as asking them. You should come prepared with access to an electronic version of your work.

Electronic Devices
Cell phones and pagers must be *turned off* prior to entering the classroom or lab.

The use of any electronic device during a quiz or exam is strictly prohibited. This includes PalmPilots, Pocket PCs, and Blackberrys. Any use of such device during a quiz or exam will be considered a breach of academic integrity. Basic handheld calculators may be used on certain quizzes and exams only when announced by the instructor.

Special Services
If you are on record with the College's Special Services as having special academic or physical needs requiring accommodations, please meet with me during my regular office hours or schedule an appointment as soon as possible. We need to discuss any accommodations before they can be implemented. Also, please note that you must make arrangements for extended time on exams and testing in a semi-private setting at least one week before *every* exam.

End of Course
This course officially ends with the scheduled Final Exam period. No work for this class will be accepted beyond that point.