EECS 560: Data Structures  
Fall 2017

Course Description
Data abstraction and abstract data types. Topics include the design and implementation of dictionary, priority queues, concatenated queues, disjoint set structures, graphs, and other advanced data structures based on balanced and unbalanced tree structures. Special emphasis will be placed on the implementations of these structures and their performance tradeoffs. Both asymptotic complexity analysis and experimental profiling techniques will be introduced. Labs will be used to provide students with hands-on experience in the implementations of various abstract data types and to perform experimental performance analysis.

Lectures
MWF, 8am-8:50am, 2112 Learned Hall

Labs
M, 9-10:50am, 1005D Eaton Hall (Section 1)  
W, 12-1:50pm, 1005D Eaton Hall (Section 2)  
F, 12-1:50pm, 1005D Eaton Hall (Section 3)

Instructor
Dr. Suzanne Shontz  
3016 Eaton Hall  
Dept. of Electrical Engineering and Computer Science  
Office Phone: (785) 864-8816  
E-mail: shontz@ku.edu

Graduate Teaching Assistant
Apoorv Ingle  
2041 Eaton Hall  
Department of Electrical Engineering and Computer Science  
E-mail: apoorv.ingle@ku.edu

Office Hours:
M 3-4pm, WF 9am-10am, or by appointment (Dr. Shontz)  
**TR 12-1pm or by appointment** (Apoorv) *(updated 10/3/17)*

Important Note: Dr. Shontz has a second office in 203 Nichols Hall. At times you will be asked to come to Nichols Hall to meet with me if you request to do so outside of office hours. *Hence, it is recommended that you set-up meetings in advance via e-mail.*
Text

Prerequisites
EECS 210 (Discrete Structures) and EECS 448 (Software Engineering I).

Course Requirements
Lecture attendance is required, although attendance will not be recorded. Laboratory attendance is required and will be recorded. Three or more unexcused absences from lab will result in a failing grade for this course. Two late arrivals to lab will count the same as one unexcused absence. The course requirements for EECS 560 include class participation, five homework assignments, twelve laboratories, two midterm exams, and a final exam. The homework assignments will require a combination of problem solving and mathematical analysis of data structures. The laboratories will require computer programming in C++. Prior knowledge of C++ is a prerequisite for the course.

Homework assignments will be due approximately ten days after they are assigned. Due dates for homework assignments will be announced in class. (The dates listed on the course calendar are intended simply as a planning guide for me.)

Laboratories will be due approximately seven days after they are assigned. Due dates for laboratories will be announced in lab. At times, a two-week lab will be assigned (due to the scheduling of the lab sections).

There will be a penalty of 20% per day for homework or laboratories handed in up to 48 hours late. No homework assignments or laboratories will be accepted more than 48 hours late. No late homework assignment or laboratory will be accepted which is either (i) more than 48 hours late, or (ii) is not submitted by 11:59pm the day before Stop Day.

There will be two midterm exams and one final exam; the dates for the exams are given on the course calendar. Please reserve these dates on your calendar. The exams will be closed-book. A make-up midterm or final exam will be given to any student who is absent from an exam for a compelling reason and gets permission from the instructor.

The exams will cover topics drawn from the lectures, homework, and laboratories, and from the underlying data structures and their analyses.

Grading
The homework assignments will count for 10% of the final grade. Laboratories will count for 20% of the final grade. Each midterm exam will count for 20%, and the final exam will count for 30% of the final grade, respectively.

Important note: You must earn at least a 60% average on the homework/laboratory and exam portions of the course in order to receive a course grade of D or better. Failure to earn at least a
60% average on either the homework/laboratory or the exam component will result in a grade of F for the whole course.

Only after meeting the 60% minimum requirements for both the lab and the exam portions of the course, your final grade in the class will then be computed by using the weighted average given above, the lab attendance policy below, and the following scale:

A: [92%-100%]
A- [90%-92%]
B+: [88%-90%]
B: [82%-88%]
B- [80%-82%]
C+: [78%-80%]
C: [72%-78%]
C- [70%-72%]
D+: [68%-70%]
D: [60%-68%]
F: [0%-60%].

Depending on overall student performance in the course, I reserve the right to lower (but not raise) the above grade cutoffs. However, this is not something you should count on.

**Fractional Grading Policy.** This grading policy is in accordance with the fractional grading policy which was adopted by the School of Engineering. In particular, plus/minus (+/-) grades may be used in the School of Engineering at the instructor’s discretion. The plus or minus sign describes intermediate levels of performance between a maximum of A and a minimum of F in a course. Courses in the School of Engineering will not issue plus or minus grades below a D. Intermediate grades are calculated in a student’s GPA as 0.3 units above or below the corresponding letter grade (1 grade point of A = 4 pts, 1 grade point of A- = 3.7 pts, 1 grade point of B+ = 3.3 pts, and so on). This course, i.e., EECS 560, will utilize +/- grading in Fall 2017 as indicated above.

**Class Schedule**
The course calendar shows a week-by-week syllabus. The dates and order of topics are subject to change by the instructor. Any significant changes will be announced in class.

**Course Website and E-mail**
There is a course website available at the following URL:


E-mail will be used for announcements not given in class.

**Class Forum**
There is a class forum which students can use for discussions which is available at the following URL:

piazza.com/ku/fall2017/eecs560/home.

The discussion forum will be moderated by the GTA.
Computing Facilities
Students will have access to the linux machines in Eaton 1005D computer laboratory for running C++ codes. While you can edit and compile your code anywhere, your code must run on the linux machines (i.e., the EECS cycle servers) in this laboratory.

Additional Course Policies
1. You are responsible for all information we post on our class web site, including any possible changes to assignments after they are assigned.
2. Unless otherwise stated, all material from (a) lectures and laboratories, (b) homework assignments, (c) the underlying concepts, and (d) information posted on the class website are fair game for exams.
3. Except medical device(s) and laptop, no calculators, cell phones, or electronic devices will be allowed. No such devices should be out in the open. If you are using a laptop in class, it must be used solely for taking notes.
4. Occasionally you may not understand why points have been deducted from your homework assignment, laboratory, or exam. If so, you should come to see us. We will re-grade your whole homework assignment, laboratory, or exam, if, and only if, you contact us within one week after it has been returned in class. No homework assignment, laboratory, or exam, will be re-graded after it has been returned for more than one week, regardless of whether you were in class or not that day.
5. We are not responsible for any homework assignment, laboratory, or exam that you do not pick up after they have been returned in class. You will need to come to office hours to collect such work after it has been returned.
6. Keep all copies of your work. If you dispute any recorded score, you must bring in your original work for verification in order to have it changed.
7. If you have a mandated religious observance with conflicts with a scheduled midterm examination, please contact me privately at the beginning of the semester so that a make-up examination can be scheduled at a mutually acceptable time. (The university policy which applies to religious observances in conflict with examinations does not apply to the final examination since instructors do not schedule final exams.)

Academic Integrity Policy
Cheating in the course will not be tolerated. All submitted work must be strictly your own individual effort; there is no group homework assignment/laboratory/exam in this course. Discussing general strategies or approaches with other is OK. (For example, discussing what data structures are the most efficient way to implement a particular algorithm is OK. However, discussing how to implement a particular data structure is not OK.) Sharing your work or copying is cheating, and submitting work that is not all yours, independent of your source, is also considered cheating. If you are having difficulty with a homework assignment or laboratory, please see the GTA or me. Anyone found cheating will receive a 0 on that work (homework assignment or laboratory) or an F in the class (midterm exam or final exam). A second incident will result in an F grade for the course. These penalties will be received by all parties involved, following a hearing with the instructor. In all cases, reports of academic misconduct will also be made to the dean’s office where further disciplinary action may be taken in accordance with School of Engineering and University of Kansas guidelines. This may result in much more
serious sanctions. It is your responsibility not to let anyone copy your homework assignment/lab/exam; otherwise, you may have to pay the price for others' misconduct.

**Academic Achievement and Access**
Any student in this course who has a disability that may prevent him/her from fully demonstrating his/her abilities should contact me personally as soon as possible so we can discuss accommodations necessary to ensure full participation and facilitate the educational opportunity.

The Academic Achievement & Access Center (AAAC) coordinates accommodations and services for all KU students who are eligible. If you have a disability for which you wish to request accommodations and have not contacted the AAAC, please do so as soon as possible. Their office is located in 22 Strong Hall; their phone number is (785) 864-4064 (V/TTY). Information about their services can be found at [http://www.achievement.ku.edu/](http://www.achievement.ku.edu/). Please contact me privately in regard to your needs in this course.

**Concealed Carry Policy**
Individuals who choose to carry concealed handguns are solely responsible to do so in a safe and secure manner in strict conformity with state and federal laws ([http://concealedcarry.ku.edu/information](http://concealedcarry.ku.edu/information)) and KU weapons policy ([http://policy.ku.edu/university-kansas-policy-weapons-including-firearms-effective-july-1-2017](http://policy.ku.edu/university-kansas-policy-weapons-including-firearms-effective-july-1-2017)).

Safety measures outlined in the KU weapons policy specify that a concealed handgun:

- Must be under the constant control of the carrier.
- Must be out of view, concealed either on the body of the carrier, or backpack, purse, or bag that remains under the carrier’s custody and control.
- Must be in a holster that covers the trigger area and secures any external hammer in an un-cocked position.
- Must have the safety on, and have no round in the chamber.

**Additional Lab Policies**
1. The purpose of the laboratories is to give you an opportunity to implement various concepts developed in class, thereby learning them more deeply than is possible simply by reading the book and attending lectures.
2. Questions dealing with labs and laboratory assignments must be directed to the GTA. If you still have difficulty after talking with the GTA, see the instructor for help.
3. All programs must be written in C++ and executable using our departmental linux systems. If you use another C++ development environment at home or elsewhere, it is your responsibility to make sure the code you submit compiles and runs correctly in the linux environment used in the lab. We will not debug your program for you. A program that will not compile will earn you at most 50% of the points.
4. Since you are learning to implement data structures, you may not use STL (not even vectors and strings), and you may not use code that you find on the web or books other than your text as part of your program.
5. Different lab assignments may have different scores as well as different due days. Read the lab assignment carefully and, if you have any questions, consult with your GTA.

Suzanne M. Shontz, Associate Professor, Department of Electrical Engineering and Computer Science, University of Kansas, shontz@ku.edu
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<th>Week</th>
<th>Lecture Topics</th>
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<td>1</td>
<td><strong>Aug. 21, 23, and 25:</strong> Introduction to Algorithmic Analysis</td>
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<td>2</td>
<td><strong>Aug. 28, 30, and Sept. 1:</strong> Introduction to Algorithmic Analysis/Dictionary and Hash Tables</td>
<td>Homework #1 out on Sept. 1.</td>
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<td>3</td>
<td><strong>Sept. 6 and 8:</strong> Dictionary and Hash Tables</td>
<td>No class on Sept. 4 (Labor Day). No lab this week.</td>
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<td>4</td>
<td><strong>Sept. 11, 13, and 15:</strong> Trees and Their Implementations</td>
<td>Homework #1 due on Sept. 11. Homework #2 out on Sept. 11.</td>
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<td>5</td>
<td><strong>Sept. 18, 20, and 22:</strong> Trees and Their Implementations/Search Trees</td>
<td>Homework #2 due on Sept. 20.</td>
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<td>6</td>
<td><strong>Sept. 25, 27, and 29:</strong> Midterm Exam #1/Search Trees</td>
<td>Midterm Exam #1 on Sept. 27.</td>
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<td>7</td>
<td><strong>Oct. 2, 4, and 6:</strong> Priority Queues and Heaps</td>
<td>Homework #3 out on Oct. 2.</td>
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<td>8</td>
<td><strong>Oct. 9, 11, and 13:</strong> Priority Queues and Heaps</td>
<td>Homework #3 due on Oct. 11.</td>
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<td>9</td>
<td><strong>Oct. 18 and 20:</strong> Concatenated Queues</td>
<td>No class on Oct. 16 (Fall Break). No lab this week. Homework #4 out on Oct. 20.</td>
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<td>10</td>
<td><strong>Oct. 23, 25, and 27:</strong> Concatenated Queues</td>
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<td>11</td>
<td><strong>Oct. 30 and Nov. 1 and 3:</strong> Disjoint Sets</td>
<td>Homework #4 due on Oct. 30.</td>
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<td><strong>Nov. 6, 8, and 10:</strong> Disjoint Sets/Midterm Exam #2</td>
<td>Midterm Exam #2 on Nov. 10.</td>
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<td>13</td>
<td><strong>Nov. 13, 15, and 17:</strong> Graph and Graph Algorithms</td>
<td>Homework #5 out on Nov. 17.</td>
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<td>14</td>
<td><strong>Nov. 20:</strong> Graph and Graph Algorithms</td>
<td>No class on Nov. 22 and 24 (Thanksgiving Break). No lab this week.</td>
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<td>15</td>
<td><strong>Nov. 27, 29, and Dec. 1:</strong> Advanced Data Structures (time permitting)</td>
<td>Homework #5 due on Dec. 1.</td>
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<td>16</td>
<td><strong>Dec. 4 and 6:</strong> Advanced Data Structures (time permitting)</td>
<td>Dec. 8 is Stop Day. No lab this week.</td>
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<td>FINAL</td>
<td><strong>Monday, December 11 – 7:30am-10:00am:</strong> Final Exam</td>
<td>Final Exam (non-comprehensive) on Dec. 11.</td>
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