Course Information | Course Title: **95772 Data Structures for Application Programmers**  
Meeting Day/Time/Location: TR. 4.30-5.50pm. HBH 1005  
Instructor: Neelam Dwivedi (ndwivedi@andrew.cmu.edu).  
Office Hours: Tue, Thu 3-4 pm, or by appointment. Office: HBH 2116  
TA: Aruna Natarajan Srinivasan <arunan@andrew.cmu.edu>  
Office hours: Thu, 12-2pm  
Location: HBH 2007B

Prerequisites | None

Description | This course is an introduction to Data Structures and a few fundamental algorithms for students with some prior programming experience (functions, loops and arrays mainly in Java). It covers the conceptual and implementation views of some common data structures and algorithms. It also goes over the Java Collections (such as List, ArrayList, LinkedList, Set, HashSet, TreeSet, Map, HashMap, TreeMap, PriorityQueue) to solidify the understanding of the data structures. There is an introduction to the analysis of algorithms that operate on them. Following learning-by-doing methodology, there will be many repetitions of writing code and reviews of the items covered in the class.

Course Materials | Key reference:  
• [http://docs.oracle.com/javase/8/docs/api/index.html](http://docs.oracle.com/javase/8/docs/api/index.html)  
Supplemental references:  
• Data Structures & Algorithms in Java. Robert Lafore. 2nd Edition. SAMS.  
Software:  

Evaluation Method | The final grade will be out of 200 points. The grading breakdown is listed below. A detailed description of each of these activities is given on the next page.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Points</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labwork</td>
<td>50 points: 6 labs of 10 points each. Top 5 scores will be considered</td>
<td>25%</td>
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<tr>
<td>Quiz</td>
<td>50 points: 6 quizzes of 10 points each. Top 5 scores will be considered</td>
<td>25%</td>
</tr>
<tr>
<td>Project</td>
<td>20 points</td>
<td>10%</td>
</tr>
<tr>
<td>Midterm</td>
<td>40 points</td>
<td>20%</td>
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<tr>
<td>Finals</td>
<td>40 points</td>
<td>20%</td>
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<tr>
<td>Total</td>
<td>200 points</td>
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Learning / Course Objectives | Acquire an understanding (design, analysis, and implementation) of basic data structures and their major operations and fundamental algorithms.  
Provide an introduction to algorithm efficiency and complexity in terms of running time and space.

Grading Scale | A+ 100%  
A  93 - 99%  
A-  90 - 92%  
B+ 87 - 89%  
B  83 - 86%  
B-  80 - 82%  
C+ 77 - 79%  
C  73 - 76%  
C-  70 - 72%
### Course / Topical Outline:
(Subject to change as needed)

<table>
<thead>
<tr>
<th>Wk</th>
<th>Date</th>
<th>Topic</th>
<th>Reference (GTG Book)</th>
<th>Lecture</th>
<th>Lab</th>
<th>Quiz</th>
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<tbody>
<tr>
<td>1</td>
<td>Jan-17</td>
<td>ArrayLists</td>
<td>Ch. 7</td>
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<td>Jan-19</td>
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<td>Lab1</td>
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<td>2</td>
<td>Jan-24</td>
<td>Asymptotics</td>
<td>Ch. 4</td>
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<td>Jan-26</td>
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<td>Lab2</td>
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<td>3</td>
<td>Jan-31</td>
<td>Recursion</td>
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<td>Quiz2</td>
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<td></td>
<td>Feb-2</td>
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<tr>
<td>4</td>
<td>Feb-7</td>
<td>Linked Lists</td>
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<td>Mid-term</td>
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<td>5</td>
<td>Feb-14</td>
<td>Stacks, Queues, Deques</td>
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<td>6</td>
<td>Feb-21</td>
<td>Trees &amp; Binary Search Trees</td>
<td>Ch. 8, 11</td>
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<td>Lab5</td>
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<tr>
<td>7</td>
<td>Feb-28</td>
<td>Maps and Hash tables</td>
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<td>Mar-2</td>
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<td>Lab6</td>
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<td>8</td>
<td>Mar-7</td>
<td>Final Exam</td>
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### Course Policies & Expectations

1. **Labwork**
   a. Each week, you will be assigned a short programming problem related to the topic discussed in the previous class to be completed during the lab-session.
   b. Out of the six lab assignments, top five scores will be considered for your final grade.
   c. Consider labwork as a practice-exam. You will have full access to all the references but you will have to produce the final solution individually. However, you can consult with me, the TA or your classmates during labwork.

2. **Quiz**
   a. There will be six short quizzes based on the topic covered in the class.
   b. Out of the six quizzes, top five scores will be considered for your final grade.

3. **Project**
   a. You will work on a mini project that will be assigned in the 2nd week of the semester. The project is exploratory in nature and will require you to research outside the concepts discussed in class. You will deliver the project in two iterations. While your first submission will be graded, your final project grade will depend on your final submission.

4. **Class Attendance**
   a. As evident from all the activities listed above (labwork and quiz) that require your presence in the class, you are expected to attend all classes.
   b. If you miss any of the labwork and/or quiz as per the schedule above, it will be adjusted as one of the six to be adjusted as lowest score. No makeup quiz/labwork will be accepted unless there is an emergency, in which case a documented evidence may be required. Job interviews do not count as an emergency.

5. **Grades**
   a. Grade disputes, if any, must be reported to the TA or the instructor within one week from the day of grade-distribution.
   b. Copying from any source without citation, sharing your work with other students, or copying from other students will be considered as cheating and plagiarism and will be addressed according to the university policies [http://www.cmu.edu/academic-integrity/](http://www.cmu.edu/academic-integrity/).
   c. You are responsible for being familiar with the university standard for academic honesty and plagiarism. Please see the CMU Student Handbook for information. In order to deter and detect plagiarism, online tools and other resources are used in this class.
Students with Disabilities:
Our community values diversity and seeks to promote meaningful access to educational opportunities for all students. CMU and your instructors are committed to your success and to supporting Section 504 of the Rehabilitation Act of 1973 as amended and the Americans with Disabilities Act (1990). This means that in general no individual who is otherwise qualified shall be excluded from participation in, be denied benefits of, or be subjected to discrimination under any program or activity, solely by reason of having a disability.

If you believe that you need accommodations for a disability, please contact us ASAP, and we will work together to ensure that you have the correct access to resources on campus to assist you through your coursework and time at CMU.

Academic Integrity:
Carnegie Mellon University sets high standards for academic integrity. Those standards are supported and enforced by students, including those who serve as academic integrity hearing panel members and hearing officers. The presumptive sanction for a first offense is course failure, accompanied by the transcript notation “Violation of the Academic Integrity Policy.” The standard sanction for a first offense by graduate students is suspension or expulsion. Please see http://www.cmu.edu/academic-integrity/ for any questions.

Cell Phones, Smartphones and other handheld wireless devices:
Other than during class breaks, please silence ring tones and refrain from engaging in calls, messaging or other use during class time. All devices must not be visible in any way during exams.

Policy Regarding Students Using English as a Foreign Language:
Assignments in this course are graded with reference to evidence of the acquisition of concepts, presentation format, and accuracy of information. Having done business in countries that use languages other than English, we understand that the use of an unfamiliar language can result in unusual word choices or grammatical errors that are not critical to the overall understanding of the information. Therefore, we will take into account your need to function in a language that may be unfamiliar to you. We will provide feedback as appropriate if we feel that language or grammar you have used in assignments would be best if it were configured in a different way.

Use of SU Blackboard System for this course:
The Heinz School uses Carnegie Mellon University’s Blackboard system to facilitate distance learning as well as to enhance main campus courses. In this course, we will use the Blackboard system generally to post lecture notes and related documents and to receive assignments electronically from students. To access Blackboard go to www.cmu.edu/blackboard

Take care of yourself: Do your best to maintain a healthy lifestyle this semester by eating well, exercising, avoiding drugs and alcohol, getting enough sleep and taking some time to relax. This will help you achieve your goals and cope with stress.
All of us benefit from support during times of struggle. You are not alone. There are many helpful resources available on campus and an important part of the college experience is learning how to ask for help. Asking for support sooner rather than later is often helpful.
If you or anyone you know experiences any academic stress, difficult life events, or feelings like anxiety or depression, we strongly encourage you to seek support. Counseling and Psychological Services (CaPS) is here to help: call 412-268-2922 and visit their website at http://www.cmu.edu/counseling/. Consider reaching out to a friend, faculty or family member you trust for help getting connected to the support that can help.