IC312 Data Structures

Course Policy, Fall AY19

Coordinator: Assoc. Prof. Gavin Taylor, x3-6816, taylor@usna.edu
Instructor: Asst. Prof. Adam Aviv, x3-6655, aviv@usna.edu

Course Description: This course examines abstract data types (ADTs), data structures, data representation and information management including storage structures, allocation and collection. ADTs and data structures presented include lists, stacks, queues, trees, heaps, priority queues, maps, dictionaries and graphs. Sorting and searching techniques, hashing and graph algorithm analysis are also covered.

Credits: 3-0-3

Learning Objectives:

1. Understand the fundamentals of algorithm analysis. (supports outcome 2)
2. Possess an understanding of the concept of abstraction and be able to describe the idea of separation of implementation and interface. (supports outcome 1)
3. Recognize and apply the canonical ADTs (Lists, Queues, Stacks, Trees, Priority Queues, Dictionaries, and Graphs) appropriate for solving a problem. (supports outcome 1)
4. Demonstrate the ability to implement the canonical ADTs with: arrays, linked lists, binary trees, hash tables, balanced trees, and other similar structures (supports outcome 2)
5. Be proficient in defining and coding recursive algorithms, including recognizing when recursive solutions are appropriate (supports outcome 2)

Student Outcomes:

Graduates of the program will have an ability to:
1. Analysis. Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
2. Implementation. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program’s discipline.
3. Communication. Communicate effectively in a variety of professional contexts.
4. Ethics. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
5. Teamwork. Function effectively as a member or leader of a team engaged in activities appropriate to the program’s discipline.

CS-6. Theory. Apply computer science theory and software development fundamentals to produce computing-based solutions.
IT-6. Requirements. Identify and analyze user needs and to take them into account in the selection, creation, integration, evaluation, and administration of computing based systems.

Textbook(s): None
**Extra Instruction:** Extra instruction (EI) is strongly encouraged and should be scheduled by email with the instructor. EI is not a substitute lecture; students should come prepared with specific questions or problems.

**Collaboration:** The guidance in the Honor Concept of the Brigade of Midshipmen and the Computer Science Department Honor Policy must be followed at all times. See [www.usna.edu/CS/resources/honor.php](http://www.usna.edu/CS/resources/honor.php). For this course, collaboration is allowed on homeworks. **ALL COLLABORATION MUST BE DOCUMENTED.** For this course, collaboration is defined as “two or more people working together to develop an approach to a problem and overcoming obstacles that present themselves.” Note this is different from “writing code together,” or “one midshipman guiding another towards a solution.” After collaboration, participants should go off and do their own coding. If not all participants are contributing, or a midshipman’s code is on display, you are not collaborating, and EI is likely more appropriate than continuing to work together. The only allowed exception to the “no code” rule is you may help each other with small-scale debugging, which results in only a few changed lines of code.

Copying part of a classmate’s code, in any way, is clearly prohibited.
When discussing concepts (“I don’t understand how a linked list works”), this policy doesn’t apply; discuss whatever you want, however you want. When the conversation is as related to a solution to an assignment, make sure you’re collaborating.
Note that for projects, no collaboration of any kind is allowed.
Evidence indicating a violation of this policy on academic integrity will result, at minimum, in a 0 on the assignment, and will likely be forwarded to the Brigade Honor Staff as violation of the Brigade Honor Concept.

**Classroom Conduct:** The section leader will record attendance and bring the class to attention at the beginning and end of each class. If the instructor is late more than 5 minutes, the section leader will keep the class in place and report to the Computer Science department office. If the instructor is absent, the section leader will direct the class. Drinks are permitted, but they must be in reclosable containers. Food, alcohol, smoking, smokeless tobacco products, and electronic cigarettes are all prohibited. Cell phones must be silent during class.

**Late Policy:** No late work is accepted unless worked out in advance or in the event of unforeseeable emergencies.
**Absences:** You are responsible for obtaining any material missed due to an absence. You must ensure your work is submitted on time regardless of other commitments, i.e. duty, sick call, MO, **eye surgery,** etc. Should bona fide emergencies arise, it is your responsibility to notify the instructor as soon as possible.

**Grading:**

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