CS 570 WS – Data Structures

Stevens Institute of Technology
Schaefer School of Engineering & Science
Fall 2019

Instructor: Iraklis Tsekourakis
Course Web Address: https://sit.instructure.com/courses/34684
Course Schedule: Weeks are defined as: Monday-Sunday
Contact Info: itsekour@stevens.edu, (201)216-5390
Virtual Office Hours: Thursday 6-7pm ET, or by appointment (email)
Virtual session URL: https://sit.instructure.com/courses/34684/external_tools/86566
Prerequisite(s):
Corequisite(s):
Cross-listed with:

COURSE DESCRIPTION

This is a course on standard data structures, including sorting and searching and using the Java language. The topics include: programming; testing; recursion; elementary data structures (lists, stacks, queues, and maps); use of elementary data structures in application frameworks; searching; sorting; and introduction to asymptotic complexity analysis.

STUDENT LEARNING OUTCOMES

After successful completion of this course, students will be able to:

- **Abstract Data Types:** Understand the notion of Abstract Data Types, and their use in object-oriented designs.
- **Complexity** - Calculate the Big O of diverse non-recursive algorithms and use it to compare efficiency.
- **Collections** - Use and understand Collection class in Java, with major emphasis on Lists, Stacks and Queues. Implement double linked lists in Java.
- **Trees** - Implement Binary Search Trees, Max/Min-Heaps, Priority Queues in Java, and understand the basic concepts of self-balancing Binary Search Trees
- **Sets-Maps** - Understand what are Sets and Maps, and more specifically implement hash tables in Java.
- **Recursion**- Understand, and implement recursive algorithms, and data structures.

- **Programming** - Combine different classes together to implement big programming assignments in Java, including a final project that combines some of the data structures studied in class.

COURSE FORMAT AND STRUCTURE

This course is fully online. To access the course, please visit stevens.edu/canvas . For more information about course access or support, contact the Technology Resource and Assistance Center (TRAC) by calling 201-216-5500.

Course Logistics

- You are encouraged to "mentally enroll" in this course as if it occurred on Mondays. In other words, our weeks will run from Monday to Sunday. I will post information (online activities, discussion starters, etc.) for the upcoming week by Sunday evening, so that when you log in on Monday, you can begin the new week.
- When assignments are due, they are due by 11:59 p.m. EST on the due date listed in the course schedule.
- Deadlines are an unavoidable part of being a professional and this course is no exception. Course requirements must be completed and posted or submitted on or before specified due date and delivery time deadline. Due dates and delivery time deadlines are defined as Eastern Standard Time (as used in Hoboken, NJ). Please note, students living in distance time zones or overseas must comply with this course time and time and due date deadline policy. Avoid any inclination to procrastinate. To encourage you to stay on schedule, due dates have been established for each assignment.
- An assignment file should be appended by your username, such as "assignment1_kim53.zip". This may make it easier for me to manage assignment files you download to my computer.

Instructor's Online Hours

I will be available via email and will respond as soon as I am available (generally within 24-48) hours. For the online discussions, I will check in at least 3 times per week. Keep in mind that it is not possible for me to respond to every single posting every week (nor is it pedagogically appropriate), but I will be sure to respond to a variety of postings and students each week and attempt to assure equality in terms of responses to students. When emailing me, please place in the subject line the course number/section and the topic of the email (i.e. CS 570 – Assignment 2 Question). This will help me tremendously in locating your emails quicker when I scan the hundreds of emails that seem to make it into my box each day.

Virtual Office Hours

Virtual Office Hours are a synchronous session (through Zoom) to discuss questions related to weekly readings and/or assignments. Office hours will be held Thursday evenings from 6:00-7:00 pm EST. To connect to the weekly session, go to https://sit.instructure.com/courses/34684/external_tools/86566.

Online Etiquette Guidelines

Your instructor and fellow students wish to foster a safe online learning environment. All opinions and experiences, no matter how different or controversial they may be perceived, must be respected in the tolerant spirit of academic discourse. You are encouraged to comment, question, or critique an idea but you are not to attack an individual. Our differences, some of which are outlined in the University's inclusion statement below, will add richness to this learning experience. Please consider that sarcasm and humor can be misconstrued in online interactions and generate unintended disruptions. Working as a community of learners, we can build a polite and respectful course ambience. Please read the Netiquette rules for this course:

- Do not dominate any discussion. Give other students the opportunity to join in the discussion.
- Do not use offensive language. Present ideas appropriately.
- Be cautious in using Internet language. For example, do not capitalize all letters since this suggests shouting.
- Avoid using vernacular and/or slang language. This could possibly lead to misinterpretation.
- Keep an “open-mind” and be willing to express even your minority opinion.
- Think and edit before you push the “Send” button.
- Do not hesitate to ask for feedback.

TENTATIVE COURSE SCHEDULE

	Topic(s)	Reading(s)	HW
Week 1	Java Syntax	Appendix A	
Week 2	Java Syntax (II), ADT	Appendix A, Chapter 1	Assignment on Java
Week 3	Complexity	Chapter 2	
Week 4	Array based Lists, Linked Lists	Chapter 2	Assignment on Complexity
Week 5	Double Linked Lists, Iterators, Collections interface	Chapter 2	
Week 6	Stacks	Chapter 3	Assignment on Double Linked Lists
Week 7	Queues	Chapter 4	
Week 8	Recursion	Chapter 5	Assignment on Recursion
Week 9	More Recursion	Chapter 5	
Week 10	Introduction to Trees	Chapter 6	
Week 11	Binary Search Trees, max/min heaps, priority queues	Chapter 6	Assignment on Priority Queues
Week 12	Sets & Maps, Hashing	Chapter 7	
Week 13	Sets & Maps, Hashing	Chapter 7	Final Programming Project (Combines topics)

Week 14	Sorting	Chapter 8	

COURSE MATERIALS

Textbook(s):	Data Structures: Abstraction and Design Using Java, 3rd Edition, Elliot B. Koffman and Paul A. T. Wolfgang
Other Readings:	Course Lecture Notes, available on Canvas
Materials:	Videos prepared by instructor, available on Canvas

COURSE REQUIREMENTS

- **Homework:** The programming assignments will be done individually. No collaboration is allowed between students. No code from online resources is allowed to be used besides the code that I will share with you. Any sign of collaboration will result in a 0 and being reported to the Honor Board. Programming assignments might be tested for similarity using the MOSS, or similar software, and any sign of collaboration will be reported to the HONOR board.

  Quizzes: A short quiz will be given every week, after the end of the add/drop period, starting on week 3. The quizzes will be given on Canvas using the Respondus LockDown browser. On week 2, there will be an ungraded test quiz to ensure that you have set up the required software. Related instructions can be found in the next section.

  Exams: The final exam will be given during the final exam period. An announcement will be posted with more details on week 13. The exam will be given on Canvas using the Respondus LockDown browser.

TECHNOLOGY REQUIREMENTS

Baseline technical skills necessary for online courses

- Basic computer and web-browsing skills
- Navigating Canvas

Technology skills necessary for this specific course

- Live web conferencing using Zoom

Required Equipment

- Computer: current Mac (OS X) or PC (Windows 7+) with high-speed internet connection
- Webcam: built-in or external webcam, fully installed
- Microphone: built-in laptop or tablet mic or external microphone

Required Software

- Microsoft Word
- Java SDK

- Eclipse IDE

GRADING PROCEDURES

Grades will be based on:

Quizzes	10%
Assignments	60%
Exam	30%

Any complaint regarding a grade must be presented no later than **7 weekdays** following the publication of grades of respective assignments.

Late Policy

Late assignment (even by 2 seconds) will be given a -25% decrease penalty per day, for the first 2 days after the deadline. So, if you send an assignment 1 second late, you will receive 75% of your grade for the assignment. If you send it, 24 hours, and 1 second late, you will receive 50% of your grade for the assignment etc. After 48hrs from the deadline there will be a -90% decrease penalty, so you will receive 10% of your grade.

Academic Integrity

Graduate Student Code of Academic Integrity

All Stevens graduate students promise to be fully truthful and avoid dishonesty, fraud, misrepresentation, and deceit of any type in relation to their academic work. A student's submission of work for academic credit indicates that the work is the student's own. All outside assistance must be acknowledged. Any student who violates this code or who knowingly assists another student in violating this code shall be subject to discipline.

All graduate students are bound to the Graduate Student Code of Academic Integrity by enrollment in graduate coursework at Stevens. It is the responsibility of each graduate student to understand and adhere to the Graduate Student Code of Academic Integrity. More information including types of violations, the process for handling perceived violations, and types of sanctions can be found at www.stevens.edu/provost/graduate-academics.

Special Provisions for Undergraduate Students in 500-level Courses

The general provisions of the Stevens Honor System do not apply fully to graduate courses, 500 level or otherwise. Any student who wishes to report an undergraduate for a violation in a 500-level course shall submit the report to the Honor Board following the protocol for undergraduate courses, and an investigation will be conducted following the same process for an appeal on false accusation described in Section 8.04 of the Bylaws of the Honor System. Any student who wishes to report a graduate student may submit the report to the Dean of Graduate Academics or to the Honor Board, who will refer the report to the Dean. The Honor Board Chairman will give the Dean of Graduate Academics weekly updates on the progress of any casework relating to 500-level courses. For more information about the scope, penalties, and procedures pertaining to undergraduate students in 500-level courses, see Section 9 of the Bylaws of the Honor System document, located on the Honor Board website.

EXAM CONDITIONS

The following procedures apply to quizzes and exams for this course. As the instructor, I reserve the right to modify any conditions set forth below by printing revised Exam Conditions on the quiz or exam.

1. Students may use the following materials during quizzes and/or exams. Any materials that are not mentioned in the list below are not permitted.

Material	Permitted?	
	Yes	No
Handwritten Notes Conditions: i.e. size of note sheet		x
Typed Notes Conditions: i.e. size of note sheet		x
Textbooks Conditions: i.e. specific books		x
Readings Conditions: i.e. specific documents		x
Other (specify)		x

2. Students are not allowed to work with or talk to other students during quizzes and exams.
3. Students are not allowed to use any other device to access the internet besides the computer that is used to access the LockDown Browser.

For all quizzes, and the exam of the course, students will be required to use the LockDown browser and a webcam. Please see below for more details.

Using LockDown Browser and a Webcam for Online Exams

This course requires the use of LockDown Browser and a webcam for online exams. The webcam can be built into your computer or can be the type that plugs in with a USB cable. Watch this short video (http://www.respondus.com/products/lockdown-browser/student-movie.shtml) to get a basic understanding of LockDown Browser and the webcam feature. A student Quick Start Guide (http://www.respondus.com/downloads/RLDB-QuickStartGuide-Instructure-Student.pdf) is also available. Then download and install LockDown Browser using the Stevens Respondus LockDown Browser Link (https://www.respondus.com/lockdown/download.php?ID=389551528) (Don't Google for a download link — it will be for the wrong school!)

To ensure LockDown Browser and the webcam are set up properly, do the following:

- Start LockDown Browser, log into Canvas, and select this course.
- Locate and select the **Help Center** button on the LockDown Browser toolbar.
- Run the **Webcam Check** and, if necessary, resolve any issues.
- Run the **System & Network Check**. If a problem is indicated, see if a solution is provided in the Knowledge Base. Troubleshooting information can also be emailed to our institution's help desk.
- Exit the Help Center and locate the practice quiz named [**NOTE TO INSTRUCTOR: CREATE A BRIEF PRACTICE QUIZ AND INSERT NAME/LOCATION OF QUIZ**].
- Upon completing and submitting the practice quiz, exit LockDown Browser.

When taking an online exam that requires LockDown Browser and a webcam, remember the following guidelines:

- Ensure you're in a location where you won't be interrupted
- Turn off all other devices (e.g. tablets, phones, second computers) and place them outside of your reach
- Clear your desk of all external materials not permitted — books, papers, other devices
- Before starting the test, know how much time is available for it, and that you've allotted
- sufficient time to complete it
- Remain at your computer for the duration of the test
- If the computer or networking environment is different than what was used previously with the **Webcam Check** and **System & Network Check** in LockDown Browser, run the checks again prior to starting the test
- To produce a good webcam video, do the following:
    - Avoid wearing baseball caps or hats with brims
    - Ensure your computer or tablet is on a firm surface (a desk or table). Do NOT have the computer on your lap, a bed or other surface where the device (or you) are likely to move
    - If using a built-in webcam, avoid tilting the screen after the webcam setup is complete
    - Take the exam in a well-lit room and avoid backlighting, such as sitting with your back to a window
- Remember that LockDown Browser will prevent you from accessing other websites or applications; you will be unable to exit the test until all questions are completed and submitted

LEARNING ACCOMODATIONS

Stevens Institute of Technology is dedicated to providing appropriate accommodations to students with documented disabilities. The Office of Disability Services (ODS) works with undergraduate and graduate students with learning disabilities, attention deficit-hyperactivity disorders, physical disabilities, sensory impairments, psychiatric disorders, and other such disabilities in order to help students achieve their academic and personal potential. They facilitate equal access to the educational programs and opportunities offered at Stevens and coordinate reasonable accommodations for eligible students. These services are designed to encourage independence and self-advocacy with support from the ODS staff. The ODS staff will facilitate the provision of accommodations on a case-by-case basis.

For more information about Disability Services and the process to receive accommodations, visit https://www.stevens.edu/office-disability-services. If you have any questions please contact: Phillip Gehman, the Director of Disability Services Coordinator at Stevens Institute of Technology at pgehman@stevens.edu or by phone 201-216-3748.

Disability Services Confidentiality Policy

Student Disability Files are kept separate from academic files and are stored in a secure location within the Office of Disability Services. The Family Educational Rights Privacy Act (FERPA, 20 U.S.C. 1232g; 34CFR, Part 99) regulates disclosure of disability documentation and records maintained by Stevens Disability Services. According to this act, prior written consent by the student is required before our Disability Services office may release disability documentation or records to anyone. An exception is made in unusual circumstances, such as the case of health and safety emergencies.

INCLUSIVITY

Name and Pronoun Usage

As this course includes class discussion, it is vitally important for us to create an educational environment of inclusion and mutual respect. This includes the ability for all students to have their chosen gender pronoun(s) and chosen name affirmed. If the class roster does not align with your name and/or pronouns, please inform the instructor of the necessary changes.

Inclusion Statement

Stevens Institute of Technology believes that diversity and inclusiveness are essential to excellence in academic discourse and innovation. In this class, the perspective of people of all races, ethnicities, gender expressions and gender identities, religions, sexual orientations, disabilities, socioeconomic backgrounds, and nationalities will be respected and viewed as a resource and benefit throughout the semester. Suggestions to further diversify class materials and assignments are encouraged. If any course meetings conflict with your religious events, please do not hesitate to reach out to your instructor to make alternative arrangements.

You are expected to treat your instructor and all other participants in the course with courtesy and respect. Disrespectful conduct and harassing statements will not be tolerated and may result in disciplinary actions.

MENTAL HEALTH RESOURCES

Part of being successful in the classroom involves a focus on your whole self, including your mental health. While you are at Stevens, there are many resources to promote and support mental health. The Office of Counseling and Psychological Services (CAPS) offers free and confidential services to all enrolled students who are struggling to cope with personal issues (e.g., difficulty adjusting to college or trouble managing stress) or psychological difficulties (e.g., anxiety and depression) and who can visit the office in person. CAPS is open from 9:00 am – 5:00 pm Mondays, Wednesdays, Thursdays and Fridays and from 9:00 am – 7:00 pm on Tuesdays during the Fall and Spring semesters; appointments are highly encouraged. For those students who cannot visit the Stevens campus for an in-person appointment, you can contact a local mental health care provider for an in-person appointment, or if you are enrolled in the Stevens Student Health Insurance, you may call Care Connect for 24/7 mental health support at 1-888-857-5462.

For further information please visit the CAPS webpage on Seeking Help Off-Campus: https://www.stevens.edu/directory/counseling-and-psychological-services/seeking-help-campus.

EMERGENCY INFORMATION

In the event of an urgent or emergent concern about the safety of yourself or someone else in the Stevens community, please immediately call the Stevens Campus Police at 201-216-5105 or on their emergency line at 201-216-3911. These phone lines are staffed 24/7, year round. For students who do not reside near the campus and require emergency support, please contact your local emergency response providers at 911 or via your local police precinct. Other 24/7 national resources for students dealing with mental health crises include the National Suicide Prevention Lifeline (1-800-273-8255) and the Crisis Text Line (text

“Home” to 741-741). If you are concerned about the wellbeing of another Stevens student, and the matter is *not* urgent or time sensitive, please email the CARE Team at care@stevens.edu. A member of the CARE Team will respond to your concern as soon as possible.