General Information

Time and Place: MWF, 9:00-9:50, Begeman 301

Class Websites:
- http://www.cs.uni.edu/~schafer/3320/ (lesson materials)
- Blackboard (Graded material)

Credits: Three (3) This course meets the Credit Hour Expectations outlined in the Course Catalog.

Instructor: Dr. Ben Schafer

Email: schafer@cs.uni.edu

Student Hours:
I have decided that, by default, I will hold all student hours by appointment and online unless we have made special arrangements prior to the meeting. To begin with, I have made multiple sessions available each week.

- MWF 10-11 AM
- T/Th 9:30-11:00 AM
- T/Th 2:00-3:00 PM

In order to meet with me during one of these time slots you should first set up an appointment using my online calendar.


Then at the appropriate time, you can log on to the following Zoom room:

- https://uni.zoom.us/j/3192732187  [The password for this room is simply the three letter acronym for our campus]

If those times don't work for you, or you feel the need to meet with me face-to-face, PLEASE, send me an email and propose a specific alternative. I want to meet with you at a time/place that is best for both of us and am very willing to work things out.

Course Information

Course Description
Introduction to the structure and application of common data structures used in computer science and the algorithms used with/for these structures. Includes an ongoing discussion on algorithm analysis. Also includes significant elements of algorithms, program design, techniques for data storage and retrieval, and data beyond a local text file.

General Course Goals/Outcomes
The course has three general goals.

1. That students are able to analyze their programs to evaluate computational complexity and use studied algorithms to provide efficient solutions. Such algorithms include: searching and sorting, graphing problems, and string problems.
2. That students are able to explain and use efficient data structures include: stacks, queues, lists, hash tables, trees, and graphs.
3. That students are able to design and implement "medium" sized programs using functional decomposition and be able to select appropriate data structures.
Specific Outcomes/Assessments
By the end of the course students should be able to complete the following:

- Analyze code to determine its execution-time (big-oh notation) and storage utilization.
- Write recursive functions to traverse data structures
- Write and analyze simple and advanced sorts: bubble, selection, insertion, merge, and quick sorts.
- Write and analyze searching techniques: linear search, binary search, closed-address hashing.
- Use common "linear" data structures using an "array" (i.e., contiguous block of memory) and "linked nodes" as appropriate: stack, queue, and lists
- Explain the implementation of common "tree" data structures
- Trace and program graph algorithms: depth-first search, breadth-first search, Prim's algorithm, Dijkstra's algorithm, and topological sort.

Classroom Structure

Textbook

Computer Use
Students in this course will rely heavily on the use of the computer. All of the learning materials and programming environments for this course are available from any computer with a web browser and internet access. You will need access to a computer with Internet access while off campus and when in the classroom. If you do not have access to a device for daily use, please reach out to me and we will see what we can do to get you access to one of the limited number of laptops available for student use. [Recognize that these are shared among students and you should use caution when using them both for your physical and cyber safety.]

Classroom Interactions
We are faced with yet another challenging school year. I think everyone had really hoped that we could start this school year, more or less, as business as usual. However, Covid – in particular the Delta variant – is still a real and legitimate problem and it is very likely that it will continue to have an impact on daily operations. It has changed my plans for this course multiple times already over the summer as I thought about this semester. Our understanding of the science has changed and will continue to change. By extension, the CDC, federal, state, and campus guidelines continue to be an evolving work in progress. I ask that we all do our part to be patient, understanding, and cooperative.

I am a firm believer in the power of collaborative, peer-based learning. I really do believe that you learn much more if you are actively engaged with the material vs. simply listening to me tell you about the material. Because of this, I will ask you to collaborate in class frequently this semester. I very truly do not want to make you uncomfortable. If you are placed in a classroom situation where you are uncomfortable due to health concerns, I will ask you to PLEASE bring it to my attention. I will do everything reasonable to accommodate your situation. Nonetheless, this whole situation will be better if we all are cooperative. Many of us are vaccinated and I believe that is a good and helpful thing. If you aren't vaccinated yet, I ask you to give it serious and scientific consideration. However, given the current evidence I will strongly encourage you, even if vaccinated, to wear a mask in social situations such as our classroom. The science really does suggest that proper usage of masks is safe and effective.
Two of the most important rules I have put upon myself are "be flexible" and "always ask yourself what is best for your students." If you understand this and have a similar attitude, we should be fine.

**Course Grading**

I use a grading system drawn from the philosophies of "standards-based grading" and "equitable grading" ([https://gradingforequity.org/](https://gradingforequity.org/)). The main idea is that I WANT you to succeed in the course by giving you multiple opportunities for you to show me that you have learned the necessary material. In most cases, if you can’t do this the first time you will be able to re-study and try again.

You will earn multiple "grades" in this course. Each of these is a category of understanding that, for simplicity, is recorded as a score from 1-4 with the following meaning:

<table>
<thead>
<tr>
<th>Score</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>You submitted the deliverables or attempted the activity but you show little understanding of the standards of the activity. [NOTE, you cannot pass this course (grade of C or higher) with any 1s in your grades]</td>
</tr>
<tr>
<td>2</td>
<td>You have made significant progress towards demonstrating competency but there are limited items that remain unsatisfied.</td>
</tr>
<tr>
<td>3</td>
<td>You have &quot;met&quot; the standards of the activity. [You have displayed minimum acceptable competency on this activity.]</td>
</tr>
<tr>
<td>4</td>
<td>You have &quot;exceeded&quot; the standards of the activity. [You have met the standards of competency and shown considerable understanding/knowledge of the material.</td>
</tr>
</tbody>
</table>

As of the first day of the semester, it is my intention that we will complete the following activities this semester:

- **Ungraded Activities**
  - We will do a lot of activities, both in class and as "homework," that are completed as a way to enhance your learning. In most cases, it is the process that I am after rather than the results.
  - As such, I may ask you to submit your results, but I prefer not to assign a grade to this. Please keep an eye on the course website and be prepared to submit these activities when requested.
  - While these are not formally graded, repeated failure to attempt and submit these activities may result in the decrease of a grade to a "minus" grade. That is, failure to make a good faith effort at these may drop an A grade to an A-.
    - This is at my discretion rather than some set number of missed activities.
  - I will discuss this with you when I feel we are approaching this situation

- **Competency Demos (CD)** worth one grade each
  - These are similar to a quiz or test in other classes that you take.
  - You will complete each competency demo within Blackboard and during class time unless special arrangements were made in advance.
  - Most CDs consists of several questions, individually graded. From these, I will assign a final, single evaluation of the entire CD based on your overall set of responses. This score is not necessarily a simple mathematical average but an assessment of your overall CD.
  - If you are unsatisfied with your grade on any CD, you may talk to me, restudy the material, and attempt a second version of the CD for a (potentially) higher grade.
- **Projects**
  - Projects are the rare graded "homeworks."
  - Once you have had a chance to fully engage with the content of this course I will ask you to complete three graded projects:
    - 2 research and writing based projects. These will likely be completed as an individual.
    - 1 programming project. This will likely be completed with a partner.
  - I anticipate that you will be able to submit each for an initial grade. If you do not like the grade you earned, you will be provided an opportunity to ask questions, and revise the project(s).

Final course grades will be determined using the following evaluation criteria.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>All scores are 3 or 4 AND more 4s than 3s</td>
</tr>
<tr>
<td>B</td>
<td>All scores are 3 or 4 OR No more than one score of 2 AND an overall average of 3.25 or higher</td>
</tr>
<tr>
<td>C</td>
<td>No more than one score of 2</td>
</tr>
<tr>
<td>D</td>
<td>More (3s and 4s) than (1s and 2s).</td>
</tr>
<tr>
<td>F</td>
<td>Any situation not handled above.</td>
</tr>
</tbody>
</table>

In most situations, grades earned are straight letter grades – no plusses or minuses. Because you have multiple opportunities to retake and earn better grades this isn't as rough as it might sound. However, I DO reserve the right to raise grades slightly (take a B grade to a B+) if I feel there are specific and individual circumstances that warrant this change from the above criteria.

Please note, in an effort to be responsive to your needs I reserve the right to modify the structure of this course as we are in progress. If there is significant deviation from the policies described below, this new policy will be clearly discussed with you and in a timeframe that gives you a time to plan accordingly.]

**Getting Help**
If you are having trouble with a topic in the class PLEASE make an effort to reach out to me early. Do not wait until the situation is out of control. I am VERY willing to help. However, I have to know you want and need help.
Additional Policies and Statements

Scholastic Conduct
You are responsible for being familiar with the University’s Academic Ethics Policies:

https://www.uni.edu/policies/301

Copying from other students is expressly forbidden. Doing so on CDs will be penalized every time it is discovered. The penalty can vary from zero credit for the copied items (first offense) up to a failing grade for the course. If an assignment makes you realize you do not understand the material, ask a fellow student a question designed to improve your understanding, not one designed to get the assignment done. Your final submission for assignments should be individual, original work unless otherwise specified. Any substantive contribution to your solution by another person or taken from a publication should be properly acknowledged in writing. Failure to do so is plagiarism and will necessitate disciplinary action. In addition to the activities we can all agree are cheating (plagiarism, bringing notes to a closed book exam, etc), assisting or collaborating on cheating is cheating. Cheating can result in failing the course and/or more severe disciplinary actions. Remember: Discussing assignments is good. Copying code or answers is not.

Accessibility
The University of Northern Iowa (UNI) complies with the Americans with Disabilities Act Amendments Act of 2008 (ADAAA), Section 504 of the Rehabilitation Act of 1973, the Fair Housing Act, and other applicable federal and state laws and regulations that prohibit discrimination on the basis of disability. Students with disabilities experiencing a barrier to access should connect with Student Accessibility Services (SAS) to request accommodations. For more information about the accommodation process, please contact SAS at (319) 273-2677 Relay 711, accessibilityservices@uni.edu, or GIL 118. Additional information is also available at sas.uni.edu.

The Learning Center
The Learning Center @ Rod Library provides free tutoring for a variety of different areas (i.e. writing, math, science, business, Spanish, college reading and learning strategies). The Learning Center @ Rod Library is open for walk-in assistance Monday-Thursday 10am-10pm and is free of charge for all UNI students. If you are unavailable during normal tutoring hours, online tutoring is also available through Smarthinking. You will need your CATID and passphrase to gain access. To access the Smarthinking platform go to https://tlc.uni.edu/online. For more information, go to https://tlc.uni.edu, email TheLearningCenter@uni.edu, call 319-273-6023, or visit the TLC desk located on the main floor of Rod Library.

Free Speech
The University of Northern Iowa supports and upholds the First Amendment protection of freedom of speech and the principles of academic and artistic freedom. We encourage the free and responsible exchange of diverse ideas on our campus. The University is committed to open inquiry and the spirited and thoughtful debate of such ideas.

Absences related to COVID-19 illness, self-isolation, or quarantine.
Faculty must be prepared to have assignment alternatives for individual students who are unable to attend class due to COVID-related health issues. To utilize these alternative assignments, students must report the issue by completing the Panther Health Survey; students directed not to come to campus or who are unable to participate in class due to COVID-19 related illness, self-isolation, or quarantine should utilize the information provided in the survey to have their faculty notified of their
need to be absent. These same instruction/assignment alternatives should also extend to field experiences that students may not be able to attend for the same reasons. Questions related to COVID-19 testing should be directed to the Student Health Center COVID line (319) 273-2100, Monday-Friday, 8:00 am - 4:30 pm.

Students who have concerns about an underlying health condition(s) and the risks of attending classes, living in a residence hall, or any other aspect of the educational experience due to COVID-19 should consult with their health care provider. Please connect with Student Accessibility Services as soon as possible to discuss accommodations specific to your access needs.

Office of Compliance and Equity Management
Non-discrimination in Employment or Education
Content in this class has the potential to be disturbing to some individuals based on life experiences. If you ever feel the need to step out of the classroom or decline participation in an activity, please request an alternative learning experience.

UNI Policy 13.02 Discrimination, Harassment, and Sexual Misconduct states: "The University is committed to providing a workplace and educational environment, as well as other benefits, programs, and activities, that are free from discrimination and harassment based on a protected class, as well as retaliation."

Policy 13.02 outlines prohibited conduct and reporting processes. All University employees who are aware of or witness discrimination, harassment, sexual misconduct, or retaliation are required to promptly report to the Title IX Officer or Title IX Deputy Coordinator.

- Title IX Officer Leah Gutknecht, Assistant to the President for Compliance and Equity Management, 117 Gilchrist, 319.273.2846, leah.gutknecht@uni.edu
- Title IX deputy coordinator: Christina Roybal, Sr. Associate Athletic Director Athletics Administration, North DOME 319.273.2556, christina.roybal@uni.edu

If you or someone you know has been harassed or assaulted, you can find the appropriate resources at safety.uni.edu and equity.uni.edu. Resources that provide free, confidential counseling are also detailed at safety.uni.edu.

For additional information, contact the Office of Compliance and Equity Management, 117 Gilchrist Hall, 273-2846, equity@uni.edu.