CMPSC 250 – Analysis of Algorithms
Course Syllabus Spring 2018
Allegheny College

Course Instructor:
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Instructors Office Hours
- Monday, Wednesday, and Friday: 9:30 am –11:00 am (15 minute time slots)
- Tuesday: 11:00 am –12:00 noon (15 minute time slots)
- Thursday: 11:00 am –11:30 am (15 minute time slots)

To schedule a meeting with me during my office hours, please visit my website and click the Schedule link in the top right-hand corner. Now, you can browse my office hours or schedule an appointment by clicking the correct link and then reserving an open time slot. Students are also encouraged to post appropriate questions to a channel in Slack, which is available at https://CMPSC250s2018.slack.com/, and monitored by the instructor.

Course Meeting Schedule
Lecture: Monday, Wednesday, and Friday, 11:00 am –11:50 am at Alden 109
Lab: Friday, 2:30 pm –4:20 pm at Alden 109

Academic Bulletin Course Description
A study of fundamental methods for designing and implementing algorithms and analyzing their efficiency. While developing expertise in the mathematical analysis of algorithms and algorithmic programming, students investigate different types of algorithms through hands-on activities that often require teamwork. Students also learn how to determine whether algorithmic answers exist for various problems that are solvable by a computer program. During a weekly laboratory session students use state-of-the-art technology to complete projects, reporting on their results through both written reports and oral presentations.

Prerequisites: Computer Science 112 and Math 205 officially (but you may take it if you have the instructor permission)

Required Texts and Materials
Algorithms (4th edition) by Robert Sedgewick and Kevin Wayne. Some of the content for this class will also come directly from me.

Learning Objectives
Upon successful completion of this class, the student will be able to:
1. Implement and analyze algorithms for common tasks such as sorting, searching, and operations for common data structures.
2. Design techniques such as recursion, divide and conquer, and dynamic programming.
3. Understand how computational complexity is measured in terms of time and space; examine the classes P and NP and become familiar with the notion of NP-completeness.
4. Examine on some existing problems in the field with concrete examples of algorithms used in decision making.
5. Develop stand-alone applications by incorporating QOS driven optimization strategies to algorithm design.

Teaching and Learning Methods
The main mode of learning in this class is following along with the posted course material, completing lab work as
instructed by the lab specifications, and reading the textbook and other accompanying materials provided by the instructor. Students are responsible for reading online resources as needed to expand on the topics that are discussed in the lectures. The instructor will ask questions to stimulate thinking and participation. Students comments and questions are highly encouraged during the class and via the course Slack channel.

Students are encouraged to form a team and interact with the instructor on brainstorming and developing new ideas for technically sound final project. The key for success is to identify the project idea as early as possible. It is also possible to design the final project as a stepping stone to build collaborations with the instructor (for example: independent research study, summer research project, and thesis work).

Students are responsible for attending each lecture and lab session when scheduled (see the Attendance Policy for further details). Course content will be delivered via the course webpage and/or BitBucket, and assignments should also be submitted to BitBucket repository.

Grading and Evaluation
Your total grade for the course will be based on the following, weighted appropriately:

- Quiz (20%)
- Labs (25%)
- Project (20%)
- Exams (25%)
- Attendance and class participation (10%)

A more detailed breakdown of the expectations for grades in the course is as follows:

- **Class Participation:** All students are required to actively participate during all of the class sessions. Your participation will take forms of completing class exercises (individually and in teams), answering questions about the required reading assignments, contributing to class discussions and asking constructive questions. You must also regularly participate in the discussions and polls on the Slack channels for this course.
- **Labs:** The laboratory assignments invites students to experience with specific algorithms and with designing and analysing new algorithms. The labs will be tied to the lectures but not always.
- **Exams:** This class will have two tests. The tests are closed book, both the first and second tests will cover material from the beginning of the class. The first test is worth 10% and the second test is worth 15% of your grade.
- **Quizzes:** The quizzes will cover all of the material in its associated module. The date for each quiz will be announced at least one week in advance of the scheduled date, tentatively (three to five) quizzes are planned. Unless prior arrangements are made with the instructor, all students will be expected to take the quizzes on the scheduled dates.
- **Final Project:** The final project will present students with an opportunity to design and implement a new State of the art algorithm that performs computation in an efficient manner. The project needs to measure efficiency by comparing with existing approaches.
- **Assignment Submission and Late Policy** section of this syllabus for details about the course Late Policy.

Assignment Submission and Late Policy
Every assignment has a due date and time. Failure to hand in the assignment by the deadline will result in a late submission penalty.

Assignments handed in within one week of the deadline will receive automatic grade reductions of 20% (in addition to any points deducted for errors). Assignments will not be accepted more than one week past the deadline, unless you can provide documented extenuating circumstances. Any extenuating circumstances must be documented through the Learning Commons, Counseling Center, Dean of Students office, Health Center, or other authoritative source.

If you are unable to attend class or lab for any reason beyond illness or injury, you must make arrangements with me to turn in assignments before class. Exams must be taken at scheduled times. This includes the quizzes, tests, and final project presentation. Please check with the instructor one week before making any travel plans for the end of the semester or around breaks.
**Attendance Policy**

It is mandatory for all students to attend all of the class and laboratory sessions. If you will not be able to attend a session, then please see the course instructor at least one week in advance to describe your situation. Students who miss more than five unexcused classes, laboratory sessions, or group project meetings will have their final grade in the course reduced by one letter grade. Students who miss more than ten of the aforementioned events will automatically fail the course.

**Disability Statement**

Students with disabilities who believe they may need accommodations in this class are encouraged to contact Student Disability Services (SDS) at (814) 332-2898. SDS is part of the Learning Commons and is located in Pelletier Library. Please do this as soon as possible to ensure that such accommodations are implemented in a timely fashion.

**Email and Slack**

The instructor will primarily be checking the course Slack channel and his allegheny email account on regular basis. In general, you could expect the instructor to reply to your email messages during:

- scheduled office hours
- morning time between 8.00 am –9.00 am
- afternoon time between 1.00 pm –2.00 pm

The instructor does not usually check his email and slack during weekends. Hence, plan it accordingly to send an email to the instructor during week days. Students who are struggling with the course material or who have question should begin by posting their question (unless a private concern) to the Slack channel, so that the instructor or a fellow student can provide an answer within the bounds of the Honor Code.

**Class Preparation**

In order to minimize confusion and maximize learning, students must invest time to prepare for the class discussions and lectures. During the class periods, the course instructor will often pose demanding questions that could require group discussion, the creation of a program or data set, a vote on a thought-provoking issue, or a group presentation. Only students who have prepared for class by reading the assigned material and reviewing the current assignments will be able to effectively participate in these discussions. More importantly, only prepared students will be able to acquire the knowledge and skills that are needed to be successful in both this course and the field of computer science.

**Honor Code**

All students enrolled at Allegheny College are bound by the Honor Code. It is expected that your behavior will reflect that commitment. To this end, we expect that you will adhere to the following Department Policy:

**Department of Computer Science Honor Code Policy**

It is recognized that an important part of the learning process in any course, and particularly in computer science, derives from thoughtful discussions with teachers, student assistants, and fellow students. Such dialogue is encouraged. However, it is necessary to distinguish carefully between the student who discusses the principles underlying a problem with others, and the student who produces assignments that are identical to, or merely variations on, someone else's work. It will therefore be understood that all assignments submitted to faculty of the Department of Computer Science are to be the original work of the student submitting the assignment, and should be signed in accordance with the provisions of the Honor Code. Appropriate action will be taken when assignments give evidence that they were derived from the work of others.

You are encouraged to periodically review the specifics of the Honor Code as stated in the College Catalogue, The Compass, and elsewhere.

Additionally, the Honor Committee co-chairs have requested that a signature as well as the following phrasing be included on all submissions of graded work:

"This work is mine unless otherwise cited."