CSCI 332 Design and analysis of algorithms

Brief course description:
Students will learn classic algorithms, how they were discovered, how they are constructed, and how to analyze their theoretical runtimes.

Instructors:
Jake Pennington, Social Science 406
Oliver Serang, Social Science 408
Office hours T 2:50pm – 3:50pm

Time and place:
10:30am – 11:50am UC303

Final exam:
The final exam will be held in room UC303 on 8am – 10am on April 27th.

Textbook: Algorithms in Python, Serang (2018), available free:

Learning goals:
1. Analyze and understand the fundamentals of classic algorithms.
2. Understand the theoretical underpinnings of modern computer science.

Learning outcomes:
Students will learn basic algorithm classifications, theoretical complexity analysis, sorting algorithms, recurrence closed forms, heaps, minimum spanning tree approximation of the traveling salesman problem, Gauss multiplication, Karatsuba multiplication, Strassen matrix multiplication, fast Fourier transform (FFT), FFT fast convolution, subset-sum, knapsack, convolution trees, min- and max-convolution, reductions, computability, and basic complexity classes.

Attendance policy:
As a primarily lecture-/discussion-based course, attendance is highly encouraged, but is not part of the final grade; however, it is the responsibility of students to arrive at class on time in order to respect the instructor, their classmates, and to minimize disruptions.

The class will meet in person. If a student is in quarantine, let me know before class; in that case, a Zoom link will be provided so that the student can listen in live. Zoom links will only be provided for illness / quarantine; if no students require it, lectures will be performed in person only.

Missed assignments will be given a score of 0 without a note from a doctor for the day of the assignment.

Homework:
Homework assignments are optional and are assigned to help reinforce understanding and prepare for quizzes and the exam.

Quizzes:
Pop quizzes will be done in class. Your quiz average will be computed by excluding quizzes absent with a doctor’s note for that date.

Grading:
Final grades will be curved at the instructor’s discretion. The pre-curved grades will combine grades with the following weight:

- 50% quizzes
- 50% comprehensive final exam

These pre-curved grades will be: 90% A, 80% B, 70% C, 60% D, 50% F, and the curve may only improve grades.

To show the greatest respect for your fellow students, further inquiry on grades (e.g., “What if I wrote...”) should be conducted at office hours after the graded assignment has been returned. Likewise, students should not challenge the
substance of the course (e.g., “I don’t think this question was fair...”); this is disruptive to other students, and each student is ultimately responsible for their own mastery of the material covered in the lecture. A good education is a worthwhile challenge, and we’re all in this together!

**Academic honesty and plagiarism:**
All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the Student Conduct Code: [http://www.umt.edu/vpsa/policies/student_conduct.php](http://www.umt.edu/vpsa/policies/student_conduct.php).

To make a level playing field, students are responsible for having potentially helpful materials (e.g., notes, smartphone), put away during midterm and exam. Failure to do so or talking to other students during a midterm or exam will result in a 0 for that assignment. Likewise, students should not begin work on the midterm or exam until the instructor says that every student has received their midterm or exam. Time is often short on these assignments, and this ensures that students who receive their paper first could receive an advantage.

**Disability policy:**
The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and Disability Services for Students. If you have a disability that adversely affects your academic performance, and you have not already registered with Disability Services, please contact Disability Services in Lommasson Center 154.