CIS 575, Introduction to Algorithm Analysis, Spring 2014

- **Classes:** MWF, 2:30pm-3:20pm, in Nichols 122.
- **Instructor:** Torben Amtoft, tamtoft hat ksu dot edu, 219C Nichols, 532-7917.  
  *Office Hours:* Tuesdays 2-4pm, and by appointment.
- **Teaching Assistant:** Yang Xue, xueyang hat ksu dot edu, Nichols 16A; office hours are MW 3:30-5:00pm, and by appointment.
- **Course Homepage:** http://people.cis.ksu.edu/~tamtoft/CIS575/S14/index.html.
- **Up-to-date Log File:** http://people.cis.ksu.edu/~tamtoft/CIS575/S14/log.html.

**Prerequisites:**

- CIS 300 (Data and Program Structures)
- CIS 301 (Logical Foundations of Programming)
- MATH 510 (Discrete Mathematics)

Specifically, students are expected to have the following background:

- Significant programming experience in some high-level language, for example Java, C#, C, or C++
- Familiarity with standard data structures such as lists, stacks, trees, graphs, etc.
- Understanding of basic concepts of propositional and predicate logic and their use in program verification
- Experience in writing mathematical proofs in natural language
- Understanding of fundamental mathematics such as basic set theory, functions, solution of equations, limits, summations, derivatives and integrals, combinatorics

Please see the instructor if you have questions.

**Learning Outcomes:** Students should attain competency in the following:

- Application of mathematical techniques to analyze time and space usage of algorithms and data structures
- Understanding various advanced data structures and their tradeoffs
- Proving theorems about algorithms
- Recognizing and applying algorithmic design techniques

**Topics** (tentative):

- Algorithm correctness
- Worst-case asymptotic analysis
- Various data structures, such as
- Graphs and trees
- Priority queues
- Union/find structures
- Various design techniques, such as
  - Divide-and-conquer algorithms
  - Greedy algorithms
  - Dynamic programming algorithms
- Certain frequently occurring settings, such as
  - Depth-first search
  - Network flow and matching

Homeworks are due almost every week and are to be submitted through K-State Online. Assignments that are late will not be graded, unless in case of documented medical or family emergencies.

Exams will be closed-book though the use of a limited amount of note sheets may be permitted. The final will be comprehensive, but with emphasis on the last part of the course.

Grading:

- Homework: 25%
- Exam 1, February 26: 20%
- Exam 2, April 9: 20%
- Final Exam, May 15: 30%
- Class participation: 5%

Attendance will be taken from time to time. Extra credit for class participation will be given if you actively contribute to the learning climate by constructive and interesting comments and questions (as subjectively judged by me).

Final letter grades are not based on strict percentage cutoffs but are "curved" by taking into account the difficulty of the exercises and exams. As a rule of thumb, however, you should expect that it requires a bit more than 80% to earn an A, and somewhat more than 60% to earn a B. In general, my approach to grading is expressed well by this piece by S.A. Miller.

Grievances: If you think the instructor or the TA has made an oversight when grading your test or your homework, you are of course very welcome to ask for clarification. But complaints about judgment calls, like how much credit to give for a partially correct solution, are not encouraged (it is like arguing balls and strikes).

Academic Honesty: Kansas State University has an Honor System based on personal integrity, which is presumed to be sufficient assurance that, in academic matters, one's work is performed honestly and without unauthorized assistance. Undergraduate and graduate students, by registration, acknowledge the jurisdiction of the Honor System. The policies and procedures of the Honor System apply to all full and part-time students enrolled in undergraduate and graduate courses on-campus, off-campus, and via distance learning. The honor system website can be reached via the following URL: www.k-state.edu/honor. A component vital to the Honor System is the inclusion of the Honor Pledge which applies to all assignments, examinations, or other course work undertaken by students. The Honor Pledge is implied, whether or not it is stated: "On my honor, as a student, I have neither given nor received unauthorized aid on this academic work." A grade of XF can result from a breach of
academic honesty. The F indicates failure in the course; the X indicates the reason is an Honor Pledge violation.

You are very welcome to discuss the course material, as well as specific questions, with your fellow students. However, all submitted answers must be your own work: you are not allowed to show your answers to anyone else, or look at the answers of any other student; neither are you allowed to consult previous model solutions that may be around, or solicit the Internet for solutions to specific homework problems. If you are in doubt about what is permissible, please ask me.

**Students with Disabilities:** Students with disabilities who need classroom accommodations, access to technology, or information about emergency building/campus evacuation processes should contact the Student Access Center and/or their instructor. Services are available to students with a wide range of disabilities including, but not limited to, physical disabilities, medical conditions, learning disabilities, attention deficit disorder, depression, and anxiety. If you are a student enrolled in campus/online courses through the Manhattan or Olathe campuses, contact the Student Access Center at accesscenter@k-state.edu, 785-532-6441; for Salina campus, contact the Academic and Career Advising Center at acac@k-state.edu, 785-826-2649.

**Expectations for Classroom Conduct:** All student activities in the University, including this course, are governed by the Student Judicial Conduct Code as outlined in the Student Governing Association By Laws, Article V, Section 3, number 2. Students who engage in behavior that disrupts the learning environment may be asked to leave the class.

**Acknowledgment:** Much of the course material, including this syllabus, is adapted from a previous course taught by Rodney Howell.

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_Torben Amtoft_