Graduate Examination  
Spring 2013  

February 4, 2013  

General Specification  

The Graduate Examination in Computer Science will consist of tests in each of the following areas: Theory and Systems. Three hours will be allowed for the completion of each area test and the entire examination will take place over the course of two days, one area exam per day. 

The Ph.D. Qualifying Examination in Computer Science will consist of both area examinations. The Plan B Master’s Final Examination will consist of one of the two area examinations as chosen by the student and agreed to by the student’s graduate committee. 

Date: The Spring 2013 examination is tentatively scheduled for sometime in April 2013.  

Exam Administration and Grading Procedure  

Each area examination will be administered by a group of faculty associated with that area of examination. The completed exams are submitted to the department office, to become part of the student’s permanent record. Faculty members receive photocopies of the portions of the exams they are grading. The grades and any associated grading comments are submitted to the department office. The grades and comments become part of the student’s permanent record. The student is permitted to view those grades and comments. 

A Computer Science faculty meeting will be held after the questions have been graded. At this meeting the faculty will examine the grades and comments for each student’s exam. The faculty will decide a grade of Pass, Pass Conditionally, or Fail on the whole examination for each doctoral student. A grade of Pass or Pass Conditionally requires a two-thirds majority vote by the tenured and tenure-track Computer Science faculty. It is important that this process remain confidential within the Computer Science Faculty. Each student is to be informed of their outcome by their own advisor. 

The grade Pass Conditionally is included in recognition that borderline cases will appear from time to time. The conditions foreseen are (1) that the student must pass (with a specified grade or better) one or more particular courses the next time these courses are offered, or (2) the student must pass an oral examination in one or more areas of the examination. Each oral examination will be administered by the faculty in the area involved within two weeks of the student’s receiving notification of the Pass Conditionally grade and its conditions. 

A student may continue in the Ph.D. program with a grade of Pass or Pass Conditionally. If a student with a Pass Conditionally grade fails to meet the conditions at the earliest possible time, that student’s grade will be changed to Fail. A student with the grade of Fail may retake the qualifying examination at most a second time. Failure to Pass or Pass Conditionally the examination at the second sitting will terminate the student from the Ph.D. program.
Area Examination Specifications and Reading Lists

1 Systems

There are seven sections to the Systems exam. Each examinee must identify three of the seven parts by February 28, 2013 over which he/she will be examined. The examination will be based on the references listed below. Each part will consist of three questions making a total of nine questions on this examination for each student. At the time of the exam, students may select two questions in each identified part, for a total of six of the nine questions, to be graded. The exam is open book, meaning that those taking the examination may consult the references cited below during the examination.

1.1 Computer Graphics


Readings: Chapters 2–12, Appendix 3.

Readings: Chapters 2–18, 25.

Readings: Chapters 1, 2, 4–7, 9, 10, 12, 13, Appendix B and C.

1.2 Operating System Design

Readings: Chapters 3, 4, 5, 6, 7, 8, 9, 11

1.3 Computer Networks

Readings: Chapters 2, 3, 4, 5, 6

1.4 Programming Languages

Readings: Chapters 1, 2, 6.1-6.3.

Readings: Chapters 1, 2

1.5 Compiler Construction

Readings: Chapters 2, 3, 4, 5, 6

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1.6  Artificial Intelligence


1.7  Principles of Database Systems

Students may choose (by February 28, 2013 ) from either of the following textbooks.

  *Readings:* Chapters 2 - 7, 8.3 - 8.4, 10.2 - 10.5, 11.

  *Readings:* Chapters 1 - 5, 6 - 7, 8, 12, 16, 19 - 21.

2  Theory

There are seven sections to the theory exam. The examination will be based on the references listed below. Each examinee must identify three of the seven parts by February 28, 2013 over which he/she will be examined. Each part will consist of three questions making a total of nine questions on this examination for each student. At the time of the exam, students may select five of the nine questions to be graded. The exam is open book, meaning that those taking the examination may consult the references cited below during the examination.

2.1  Foundations of Computing

*Readings:* Sections 1.1, 1.4, 2.1, 2.2, 2.4, 3.6, 5.1, 5.2, 5.4, 6.1, 6.2, 6.4, 7.1, 8.3

J.L. Hein *Discrete Structures, Logic and Computability* (first or second editions), Jones and Bartlett, 1996.
*Readings:* Sections 1.1, 3.1, 3.2, 3.3, 4.4, 8.2, 11., 11.4, 12.1, 12.2, 12.4, 13.1

2.2  Theory of Computation

*Readings:* Chapters 2–7

2.3  Analysis of Algorithms

*Readings:* Chapters 1-9.

2.4  Computational Complexity


2.5  Languages and Automata

Readings: Numbered Lectures 1-16, 19-27.

2.6 Computational Learning

2.7 Randomness in Computation