Computer Science Ph.D. Qualifying Examinations
Rules and Reading List

Revision of December 2000

Rules

The Computer Science Ph.D. qualifying exams are given once a year, typically in January. Next time they will be offered in January 2001. Students must notify the departmental Coordinator of Academic Advising (Jeanette Magee, 718-260-3210, jmagee@poly.edu) of their intent to take the exams at least one month before the exams. There are three exams, which *must* be taken at the same time on the student's initial attempt. In general, students who do not pass all three exams will be required to retake all three. However, in exceptional circumstances, a student who does not pass all three exams may be required to retake only one of them. In either case, the exams must be retaken the next time they are offered. Students who do not pass the exams within two attempts may not continue in the PhD program.

Only students already accepted into the Ph.D. program may take the qualifying exams. Full-time students are expected to take the exams *no later than* during their second year. Supported full-time students may lose their support if they do not take the exams by that time. Full-time Ph.D. students who enter the program with a Master's degree are encouraged to take the exams during their first year if they feel they will have sufficient preparation (between their Master's coursework, their first-semester coursework at Poly, and their independent studying) by January of their first year.

Part-time students should consult the Director of Graduate Studies (Prof. Boris Aronov, 718-260-3092, aronov@ziggy.poly.edu) for an appropriate time to take these examinations. Normally, this will be after the student has taken the supporting courses (see below) for the examinations.

The contents of the reading list for each exam define the required knowledge on which the respective exam is based. While the student is advised to take the supporting courses associated with each exam, the student should rely on the reading lists, *not* the actual contents of the supporting courses, for a definition of expected knowledge. (This is for the sake of uniformity, as students may take the supporting courses at different campuses, with different instructors and/or different texts.)

Samples of exams given in previous years are available from the department.

Algorithms and Theory of Computation (3 hours)

Supporting Courses: CS603 Algorithms I, CS604 Algorithms II, CS675 Theory of Computation.

Algorithms

Reading List: Cormen, Leiserson, and Rivest, *Introduction to Algorithms*, McGraw-Hill, Topics I–VI (pp. 1–629) and Chapter 36 from Topic VII (pp. 916–963).

Faculty Contact: Prof. T. Suel, room LC231, e-mail: suel@photon.poly.edu, tel.: 718-260-3354.

Theory

Reading List: J.C. Martin, *Introduction to Languages and the Theory of Computation* (second edition). Chapters 1–5, 6.1–6.4, 6.6, 8–10, 12.1–12.4, 13–15.

Faculty Contact: Prof. L. Hellerstein, room LC234, e-mail: hstein@duke.poly.edu, tel.: 718-260-3689.

Architecture and Operating Systems (3 hours)

The exam consists of basic material from both topics plus a choice *of advanced material from either architecture or operating systems.*

Please be advised that the reading list for this exam may be changed for the 2002 exams.

Supporting Courses: CS613 Computer Architecture I, CS614 Computer Architecture II, CS623 Operating Systems I, CS624 Operating Systems II.

Basic Reading List for Operating Systems Maekawa, Oldehoeft, and Oldehoeft, *Operating Systems, Advanced Concepts*, Benjamin Cummings, 1987, Chapters 1–5 and 8.
OR
Raphael A. Finkel, *An Operating Systems Vade Mecum*, Prentice Hall, Englewood Cliffs, NJ, 2nd Ed., 1988; the book is freely available at:

http://www.cs.engr.uky.edu/~raphael/ or http://naxos.poly.edu/~ad/Vade.PS.

Advanced Material for Operating Systems Maekawa, Oldehoeft, and Oldehoeft, *Operating Systems, Advanced Concepts*, Benjamin Cummings, 1987, Chapters 6, 7 and 9.
George Coulouris, Jean Dollimore, and Tim Kindberg, *Distributed Systems: Concepts and Design*, 2nd edition, Addison-Wesley, 1994.

Faculty Contact: Prof. A. Delis, room LC217, e-mail: ad@naxos.poly.edu, tel.: 718-260-3313.
AND
Prof. R. Flynn, room WC5, e-mail: flynn@west.poly.edu, tel.: 718-260-2003.

Basic Reading List for Architecture J. L. Hennessy and D.A. Patterson, *Computer Architecture: A Quantitative Approach*, Second Edition, Morgan Kaufman Publishers Inc., 1996, Chapters 1, 2, 3, 5, and Appendix A.

Advanced Material for Architecture J. L. Hennessy and D.A. Patterson, *Computer Architecture: A Quantitative Approach*, Second Edition, Morgan Kaufman Publishers Inc., 1996, Chapters 4, 6 and Appendix B.
AND
K. Hwang, *Advanced Computer Architecture with Parallel Processing*, McGraw-Hill, 1993, Chapter 2, Section 3.3, and Chapters 5, 6, 7, 8, and 9.

Faculty Contact: Prof. N. Memon, room LC116, e-mail: memon@poly.edu, tel.: 718-260-3970.

Programming Languages, Compilers, Artificial Intelligence, Software Engineering, and Databases (3 hours)

The exam consists of five parts. All student must answer the Programming Languages part and choose TWO of the remaining four parts.

Supporting Courses: CS637 Programming Languages, CS641 Compilers I, CS661 Artificial Intelligence I, CS606 Software Engineering I, and CS 608 Principles of Database Systems.

Programming Languages

Reading List: Sebesta, *Concepts of Programming Languages*, Addison-Wesley, 4th Ed. (1999).

Faculty Contact: Prof. P. Frankl, room LC237, e-mail: phyllis@morph.poly.edu, tel.: 718-260-3870

Compilers

Reading List: Aho, Sethi and Ullman, *Compilers: Principles, Techniques, and Tools*, Addison-Wesley, 1986, Chapters 1–5.5 and 8–10.7.

Faculty Contact: Prof. B. Aronov, room LC236, e-mail: aronov@ziggy.poly.edu, tel.: 718-260-3092.

Artificial Intelligence

Reading List: Primary textbook:
Russell and Norving, *Artificial Intelligence: A modern Approach*, Prentice Hall, 1995. Chapters: 1, 3, 4, 5, 7, 9, 11 and 24.
Supplementary textbooks:
N. J. Nilsson, *Principles of Artificial Intelligence*, Tioga Publishing Company, Palo Alto, CA, 1980, Chapters 4 and 5.
Chapters 4 and 5 of the above book supplement Chapters 7 and 9 of Russell and Norving's book.
E. Rich and K. Knight, *Artificial Intelligence*, 2nd Ed., McGraw-Hill, 1991. Chapters 1–3, 5, 12, 13 and Sections 21.1–21.2.
Students can study Rich and Knight's book instead of the primary textbook, but the primary textbook is preferred since it gives a better explanation of the material.

Faculty Contact: Prof. E. Wong, room LC217, e-mail: wong@poly.edu, tel.: 718-260-3523.

Software Engineering

Reading List: Roger S. Pressman, *Software Engineering, Fourth Edition*, McGraw-Hill Co., 1997, Chapters 1–9, 11, 12, 16–23.
OR
Bernd Bruegge and Allen H. Dutoit, *Object-Oriented Software Engineering*, Prentice Hall, 2000, Chapters 1–7, 9–12.

Faculty Contact: Prof. G. Naumovich, room LC228, e-mail: gleb@poly.edu, tel.: 718-260-3554.

Databases

Reading List: *Database Systems Concepts*, by A. Silberschatz, H. Korth, and S. Sudarshan, Third Edition, McGraw Hill, 1997. Chapters: 1–7, 10–16.

Faculty Contact: Prof. A. Delis, room LC217, e-mail: ad@naxos.poly.edu, tel.: 718-260-3313.