

The Handbook of the Ph.D. Program in Computer Science

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Department of Computer Science
University of Texas at San Antonio

Contents

1 Admission Requirements	3
2 Program Guidelines	3
2.1 Program of Study	3
2.2 Transfer of Credit	4
2.3 Advisors	4
2.4 The Milestones and Timeline	4
2.5 Advancement to Candidacy	5
2.6 Qualifying Examination	5
2.7 Doctoral Dissertation Proposal Examination	6
2.8 The Dissertation Committee	7
2.9 Doctoral Dissertation and Final Oral Examination	7
2.10 Change of Program	7
A Common Syllabus of Qualifying Examination	8
A.1 Analysis of Algorithms	8
A.2 Operating Systems	11
B Frequently Asked Questions on Dissertation Proposal Defense	13
B.1 What is a proposal defense?	13
B.2 What is the format of the proposal defense?	13
B.3 What kinds of questions will my committee ask me?	13
B.4 What is the composition of the committee?	13
B.5 When should I do my proposal defense?	14
B.6 How is the proposal defense related to other exams?	14
B.7 What should I do to prepare for the proposal defense?	14
B.8 What should be in the dissertation proposal?	14
B.9 How many references are enough?	15
B.10 Will my proposal defense really take 2 hours?	15
B.11 What if I change my topic after I pass the proposal defense?	15
B.12 What is the role of the advisor versus the committee?	15
B.13 What does the PhD degree mean?	15
B.14 How long is it between the proposal defense and the dissertation defense?	15
B.15 How do I know when I am becoming an independent researcher?	15
C Forms	16

The Handbook of The Ph.D. Program in Computer Science

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The Department of Computer Science offers advanced coursework and research leading to the Doctor of Philosophy (Ph.D.) degree in Computer Science. Successful Ph.D. candidates must demonstrate an in-depth knowledge of computer science and must deliver an original contribution to the field.

1 Admission Requirements

Contact the UTSA Graduate School (<http://graduateschool.utsa.edu>) for application forms by mail or to apply on-line.

The minimum requirements for admission to the Doctoral degree program in computer science in addition to University-wide graduate admission requirements are as follows:

- a B.A., B.S., or M.S. degree in computer science or a related area;
- the GRE general test – verbal, math, and analytical sections. The GRE computer science subject test is strongly recommended but not required. When GRE scores are used to determine an admission, applicants will be compared to applicants with similar socioeconomic backgrounds; and
- three letters of recommendation attesting to the applicant’s readiness for doctoral study.

Admission is competitive. Satisfying the minimum requirements does not guarantee admission. An application should also include a resume and a statement of research experience and interest. Applicants will automatically be considered for scholarships, and teaching and research assistantships. To receive full consideration all application materials should be received by February 1 for Fall admission or October 1 for Spring admission. A complete application includes the application form, transcripts, three letters of recommendation, a resume, a statement of research experience and interest, the GRE scores and the TOEFL score for those applicants whose native language is not English and they have not graduated from a United States institution.

2 Program Guidelines

These guidelines for the Doctor of Philosophy Degree in the Department of Computer Science at UTSA describe requirements and procedures that supplement, but do not supersede, the Doctoral Degree Regulations listed in the UTSA Graduate Catalog. Candidates for the degree are required to successfully complete a minimum of 90 semester credit hours of graduate coursework as described in the program of study.

2.1 Program of Study

- A. Core courses (12 semester credit hours):
- CS 5363 Programming Languages and Compilers
 - CS 5513 Computer Architecture
 - CS 5523 Operating Systems
 - CS 5633 Analysis of Algorithms

B. Electives (18 semester credit hours):

Students must complete at least 18 semester credit hours of additional eligible organized graduate courses in the Department of Computer Science.

C. Computer science research (42 semester credit hours minimum):

CS 7123 Research Method (6 semester credit hours required, 3 semester credit hours may be replaced by CS 6953 Independent Study)

CS 7211-6 Doctoral Research (18 semester credit hours minimum)

CS 7311-6 Doctoral Dissertation (18 semester credit hours minimum)

D. Flexible Electives (18 semester credit hours):

Students must complete an additional 18 semester credit hours selected from organized graduate courses, independent study, research seminar, doctoral research and doctoral dissertation. With prior approval of the Graduate Advisor of Record, students may apply a maximum of 6 hours of graduate courses from other disciplines to the degree.

2.2 Transfer of Credit

Students may transfer prior graduate study up to 30 semester credit hours from another institution toward the Doctor of Philosophy degree in Computer Science with the approval of the Graduate Studies Committee. Each student's transcript will be evaluated by the Graduate Studies Committee, and credit will be determined on a course-by-course basis to satisfy the requirements of the degree.

2.3 Advisors

Upon entering the Ph.D. program, each student is assigned an advisor, who would provide advising to students based on the Milestones Agreement Form of UTSA Doctoral Program in Computer Science. According to this agreement, the advisor in student's first year will be the Computer Science Graduate Advisor of Record who is responsible for the administration of the Computer Science graduate degree programs, including the Ph.D. program and the MS program. Starting in the second year, or as soon as the student passes the PhD Qualifying Examination, the student will be advised by the student's Doctoral Advisor who is a computer science faculty who directs the research of the student, with the goal of passing a dissertation proposal examination and successful completion of a dissertation.

The advisor should be consulted each semester before the student registers for courses. During the first year in the program, the student should find a faculty to be the student's Doctoral Advisor. (It is also possible for a student to have two Doctoral Advisors, who jointly supervise the student.) A Doctoral Advisor must be a member of the Computer Science Graduate Council. The student must choose a Doctoral Advisor after the student has passed the qualifying exam. A student may change Doctoral Advisor by submitting a Change of Advisor form for approval by the Graduate Studies Committee.

2.4 The Milestones and Timeline

The progress of the students in the Ph.D. program is specified on the Milestones Agreement Form of UTSA Doctoral Program in Computer Science. See the form on page 17 for the expected timeline for students to reach each milestone. Students admitted to the program are required to sign the form and submit it to the Department of Computer Science within the first year of the enrollment into the program.

An approximate timeline for completing the program by a full-time PhD student with a BS degree is as follows.

- Year One: Complete CS 5523 Operating Systems, CS 5633 Analysis of Algorithms, and 3 credit hours of CS 7123 Research Method, and pass the Qualifying Examinations in the first semester. Select a Doctoral Advisor. Complete another 3 credit hours of CS 7123 Research Method and 6 credit hours of other required courses

- Year Two: Complete all core courses and register CS 7211-6 Doctoral Research with the Doctoral Advisor every semester. Complete nearly all of the course work by the end of the year.
- Year Three: Write a dissertation proposal. Form a dissertation committee. Pass the Dissertation Proposal Examination by the end of the year. Apply for candidacy.
- Year Four and Beyond: Write a dissertation. Pass the Final Oral Examination.

Each student enrolled in the PhD program will be evaluated annually for their progress in the program in terms of those milestones in the Milestone Agreement Form. The Annual Report Form on page 20 is required to complete the annual evaluation and to file the progress report to the Graduate School.

Students whose progress in the program are less than satisfactory as compared to the Milestone Agreement will be required to provide an action plan to address the problems that cause the delay of the progress.

2.5 Advancement to Candidacy

Students seeking a doctoral degree must be admitted to candidacy. The requirements for admission to candidacy include passing a doctoral qualifying examination and a doctoral dissertation proposal examination. Students should consult the University's Doctoral Degree Regulations for other requirements.

2.6 Qualifying Examination

To pass the PhD Qualifying Examination in Computer Science, a computer science doctoral student must meet the following two requirements.

1. GPA requirement: A GPA of 3.3 or better in
 - CS 5633 Analysis of Algorithms,
 - CS 5523 Operating Systems, and
 - one of CS 5513 Computer Architecture and CS 5363 Programming Languages and Compilers.
2. QE requirement: Satisfactory performance on the Algorithms and the Operating Systems qualifying examinations (QEs).

Full-time doctoral students must pass the PhD Qualifying Examination before the beginning of the third long semester in the doctoral program. More specifically, full-time students who are admitted in the Fall semester must satisfy the GPA and QE requirements by the end of the following May; full-time students who start are admitted in the Spring semester must satisfy the GPA and QE requirements by the second week of January before the start of the third long semester.

Part-time doctoral students must (a) meet the GPA requirement by the time they complete the first 18 hours of computer science courses at UTSA while enrolled in the doctoral program, and (b) meet the QE requirement prior to attempting more than 18 accumulated hours of computer science courses while enrolled in the doctoral program.

Failure to meet these requirements by the given timeline will normally result in dismissal from the program.

After passing the PhD Qualifying Examination by the given timeline, the student must select a doctoral advisor and register for CS 7211-6 Doctoral Research every semester until the student passes the doctoral dissertation proposal examination.

GPA Verification

For students who take the four core courses (CS 5633 Analysis of Algorithms, CS 5523 Operating Systems, CS 5513 Computer Architecture and CS 5363 Programming Languages and Compilers) at UTSA, the most recent course grades obtained will be used to verify the GPA requirements. For students who transfer the courses for credit, the grades (or grades converted to equivalent UTSA grades) indicated in their admission transcripts will be used to verify the GPA requirements.

QE Specification

1. A qualifying examination consists of the final examination in the relevant core course plus an one-hour extended examination on material that may include additional topics selected from the Qualifying Examination Syllabus for that subject.
2. The one-hour extended examination will be administered after the regular final examination period, typically in the third week of May for courses taught in the spring and in the first week of January for courses taught in the fall.
3. Students who receive transfer credit for CS 5633 (AL) or CS 5523 (OS) must take an examination equivalent to the course final examination as well as the one-hour extended examination to pass the QE. This requirement also applies to students who have previously taken these courses at UTSA and whose final examination papers are no longer available. Arrangements will be made to administer the equivalent final examination in conjunction with the one-hour extended examination for these students.
4. The course instructor will make and grade both the final examination and the extended examination. A QE committee consisting of three faculty members appointed by the Department Chair will meet with the instructors of the two QE courses and review the student examinations. The QE committee will compare the performance of all students who have taken a particular QE exam and, after discussion with course instructors, make a determination of which students showed sufficient mastery to pass the QE. This determination will be made independently of the course grade.
5. Students in the CS Master's program may elect to take a QE (including the course final exam and the one-hour extended exam) and be evaluated by the Examination Committee using the same standards applied to the doctoral students. Students who pass the QE will earn a QE credit, provided they enter the CS PhD program within four years. Fail to receive a QE credit does not limit the number of attempts allowed when these students are enrolled in the CS doctoral program.
6. A doctoral student may attempt each subject QE at most two times.

2.7 Doctoral Dissertation Proposal Examination

After a student has passed the qualifying examination and has made progress in doctoral research, the next step is the Doctoral Dissertation Proposal. The student has to form a Dissertation Committee chaired by the student's doctoral advisor and prepare a written proposal for a dissertation topic. The Dissertation Committee will conduct an oral examination during which the student presents the dissertation proposal. The presentation is followed by a period of questioning based on the dissertation proposal. Unanimous approval of the Dissertation Committee is required to pass the oral examination. No more than two attempts to pass the oral examination will be permitted.

The student should submit the dissertation proposal to the student's Dissertation Committee at least two weeks prior to the examination. A Program of Study form must also be submitted by the student and be approved by the Graduate Studies Committee at this time. The dissertation proposal should

- present an overview of the background and related work in the field,
- explain the basic idea of the dissertation topic,
- argue why that topic is original, challenging, and important,
- state what kind of results are expected, and present preliminary results, if any, and
- make a plausible argument that these results are obtainable within a reasonable amount of time.

The student should write the dissertation proposal as soon as they can address the issues described above.

The answers to a set of Frequently Asked Questions to the dissertation proposal examination is in Appendix B. Note that if after passing the dissertation proposal examination, the student changes a Doctoral Advisor and starts a different research topic under the supervision of the new Doctoral Advisor, the student must pass another dissertation proposal examination on the new research topic.

After a student has passed the doctoral dissertation proposal examination, the student must register for CS 7311-6 Doctoral Dissertation every semester until the student completes the degree.

2.8 The Dissertation Committee

The Dissertation Committee of a student consists of a minimum five faculty members, with the student's Doctoral Advisor being the chair of the committee. The remaining members of the committee should be selected by the student, in consultation with the student's Doctoral Advisor. The chair and three of the other members of the committee must be members of the Department of Computer Science. One remaining member should be from outside of the Department of Computer Science. All the members of the Dissertation Committee must be Members or Special Members of the UTSA Graduate Council. A committee member from outside the University can become a Special Member of the Graduate Council with approval by the Computer Science and the UTSA Graduate Council. The composition of the committee must be approved by the Graduate Studies Committee, the College of Sciences, the Graduate School, and the Provost and the Vice President for Academic Affairs.

2.9 Doctoral Dissertation and Final Oral Examination

After a student has passed the doctoral dissertation proposal examination, the next steps are writing a dissertation and passing the final oral examination. The final oral examination is administered and evaluated by the student's Dissertation Committee and covers the dissertation and the general field of the dissertation. The final oral examination consists of an open presentation of the dissertation followed by an oral examination. Unanimous approval of the Dissertation Committee is required to pass the final oral examination. Also, the dissertation must be unanimously approved by the Dissertation Committee.

2.10 Change of Program

A student who wants to exit the Ph. D. program may apply to switch to the Master's Degree program in computer science. The student may apply for a M.S. degree in Computer Science by satisfying all requirements of the M.S. degree. All the graduate courses taken as a doctoral student except Research Seminar, Doctoral Research and Doctoral Dissertation may be counted towards a M.S. degree. The passing of the doctoral qualifying exam and dissertation proposal exam satisfies the comprehensive exam requirement for the M.S. degree.

A student who wants to switch to the Master's Degree Program must petition for a change in status from "Ph.D. degree seeking" to "M.S. degree seeking". The petition must be approved by the Graduate Studies Committee prior to the deadline for applying for graduation.

A student who is supported by a stipend, a teaching or research assistantship automatically rescinds the financial support and any tuition waiver upon changing status to an M.S. seeking student. A student who applies for the interim M.S. degree after being admitted to Ph.D. candidacy retains the status as a Ph.D. seeking student.

A Common Syllabus of Qualifying Examination

A.1 Analysis of Algorithms

Syllabus

Philosophy: We are testing analytical ability: how well students think on their feet, rather than details of some data structure, etc. So there will be less reliance on memory. The questions will be more of a general nature (and will require more analytical/creative ability) than a typical final exam.

All sections marked with a * in CLRS (4.4, 5.4, 11.5, 12.4, 16.4, 16.5, 21.4, 26.4, 26.5) are excluded.

1. Preliminaries (CLRS Chapters 3 and 4):

- pages 21, CLRS Ch 3 Growth of Functions
- pages 29, CLRS Ch 4 Recurrences
- pages 30, CLRS Ch 5 Probabilistic Analysis and Randomized Algorithms
- pages 6, CLRS Ch C.3 Discrete random variables

- Algorithm growth, Big-Oh and similar notations.
- Recurrence equations, and their solution. Applications of recurrences.
- Randomized algorithms, expected runtime analysis

2. Sorting (CLRS Chapters 6-9):

- pages 18, CLRS Ch 6 Heapsort
- pages 20, CLRS Ch 7 Quicksort
- pages 18, CLRS Ch 8 Sorting in Linear Time
- pages 13, CLRS Ch 9 Medians and Order Statistics

- Algorithms (Heapsort, quicksort, mergesort, radixsort).
- Proof that sorting (by comparisons) takes $\Omega(n \log(n))$ time.
- Medians and order statistics.

3. Divide and conquer techniques (CLRS Section 2.3, Chapter 7, and Section 28.2):

- pages 10, CLRS Section 2.3 Designing Algorithms
- pages 20, CLRS Ch 7 Quicksort
- pages 7, CLRS Section 28.2 Strassen's algorithm

- For mergesort.
- For quicksort.
- Strassen's algorithm for matrix multiplication.

4. Trees and hashing (CLRS Chapters 10–14 and 18):

- pages 21, CLRS Ch 10 Elementary Data Structures
- pages 42, CLRS Ch 11 Hash Tables
- pages 20, CLRS Ch 12 Binary Search Trees
- pages 29, CLRS Ch 13 Red-Black Trees
- pages 21, CLRS Ch 18 B-trees

- pages 17, CLRS Ch 14 Augmenting Data Structures
 - Stacks, queues, linked lists.
 - Hashing techniques and functions.
 - Binary search trees.
 - Balanced search trees.
 - B-trees.
 - Dynamic order statistics, interval trees
5. Dynamic programming (CLRS Chapter 15):
- pages 47, CLRS Ch 15 Dynamic Programming
 - Examples and principles.
6. Greedy algorithms (CLRS Chapters 16 and 23);
- pages 25, CLRS Ch 16 Greedy Algorithms
 - pages 19, CLRS Ch 23 Minimum Spanning Trees
 - Huffman codes.
 - Minimal spanning tree.
7. Graph algorithms (CLRS Chapters 22-26):
- pages 34, CLRS 22 Elementary Graph Algorithms
 - pages 19, CLRS 23 Minimum Spanning Trees
 - pages 40, CLRS 24 Single-Source Shortest Paths
 - pages 23, CLRS 25 All-pairs Shortest Paths
 - pages 56, CLRS 26 Maximum Flow
 - Graph representations.
 - Graph traversals.
 - Spanning trees or forests.
 - Shortest paths.
 - Maximum flow.
8. Amortized Analysis (CLRS Ch 17)
- pages 25, CLRS 17 Amortized Analysis
 - Analyzing a sequence of operations
 - Aggregate, accounting, and potential methods
9. Data Structures for Disjoint Sets (CLRS Ch 21, excluding 21.4)
- pages 12, CLRS 21 (excluding 21.4) Data Structures for Disjoint Sets
 - Union/Find data structures

- Linked list representations, disjoint forest representations
- Union by rank, path compression
- Runtime, but not the proof, of union by rank with path compression

10. NP-completeness (CLRS Chapter 34):

- pages 56, CLRS Ch 34 NP-Completeness
- We won't ask students to prove how NP Turing Machines reduce to satisfiability, but they should be able to do simple reductions.
- The classes P, NP, NP-complete, NP-hard.
- An initial NP-complete problem.
- Reductions and proofs that other problems are NP-complete, e.g., Hamiltonian Circuit, Traveling Salesman, and Vertex Cover.

References

- Algorithms, by Cormen, Leiserson, Rivest, and Stein (CLRS) (the "green" book).

A.2 Operating Systems

Syllabus

1. Basic resource management:

- pages 95-128 SGG Ch 4 Processes
- pages 207-249 CDK Ch 6 Operating Systems Support
- pages 129-149 SGG Ch 5 Threads
- pages 151-188 SGG Ch 6 Process scheduling
- pages 273-316 SGG Ch 9 Memory Management
- pages 317-370 SGG Ch 10 Virtual Memory
- pages 371-409 SGG Ch 11 File System Interface
- pages 411-451 SGG Ch 12 File System Implementation

Total: 314 pages

Main Topics:

- Processes and process organization
- Threads versus processes
- Process scheduling
- Memory management and virtual memory
- Disk and storage management
- File systems

2. Synchronization:

- pages 189-241 SGG Ch 7 Process Synchronization
- pages 243-270 SGG Ch 8 Deadlocks

Total pages: 82 pages

Main Topics:

- Mutual exclusion
- Mutex locks
- Semaphores
- Condition variables
- Classical synchronization problems
- Monitors
- Concurrency
- Deadlocks

3. Communication:

- pages 65-124, CDK Ch 3 Networking
- pages 125-164, CDK Ch 4 Interprocess Communication
- pages 165-203, CDK Ch 5 Distributed Objects and Remote Invocation
- pages 669-695, CDK Ch 17 Corba

Total Pages: 166

Main Topics:

- Connectionless versus connection-oriented protocols
- Blocking versus non-blocking
- Client-server model
- RPCs
- Remote object invocation
- CORBA
- Multicast
- Group communication
- Message passing

4. Naming, authentication, and protection

- pages 251-308, CDK Ch 7 Security
- pages 629-656, SGG Ch 18 Protection
- pages 353-384, CDK Ch 9 Name Services

Total: 118 pages

Main Topics:

- Basic security principles
- Authentication
- Digital signatures
- Public Key versus Shared Key
- Needham-Schroeder, Kerberos, SSL
- Domains
- Capabilities
- Name services and spaces
- DNS
- Directory services
- Discovery services

5. Distributed file systems

- pages 309-352, CDK CH 8 Distributed File Systems

Total: 44 pages

Main Topics:

- Design principles of distributed file systems
- NFS
- Andrew
- Caching
- Consistency
- Persistent stores

Operating Systems total: 724 pages

References

- Operating System Concepts, 6th ed by Silberschatz, Galvin and Gagne (SGG)
- Distributed Systems, 3rd ed. by Coulouris, Dollimore, and Kindberg (CDK)

B Frequently Asked Questions on Dissertation Proposal Defense

B.1 What is a proposal defense?

A proposal defense, which consists of an oral presentation and an oral examination, is one of the steps designed to prepare you to become an independent researcher. During the proposal defense you will explain the general problem or research area of your work. You will demonstrate your understanding of the background material in this area and your general grasp of how the problem you have picked fits into the big picture. Before your proposal defense, you will submit a written dissertation proposal to your proposal committee. (See Question 8 for details.)

B.2 What is the format of the proposal defense?

The proposal defense consists of a presentation (50 minutes), a question period, and a closed session with the committee. The audience may stop and ask you questions at any time, so often the presentation runs longer. You should time your presentation to be 40 to 50 minutes if there are no questions. Here is advice for the format of the presentation:

1. Since you only have 40-50 minutes, you should cover elementary background material quickly.
2. It is essential that you get to substantive topics in your allotted time.
3. You must be ready to answer elementary questions on the background material of your area. You should also be prepared to discuss related work and to describe how your work is different.
4. You must prepare your talk carefully, making sure you have the formulas and analysis correct. Only the content of this talk really matters, and not any particular flashy format.
5. It is a good idea to put small examples to the side to show that you understand any formulas and can explain them.
6. You want to convince the committee that you clearly understand what you are doing.
7. Emphasize your research contributions and future directions.
8. The material of your presentation should reflect your written dissertation proposal, which is described in more detail below.
9. You should practice your presentation prior to the defense, ideally with some friends who can ask you questions about things that aren't clear.
10. Your advisor should always review the proposal before you submit it to your committee members.
11. Please proofread your dissertation proposal and slides carefully.

B.3 What kinds of questions will my committee ask me?

One of the purposes of the proposal defense is to demonstrate that you understand the problem that you are working on. Remember that sometimes your committee members will ask you questions, not because they want to know the answer, but because they want to know if you do. They will question the meaning of formulas, your graphs, the assumptions, and especially your contribution and your ideas.

B.4 What is the composition of the committee?

The committee consists of your advisor and three faculty members from computer science. Usually this committee ends up as part of your dissertation committee, but that is not required. You should pick your committee in conjunction with your advisor to represent expertise that might be useful to you in completing your dissertation. Your committee must be approved by the PhD doctoral studies committee.

B.5 When should I do my proposal defense?

Generally you should try to do your proposal defense in your third year.

B.6 How is the proposal defense related to other exams?

There are three major exams that you must pass to earn a PhD in CS. These exams measure your progress towards becoming an independent researcher.

The first exam is the written exam taken at the end of the first year. This exam verifies your competency in core subjects. When you pass this exam, you can sign up for doctoral research.

The second exam is the proposal defense, which is also the CS PhD oral examination. The purpose of the proposal defense is to make sure that you understand the problem and have the necessary background to do research in the area you have selected. The exam also establishes that you have a game-plan for your research. When you pass this exam, you advance to candidacy and can sign up for doctoral dissertation.

The final exam is the actual dissertation defense. At this exam you explain and defend your original research as embodied by your thesis document and publications. You set your work and contributions in the bigger picture of the field.

B.7 What should I do to prepare for the proposal defense?

1. Pick a proposal committee and get the committee approved
2. Prepare your dissertation proposal and submit it to your committee at least 2 weeks before the defense. (Ideally you should do this 4 weeks before the defense and then meet individually with your committee members 2 weeks before to discuss any changes that need to be made in the dissertation proposal before the defense. You should also give your committee copies of the papers that you have co-authored.)
3. Prepare your presentation
4. Schedule the defense with the Department office and your committee members. You should allow a 2 hour block of time for this.
5. Practice your presentation
6. Make any corrections or complete other work required by your committee

B.8 What should be in the dissertation proposal?

A written dissertation proposal should be submitted to the student's Oral Examination Committee at least two weeks before the presentation. The guidelines state that the dissertation proposal should:

1. Present an overview of the background and related work in the field.
2. Explain the basic idea of the dissertation topic.
3. Argue why that topic is original, challenging, and important.
4. State what kind of results are expected and present preliminary results, if any.
5. Make a plausible argument that these results are obtainable within a reasonable amount of time.

The proposal should also contain a clear description of your contribution to the publications and work done jointly so far. You should also clearly delineate in both your presentation slides and in the dissertation proposal which results are yours and which results you are using from other work (with a reference).

B.9 How many references are enough?

The reference list for the proposal may not include all of the references that end up in your dissertation, but it is important that you have found the relevant related work so that you don't duplicate results for your dissertation. You include recent references and references that are from high-quality venues. Part of learning to become an independent researcher is to learn what the high-quality publications are and to recognize high-quality work. If you have any questions, ask your advisor or committee members. You should not have references that are mostly 5 years old or are all less selective conferences. At least some of your references should be from the top journals or conferences in that area.

B.10 Will my proposal defense really take 2 hours?

Proposal defenses usually run $1\frac{1}{2}$ to 2 hours. Plan on 2 hours.

B.11 What if I change my topic after I pass the proposal defense?

You do not have to pass the defense again if you make minor changes in your topic or the plan to complete your dissertation, but you need to keep your committee and the Graduate Advisor of Record informed. The Graduate Advisor of Record in conjunction with the Graduate Studies Committee will decide whether the change is major enough to warrant redoing the dissertation proposal or changing the membership of your dissertation committee.

B.12 What is the role of the advisor versus the committee?

Your advisor plays the most important role in guiding your research, and will generally be the one to tell you when to do your proposal defense and your dissertation defense. However, your committee as a whole has to pass you on these milestones. They can be a valuable resource in suggesting directions. They also are likely candidates for recommendation letters when you graduate. You should keep them informed of your progress.

B.13 What does the PhD degree mean?

Earning a PhD signifies that you are an independent researcher who has made original contributions to your field. Even seemingly modest results can take on more importance later.

B.14 How long is it between the proposal defense and the dissertation defense?

The key to earning a PhD is to make an original contribution. As such there can be no fixed time limit. A typical time is one to two years, but this varies considerably depending on student and research area.

B.15 How do I know when I am becoming an independent researcher?

Becoming an independent researcher doesn't happen overnight. You will begin by working with your advisor and possibly a small group of other students on research projects, often in a supporting role.

As you mature, you should be contributing more of the ideas and doing more of the writing. Research quality is generally judged by publication quality. As your contribution to the research increases, generally your position in the authorship moves forward. (Some theoretical fields always publish alphabetically, but most go by contribution, with the advisor going either first or last in the list.) Your first paper will probably not get into a great venue unless someone else does the writing. As you get more experience and the quality of your work increases, you should be targeting better conferences and journals. It is important to make a significant enough contribution to the work that constitutes your thesis that you are first author on the publications reporting that work. However, you can't expect to be first author if you do not make this significant contribution.

C Forms

This appendix contains the following forms.

1. Milestone Agreement Form on the following page.
2. PhD Annual Report Form on page 20.
3. Selection of Doctoral Advisor Form on page 23.
4. Change of Doctoral Advisor Form on page 24.
5. Appointment of Oral Examination Committee on page 25.
6. Completion of Qualifying Exam Form on page 26.
7. Dissertation Proposal Approval Form on page 27.
8. Appointment of Dissertation Committee Form on page 28.
9. Application for Candidacy Form on page 29.
10. Certification of Completion of Dissertation Form on page 30.
11. Program of Study Form on page 31.
12. Petition for Transfer Credits form on page 32.

Milestones Agreement Form UTSA Doctoral Program in Computer Science

This form is provided for the purpose of informing students about the academic milestones that they will be expected to reach in order to earn their Ph.D. degree as well as when they are expected to complete these milestones. Students are expected to reach each milestone within the specified time period in order to be considered to be making satisfactory progress through the program. Students who are not making satisfactory progress may lose funding, be placed on academic probation, or be dismissed from the program.

Academic Advising

Upon entering the UTSA Doctoral program in Computer Science, each student will be assigned an advisor. The advisor will be a graduate council member of the program department. During the first year in the program the student's advisor will be the Graduate Advisor of Record (GAR) for the Computer Science Doctoral Program. In subsequent years, the student is required to select a Doctoral Advisor who will guide the student in the conduct of independent research and the completion of a doctoral dissertation. The GAR and the Computer Science Graduate Studies Committee (CSGSC) will continue to monitor the progress of all students in the program.

Academic advising includes the following elements that are designed to ensure that students remain in good academic standing and make satisfactory progress through the program. It is the responsibility of each student's advisor to do the following:

- Provide the student with guidance and mentoring and seek the assistance of other faculty and graduate school resources when necessary to support the student's academic and career development.
- Ensure that a mutually agreed upon set of expectations and goals for the student are in place and assessed periodically.
- Help the student assemble a dissertation committee.
- Provide career advice and links to information on previous graduate placement. Be accessible to give advice and feedback on career goals.
- Review the student's progress with input from the student prior to every semester, including the summer. The results of this review will be included in the program's annual doctoral progress report.
- Make suggestions on course selection.
- Review Program of Study to determine if modifications are necessary.
- Clarify the timetable for completing any remaining course requirements, examinations, and other requirements.
- Assist the student in understanding the requirements for successful completion of dissertation.
- Sign the student's completed registration form each semester.

Milestones to Be Completed by CS PhD Program Students

Full-time students entering the PhD degree program without a master's degree in computer science are expected to reach the milestones of the PhD program in accordance with the time-line indicated below. Part-time students and full-time students entering the program with a master's degree in computer science will be provided with appropriately adjusted time-lines for the completion of milestones. Additional adjustments to the time-lines can be made to accommodate special situations on a case-by-case basis. Such adjustments may be made, when necessary, by the student's advisor with the approval of the Graduate Studies Committee.

The achievement of each milestone within the period of time indicated by the appropriate time-line will be considered satisfactory progress in completion of the milestones. The time-lines given below, however, allow for a certain degree of uncertainty and variability, which is inherent in academic research. Students are encouraged to complete each milestone as early as possible. The determination of whether a student is making satisfactory progress in the PhD program will be based on annual evaluations by the student and the advisor. Completion of milestones in accordance with the student's time-line will be considered in that evaluation.

- ***Completion of Courses***

- Complete at least three required core courses by the end of the 2nd long semester.
- Complete all required core courses and at least three additional required courses by the end of the 4th long semester.
- Complete at least 24 credit hours of required courses* by the end of the third year.
- Complete all required courses* by the end of the fifth year.

*Up to 30 credit hours of course work can be substituted by transfer credits.

- ***Pass the Qualifying Examination***

- Pass the Qualifying Examination at the beginning of the 3rd long semester.

- ***Select Doctoral Advisor(s)***

- Select a Doctoral Advisor (or up to two Co-Advisors) at the beginning of the semester immediately after passing the qualifying examination.

- ***Pass the Doctoral Dissertation Proposal Examination***

- Perform Doctoral Research (or Independent Study) with the Doctoral Advisor(s) for credits every semester, after passed the qualifying examination.
- Convene a Doctoral Dissertation Proposal Examination Committee.
- Present and defend a Doctoral Dissertation Proposal to the satisfaction of the Doctoral Dissertation Proposal Examination Committee. The expected time to complete this milestone is at the end of the 4th year. However, students who have made satisfactory progress in previous years but are unable to complete this milestone at the end of the 4th year may be allowed to extend the time line to the end of the 5th year. Beyond that, the student in consultation with the Advisor must devise an action plan to complete the remaining milestones with an adjusted time line. This action plan must be reviewed and approved by the Graduate Studies Committee.

- ***Complete the Doctoral Dissertation***

- Convene a Doctoral Dissertation Committee after passing the Doctoral Dissertation Proposal Examination.
- Perform Doctoral Dissertation with Doctoral Advisor for credits every semester immediately after the passing of the Doctoral Dissertation Proposal Examination.
- Present and defend the Doctoral Dissertation to the satisfaction of the Doctoral Dissertation Committee. The

expected time to complete this milestone is before or at the end of the 5th year. However, students who have made satisfactory progress in previous years but are unable to complete this milestone at the end of the 5th year may be allowed to extend the time line to the end of the 6th year. Beyond that, the student in consultation with the Advisor must devise an action plan to complete this milestone with an adjusted time line. This action plan must be reviewed and approved by the Graduate Studies Committee.

- Submit the dissertation to the Graduate School before designated deadline.
- Complete an Exit Interview and submit the same to the CS Department.

Annual Evaluation of Progress

The student will meet with their Advisor(s) at the end of each year to evaluate the progress according to the milestones, and submit the result to the Graduate Studies Committee in an Annual Progress Evaluation Form.

Degree Completion Checklist for Students

- Maintain active student status by registering for appropriate courses and for the minimum required credit hours every fall and spring semester.
- Submit a signed Milestones Agreement Form to the Computer Science Department before the end of 1st long semester.
- Complete all required organized coursework.
- Successfully pass required qualifying examinations.
- Convene a Dissertation Committee.
- Present and successfully defend a Dissertation Proposal.
- Enroll in required dissertation hours and complete the dissertation.
- Complete and successfully defend a Dissertation.
- Submit required documentation to the Graduate School for completion and graduation.

I have read this form and have had the opportunity to discuss the information contained in it with my advisor. I understand the academic milestones that I am expected to reach in order to successfully complete the Computer Science program, as well as the expected time-line for completing these milestones. I agree to follow the time-line and strive to make satisfactory progress while in the PhD program.

Signature of Student

Date

Signature of Advisor

Date

Department of Computer Science, UTSA, Annual Ph.D. Progress Report

Name:

Advisor:

Date:

Assessment Period:

Semester you entered program:

Student's Self Evaluation

Please answer the following questions as they relate to the current assessment period. Use extra paper if needed. Attach a copy of the up-to-date Program of Study.

1. Please enter the total number of course hours earned and the dates associated with past or anticipated completion of other milestones in the following table.

Courses	Hours Earned	Examinations	Completion Dates
Core/Elective		Qualifying Examinations	
Doc Research		Dissertation Proposal	
Doc Dissertation		Dissertation Defense	

2. List the courses (exclude Doctoral Research/Dissertation/Seminar) you took during this assessment period, and your grades.

Course Number	Course Title	Your Grade

3. If you were involved in a research project, briefly describe your role and contributions to the project. If you didn't have a research advisor in this period, describe your efforts to select a research area and advisor.

4. List any papers/reports you wrote, submitted and/or published during this period. Describe where the paper was submitted or published.

5. Describe any professional activities you participated in, such as refereeing, attending conferences, or giving external talks.

6. In reviewing your goals for this past year, how did your accomplishments measure up to planned goals in your Milestone Agreement?

7. If you have been assigned as a Teaching Assistant, describe your TA assignments and effort (hours/week) in performing the tasks.

Semester	Course Assigned	Effort	Student Evaluation	Additional Comments

8. Describe any circumstances that you feel have impeded your progress this year.

9. Other issues you would like to address:

Advisor's Evaluation of Student's Progress

Please evaluate the student's progress by checking the appropriate box below. If progress is "fair" or below, please attach comments on any concerns you may have about the student's progress. If the student did not achieve expected milestones on time, please attach an explanation of the circumstance and an action plan for student to improve the performance. If necessary, a revised Milestone Agreement Form should be submitted as well.

Excellent Good Fair Marginal Unsatisfactory

Student's Signature

Advisor's Signature

UNIVERSITY OF TEXAS AT SAN ANTONIO
DEPARTMENT OF COMPUTER SCIENCE

SELECTION OF DOCTORAL ADVISOR

DATE

STUDENT

NAME: _____

Student ID: _____

ADVISOR(S): _____

With the following signature, the above faculty agrees to serve as the supervising professor for the student's Ph.D. program.

Student Name: _____

SIGNATURE

Advisor(s): _____

SIGNATURE

SIGNATURE

Graduate Advisor of Record: _____

SIGNATURE

Department Chair: _____

SIGNATURE

UNIVERSITY OF TEXAS AT SAN ANTONIO
DEPARTMENT OF COMPUTER SCIENCE

CHANGE OF DOCTORAL ADVISOR

DATE

STUDENT
NAME: _____ **Student ID:** _____

FORMER
ADVISOR: _____

NEW
ADVISOR(S): _____

With the following signature, the above faculty agrees to serve as the supervising professor for the student's Ph.D. program.

Student Name: _____
SIGNATURE

Former Advisor: _____
SIGNATURE

New Advisor(s): _____
SIGNATURE

SIGNATURE

Graduate Advisor of Record: _____
SIGNATURE

Department Chair: _____
SIGNATURE

THE UNIVERSITY OF TEXAS AT SAN ANTONIO

APPOINTMENT OF ORAL EXAMINATION COMMITTEE

Student's Name: _____ Student ID: _____

Department: Computer Science College: Science

Title of Dissertation Proposal: _____

Proposed Oral Examination Committee:

Chair _____

Member _____

Member _____

Member _____

Outside Member (Optional) _____

Supervising Professor signature _____

***** Graduate Studies Committee Recommendations *****

- We recommend that the Oral Examination Committee be approved.
- We do not recommend that the Oral Examination Committee be approved.

Chair, Graduate Studies Committee _____

Department Chair signature _____

***** Graduate School *****

Official Action Taken: Approved Oral Examination Committee _____ (Date)

Disapproved Oral Examination Committee _____ (Date)

Signature _____ Date _____
Dean of Graduate School

Attachments: Curriculum Vitae of Outside Member (if applicable)

Revision date: 8/9/08

**THE UNIVERSITY OF TEXAS AT SAN ANTONIO
COMPLETION OF THE QUALIFYING EXAM
For the degree of**

DOCTOR OF _____

Name of Student Graduate Program

UTSA Academic Record

Entered Program (Initial term): _____ 20 ____

Total no. semester hours completed: _____ Cumulative GPA: _____

All required courses completed: Yes No

Qualifying Examination

Examinations Passed:

Written _____ Oral _____
Date Date

Signatures of Qualifying Examinations Committee:

PRINTED NAME / SIGNATURE Chairman

PRINTED NAME / SIGNATURE

PRINTED NAME / SIGNATURE

PRINTED NAME / SIGNATURE

Supervising Professor

PRINTED NAME / SIGNATURE

Graduate Advisor of Record and Chair: Doctoral Program Committee

PRINTED NAME / SIGNATURE

Dean of College

PRINTED NAME / SIGNATURE

Dean, Graduate School

PRINTED NAME / SIGNATURE

**THE UNIVERSITY OF TEXAS AT SAN ANTONIO
APPOINTMENT OF DOCTORAL DISSERTATION COMMITTEE**

Student's Name: _____ Student ID: _____
Department: _____ College: _____
Date Student Completed Qualifying Exam: _____

Proposed Dissertation Committee:

Chair _____
PRINTED NAME / SIGNATURE
Member _____
PRINTED NAME / SIGNATURE
Member _____
PRINTED NAME / SIGNATURE
Member _____
PRINTED NAME / SIGNATURE
Outside Member _____
PRINTED NAME / SIGNATURE
Supervising Professor: _____
PRINTED NAME / SIGNATURE

*******Doctoral Program Committee Recommendations*******

- We recommend that the Dissertation Committee be approved.
- We do not recommend that the Dissertation Committee be approved.

Chair, Doctoral Program Committee _____
PRINTED NAME / SIGNATURE
Department Chair _____
PRINTED NAME / SIGNATURE
Dean of College _____
PRINTED NAME / SIGNATURE

*******Graduate School*******

Official Action Taken: Approved Dissertation Committee
 Disapproved Dissertation Committee

Signature: _____ Date: _____
 Dean, Graduate School

Attachment: Curriculum Vitae of Outside Member

THE UNIVERSITY OF TEXAS AT SAN ANTONIO
APPLICATION FOR CANDIDACY FOR THE DOCTORAL DEGREE

Student's Name: _____ Student ID: _____

Anticipated Graduation Date: _____

Degree Sought: _____ Major: _____

Title of Dissertation: _____

Student's Signature: _____ Date: _____

_____ Level of English proficiency is satisfactory.

_____ Scholarship to date is satisfactory.

_____ Program of Study is satisfactory.

_____ Qualifying Examination administered

Supervising Professor for Dissertation: _____

PRINTED NAME / SIGNATURE

Dissertation Committee Members: _____

PRINTED NAME / SIGNATURE

PRINTED NAME / SIGNATURE

PRINTED NAME / SIGNATURE

PRINTED NAME / SIGNATURE

Outside Examiner: _____

PRINTED NAME / SIGNATURE

Supervising Professor: _____

PRINTED NAME / SIGNATURE

*******Doctoral Program Committee Recommendations*******

Based upon this student's performance to date and the attached Program of Study:

- We recommend that the student be advanced to Candidacy.
- We do not recommend advancement to Candidacy at this time.

Chair, Doctoral Program Committee _____

PRINTED NAME / SIGNATURE

Department Chair _____

PRINTED NAME / SIGNATURE

Dean of College _____

PRINTED NAME / SIGNATURE

*******Graduate School*******

Official Action Taken: Advanced to Candidacy
 Denied Candidacy

Signature: _____ Date: _____

Dean, Graduate School

THE UNIVERSITY OF TEXAS AT SAN ANTONIO

Program of Study for the Doctor of Philosophy

Student Name _____		Student ID _____		
Program of Study for Doctor of <u>Philosophy</u>				
Catalog 2007-2009 _____		Major <u>Computer Science</u> Concentration _____		
The following courses are required for the degree indicated below:				
Discipline and Number	Course Title	Sem. Hr. Credit	Grade	When and Where Completed
CORE COURSES (12 hrs. required)				
CS 5363	Programming Lang & Compiler	3		
CS 5513	Computer Architecture	3		
CS 5523	Operating Systems	3		
CS 5633	Analysis of Algorithms	3		
ELECTIVES (18 hours required)				
RESEARCH SEMINAR (6 hrs)				
DOCTORAL RESEARCH (18 hrs minimum)				
DOCTORAL DISSERTATION (18 hrs minimum)				
FLEXIBLE ELECTIVES (18 hrs minimum)				

Total * 90

*Minimum of 90 hours of courses with B or above.

**Indicates course used towards MS degree (maximum of 30 hours, comparable to core and elective courses).

Upon completion of the above requirements, in addition to meeting the University-wide requirements for all Doctoral degrees, the above named student has satisfied all requirements for Doctor of Philosophy.

Supervising Professor's Signature _____ Date _____

Advisor of Record's Signature _____ Date _____

Signature _____ Date _____
 Doctoral Program Committee Chairman

Signature _____ Date _____
 Dean of College of _____

Signature _____ Date _____
 Dean of Graduate School

NOTES:

Dissertation Committee: Chair: _____ Member: _____
 Member: _____ Member: _____
 Member: _____ Outside Member: _____

THE ORIGINAL COPY OF THIS FORM MUST BE FILED WITH THE REGISTRAR

DO NOT WRITE BELOW THIS LINE

Applied for degree _____	Time Limit (8yr) _____	Hours of A _____ x 4 _____
Advanced to Candidacy _____	Comprehensive Exam _____	B _____ x 3 _____
Admission Cleared _____	Dissertation Filed _____	C _____ x 2 _____
		Total _____ : GPA (3.0 min) _____

The University of Texas at San Antonio
College of Sciences

**PETITION FOR COURSES TAKEN AT ANOTHER INSTITUTION
TO BE COUNTED IN UTSA Ph.D. DEGREE PROGRAM**

College of Sciences

Student's Name _____ Student ID Number @ _____

Degree Ph.D _____ Major Computer Science _____ Concentration _____

Courses to be transferred from other components of The University of Texas System:

Number	Title	Hours	Institution	Grade	Date

Courses to be transferred from institutions outside The University of Texas System:

Number	Title	Hours	Institution	Grade	Date

The courses listed above must have a grade of B or better; are from an accredited university and have not been used in another degree program.

- 1) Please attach transcript/s
- 2) Syllabus or course description required
- 3) Evidence that the university where the courses were taken is accredited

Application of the starred (*) courses listed above to the Program of Study for this student is hereby approved.

Approve Disapprove

_____	_____	_____	_____
		Graduate Program Committee Chairman	Date
_____	_____	_____	_____
		Department Chair	Date
_____	_____	_____	_____
		Associate Dean, College of Sciences	Date
_____	_____	_____	_____
		Dean of the Graduate School	Date