

# Proposed Systems Preliminary

Committee Members

Applicable for 2012 and beyond

## 1. Introduction

The purpose of the *Systems Preliminary Exam* is to give students an opportunity to demonstrate their ability to analyze, evaluate, and present a pre-existing body of *specific* research in the area of computer systems. The prelim is open to students in all research areas, but will customarily be taken by students interested in research in computer systems to demonstrate ability in their intended research area. Examples of areas of research that fall within this field include, but are not limited to, the following topics: **networking, operating systems, wireless networking and distributed systems**. The specific topic area of the examination is expected to fall within one of these areas or involve a synthesis of these areas.

We are proposing a System Prelim with the following components:

- Review Paper - A 10 in ACM conference format page paper reviewing a coherent selection of 6 to 10 papers from the published research literature in a specific area. Students are expected to synthesize the topic area, describe what research is "settled art" and hypothesize about future contributions in the area.
- Formal Presentation - A 25-minute presentation, followed by questioning by the System Prelim committee.

The timeline for this prelim is:

### <Spring semester>

2nd Week of February: Student submits proposal to review committee

3th Week of February: Proposal returned from review approved, amended, student begins document.

2nd Week of March: Student submits document.

4st Week of March: Feedback from review committee

No later than 2nd week of April: Oral defense

### <Fall semester>

3rd Week of September: Student submits proposal to review committee

4th Week of September: Proposal returned from review approved, amended, student begins document.

3rd Week of October: Student submits document.

1st Week of November: Feedback from review committee

No later than 3rd week of November: Oral defense

## 2. Preparation

Typical preparation for the System Prelim will consist of a standard undergraduate background in computer Science and two to three classes in areas of computer systems; the exact classes that make sense depend on the specific topic of interest of the student, but students will typically have mastery of the material in **CSCI 5573 Advanced Operating Systems**, **CSCI 5273 Network Systems**, and one other computer systems related course. Those additional classes may include **CSCI 5473 Applied Operating Systems**, **CSCI 5594 Advanced Computer Architecture**, **CSCI 5673 Distributed Systems**, **CSCI 5753 Computer Performance Modeling**, **CSCI 55151 Parallel Computing** or an appropriate **CSCI 7143 Topics in Computer Systems** course.

Other follow-on courses may be relevant based on future course offerings and individual student concerns. Note that while these courses are strongly recommended as preparation for the System Prelim, students with transfer courses, or other kinds of preparation, may well be ready to take the prelim without taking these courses.

## 3. Logistics

Students will first identify a potential topic area, as well as a Computer Science System faculty member who must agree to review and approve the topic. The faculty member selects the papers to be reviewed.

The student must prepare a 1-page written proposal that describes their preparations for taking the exam (classes, experience, interests), describes the topic area, specifies the approving System faculty member, and lists the technical papers to be reviewed. This proposal is then submitted to the System Prelim Committee for consideration and approval by the start of the 3rd week of September (2nd Week of February).

The student has exactly 30 calendar days to prepare the review of the selected papers from the start of the 4th week of September (3th Week of February). The review committee may provide feedback on the proposal prior to that time. The committee may modify or add papers appropriate to the area or may reject the proposal as out of scope or inappropriate for the Systems prelim. The student may consult relevant faculty members with specific questions concerning the content of the individual papers, but the student is expected to independently formulate (and later defend) their own overall analysis of the papers in the topic area.

The review and report must synthesize the papers, and must include a clearly stated summary that indicates what topics are "settled art", what topics are actively debated in current literature and how future technology or other developments may affect the topic area. The student should expect to defend these statements during the oral phase of the exam. The student is expected to cover the assigned papers and citations and related articles as needed.

Copies of the completed review will then be delivered via **both** hard-copy and electronic form (PDF) to the department Graduate Adviser on or before the 3rd week of October (2nd Week of March). Students may not submit preliminary drafts to any member of the committee for comment.

The review committee (three members of the Systems Prelim Committee), may provide written feedback on or before the first week of November. This written feedback will primarily focus on the conclusions drawn about the topic area. It may suggest that the student consider additional sources, novel technologies or other implications based on the students review.

A formal presentation of the topic review by the student will be held no later than the third week of November. At the formal presentation students are expected to present the content to the review committee in a professional manner. The committee's evaluation is based on the technical content, presentation style, and ability to defend the thesis specified in the paper as well as general command of the area. Although fluency in English is not a requirement, students must be able to clearly convey the material orally. The presentation should be roughly 25 minutes in length. Following the presentation, the review committee will briefly meet and then a questioning period of no more than one hour will be held.

Determination of the final outcome of the prelim will follow in no more than a week.

## **4. Example**

A student is interested in the area of file systems, a subset of operating systems. She meets with a faculty sponsor, who select 6-10 papers in the area of technical aspects of file systems, emerging workloads and usage patterns and emerging technology trends. The student prepares a written report based on these writings. Sample conclusions that are drawn are: that contemporary disk scheduling topics are "settled art", that a current area of work is highly reliable file systems and that future directions in file systems research would involve the use of integrated storage modalities and content-based retrieval methods.

The report would be delivered to a review committee of three faculty. They may opine that the integration of content mobility and the intrinsic nature of distributed data will have significant impact on any future file system work.

The student would then present their report review. Faculty may question on topics related to file systems or general aspects related to the current or future topics (e.g. the student may have to explain Byzantine failure, solutions to it and how it could affect file system design).

## **5. Miscellaneous**

The subject area of the review paper may well correspond closely to a student's current area of research and planned thesis work. As such, it may overlap with a planned, or in progress, literature review section of a thesis proposal. This is explicitly permitted and encouraged.

Prior conference papers, journal articles, masters theses, and class projects cannot be submitted verbatim as a substitute for the System Prelim paper. However, portions of such prior written work on which the student is the sole author may be re-used as the basis for part of the System paper. Use of material where the student is one of several authors must be negotiated between the student and the System faculty sponsor prior to the examination.

Given that three faculty schedules need to be coordinated, arrangements to schedule the date of the oral exam should begin early in the semester. Scheduling the presentation is the student's responsibility, and should be arranged before the actual review has been submitted to allow sufficient time for scheduling.

Students are strongly encouraged to make practice runs of their presentation to their peers, research associates and faculty members who are not participating in the System Prelim.