

OPERATING SYSTEMS QUALIFYING EXAM - GUIDELINES

OS Faculty (as of 8/25/08)

Professors Kannan (Coordinator), Ullmer, Kosar and Karki .

General Guidelines:

The exam usually has two parts. Part I covers the advanced OS syllabus (typically from the CSC 7103 class). Part II covers basic operating systems concepts (typically from CSC 4103). The advanced OS component is usually quantitative; the questions asked here include analysis of distributed algorithms as well (for example, Lamport's vector time stamp algorithm, real-time scheduling problems etc.). The basic OS component will contain a mix of quantitative and qualitative questions. The quantitative portion could include basic problems such as paging, virtual memory analysis etc. The qualitative portion could include design questions such as the best memory and file server design choices for a highly distributed computation intensive collaborative environment.

The Pass/Fail decisions will be made by the OS faculty listed above. The principal deciding factor will be total score. Overall averages and individual past performances in the graduate class may be considered in borderline cases.

Specific Guidelines:

1. Typically there will be 7 questions – 4 from part I and 3 from part II. You must attempt a total of 5 questions with a minimum of 3 from part I.
2. Do not attempt more than 5. Our policy is if you attempt more than 5, we will decide which 5 questions are to be graded.
3. Answers will be graded qualitatively, thus it is not just the final answer that is important. We will attempt to evaluate your thought processes while arriving at the final answer. Thus showing all work is very important, especially for partial credit.
4. The passing score will be at most 75. Depending on the particular exam environment, the OS faculty may lower the passing score.

SYLLABUS:

The following reference books may be used:

1. Advanced Operating Systems – Randy Chow and Ted Johnson
2. Operating System Concepts – Silberschaatz et al.
3. Operating Systems – Tanenbaum

The following is a list of covered topics. Note that this is just an outline.

1. Process Management – Interprocess Communication, Forks and joins, Threading, Time Stamping algorithms etc.
2. File Management – Different types of file systems, File management algorithms, 2-phase commit protocols, Transaction Management etc.
3. Scheduling – real-time, earliest task first etc.
4. Distributed Process Coordination – Mutual exclusion, leader election algorithms.
5. Transaction Management – rollback and recovery algorithms, Consistency and Coherence algorithms, Multicasting protocols - Causal Order ,Total order etc.
6. Memory Management.
7. OS Design and Implementation issues.

As a general guideline, the first 8 chapters from Chow and Johnson cover most of the syllabus.