

CSE 60641: Operating Systems

Home work assignment #1

Open book, open notes, individual effort. Google searches are okay - always cite your source.
All questions carry equal points. Brevity is encouraged,

1. In Chen's paper, they state (assertion 7) "the operating system can reduce self-interference misses for small applications by using a virtual-to-physical mapping that uniformly distributes consecutive virtual pages throughout the cache". Briefly explain the issues that are being discussed.
2. In the Exokernel paper, page 258, Section 5.2, the authors state "Aegis has two system call paths: the first for system calls that do not require a stack, the second for those that do". Briefly explain what this sentence means and the issues that are being addressed (we will come back to this idea shortly).
3. Briefly describe the performance experienced by applications running over monolithic kernels, microkernel and exokernels under the following scenarios: (assume that the user written application is the same. Assume classic, unoptimized notions of monolithic, microkernel, exokernels)
 - A. Moving to a new machine that halves the context switch overhead
 - B. Moving to a new machine that doubles the disk write speeds
4. Give two scenarios: one in which microkernels are preferable and another in which microkernels can be expected to have poor performance. Briefly explain your answer. Can these scenarios benefit from the exokernel approach?