Problem 1 (4 Points)
Complete the course evaluation for CSE 422S (http://evals.wustl.edu).

Problem 2 (0 Points)

a) The developers of the Berkeley Fast File System and its relatives (Linux ext2) claim that doubling the block size roughly doubles the throughput of their file system. Explain why that statement makes sense given typical disk access time characteristics.

b) Doubling the block size has its limits. Give two reasons why you can’t continue to get throughput doubling by block size doubling.

Problem 3 (0 Points)
This problem considers Unix file systems with and without journaling.

a) When creating a new file on a Unix file system without journaling, what must be written to disk?

b) Why are the disk writes in Part a usually done synchronously and without much delay?

c) Why can a Log-structured File System with journaling postpone meta-data writes until a segment is flushed to disk?

d) Suppose that a file system is in a consistent state (i.e., all data and metadata (i-nodes, superblock) has been written to disk) and now a user has modified one data block of a file. If the system is shutdown at this point, what needs to be written to disk, where should it be written, and in what order?

Problem 4 (0 Points)
Modern RAID storage systems are known for their resilience to single drive failures, high performance (high effective data rate and/or high transaction rate), and flexibility.

a) How does RAID-5 technology handle a single drive failure?

b) A typical RAID subsystem consists of multiple drives sitting on a SCSI bus. Although, only one block can be transferred over the bus at one time, the other disks can be concurrently seeking or transferring data to their internal disk cache. What average aggregate rate must this bus be able to handle? Assume that there are 15 drives that rotate at 7200 RPM; strips are 8 KB; the formatted track capacity is 64 KB; and the typical seek time is negligible.