MC48 Homework 7

Max Hailperin

Due: December 4, 1995

1. Do exercise 8.5 from pages 585–586.

2. Do exercise 8.6 from page 586.

3. Do exercise 8.7 from page 586.

4. Suppose we replaced one of the disk drives on mcs-server; these drives are all in the 1GB to 1.5GB size range, and are a bit on the old/slow side. Suppose we replaced one either with Seagate's "Barracuda 4" drive or Seagate's "Barracuda 8" drive. Either way we'd copy the data off one of the existing drives on to the new drive, swap the new drive for the old, and resume operations. The question is, at the time of the swap, which of the two possible replacement drives would make more of an improvement in mcs-server's speed?

   The primary advertised difference between the two drives is their capacity: the Barracuda 4 is a 4GB drive while the Barracuda 8 is an 8GB drive. This difference stems in roughly equal proportions from packing more sectors into each track and from having more tracks on each recording surface. (There is a slight countervailing effect from having slightly fewer recording surfaces.)

   From the Seagate spec sheet, we find that the performance characteristics of the two drives look extremely similar. Since both would be connected to mcs-server over the existing SCSI interface, which would be the limiting factor in transfer rate, the transfer rates would be essentially identical. The average rotational latency of both drives is 4.17ms, since both spin at 7200 RPM. The lower-capacity drive has a

slight edge in the seek time specifications:

Drive Capacity	Minimum		Average		Maximum	
	Read	**Write**	**Read**	**Write**	**Read**	**Write**
4GB	0.6ms	0.9ms	8ms	9ms	17ms	19ms
8GB	0.6ms	1.1ms	8ms	9.5ms	19ms	20ms

Despite the fact that the seek time specs for the Barracuda 8 are slightly worse than those of the Barracuda 4, and the other performance specs are equivalent, I'd be willing to wager we'd see more of a performance improvement from replacing the current drive with the 8 than with the 4, at least at the time of the replacement.

Explain how this can be.