Lab 9: Memory Mapped I/O

In this lab, we will learn about techniques available to application programmers for using logical address spaces that are not as widely known or used as they probably should be.

Issues addressed by this lab include:

- Understand the concept of Memory Mapped I/O
- Understand the difference between accessing data in a file using **read/write** system calls and using Memory Mapping

Lab Materials

1. Slides
2. Lab Files

Assignment

For this lab, you should complete the implementation of the *memmap* program. This program should create a memory mapping of the source and destination files. Copy the source file using memory operations and compare this approach to the **read/write** system call approach taken by the *read_write* program. Use the *time* command in comparing the work done by the two approaches under different operating conditions.

We should be able to build the your solution *memmap* program using the Makefile submitted in your solution zip file.

When you are finished

After you have finished your implementation, you should go over the following questions, you may be quizzed over them:

1. The time required to copy the file using *read_write* varies with the size of the buffer specified. Smaller buffer sizes take longer. The time required for *memmap* varies much less regardless of how you perform the copy. Discuss why this is, and in your discussion consider the influence of: (1) the overhead of the read() and write() system calls and (2) the number of times the data is copied under the two methods. **This question was worth 20 out of the 30 points for the report back when there were reports for the lab.**
2. When you use the *read_write* command as supplied, the size of the copied file varies with the size of the buffer specified. When you use the *memmap* command implemented the size of the source and destination files will match exactly. This is because there is a mistake in the *read_write* code. What is the mistake, and how can it be corrected?

Once you are done with the lab, Modify the Makefile as per your student ID and use the zip target to create an archive for submission on blackboard.

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