

# CSCI 3323 (Principles of Operating Systems), Fall 2021

## Reading Quiz 5

**Credit:** 20 points.

### 1 Reading

Be sure you have read, or at least skimmed, Chapters 18, 19, 20, 21, and 22 of the textbook.

### 2 Instructions

Answer the questions below using *only* the course textbook — no Web searches. It's okay to talk to classmates about this assignment as you usually do, *but* I want each person to do all the reading. Include the Honor Code pledge in what you turn in, either the full pledge or just the word “pledged”. (Please put this in the same document as your answers, so I don't overlook it.) For these quizzes by doing this you are also saying you have at least attempted all the reading it covers.

You may write out your answers by hand and scan them, or you may use a word processor or other program, but please submit PDF or plain text in the “turn-in” folder I set up for you on Google Drive. (So, no word-processor files and no links to other Google Docs. This is a change from how I've asked students to turn in work in previous semesters, meant to reduce both the chance of mistakes on my part and the amount of time I spend managing multiple file formats.)

### 3 Questions

1. (2.5 points) What are the advantages of paging, as opposed to the simple contiguous-allocation (base/bound) and segmentation methods of space-sharing memory? in the MMU hardware? What are some potential risks, as described in Chapter 18?
2. (2.5 points) Making paging acceptably fast involves adding something to the MMU. What is this addition called, and what does it do?
3. (2.5 points) Caching is a good strategy for many things related to memory because most code has two properties. What are they?
4. (2.5 points) The short name for what the textbook calls “physical memory” is RAM. What is that short for, and how is it misleading in a system using paging, given what you now know?
5. (2.5 points) Chapter 20 describes several strategies for reducing the size of page tables. List as many as you can, with a one- or two-sentence description for each of how it reduces the total space needed for page tables.
6. (2.5 points) Chapter 21 mentions that data can be read into physical memory from swap space, but also from another location. What is this other location?
7. (2.5 points) Chapter 22 discusses two families of page-replacement algorithms based on historical data, differing in what aspects of history they focus on. How do they differ?

8. (2.5 points) Chapter 22 mentions LRU as a strategy for choosing pages to replace. Why is not practical to implement it exactly, and is there an algorithm that approximates it and *is* practical?