ITBU 373, Operating Systems Homework 07

Chapter 9, *Operating Systems, Three Easy Pieces*

Readings

Read chapter 9 in the *Operating Systems, Three Easy Pieces* book.

Discussion Questions

Answer the discussion questions in writing.

1. What is the central concept that underlies a *proportional-share* scheduler?
2. Why is a proportional-share scheduler also called a *fair-share* scheduler?
3. What is a *ticket* as that term is used for scheduling? Explain it in your own words.
4. What is *ticket currency*? Why might a process want to adopt a currency different from the scheduling currency or the currency used by other processes?
5. Why does "fairness" increase with job length?
6. Describe the general idea behind *stride scheduling*. What is it about stride scheduling that makes it deterministic (rather than probabilistic)?
7. What important property do lottery schedulers have that a stride scheduler does not have? Why is this property important?
8. Review *Profiling a warehouse-scale computer*, `https://static.googleusercontent.com/media/research.google.com/en//pubs/archive/44271.pdf`. The authors identify a *datacenter tax*. What are the six components of this tax? What percentage of CPU time does scheduling use after aggressive optimization?
9. Why is the CFS efficient and scalable?
10. Pages 97-98 discuss two jobs, Job A and Job B. The book notes that CFS maintains proportionality between jobs when the difference in nice values remain constant. Using the formulas in the book, show that this is true. The nice values are (A=-5, B=0) and (A=5, B=10).
11. Why are operations such as insertion and deletion in Red-Black trees logarithmic?
12. Name two scheduling issues that are problematic for proportional-share schedulers?