Progress this week

I went through the Lab 4 guide for ECE 5725, and have cross-compiled and patched the kernel for Raspberry Pi OS 5.4.72. This was relatively straightforward and I didn't run into much trouble doing so.

I also read through several papers discussing learning algorithms in multi-level feedback queue. The first one, which uses support vector machines to predict priorities [1], was very unsubstantial and had almost no analysis or validation of results. Rather it seems like it was a roughly put together paper for school. I did have some takeaways, where an prediction algorithm can prevent a scheduler from sorting processes according to their burst times. The other paper by Rinku and AshaRani [2] was much more insightful. They used an objective function for promoting/demoting between several types of queues. The multi-objective function uses weights that are learned over time, meaning that the scheduler will learn to optimize for processes it has seen. This is similar to the genetic algorithm idea I had, and it also doesn't require any learning data! This might be the way to go.

I also found some resources teaching you how to write your own OS, which includes how to write a scheduler that could be helpful [3] [4]

Plan for coming week

I'm still reading through several other papers, but I want to start working with the kernel next week. Next week may end up being a busy week, so I will see what I can get through. Hoping to dig into the kernel code itself, and seeing if I can determine how the code works.

Problems

No problems so far.

Long term plan: still OK?

Hopefully so!

References

[1] S. Satyanarayana, P. Sravan Kumar, and G. Sridevi, "Improved Process Scheduling in Real-Time Operating Systems Using Support Vector Machines," in *Proceedings of 2nd International Conference on Micro-Electronics, Electromagnetics and Telecommunications* (S. C. Sa-

tapathy, V. Bhateja, P. S. R. Chowdary, V. S. Chakravarthy, and J. Anguera, eds.), vol. 434, pp. 603–611, Singapore: Springer Singapore, 2018.

[2] D. R. Rinku and M. AshaRani, "Reinforcement learning based multi core scheduling (RLBMCS) for real time systems," *International Journal of Electrical and Computer Engineering (IJECE)*, vol. 10, p. 1805, Apr. 2020.

[3] J. Sandler, "Part 08 - Processes." http://jsandler18.github.io/tutorial/process.html.

[4] "4.1: Scheduler." https://s-matyukevich.github.io/raspberry-pi-os/docs/lesson04/rpi-os.html.