COS 318: Final Project

José M Rico, `jrico`

January 16, 2018

My final project for *COS 318: Operating Systems* consists of a ground-up rebuild of about half of the functions we have implemented in the assignments throughout the semester, as well as the use of a graphic mode (VGA video mode 0x12) in place of the text rendering mode we had been using all along.

Motivation and Topics

Even though I would have liked to work much more on this project to make it more complete, it did fulfill the two main reasons for which I did it.

First, I'm an avid graphics programmer and an aspiring video game developer. Although I didn't get to implement a game of any sort, and I didn't quite get to implementing a more general-purpose rendering library and/or rasterizer like an early OpenGL, I got much more familiar with how the built-in graphics devices communicate with the CPU, and how their memory can be accessed.

Second, while the assignments gave me a good grasp of each of the main topics they covered, I felt like they took away part of the beauty (read annoyance) of implementing an operating system. By deciding to start out from scratch, I was decided to know and understand every bit of code in my project folder. I feel like I succeeded in that regard; I certainly borrowed code from the assignments and from Internet sources, but I forced myself to go through it and understand it well.

I ended up researching many small details that come along when implementing an OS from scratch, with all its details. They involved learning that address line A20 must be explicitly enabled, to figuring out exactly how to communicate with the hard drive and graphics both from the BIOS and from protected mode. I got more experience with memory mapped devices and graphics programming, and allowing user processes to communicate with a mapped region of memory.