

Operating Systems

CMSC 422 and MSCS 515

iProject Two

Starting with and including all functionality of *iProject one*, add new functionality as specified below.

OS Functional Requirements

- Develop a facility to enter user programs, perhaps text box on the OS form, that accepts valid machine language object code. (Assume no errors for now. You could do some error-checking here since only hex digits and spaces are valid) [required]
 - Better yet, use the console for it. (This seems more difficult.) [optional]
- Add a kernel-level command to load the machine language code into memory [required]
 - load
 - Load the code it into memory at location \$0000
 - Assign the code a Process ID (PID)
 - Create a Process Control Block (PCB)
 - Return the PID on the Command Line Interface (CLI)
- Add a kernel-level command to run a program already in memory [required]
 - run <pid> [required]
- Execute the running program [required]
- As the program executes, display the following in real time:
 - Memory [required]
 - PCB [required]
 - CPU status: Program Counter, Accumulator, X register, Y register [required]
- Provide ability to single-step the execution [optional]

Source Code Requirements

- Develop a PCB object model and implement it in the OS. [required]
- Develop a memory manager interface and implement it in the OS. [required]
- Develop a main memory object model and implement it in the hardware simulation. [required]
- Develop a CPU object model and implement it in the hardware simulation [required]

Hints

- Refactor *hardwareSimulation.js* into at a few parts, perhaps *events*, *interrupts*, and *services*.
- Implement the main memory and CPU simulations as a separate objects and separate source code files within the simulation directory.
- Run all accesses to memory through your memory manager so it can do address translations.
- Read chapter 4 up to “Paging” in our text. It presents a nice look at main memory that you might find helpful.

Style, Art, and Science Requirements

- Your code must separate structure from presentation, be professionally formatted, and use and demonstrate best practices
- Remember the value of comments and expressive identifier names and how much their presence and quality affect my grading.