**Project #2**

***Summary***

While working on this project, I learned how to work with Threads and Semaphores. I have had prior experience with Threads before, but not Semaphores. However, learning the concepts of Semaphores was not difficult, and I quickly realized how useful they are. In my DMV Simulation there are many Threads acting as people serving specific functions, and many more Semaphores acting as limitations, signaling, and mutual exclusion to different variables.

One of the first difficulties I encountered was keeping track of all of the semaphores, and figuring what everything was doing. Rather than using traditional console output, I decided that this project was going to require rigorous debugging, so I built my own Debug library. It helped immensely in this project, and I plan to use it again in the next project. With my debugger, I could easily keep track of Semaphore activity, allowing me to see what Threads were waiting for which Semaphores, when Threads passed through Semaphores, and what Threads were posting to which Semaphores. Given that Threads can operate in different orders each time, having a good debugging system was critical to ever be able to figure out any problems that occurred.

Thankfully, not many problems were encountered, as I spent the first two weeks on design. After going through my design several times, I was certain that my program had been purged of all logical issues before coding even began. My experience with actually programming the project during the third week mostly affirmed this assumption. Other than a minor issue here and there, the programming process went fairly smoothly, and once I was done, everything appeared to work. I spent the last week doing thorough debugging, and cleaning up the general code. I was not comfortable with the excessive amount of variables stored in Global Memory, so I eventually decided upon making separate header files for the Semaphores, Threads, and Definitions. I included all of these variables within Namespaces to help encapsulate the variable names.

In the end, I am happy with the results of the project. I have two accomplishments that I plan to utilize in the future: my Debug library, and an itoa library that I wrote as well. Both of these were written in such a manner that they are easy to implement, and I will use these for quite some time. I also feel that my knowledge of Threads and Semaphores have been greatly strengthened, and that working with these concepts in the future will be much easier.