**CS490 Windows Internals**

**Assignment 3**

**Due: Oct 18, 2013**

1. Explain to your instructor the difference between preemptive and non-preemptive scheduling. Which approach to scheduling would you favor when maximizing a system’s throughput was the only optimization goal?

How does the Windows scheduler in server systems optimize for maximum throughput?

1. Consider a uni-processor system that uses a round-robin algorithm with 16 priorities (0-15, 0 = lowest, 15 = highest priority) for CPU scheduling. The lengths of the time quantum shall be 20ms. Context switching time is negligible. Let us assume that the system schedules threads. Running threads will not be interrupted until quantum end (Scheduling decisions are only be made at quantum end).

Our system has a workload of three single-threaded processes. These processes (threads) have the following parameters:

|  |  |  |
| --- | --- | --- |
| Thread ID | Ready at | Execution time |
| Th1 | t = 0ms | 70ms |
| Th2 | t = 15ms | 90ms |
| Th3 | t = 30ms | 80ms |

* Draw a Gantt chart illustrating the execution of these threads under the assumption that they all are executed at a static priority of 8.
* How does the execution order change if Th3 is executed with priority 9. Th1 shall be executed with priority 7 and get into an I/O wait state after 16ms execution time. Th1’s priority is being boosted by 3 after I/O completion.  
  Th1 leaves its wait state at t = 50ms. Th1’s priority then shall be decreased by 1 at quantum end until it reaches its base priority of 7.  
  Draw the corresponding Gantt chart.

1. Design and implement a version of the UNIX time-command (mytime.exe) using the Windows API. The mytime-command should interpret its arguments as a program that has to be executed within a separate process. Mytime.exe shall call GetSystemTime() before creation and after completion of the new process. (Just for Practice, **NO NEET TO SUBMIT**)

Usage of mytime.exe:

$ mytime.exe “cmd /c dir c:”

Use the Winodws-functions CreateProcess() and WaitForSingleObject() to synchronize mytime.exe with the newly created process.