CSC521 Homework 1
(Due September 18, 2019 at 6:30pm, 2 pages)

NAME:

1. (7 pt.) Explain how it is that both the virtual-machine and the microkernel approaches protect various portions of the operating system from one another?

2. (7 pt.) If a process is suspended (put into the “wait” state by an interrupt), will its threads also be suspended? Give an example.

3. (10 pt.) In Fig. 1, a multithreaded Web server is shown. If the only way to read from a file is the normal blocking read system call, do you think user-level threads or kernel-level threads are being used for the Web server? Why?

Fig. 1
4. (7 pt.) What is the purpose of a system call in an operating system?

5. (9 pt.) Assume that at time 5 no system resources are being used except for the processor and memory. Now consider the following events:

   At time 5: P1 executes a command to read from disk unit 3.
   At time 15: P5’s time slice expires.
   At time 18: P7 executes a command to write to disk unit 3.
   At time 20: P3 executes a command to read from disk unit 2.
   At time 24: P5 executes a command to write to disk unit 3.
   At time 28: P5 is swapped out.
   At time 33: An interrupt occurs from disk unit 2: P3’s read is complete.
   At time 36: An interrupt occurs from disk unit 3: P1’s read is complete.
   At time 38: P8 terminates.
   At time 40: An interrupt occurs from disk unit 3: P5’s write is complete.
   At time 44: P5 is swapped back in.
   At time 48: An interrupt occurs from disk unit 3: P7’s write is complete.

   For time 37, identify which state each process is in. If a process is blocked, further identify the event on which it is blocked.