Operating Systems II

(a) Modern operating systems typically support both threads and processes. What is the basic difference between a thread and a process? Why do operating systems support both concepts? [2 marks]

(b) You get a summer job with a company which has an in-house operating system called sOs. sOs uses static priority scheduling, supports at most 32 concurrently-executing processes, and works only on uniprocessor machines. Describe with justification how you would modify sOs in order to:

(i) support up to 50000 concurrently executing processes; [2 marks]

(ii) reduce or eliminate the possibility of starvation; [3 marks]

(iii) efficiently schedule processes on an 8 CPU symmetric multiprocessor (SMP) machine; [5 marks]

(iv) support threads in addition to processes on SMP machines. [3 marks]

(c) How would you go about reducing the time taken to boot a modern operating system? [5 marks]