2004 Paper 11 Question 6

Operating System Foundations

Two operating systems OS-A and OS-B offer only synchronous system calls, for example, for I/O. In addition, OS-A supports only one process per user-level address-space whereas OS-B supports multi-threaded applications.

(*a*) (*i*) Explain how an application-level runtime system or library running on OS-A can provide the user threads needed by concurrent programs.

[8 marks]

(*ii*) Discuss any disadvantages of supporting a concurrent programming language in this way. [3 marks]

(*iii*) Are there any advantages of having only user threads? [1 mark]

(*b*) (*i*) Explain the *differences* from the runtime described for OS-A of a runtime for OS-B which maps user threads to kernel threads. [5 marks]

(*ii*) Are the disadvantages you discussed in part (*a*)(*ii*) overcome? Explain.

[2 marks]

(*iii*) Have any problems been introduced by the use of kernel threads?

[1 mark]