Advanced Systems Topics

(a) Microkernel operating systems aim to address perceived modularity and reliability issues in traditional “monolithic” operating systems.

(i) Describe the typical architecture of a microkernel operating system such as Mach 3.0, including its use of address spaces, processor privilege levels and communication channels compared with a traditional operating system structure. [6 marks]

(ii) How does this structure affect the system performance? [4 marks]

(b) Virtual machine monitors existed before microkernels and have experienced a recent resurgence of interest; using examples, describe some of the motivations for a virtual machine monitor approach. [4 marks]

(c) Compare and contrast the means used to support pre-existing applications in the microkernel and virtual machine worlds. [6 marks]