2001 Paper 1 Question 12

Operating Systems

(*a*) From the point of view of the device driver, data may be read from an I/O device using *polling*, *interrupt-driven programmed I/O*, or *direct memory access* (DMA). Briefly explain each of these terms, and in each case outline using pseudo-code (or a flow chart) the flow of control in the device driver when reading data from the device. [14 marks]

(*b*) From the point of view of the application programmer, data may be read from a device in a *blocking*, *non-blocking* or *asynchronous* fashion. Using a keyboard as an example device, describe the expected behaviour in each case. [6 marks]