2005 Paper 4 Question 5

Operating Systems II

(*a*) Scheduling disk requests is important to reduce the average service time. Describe briefly how the SSTF, SCAN and C-SCAN scheduling algorithms work. [3 marks]

(*b*) Recently there have been proposals that *2-D disk scheduling* algorithms should be used. What is the basic idea behind 2-D disk scheduling? [2 marks]

(*c*) You are asked to develop support for 2-D disk scheduling in a commodity operating system.

    (*i*) What would be the major difficulty that you face? [2 marks]

    (*ii*) Sketch a design for how you would go about overcoming this difficulty, and comment on how well you think the resulting system would work. [8 marks]

(*d*) Several modern file-systems and databases make use of a *journal* to aid in crash recovery.

    (*i*) Briefly describe how journalling helps crash recovery. [2 marks]

    (*ii*) A researcher suggests adding 128 MB of NVRAM to a disk drive and using this to store the journal. Discuss the advantages and disadvantages of this approach. [3 marks]