

1996 Paper 3 Question 8

Operating System Functions

A computer with a 32-bit virtual addressing scheme uses pages of size 4 Kbyte. Describe, with the aid of diagrams, two practical schemes for managing its virtual address space, comparing them with regard to speed of access, efficiency (of space), and ease of memory sharing between processes. [10 marks]

A Winchester-style disc has its head currently located at track 100, and the head is moving towards track 0. Given the reference string (27, 129, 110, 186, 147, 41, 10, 64, 120, 11, 8, 10) representing the (ordered) sequence of requests for disc tracks, give the sequence of disc addresses visited by the disc head under the SSTF, SCAN and C-SCAN disc scheduling algorithms. In each case briefly describe the algorithm, and compute the average cost of a disc access in terms of the mean number of tracks traversed per access.

In what way is each of these algorithms biased in its service of disc requests? Describe an algorithm which reduces the bias. [10 marks]