

1998 Paper 1 Question 12

Operating Systems

What is meant by the term *demand paging* in a virtual memory management system, and how is it implemented? [5 marks]

List *five* techniques which the operating system can use to enhance the efficiency of demand paging. [5 marks]

Suppose the page table for the currently executing process is as follows. All values are decimal, and indexes are numbered from zero. Addresses are memory byte addresses. The page offset is 10 bits.

Virtual Page #	Valid bit	Reference bit	Modify bit	Page Frame #
0	1	1	0	4
1	1	1	1	7
2	0	0	0	–
3	1	0	0	2
4	0	0	0	–
5	1	0	1	0

Describe exactly how, in general, a virtual address generated by the CPU is translated into a physical address, with the aid of a diagram. [4 marks]

To what physical address (if any) would the following virtual addresses correspond?

(a) 1052

(b) 2221

(c) 5499

[6 marks]