

2006 Paper 3 Question 5

Operating Systems II

Most modern computers include a *translation lookaside buffer* (TLB) to speed up address translation.

- (a) Describe with the aid of a diagram the basic operation of a TLB. [2 marks]
- (b) Some TLBs support *process tags* (sometimes called *address space numbers*). Explain how process tags could be used by an operating system, and what benefits might be expected. [2 marks]
- (c) Some TLBs support *superpages* of one or more sizes.
 - (i) Explain how superpages could be used to reduce the TLB footprint for operating system kernels. [2 marks]
 - (ii) Explain how superpages could be used to reduce the TLB footprint for processes. What additional considerations need to be taken into account in this case? How well do you think your scheme would work in practice? [4 marks]
- (d) Compare and contrast the way in which demand paging is performed in Unix and VMS. [10 marks]