2008 Paper 10 Question 10

Operating System Foundations

(a) Assume a 32-bit architecture with hardware support for paging, in the form of a translation lookaside buffer (TLB), but no hardware support for segmentation. Assume that the TLB is shared rather than flushed on process switching and that the operating system designers are supporting "soft" segments.

  (i) In addition to page number and page base, what fields would you expect to find in each TLB register?
       How would each of these be used?   [4 marks]

  (ii) What fields would you expect to find in a process page table?
       How would each of these fields be used?   [6 marks]

(b) (i) Outline the function of a timing device.   [2 marks]

  (ii) Why are timers essential in multiprogramming operating systems?
                                                                           [2 marks]

  (iii) Explain the operation of a multi-level feedback queue in process scheduling.   [6 marks]