2007 Paper 1 Question 8

Operating Systems

(*a*) Most modern processors have a status register which include bits that specify whether it is running in supervisor or user state, and whether interrupts are enabled. Explain why this information is useful and what effect they have on instruction execution. [4 marks]

(*b*) Suggest *three* situations that cause the settings of these status bits to change. [3 marks]

(*c*) Discuss whether it is ever useful to run

    (*i*)   in supervisor state with interrupts enabled;

    (*ii*) in user state with interrupts disabled. [4 marks]

(*d*) Carefully describe the structure of a Unix *inode*. Assuming that the block size is 4096 bytes in a Unix file system and that indirection blocks can hold 512 entries, calculate the size in bytes of the largest file that does not need to use triple indirection. You may give your answer as a formula. [5 marks]

(*e*) State *four* reasons why the Windows NTFS file system is superior to the FAT32 file system. [4 marks]

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