2003 Paper 3 Question 5

Operating Systems II

Modern server-class machines often use a Redundant Array of Inexpensive Disks (RAID) to provide non-volatile storage.

(*a*) What is the basic motivation behind this?   [2 marks]

(*b*) Describe RAID level 0. What are the benefits and drawbacks of this scheme?
                                                                     [3 marks]

(*c*) Describe RAID level 1. What are the benefits and drawbacks of this scheme?
                                                                     [3 marks]

(*d*) Compare and contrast RAID levels 3, 4 & 5. What problem(s) with the former pair does the last hope to avoid?   [6 marks]

A server machine has k identical high-performance IDE disks attached to independent IDE controllers. You are asked to write operating system software to treat these disks as a RAID level 5 array containing a single file system. Your software will include routines to read file-system data, write file-system data, and to schedule these read and write requests. What difficulties arise here and how may they be addressed?   [6 marks]