1997 Paper 3 Question 2

Concurrent Systems

In a given application, processes may be identified as "readers" or "writers". Multiple-reader, single-writer access to data is required to be implemented with priority for writers. Readers execute procedures `startread` and `endread` before and after reading. Writers execute `startwrite` and `endwrite`.

Give pseudocode for the `startread` procedure using

(*a*) semaphores

(*b*) conditional critical regions

(*c*) monitors

(*d*) guarded commands

Explain via comments in your pseudocode how concurrency control is achieved in each case and criticise each approach from the viewpoint of the programmer and the implementer.

[20 marks]