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]