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Monitors: An Operating System Structuring Concept
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1. Wanted to introduce a mechanism that would provide safe, modular access to shared mutable state. Writing multi-threaded programs is difficult and error-prone. Hoare sought to make this easier.

2. Proposed a structure for scheduling resources for parallel user processes. Monitor was able to protect the on-going process from interruption, and meanwhile, other processes would need to wait to enter. This paper also gives example (reader & writer) about how the schema works.

3. Somewhat interesting: Monitors can be used to implement semaphores. This means that monitors are at least "as powerful" as semaphores.

   More interesting/necessary: Semaphores can be used to implement monitors.
   - Main binary semaphore "mutex" (init to 1)
     - P(mutex) on entry
     - V(mutex) on some exits
   - "urgent" semaphore (init to 0)
     - P(urgent) when signalling condition variables in the monitor
     - V(urgent) on exit or wait if urgentcount > 0.

4. [Diagram of monitor operations] (Okay, so it's not the best picture.)
Finding data races using existing debugging tools is hard. Making synchronization errors is easy. Eraser aims to automate finding synchronization errors that could lead to data races. (via dynamic instrumentation)

1) Approach: Use the lockset algorithm to detect races. Every shared variable is protected by some lock. Eraser checks whether a program respects this discipline by monitoring reads and writes; it executes from execution history. If there is an access to shared variable that is conflicting and there is no lock, then eraser identifies that as a data race.

2) Something interesting: The lockset algorithm can be enhanced to support reader/writer locks by checking the "type" of access to the variable under consideration (read or write) and removing read locks from the candidate set on write access.

3) Amazing quote: "The second topic is deadlock. If the data race is Scylla, the deadlock is Charybdis."