

Avoidance of Priority Inversion in Real Time Systems Based on Resource Restoration

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Abstract

Priority inversion is a problem that occurs in concurrent processes when low-priority threads hold shared resources required by some high-priority threads, causing the high priority-threads to block indefinitely. This problem is enlarged when the concurrent processes are in a real time system where high- priority threads must be served on time. A novice approach for avoiding the priority inversion problem is presented for processes in real time systems. This approach is based on backing up and restoring the shared resources. A low priority thread always starts on a shadow version of the shared resource, the original resource remains unchanged. When a high-priority thread needs a resource engaged by a low-priority thread, the low priority thread is preempted, the original resource is restored and the high-priority thread is allowed to use the original resource. The approach has been implemented in Java and the experimental results are fetched which verify that the approach is very suitable for real time systems where high-priority threads must be served on time.

Keywords: CPU Scheduling, Priority Inversion.