What really happened on Mars? (July 4 1997)
Priority Inversion Problem
- VxWorks based Real-time Operating System
Priority Inversion Problem

- Tries to acquire same lock - thread blocked
- High priority task is blocked indefinitely by low priority task
- Medium priority tasks prevent low level task from completing and releasing lock
Preemptive priority scheduling of threads

A bus management task with high priority:
move data in and out of “information bus”
information bus → shared memory
Mutexes

A data gathering task with low priority

A communication task with medium priority

Watch dog timer goes off and system resets
Priority Inheritance Protocol
Phoenix Mars Lander