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The Real-Time Introduction is a comprehensive investigation of the requirements of real-time systems including explanations of various related topics. Embedded systems, real-time system characteristics, hard versus soft real-time, criticality are all examined in this section. It also compares the differences between a real-time operating system and a real-time executive by demonstrating the capabilities and benefits of each. This introduction discusses the tremendous benefits of portable code and explains the different levels of portability. Cross development is another important aspect of embedded systems dealt with in this class. This explanation includes discussions of host versus target platforms as well as cross development tool-sets like GNU. The Real-Time Introduction concludes with a section illustrating the concepts behind real-time tasking design, which defines a real-time task and its attributes such as priority and concurrency.

The Classic and POSIX API section is a thorough introduction to the standards-based APIs available to the RTEMS application programmer. The full spectrum of RTEMS concepts are presented, from basic terminology and general requirements to focused issues like processes and threads, synchronization, memory management, message passing, and device specific functions. A series of RTEMS examples are presented to help the user in understanding how the APIs may be used to solve specific problems. The POSIX portion class specifically covers the functionality and capability of the POSIX1 and 1b programming library as that functionality is implemented in RTEMS. This curriculum also addresses the means by which RTEMS services interact with the RTEMS SuperCore. Techniques for debugging common problems and performance issues that impact real-time systems will be presented. Upon completion of API portion, the students understanding relative to the makeup and execution of RTEMS applications will have increased substantially.

The Board Support Package (BSP) and Device Driver section thoroughly detail the semantics associated with building and maintaining board support packages and device drivers. Upon its completion, software professionals will have added a vast amount of knowledge, and should be comfortable with the idea of incorporating RTEMS into their platform. RTEMS components covered include: Clock, Timer, Real-Time Clock, Console, Initialize, Linker, Makefiles, Networking, Shared Memory, Support Routines, Target Dependencies, Debugging, and Performance Monitoring.

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