



SNS COLLEGE OF TECHNOLOGY

Coimbatore-35



DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

23CST202- OPERATING SYSTEMS

II YEAR AIML B IV SEM

UNIT 1 – OVERVIEW AND PROCESS MANAGEMENT

TOPIC –THREADING ISSUES



Threading Issues



- Semantics of **fork()** and **exec()** system calls
- Thread cancellation of target thread
 - Asynchronous or deferred
- Signal handling
- Thread pools
- Thread-specific data
- Scheduler activations



Semantics of fork() and exec()



- Does **fork()** duplicate only the calling thread or all threads?



Thread Cancellation

- Terminating a thread before it has finished
- Two general approaches:
 - **Asynchronous cancellation** terminates the target thread immediately
 - **Deferred cancellation** allows the target thread to periodically check if it should be cancelled



Signal Handling



- Signals are used in UNIX systems to notify a process that a particular event has occurred
- A **signal handler** is used to process signals
 1. Signal is generated by particular event
 2. Signal is delivered to a process
 3. Signal is handled



Signal Handling



- Options for the signal handler:
 - Deliver the signal to the thread to which the signal applies
 - Deliver the signal to every thread in the process
 - Deliver the signal to certain threads in the process
 - Assign a specific thread to receive all signals for the process



Thread Pools



- Create a number of threads in a pool where they await work
- Advantages:
 - Usually slightly faster to service a request with an existing thread than create a new thread
 - Allows the number of threads in the application(s) to be bound to the size of the pool



Thread Specific Data



- Allows each thread to have its own copy of data
- Useful when you do not have control over the thread creation process (i.e., when using a thread pool)



Scheduler Activations



- Both M:M and Two-level models require communication to maintain the appropriate number of kernel threads allocated to the application
- Scheduler activations provide **upcalls** - a communication mechanism from the kernel to the thread library
- This communication allows an application to maintain the correct number kernel threads