Various operating system services for process management are used such as: Process creation and termination, FORK/JOIN, ABORT, SUSPEND/RESUME, DELAY etc.

Process switching leads to reduce the efficiency of the system, as at some instant of time when switching takes place between the processes, both processes are in idle state. To solve this problem a new structure called "Threads" are used. Threads represent a software approach to improving performance of operating system by reducing the overhead of process switching. A thread has some of the characteristics of process, but it is possible to have several threads (multithreading) sharing the same memory space.

Responsivess, Low overhead, speed-up, efficient communication, resource sharing, utilization in multiprocessor systems are some of the benefits of threads. Three methods are used for the implementation of threads: kernel-level threads, user-level threads and hybrid threads.

Finally, the concept of interacting process is described which are based on the concepts of multiprogramming and multitasking. Data sharing, message passing, synchronization and signalling are the four kinds of process interaction which will be explained in more detail in the next chapter 4.

EXERCISES

Multiple Choice Questions:

3.1 A process is another name for
   (a) a job
   (b) a task
   (c) aging
   (d) a collection of job

3.2 A task is
   (a) the smallest discrete step in a job
   (b) a piece of work
   (c) part of I/O
   (d) a collection of jobs

3.3 Which is the correct definition of a valid process transition within an OS?
   (a) wakeup : ready → running
   (b) dispatch : ready → running
   (c) block : ready → blocked
   (d) timer run out : ready → blocked

3.4 Only state transition initiated by the user process itself in an OS is
   (a) block
   (b) dispatch
   (c) timer run out
   (d) wakeup

3.5 FORK is
   (a) creation of new job
   (b) dispatching of a task
   (c) increasing the priority of a task
   (d) the creation of a new process

3.6 A task in a blocked state
   (a) is executable
   (b) must still be placed in the run queue
   (c) is waiting for some temporarily unavailable resource
   (d) is running

3.7 Context switching is a part of
   (a) spooling
   (b) polling
   (c) interrupt handling
   (d) interrupt servicing

3.8 A process is
   (a) a program in high level language kept on disk
   (b) contents of main memory
   (c) a program in execution
   (d) a job in secondary memory

3.9 Cascading termination refers to the termination of all child processes before the parent terminates
(a) normally
(b) abnormally
(c) part of I/O
(d) none of these

3.10 A thread sometimes called as _____
(a) heavy weight process
(b) light weight process
(c) part of I/O
(d) none of these

3.11 Benefits of threads are
(a) resource sharing
(b) responsiveness
(c) both (a) and (b)
(d) none of these

3.12 _____ threads are supported directly by the operating system
(a) user level
(b) kernel-level
(c) hybrid
(d) all of these

3.13 _____ threads are implemented by thread library
(a) user-level
(b) kernel-level
(c) hybrid
(d) all of these

3.14 Which of the following is not the association method used in hybrid thread model?
(a) one to one
(b) one to many
(c) many to one
(d) many to many

3.15 Concurrency is an illusion of _____
(a) multitasking
(b) multiprogramming
(c) parallelism
(d) none of these