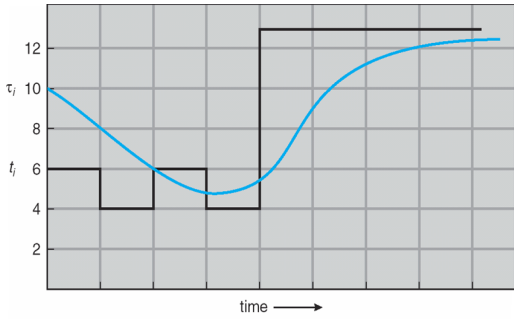
Ch6: CPU Scheduling

- Process execution consists of a cycle of CPU execution and I/O wait
- CPU scheduling decisions take place when a process:
  - Switches from running to waiting (non-preemptive)
  - Switches from running to ready (preemptive)
  - Switches from waiting to ready (preemptive)
  - Terminates (non-preemptive)
- The dispatcher module gives control of the CPU to the process selected by the short-term scheduler
  - Dispatch latency- the time it takes for the dispatcher to stop one process and start another
- Scheduling algorithms are chosen based on optimization criteria (ex: throughput, turnaround time, etc.)
  - FCFS, SJF, Shortest-Remaining-Time-First (preemptive SJF), Round Robin, Priority
- Determining length of next CPU burst: Exponential Averaging:
  1. t_n = actual length of n^{th} CPU burst
  2. τ_{n+1} = predicted value for the next CPU burst
  3. α, $0 \leq \alpha \leq 1$ (commonly α set to 1/2)
  4. Define: $\tau_{n+1} = \alpha * t_n + (1-\alpha)\tau_n$



CPU burst (t_i)	6	4	6	4	13	13	13	…
"guess" (τ_i)	10	8	6	6	5	9	11	12	…

- Priority Scheduling can result in starvation, which can be solved by aging a process (as time progresses, increase the priority)
- In Round Robin, small time quantums can result in large amounts of context switches
  - Time quantum should be chosen so that 80% of processes have shorter burst times that the time quantum
- Multilevel Queues and Multilevel Feedback Queues have multiple process queues that have different priority levels
  - In the Feedback queue, priority is not fixed → Processes can be promoted and demoted to different queues
  - Feedback queues can have different scheduling algorithms at different levels