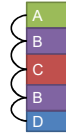


CSC 452: Scheduling

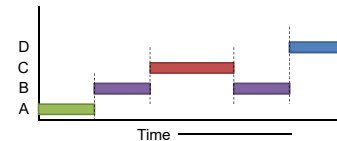
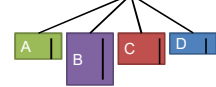
Dr. Jonathan Misurda
 jmisurda@cs.arizona.edu
<http://www.u.arizona.edu/~jmisurda>

Multiprogramming

Single \$PC
 (CPU's point of view)



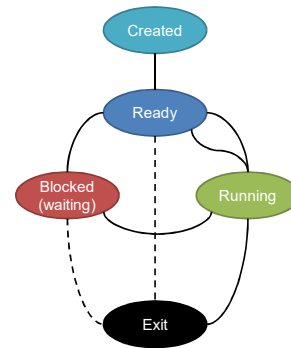
Multiple \$PCs
 (process point of view)



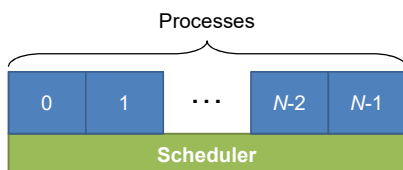
Process

A running program and its associated data

Life Cycle of a Process



Process Table



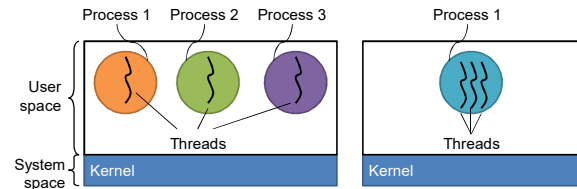
Process Table Entry

May be stored on stack {	Process management	File management
	Registers Program counter CPU status word Stack pointer Process state Priority / scheduling parameters Process ID Parent process ID Signals Process start time Total CPU usage	Root directory Working (current) directory File descriptors User ID Group ID
		Memory management Pointers to text, data, stack or Pointer to page table

Thread

A stream of instructions and their associated state

Processes and Threads



Thread State

Per process items

Address space
Open files
Child processes
Signals & handlers
Accounting info
Global variables

Per thread items

Program counter
Registers
Stack & stack pointer
State

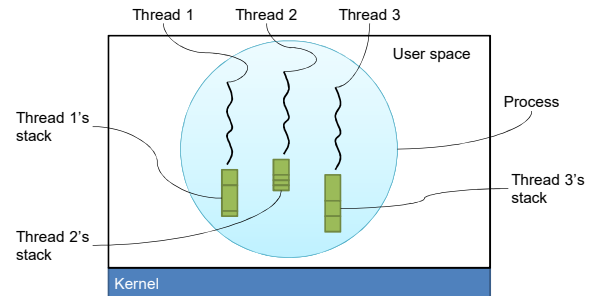
Per thread items

Program counter
Registers
Stack & stack pointer
State

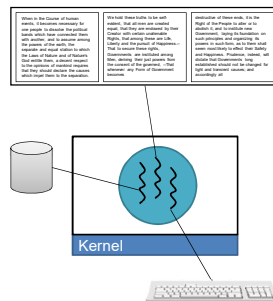
Per thread items

Program counter
Registers
Stack & stack pointer
State

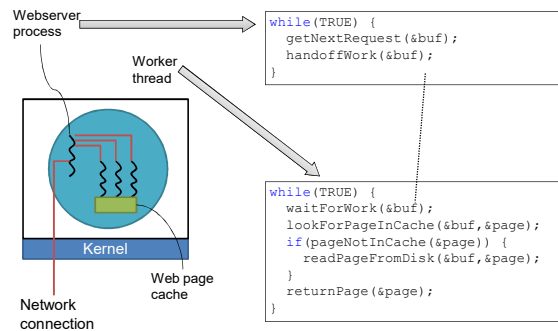
Threading



Multithreading in Action



Multithreaded Webserver



User Threads vs. Kernel Threads

