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FACULTY OF ENGINEERING & TECHNOLOGY

BCS-501 Operating System

Lecturer-06

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Processes

Process Concept
Process in memory
Process Control Block (PCB)

Process Concept

- To introduce the notion of a process -- a program in execution, which forms the basis of all computation
- To describe the various features of processes, including scheduling, creation and termination, and communication
- To explore interprocess communication using shared memory and message passing
- To describe communication in client-server systems

Process Concept

An operating system executes a variety of programs:
- Batch system – jobs
- Time-shared systems – user programs or tasks

Textbook uses the terms *job* and *process* almost interchangeably

Process – a program in execution; process execution must progress in sequential fashion

Multiple parts
- The program code, also called text section
- Current activity including program counter, processor registers
- Stack containing temporary data
  - Function parameters, return addresses, local variables
- Data section containing global variables
- Heap containing memory dynamically allocated during run time

Program is *passive* entity stored on disk (executable file), process is *active*
- Program becomes process when executable file loaded into memory

Execution of program started via GUI mouse clicks, command line entry of its name, etc

One program can be several processes
- Consider multiple users executing the same program

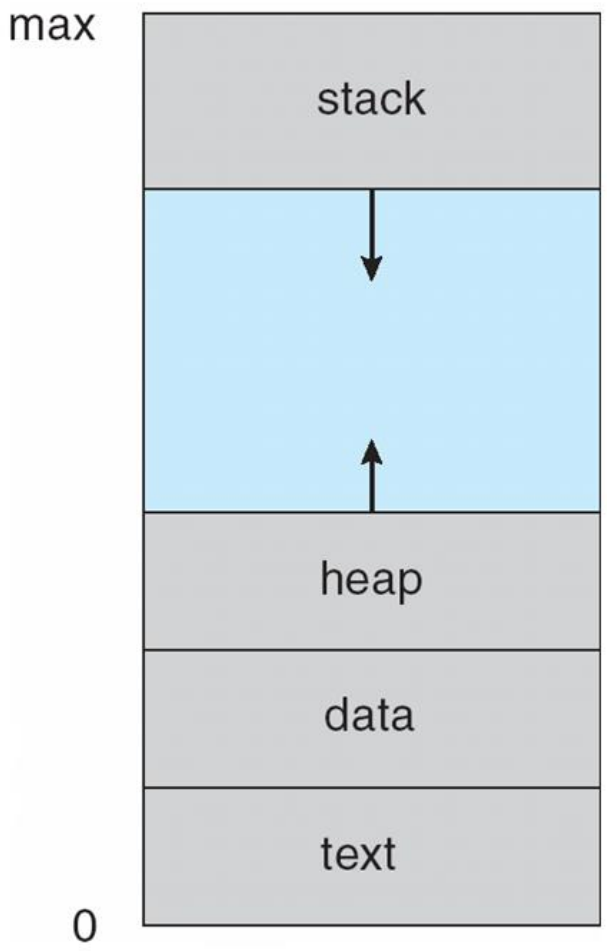
An operating system executes a variety of programs:
- Batch system – jobs
- Time-shared systems – user programs or tasks

Textbook uses the terms *job* and *process* almost interchangeably

Process – a program in execution; process execution must progress in sequential fashion

A process includes:
- program counter
- stack
- data section

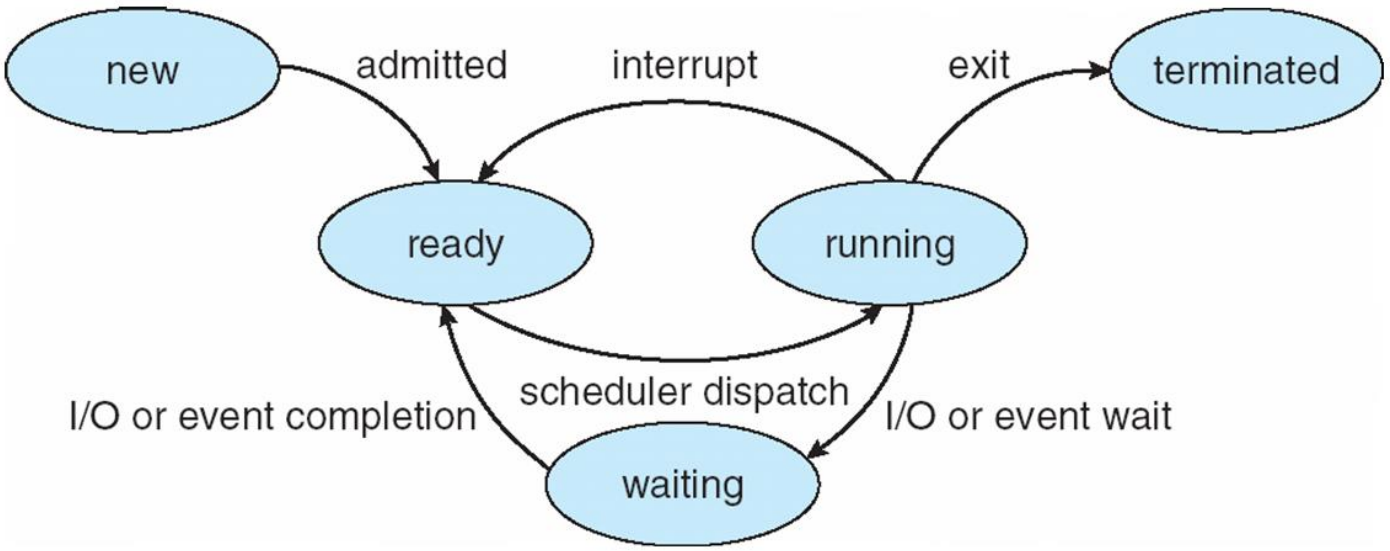
Process in memory



process state

As a process executes, it changes state

- new: The process is being created
- running: Instructions are being executed
- waiting: The process is waiting for some event to occur
- ready: The process is waiting to be assigned to a processor
- terminated: The process has finished execution


new
admitted
interrupt
exit
terminated
ready
running
scheduler dispatch
I/O or event completion
I/O or event wait
waiting

PCB

•So far, process has a single thread of execution----

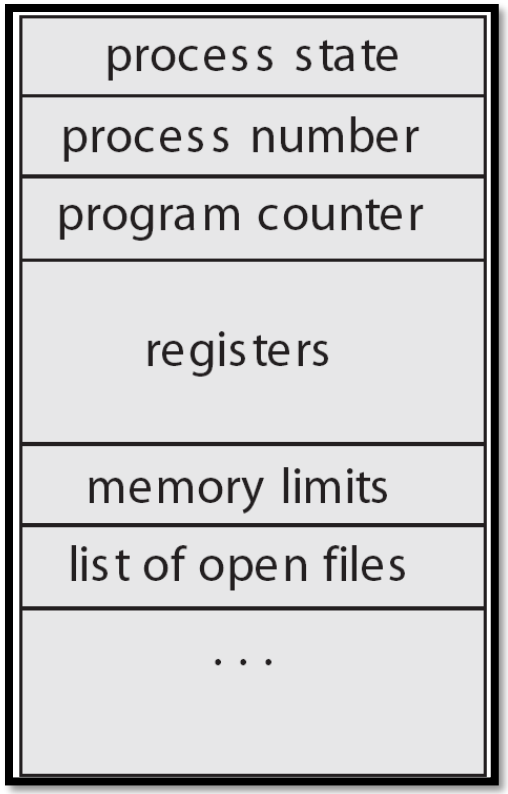
•Consider having multiple program counters per process

- •Multiple locations can execute at once
  - •Multiple threads of control -> threads

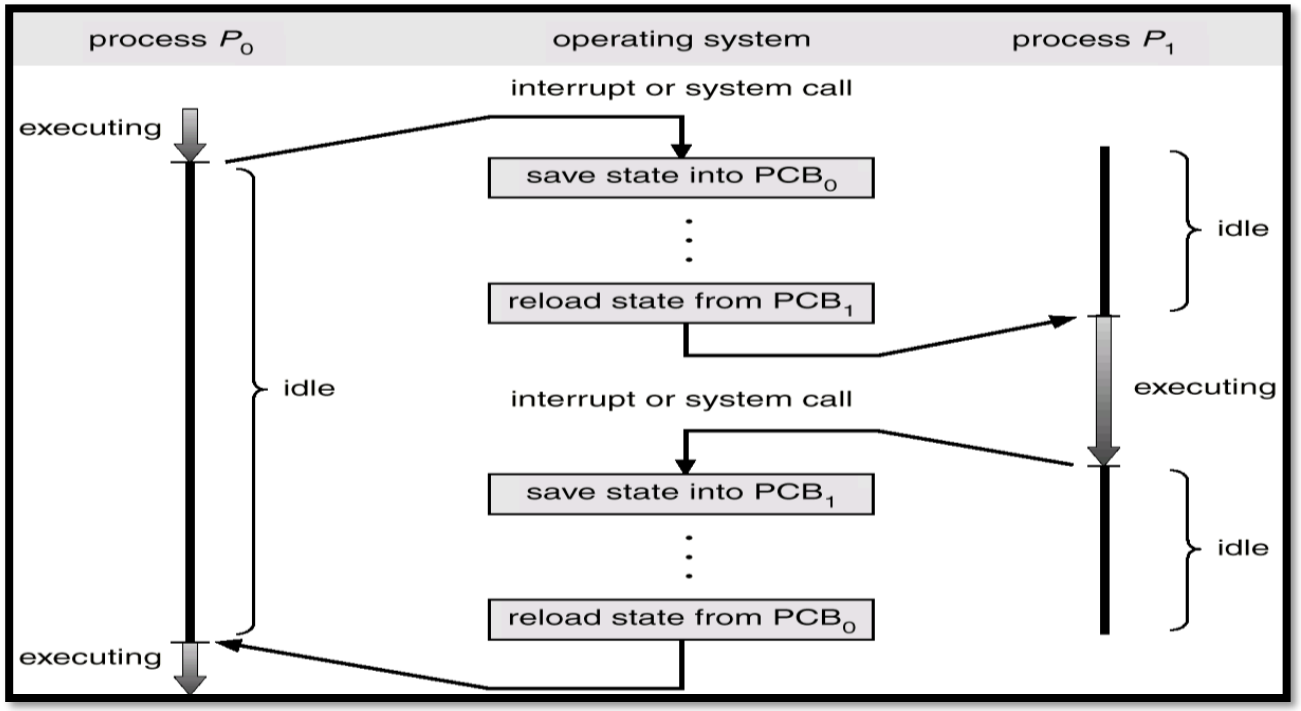
•Must then have storage for thread details, multiple program counters in PCB
•Information associated with each process.

•Process state
•Program counter
•CPU registers
•CPU scheduling information
•Memory-management information
•Accounting information
•I/O status information

Process Control Block (PCB)



CPU Switch From Process to Process



MCQ

An operating system executes a variety of programs……
A. Batch system –
B. Time-shared systems
C. Both
D. None

Process is a……a program in execution
A. process execution must progress in sequential fashion
B. process execution must progress in parallelfashion
C. process execution must progress in both fashion
D. None of these

The program code, also called …….
A. text section
B. program counter
C. processor registers
D. Stack containing temporary data

PCB is a collection of……..

A. Process state
B. Program counter
C. CPU registers
D. All of these

In Process execution must progress in sequential fashion, includes:

A. program counter
B. Stack
C. data section
D. All of these