

# CS 537 Notes, Section #2: Introduction to Processes

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Chapter 3, Section 3.1 in **Operating Systems Concepts**.

With so many things happening at once in system, need some way of separating them all out cleanly. That is a process.

Important concept: decomposition. Given hard problem, chop it up into several simpler problems that can be solved separately.

What is a process?

- "An execution stream in the context of a particular process state."
- A more intuitive, but less precise, definition is just a running piece of code along with all the things that the code can affect or be affected by.
- Process state is everything that can affect, or be affected by, the process: includes code, particular data values, open files, etc.
- Execution stream is a sequence of instructions performed in a process state.
- Only one thing happens at a time within a process.

Is a process the same as a program?

Some systems allow only one process (mostly personal computers). They are called *uniprogramming* systems (not uniprocessing; that means only one processor). Easier to write some parts of OS, but many other things are hard to do.

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Most systems allow more than one process. They are called *multiprogramming* systems.

First, have to keep track of all the processes. For each process, *process control block* holds:

- Execution state (saved registers, etc.)
- Scheduling information
- Accounting and other miscellaneous information.

Process table: collection of all process control blocks for all processes.

Process Control Block
Execution State
Scheduling Information

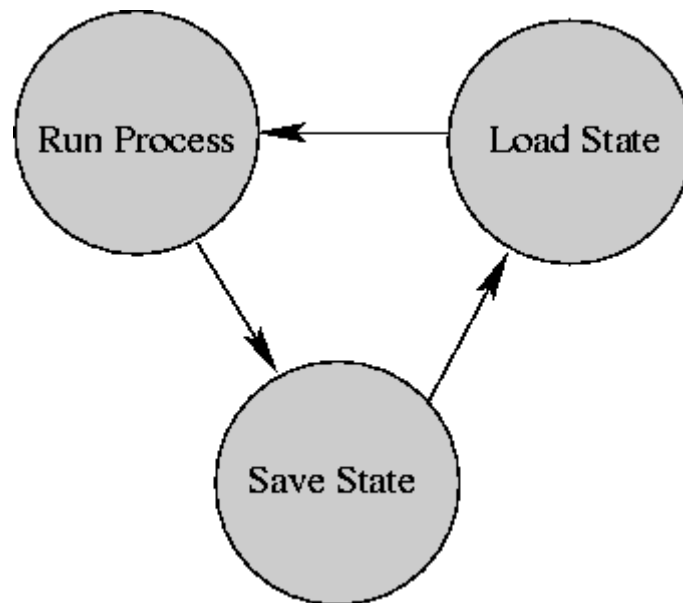
Accounting  
and  
Miscellaneous

How can several processes share one CPU? OS must make sure that processes do not interfere with each other. This means

- Making sure each gets a chance to run (fair scheduling).
- Making sure they do not modify each other's state (protection).

*Dispatcher* (also called Short Term Scheduler): inner-most portion of the OS that runs processes:

- Run process for a while
- Save state
- Load state of another process
- Run it ...



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