Managing Concurrency

- The Operating System is largely concerned with managing concurrency
- OS responsible for shifting between the activities that are currently being carried out by the computer system
- Operating System designers therefore need a unit of concurrency for the Operating System to work with

What is a Process?

- A process is a program in execution:
  - The text section
  - The program counter
  - The contents of the processor's registers
  - The process stack
  - The data section

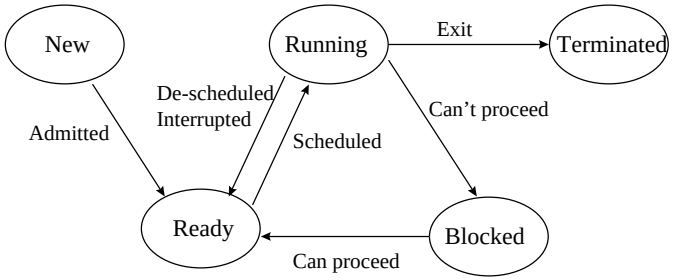
Bootstrapping the Operating System

- The bootstrap program is the first program that is run when the computer is switched on. It:
  - Initialises the CPU's registers
  - Initialises the device controllers
  - Initialises the contents of memory
    - loads the Operating System kernel
- The OS kernel then creates the first process
  - Initialises itself - incl. starting other processes
  - Waits to be interrupted

Interrupts

- Software interrupts are known as traps
  - Generated by system calls
- Hardware interrupts are generated by devices
  - Signalled to the CPU by way of the system bus
  - Serviced by interrupt service routines which are located via the interrupt service vector

The Life History of a Process



I/O Interrupts

- Device controllers control the operation of the different I/O devices attached to the computer system
- Waiting for input or output is one of the most common reasons for a process to become blocked

Process Control Blocks

- In order to manage the processes that are currently running, the Operating System maintains a structure of information for each one
  - Known as process control blocks (PCBs)
- These structures are held in lists
  - Related to the state of the processes they represent