Scheduling

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We now look at a new problem that arises when we want to schedule *multiple* resources

Deadlock

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To read from a disk, a process must call the OS kernel and wait for the kernel to reply

Terminology

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There is no “waiting” happening: the process does not run when blocked

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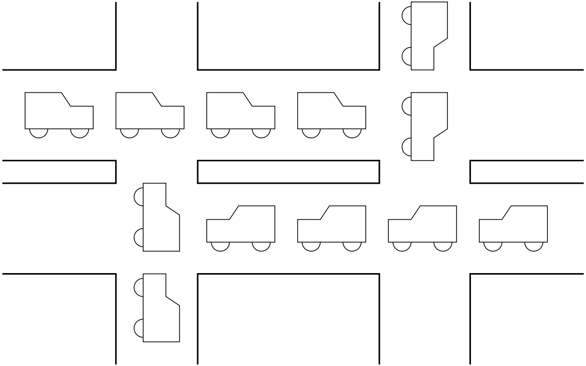
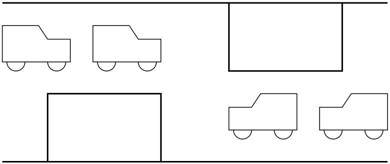
Sometimes the delay is infinite!

Deadlock



Gridlock/Deadlock

Deadlock



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- P_2 runs and makes a request for access to D_2
- The OS takes over and notices P_1 has locked D_2, so P_2 must wait until P_1 has finished with it; P_2 moves to state blocked
- Now both P_1 and P_2 are blocked and the OS can't run either process!

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And with more than two processes: think of three or more processes in a circle

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A set of processes D is *deadlocked* if

1. each process P_i in D is blocked on some event e_i
2. event e_i can only be caused by some process in D

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- there is more than one resource
- there is more than one process[1][2]

[1] It could technically happen with just one process, but that would be quite dumb programming to request for a resource you already have

[2] I've seen it happen