

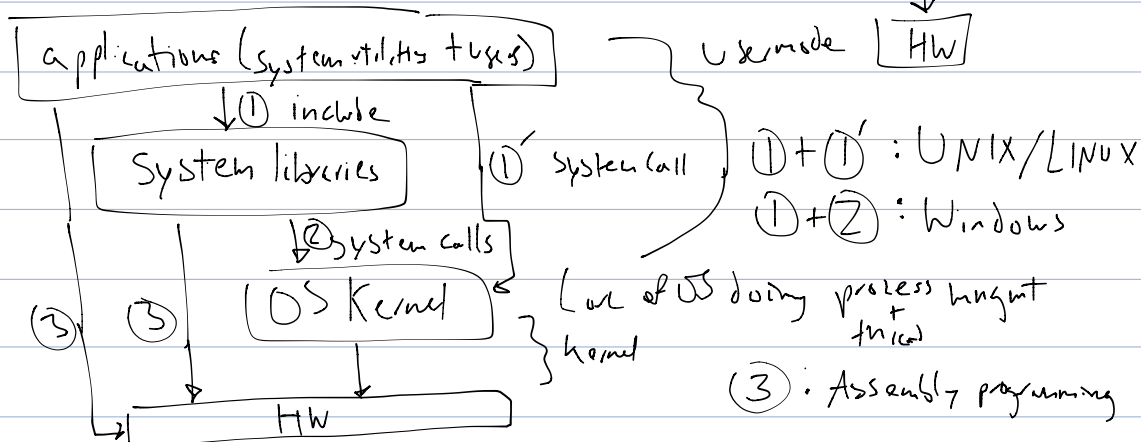
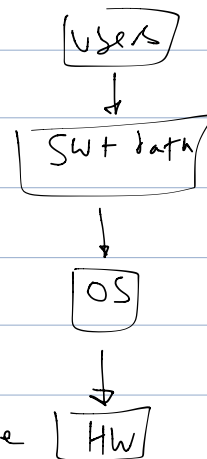
Feb 18th Exam 1

Mar 31st Exam 2

May 10th Final 2-5

What is a computer system?

- (1) Hardware
- (2) Software (applications, utility programs)
- (3) Data
- (4) Users



applications remain unchanged but privileged instructions

Shell is in user mode
replaced easily

privileged: Can only be accessed + used by kernel

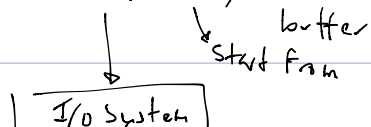
not just restricted to two modes

[mode bit] 0: kernel
1: user

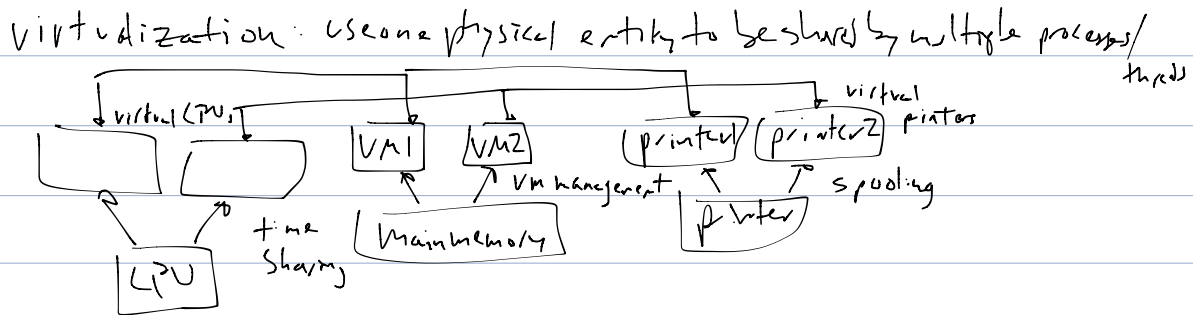
check for instructions

abstraction: put on the layer on top of the existing one

read(A1, ^{logical block #}blk, ^{memory}mb) SI: 30



↓
 Compute position of block
 move $\frac{1}{N}$ head to corresponding disk track
 check for seek errors
 read physical block into a buffer
 check for read errors
 copy block to user from the buffer



Concurrency: have multiple processes trying to access memory

<p> $counter = 3;$ $p1: \dots$ $counter++;$ $p1 \rightarrow p2; 3$ $p2 \rightarrow p1; 3$ </p>	<p> $p2: \dots$ $counter--;$ $p2 \rightarrow p1; 3$ </p>	<p> $P1$ $(1) R1 \leftarrow counter;$ $(2) R1 \leftarrow R1 + 1;$ $(3) counter \leftarrow R1;$ $(1), (2), (1)', (2)', (3), (3)'$ $R1 = 3 \quad R1 = 4 \quad R2 = 3 \quad R2 = 2 \quad 4 \quad 2 \leftarrow final$ </p>	<p> $P2$ $(1)' R2 \leftarrow counter;$ $(2)' R2 \leftarrow R2 - 1;$ $(3)' counter \leftarrow R2;$ $(1)', (2)', (3)', (3)'$ $R2 = 3 \quad R2 = 2 \quad 4 \quad 2 \leftarrow final$ </p>
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race condition