Today’s Plan

Upcoming:
- Quiz #2
- Assignment 1

Today’s topics:
- From last time:
  - The Critical Section Problem
  - Software Solutions to the Critical Section Problem
  - A Hardware Solution to the Critical Section Problem

Last time:
- Precedence & Concurrency
- S()/P(), Cobegin/Coend, Fork & Join
Most modern processors provide an instruction called “Test & Set” or “Exchange.”

- Test & Set: tests an item in storage and sets it to a given value

- Exchange: swaps two items
A Hardware Solution

BOOLEAN test_and_set(BOOLEAN *location) {
    BOOLEAN x;
    x = *location;
    *location = TRUE;
    return(x);
}

while(1) {
    while (test_and_set(&lock)); /* busy wait */
    Critical Section
    lock = FALSE;
    Non-Critical Section
}
Solution Evaluation

- The software solution given for two processes is difficult to extend to \( n \) processes.

- The hardware Test & Set solution will work for any number of processes.

- Problems:
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