



Karen West <karenwest15@gmail.com>

[The Computing Technology Inside Your Smartphone] Overview of week 7

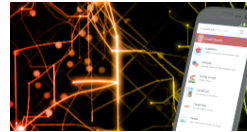
The Computing Technology Inside Your Smartphone <ENGR1210x-no-reply@courseupdates.edx.org>

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To: KarenWest15@gmail.com

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The Computing Technology Inside Your Smartphone



Welcome to the first week of performance! Now that we have a complete picture of the operation of the computer inside a smartphone, from transistors to applications, we're ready to discuss over the next two weeks the techniques used by computer architects to make our smartphones so fast.

We'll begin by discussing how we measure computer performance, its impacting factors, and Amdahl's Law, which describes the overall performance impact of a design improvement. Then we'll discuss a variety of processor performance techniques that are used in smartphones: *pipelining*, *superscalar*, *multithreading*, and *Single Instruction, Multiple Data (SIMD)* processing. In contrast to our current processor design, which performs one instruction at a time, these approaches are used together in order to simultaneously perform many operations at the same time.

After focusing on processor performance this week, next week we'll cover *caches*, which mitigate the speed gap between our very fast processor and the much slower memory that holds our instructions and data. Then we'll introduce *multicore*, the incorporation of multiple processors on a chip, and discuss a critical multicore design challenge--cache coherence--and its solution. The last performance topic of next week addresses techniques to hide the long delay of transferring instructions and data from the Flash memory that permanently holds our apps.

While we have no required labs this week (or for the rest of the course), we've organized an optional **pipelined LC-3 Lite hackathon**. Those who get involved will collectively design a pipelined processor, verify its correctness, and write programs to measure its performance benefit, a huge achievement! You'll also earn a badge from Cornell for your participation.

Finally, since there are no more required labs, those of you who are behind on the

labs have a chance to catch up over the next three weeks. If you abandoned the labs due to frustration with Jade saving/reloading, I encourage you to try again using our solutions. If the problem was getting your lab to work, click the Check button and post in the appropriate discussion forum asking us to take a look at your design. Many of your fellow students are taking advantage of our help, so don't hesitate to ask!

As always, we are here to answer your questions, even those from the first few weeks. Continue to use #SmartphoneMOOC when tweeting about the course.

On behalf of the course staff, good luck and have fun!

Dave



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edX
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Cambridge, MA, USA 02139

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