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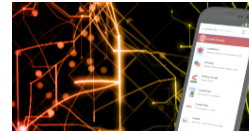**Karen West <karenwest15@gmail.com>**

[The Computing Technology Inside Your Smartphone] Overview of week 5

The Computing Technology Inside Your Smartphone <ENGRI1210x-no-reply@courseupdates.edx.org>   Tue, Apr 7, 2015 at 12:26 PM
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The Computing Technology Inside Your Smartphone

This week we continue our coverage of computer organization, getting more into the details than last week. We'll focus on Instruction Set Architecture (ISA), where the hardware and software come together, and how we design the hardware to support the ISA.

The ISA specifies a number of different requirements--such as the instruction types, the number of registers, and how memory addresses are formed--to which both the hardware and the system software (the compiler or interpreter, which we'll discuss next week) must conform. In this way, the ISA forms a *contract* between the hardware and the system software. The system software is designed to properly translate a program written in a high-level language like C or Java to the instructions in the ISA, and the hardware design--the *microarchitecture*--is designed to properly execute those instructions according to the ISA specification.

We will move back and forth between ISA definitions and the microarchitecture. For each instruction that we introduce, we'll add the hardware datapath through which instructions and data flow. In the last module, we'll describe the finite state machine that orchestrates their movement through the datapath. In between, we'll discuss the ARM ISA used in most smartphones. Next week, we'll see how the system software holds up its end of the ISA contract.

We'll also use Jade to design the logic to perform four major processor functions:

- Changing the Program Counter (PC).
- Generating the address for memory and branch instructions.
- Setting the bits in the Condition Code (CC) register.
- Determining if the branch condition is met.

Next week, we'll design the final pieces, put them together, and run programs.

Now that we are at the halfway point of the course, you should seriously consider

moving forward using the provided lab solutions if you are experiencing browser issues with Jade, can't get a particular lab to work, or need to catch up.

As always, we are here to answer your questions. Be sure to use #SmartphoneMOOC when tweeting about the course.

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

Dave

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