

ECE471: Embedded Systems – Homework 1

Due: Thursday 19 September 2013, 5:00PM

For this homework short one or two paragraph answers will suffice. There isn't necessarily a right or wrong answer, but be sure to explain your reasoning.

To submit, create a document with your answers (text, pdf, libreoffice, MS Office if you must) and e-mail them to *vincent.weaver@maine.edu* by the homework deadline.

1. Take the recently released iPhone 5s (details can be found with a quick web search). Would you classify this device as an embedded system? List 3 of the characteristics given in class for what defines an “embedded system” and say whether the device meets them.
2. You are designing a multi-million dollar space probe designed to fly to Jupiter. As part of its mission it must make highly accurate rocket burns with exact timings, as well as receive important messages from Earth at any time without warning. One co-worker suggests using a CPU that has a large out-of-order processor with large data caches, prefetching, and a branch predictor. A different co-worker suggests a simple in-order 16-bit CPU without any advanced architectural features. Which would you choose, and why?
3. You are assigned to write some code for a small microcontroller that only has 256Bytes of RAM and only 2kB of FlashROM. What language would you write the code in, and why?
4. You see an advertisement for a new computer architecture that says its ISA has a 32-bit fixed-width instruction size, 256 general purpose registers, and each ALU instruction has 4 operations (one destination and three source: `add rd, r1, r2, r3`). Why might you be a bit skeptical about this ad?