

CS 451/551, ECE 541: Assignment #1

Due Sept. 26 (for in-class students)

You may work alone or in pairs. If in pairs, just turn in one paper.

Read the online article, “The real reason apple’s 64-bit A7 chip makes sense”:

http://news.cnet.com/8301-1035_3-57602372-94/the-real-reasons-apples-64-bit-a7-chip-makes-sense/

In addition, find at least two more articles on the Apple A7 chip. List these as references in your paper.

Write a 3-page, free-form paper answering these questions.

1. How much memory can we address directly with a 32-bit address space? (Answer using the nearest multiple of 2^{10} , e.g. Megabytes, Gigabytes, Terabytes, etc. Use the table below as a guide.)
2. How much memory can we address directly with a 64-bit address space (using nearest multiple of 2^{10} .)
3. By what factor does 64 bit addressing increase the directly addressable memory?
4. What is Apple’s motivation for designing this processor and incorporating it into mobile devices?
5. Apple’s A7 chip is based on the ARMv7 Core. Name two advantages that this design brings to mobile devices, besides a large address space.

Units for Specifying Memory Size

- 1 Bit = Binary Digit
- 8 Bits = 1 Byte
- 1024 Bytes = 1 Kilobyte
- 1024 Kilobytes = 1 Megabyte
- 1024 Megabytes = 1 Gigabyte
- 1024 Gigabytes = 1 Terabyte
- 1024 Terabytes = 1 Petabyte
- 1024 Petabytes = 1 Exabyte
- 1024 Exabytes = 1 Zettabyte
- 1024 Zettabytes = 1 Yottabyte
- 1024 Yottabytes = 1 Brontobyte
- 1024 Brontobytes = 1 Geopbyte