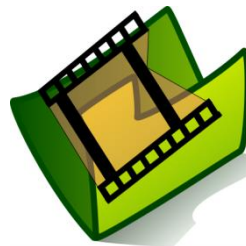# CS305
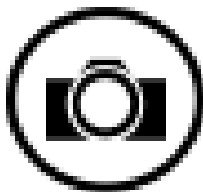# Computer Architecture

One System to Know Them All
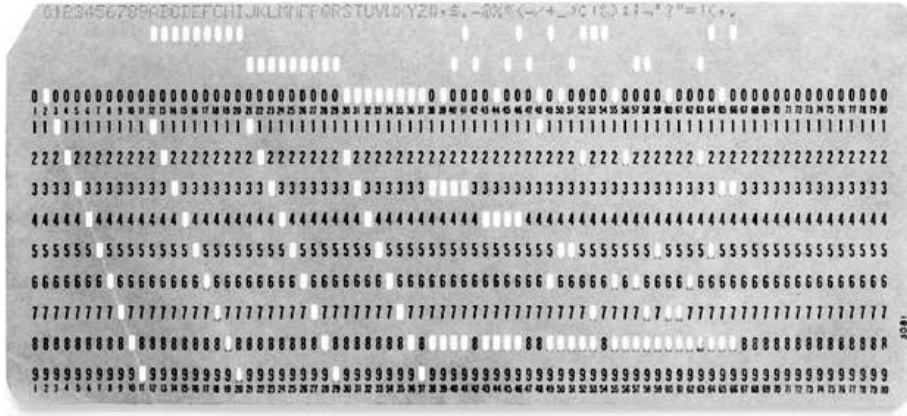
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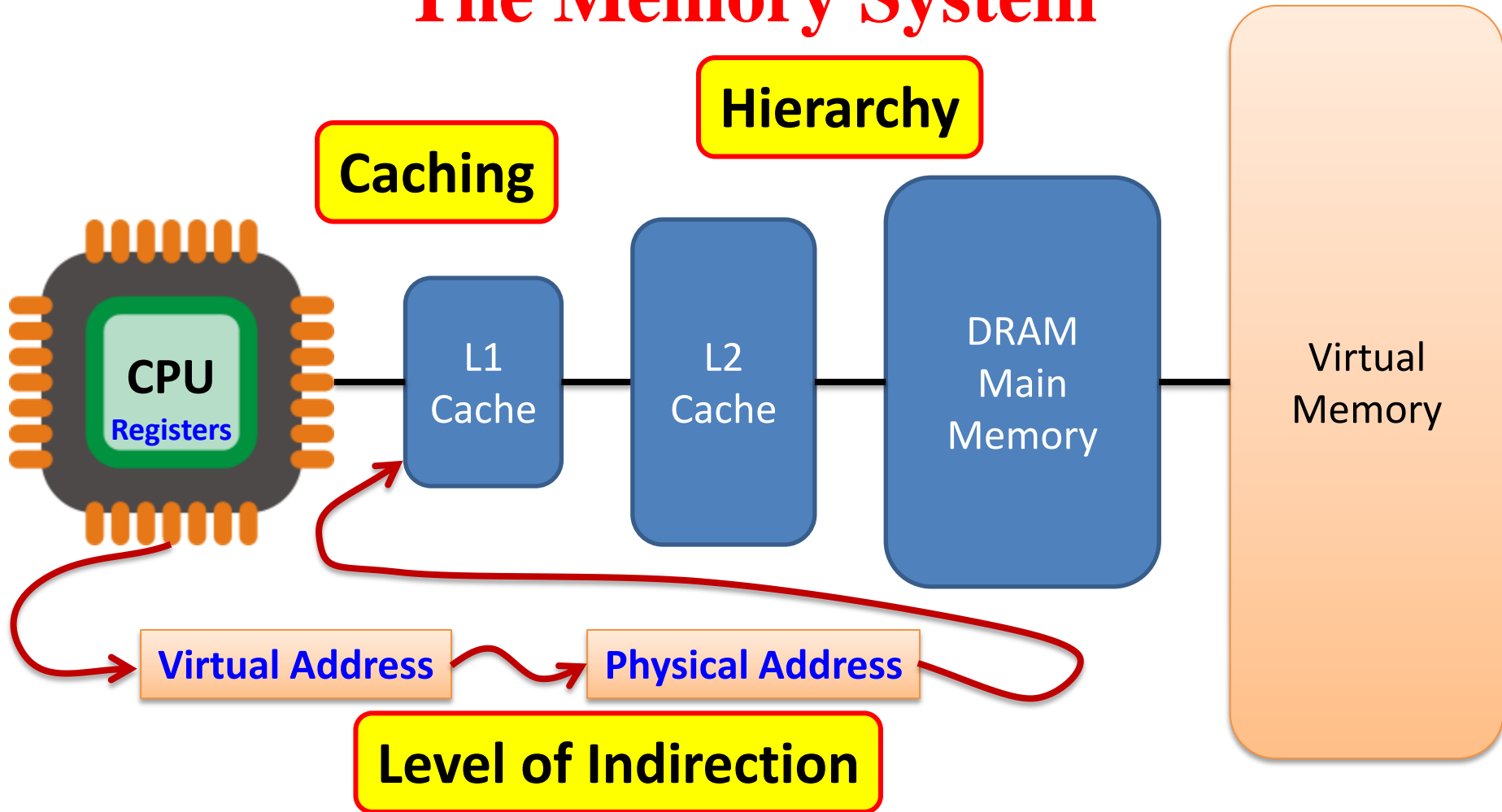
The World is Changed

Much That Once Was...

The Memory System

Hierarchy

Caching

CPU
Registers

L1
Cache

L2
Cache

DRAM
Main
Memory

Virtual
Memory

Virtual Address

Physical Address

Level of Indirection

One System to Know Them All

The world is changed. I feel it in the phones. I feel it in the phablets. I sense it in my apps.

Much that once was is now too slow, and none now live who have use for it.

It all began with the design of the memory system.

The first idea is that of **caching**, for the illusion of memory very vast, yet very fast.

The second is that of **hierarchy**, a great technique to magnify the benefits manifold.

The third is of adding a **level of indirection**, which above all else, provides flexibility.

The three cornerstone ideas of all of Computer Science Systems, they were all of them used, in the design of the memory system. Deep inside every computer, the memory system rules, and dictates the performance of every app you run, and every snap you take. And in this system is steeped, all the three great ideas of Computer Science Systems, their power, their prowess, and their versatility.

One system to know them all.

-- Bhaskaran Raman, 02 Oct 2014
Based on: Galadriel's words in the introduction to the movie "Lord of the Rings: Fellowship of the Ring"