Week 5: Introduction - memory systems and technologies-3

Computers need memory as "working space": a quickly-accessible area where they can store the programs and data that they need to process. Modern computer systems run so quickly that their CPUs often run many times faster than the rest of the system (including memory).

A computer system includes a special type of memory called ***processor cache*** (http://en.wikipedia.org/wiki/CPU_cache) ; this is a small amount of ultra-fast memory that helps alleviate any bottlenecks in the flow of information.

Memory construction

There are essentially two different types of core (main) memory technology:

Static: faster memory, using **Flip-Flops** (https://en.wikipedia.org/wiki/Flip-flop_(electronics)) (we shall see Flip-Flops later). It is faster to change state between 0 and 1 - to switch state - and it keeps state until the power is off, but it is more expensive.

Dynamic: slower memory using capacitors. It is slower to switch, but it is possible to fit more units into a given space, it is cheaper to manufacture and it generates less heat. The problem is that capacitors lose their charge very quickly, so there is a need to refresh the contents after a few milliseconds, otherwise they go to zero and lose the information.

> *Cache* memory is implemented with **static** memory.
>
> *Main system* memory is implemented with **dynamic** memory.