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New Architectures

Microprocessor Architecture

Aaradhana A. Deshmukh

Department of Computer Engineering

Smt. Kashibai Navale College of Engineering



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CONTENETS

- What is Multicore?
- Multicore Architectures
- The Software Developer's Viewpoint
- The Bus Connections
- Single Core to Multicore



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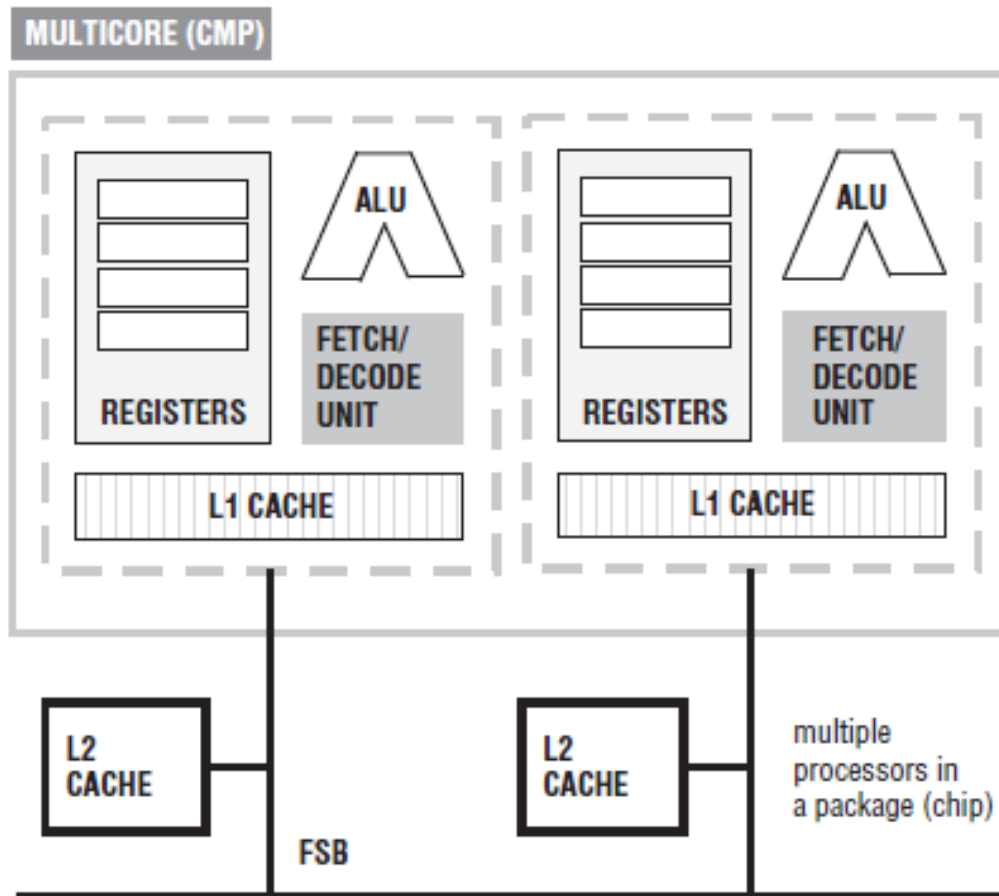
What is Multicore?

- A *multicore* is an architecture design that places multiple processors on a single die (computer chip).
- *Chip Multiprocessors (CMPs)*
- Multicore is simply a popular name for CMP or single chip multiprocessors.
- CMPs come in multiple flavors: two processors (dual core), four processors (quad core), and eight processors (octa - core) configurations.



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Multiprocessing Configurations





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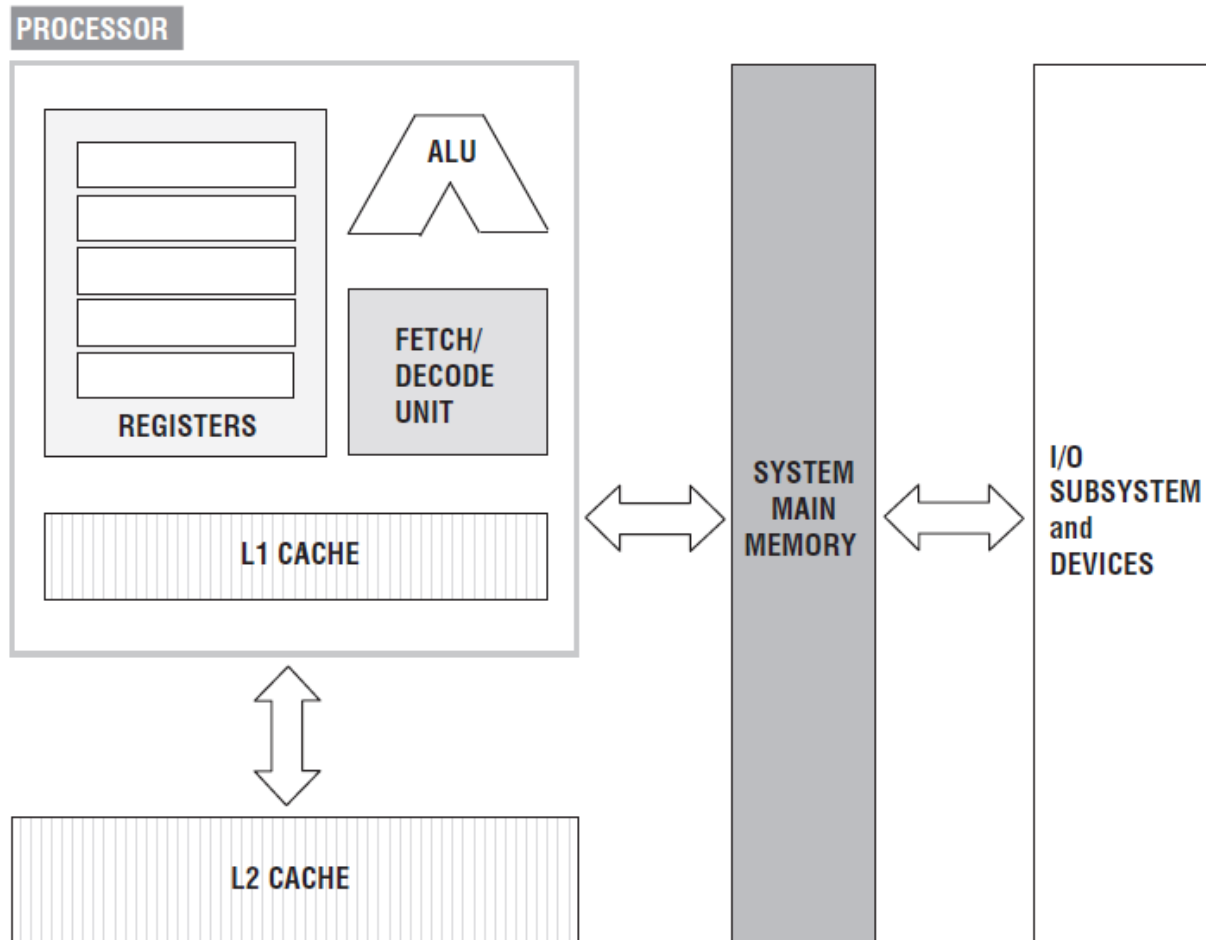
Software Developer's Viewpoints

- Parallelism Vs Sequential approach



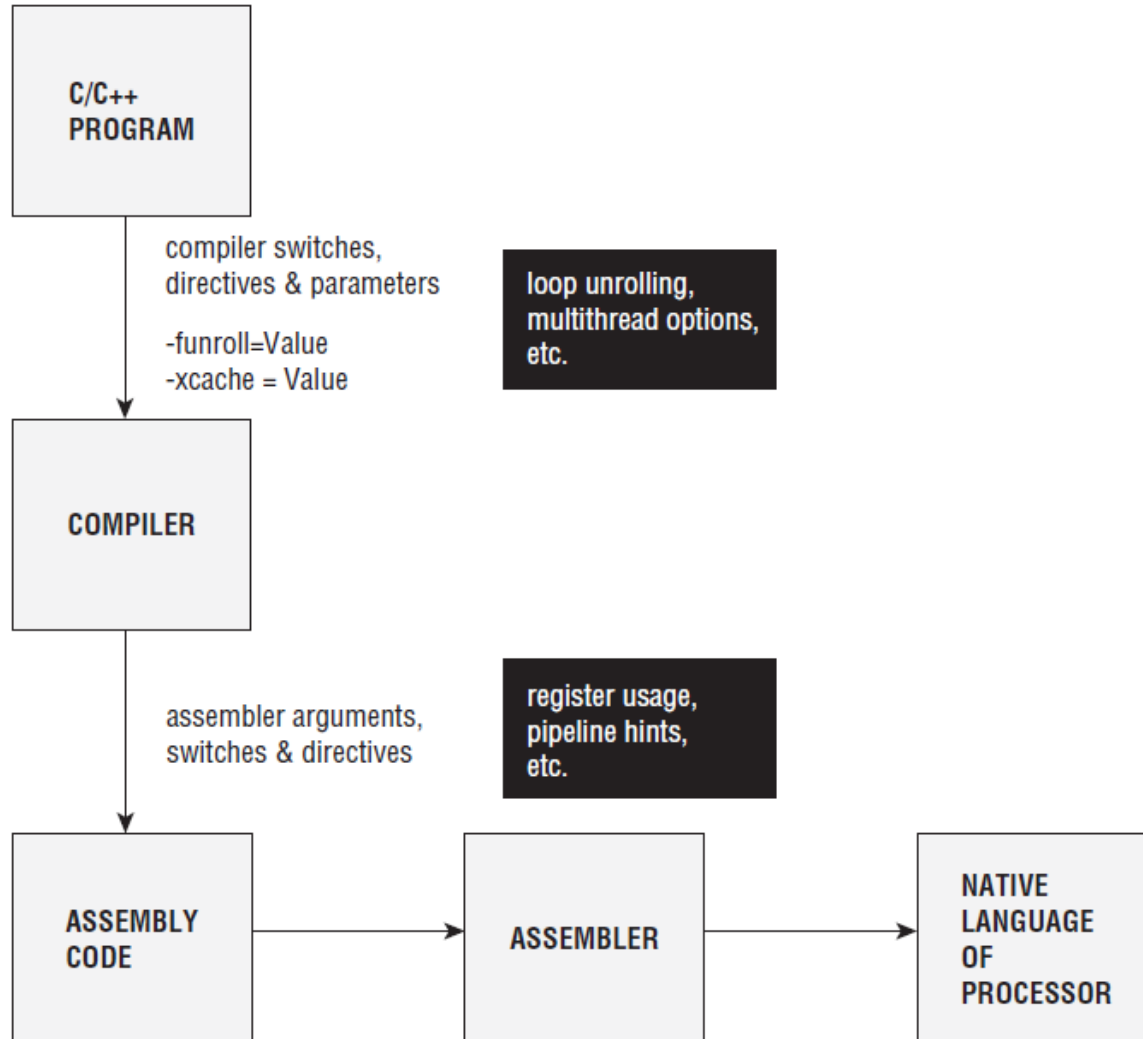
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Processor Architecture & Memory





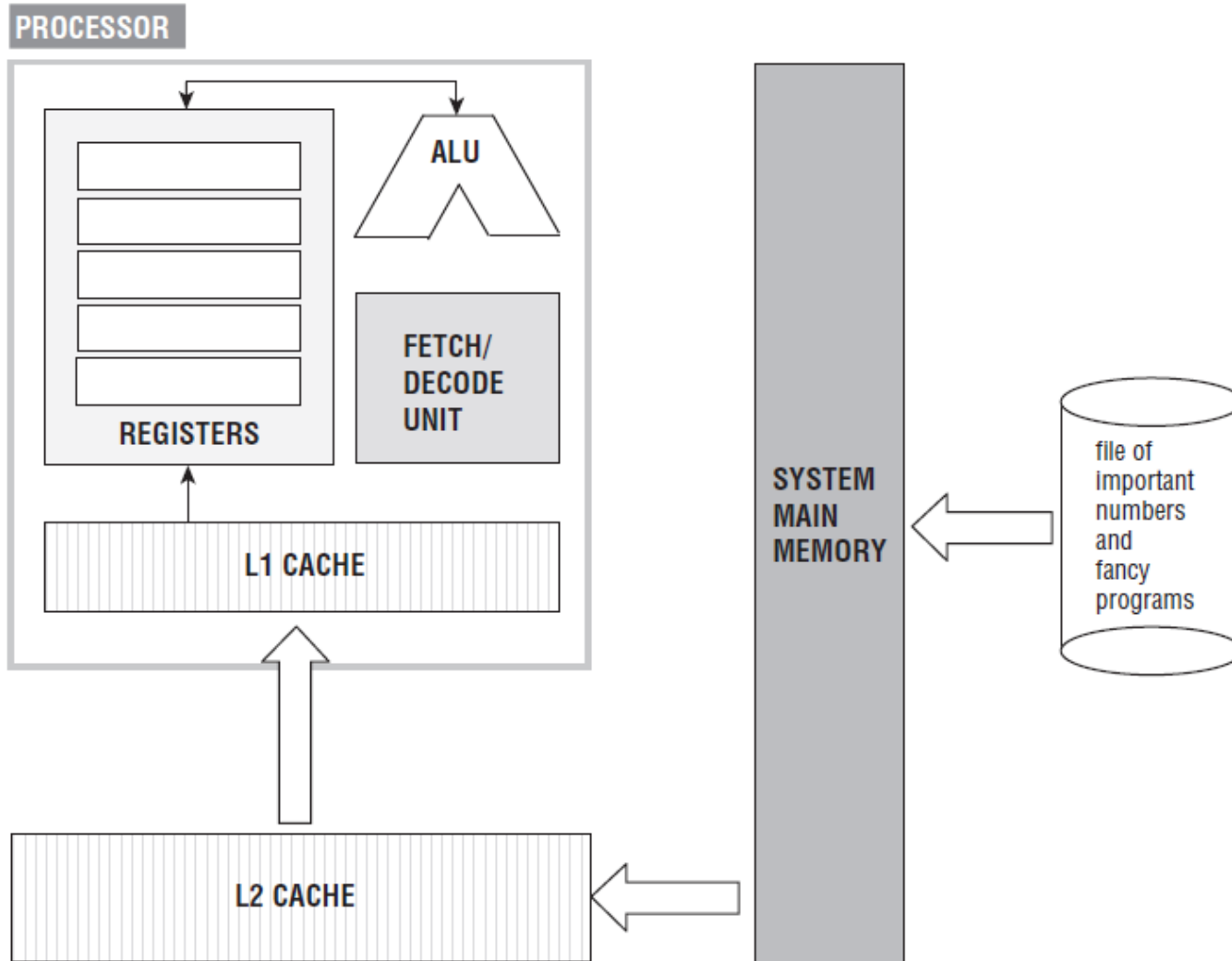
Basic Compilation Process





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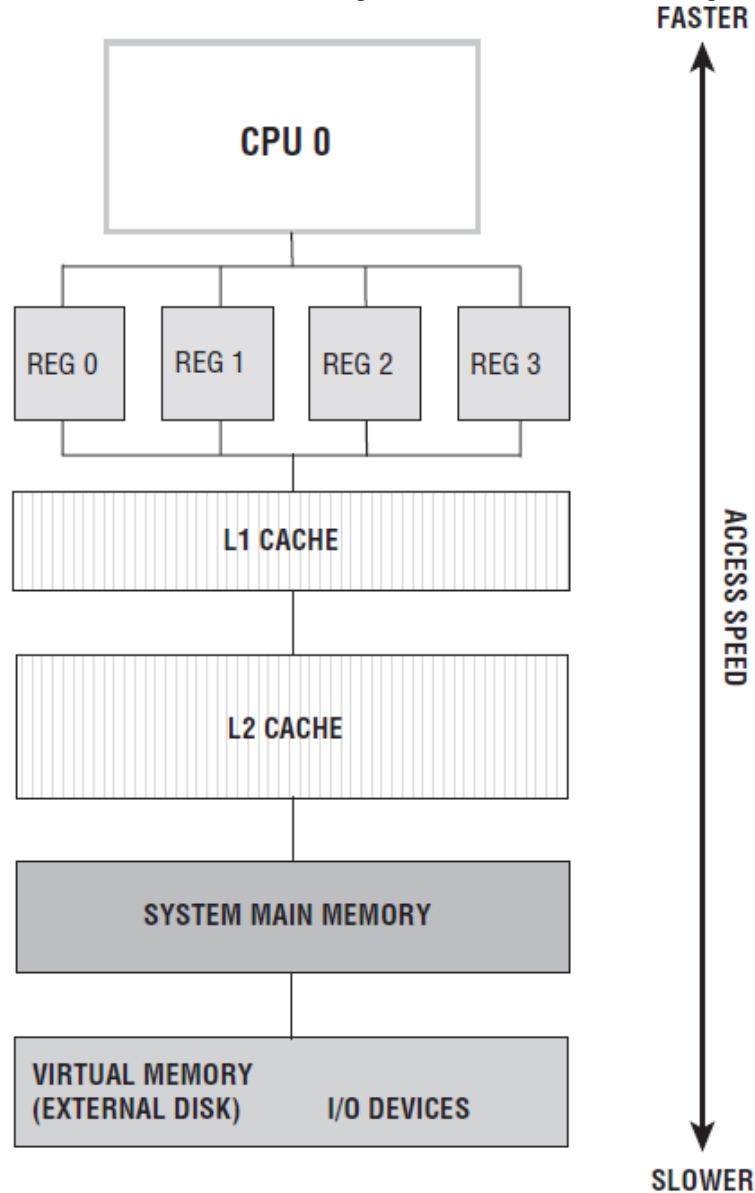
Flow of Programs & Data to the Processor





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Memory Hierarchy





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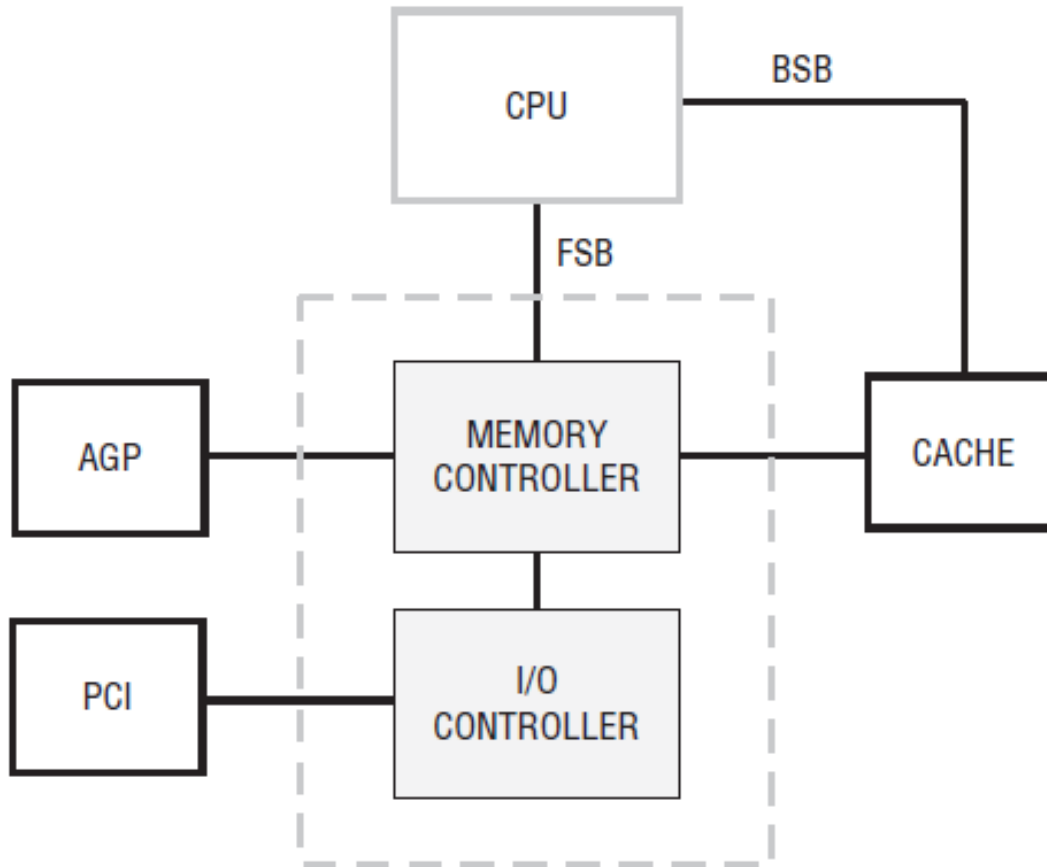
Memory

- Registers: Index, Segment, IP, Counter, Base, Data, Flag, Floating Point
- Cache: One of the primary functions of cache is to take advantage of this temporal and spatial locality characteristic of a program. Cache is often divided into two levels, level 1 and level 2.
- Main Memory



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The Bus Connection





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From Single Core to Multicore

- Multiprogramming: *Multiprogramming is a scheduling technique that allows more than one job to be in an executable state at any one time*
- Multiprocessing: a *multiprocessor is a computer that has more than one processor and multiprocessing is a technique of programming that uses more than one processor to perform work concurrently*
- Parallel Programming:



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Parallel Programming

- It is the art and science of implementing an algorithm, a computer program, or a computer application, using sets of instructions or tasks designed to be executed concurrently.



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