

# Course Introduction and Overview

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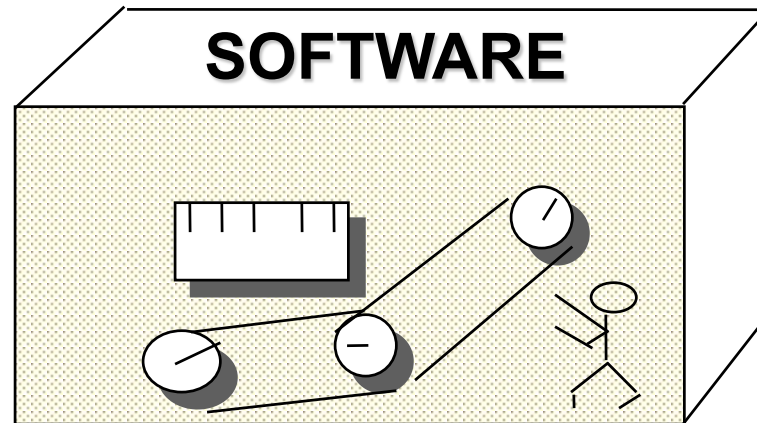
CS 4431

Michigan Technological University

## Computer Architecture Is ...

the attributes of a [computing] system as seen by the programmer, i.e., the conceptual structure and functional behavior, as distinct from the organization of the data flows and controls the logic design, and the physical implementation.

Amdahl, Blaaw, and Brooks, 1964



# What is Computer Architecture?

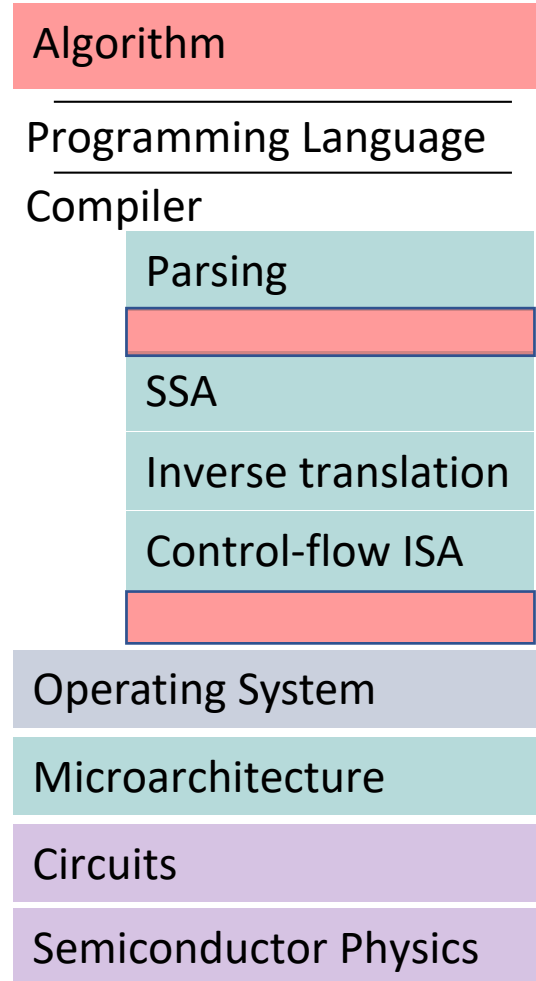
Old definition: Instruction Set Architecture (ISA)


Today's definition is much broader: hardware organization of computers (how to build computer)--includes ISA.

Layered view of computer systems:

Role of the computer architect:

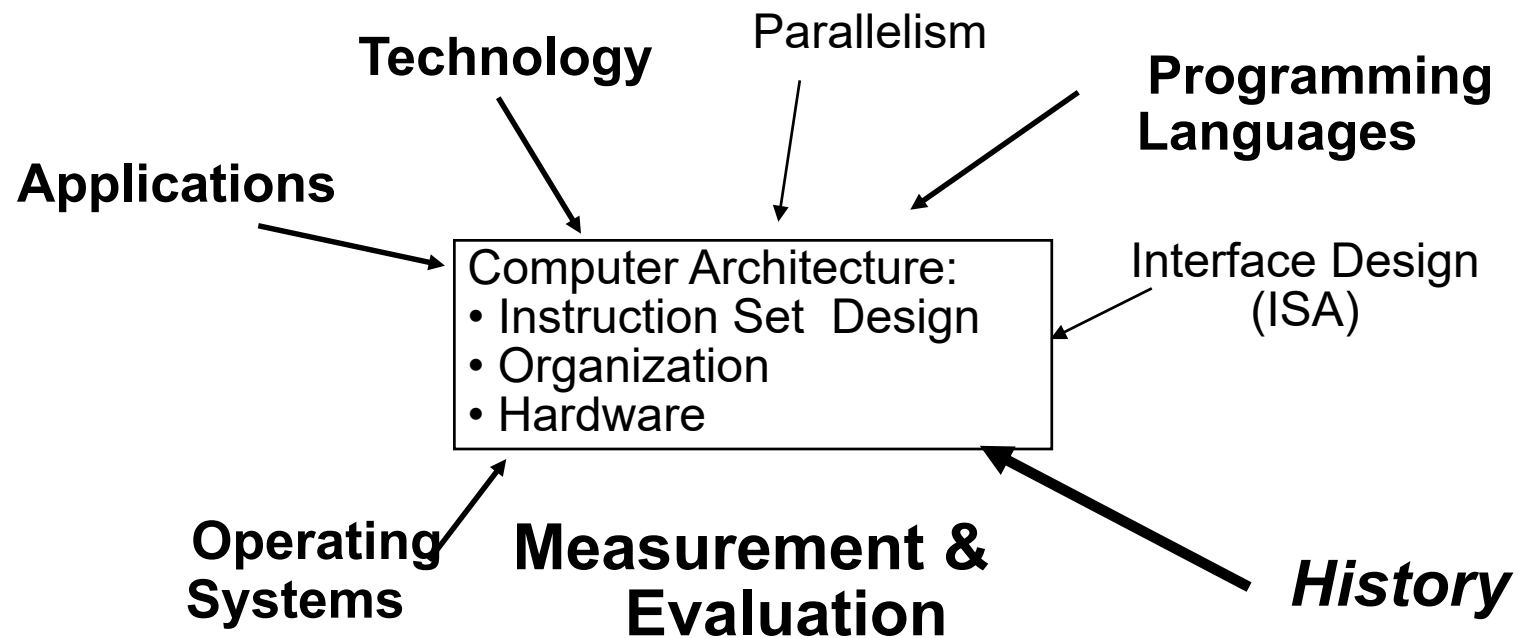
To make design trade-offs across the hw/sw interface to meet functional, performance and cost requirements.



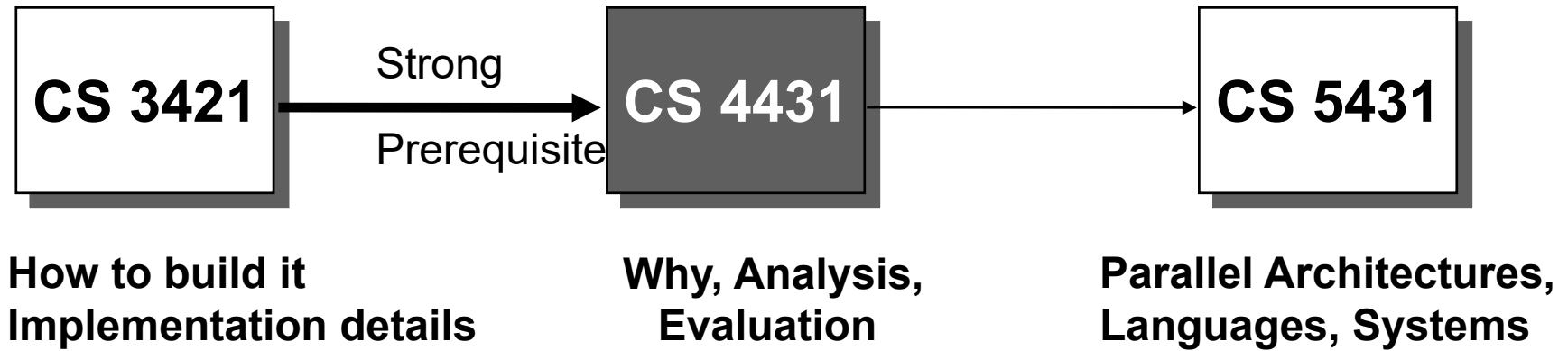
Explicit parallelization layers. 

# CS 4431 Course Focus

Understanding the design techniques, machine structures, technology factors, evaluation methods that will determine the form of computers in 21st Century



## Related Courses



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# Grading

- 25 % Project
  - To be done individually
  - Consists of multiple phases
- 15 % Homework assignments
- 30 % 2 Midterm Exams
- 30 % Final Exam
  
- For success in this course you must turn in the project and/or homework assignments on time.
- Attendance is required.

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## Topic Coverage

Textbook: Hennessy and Patterson, *Computer Architecture: A Quantitative Approach, 5-th Ed.*

- Instruction Set Principles and Examples (Appendix A)
  - Architecture Description Languages – FAST/ADL simulation system
  - Pipelining: Basic and intermediate concepts (review, Appendix C)
  - Fundamentals of Quantitative Design and Analysis (Chapter 1)
  - Memory Hierarchy Design (Chapter 2)
  - Instruction Level Parallelism and its Exploitation (Chapter 3)
  - Data Level Parallelism in Vector, SIMD, and GPU architectures (Chapter 4 and thread Level Parallelism (Chapter 5) – Time permitting.
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