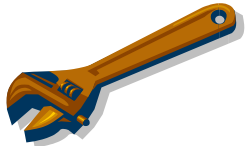


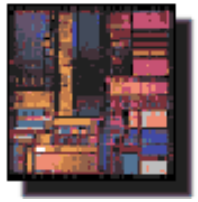




Digital Systems Design Automation

Unit 1: Course Introduction and Overview

Lecture 1.5: Levels of Abstraction in IC Design



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Outline

1.1 Moore's Law

1.2 Design Complexity and need for EDA

1.3 Course Overview

1.4 Taxonomy of integrated circuits

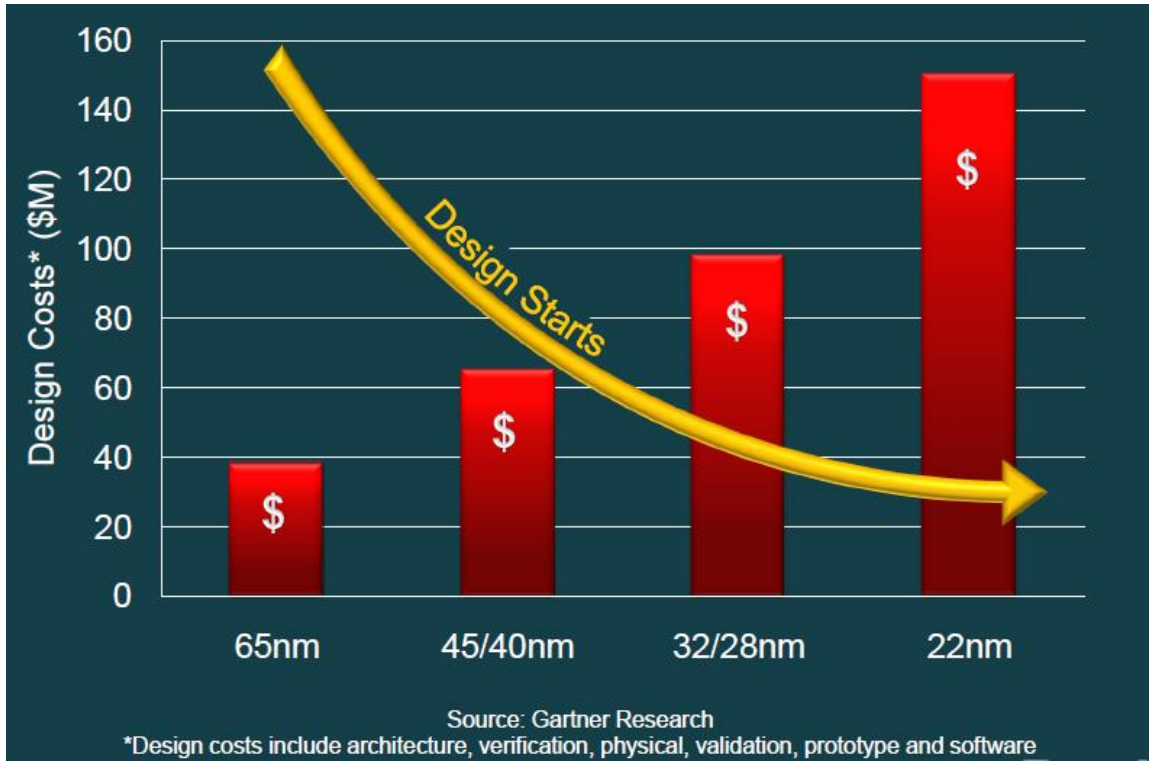
1.5 Levels of abstraction in IC design

1.6 A quick tour of logic level design automation

Levels of Abstraction in IC Design

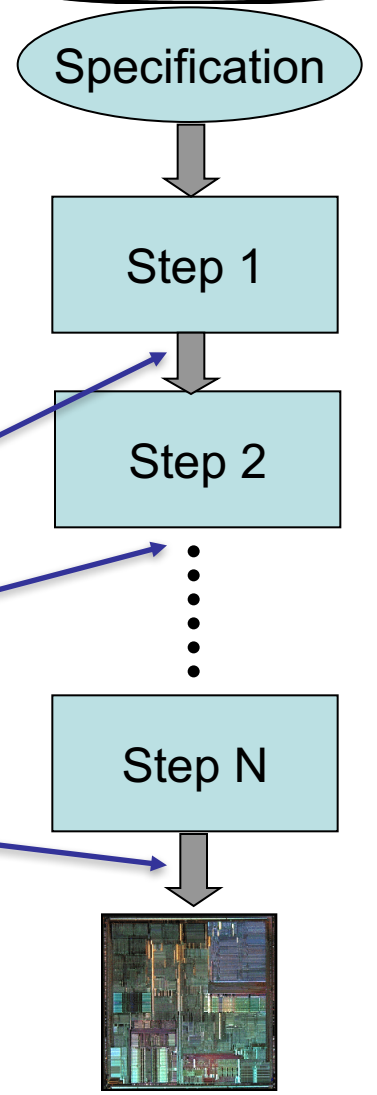
Increasing Design Cost and Decreasing Design Starts

- Increasing cost for IC design has driven down the number of design starts



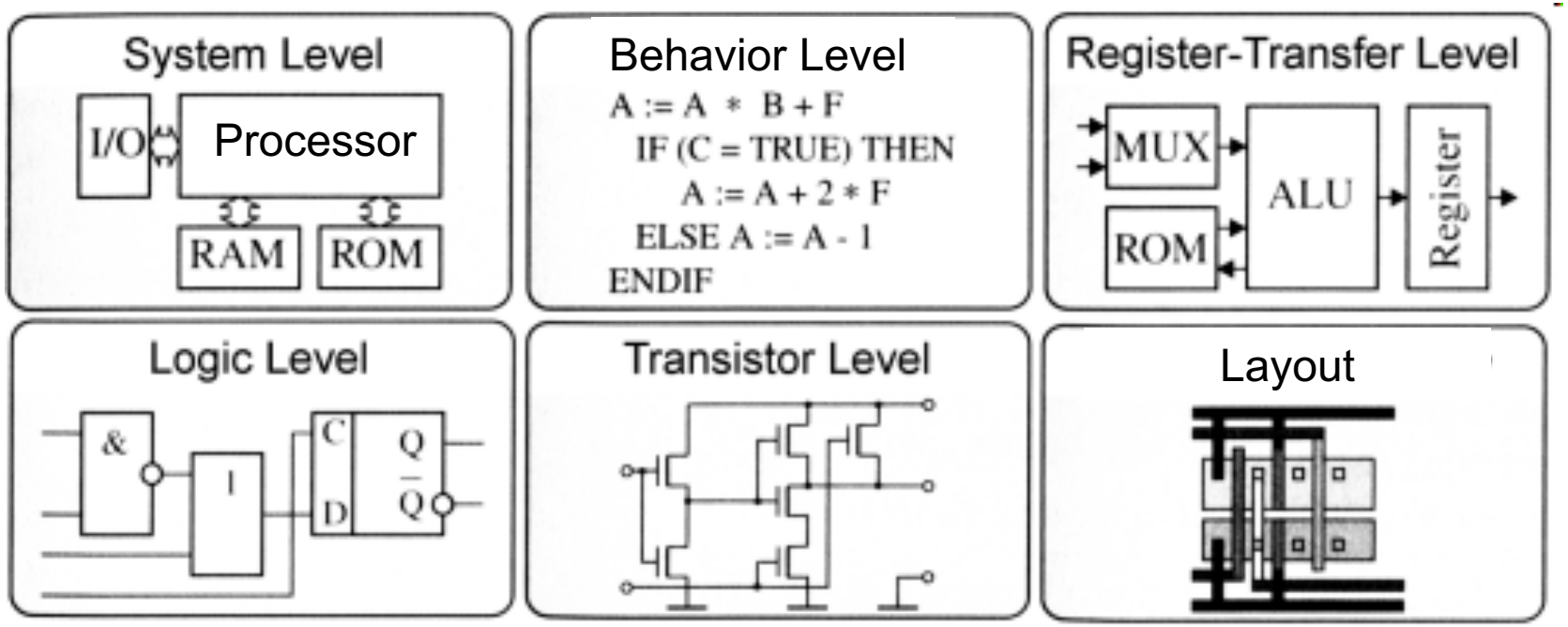
Levels of Abstraction in IC Design

- How do you attack the complexity of IC design?
- Divide-and-conquer: Break the problem down into smaller, tractable steps
  - Trades off optimality for feasibility
- Need clearly specified interfaces between these steps (levels of abstraction)

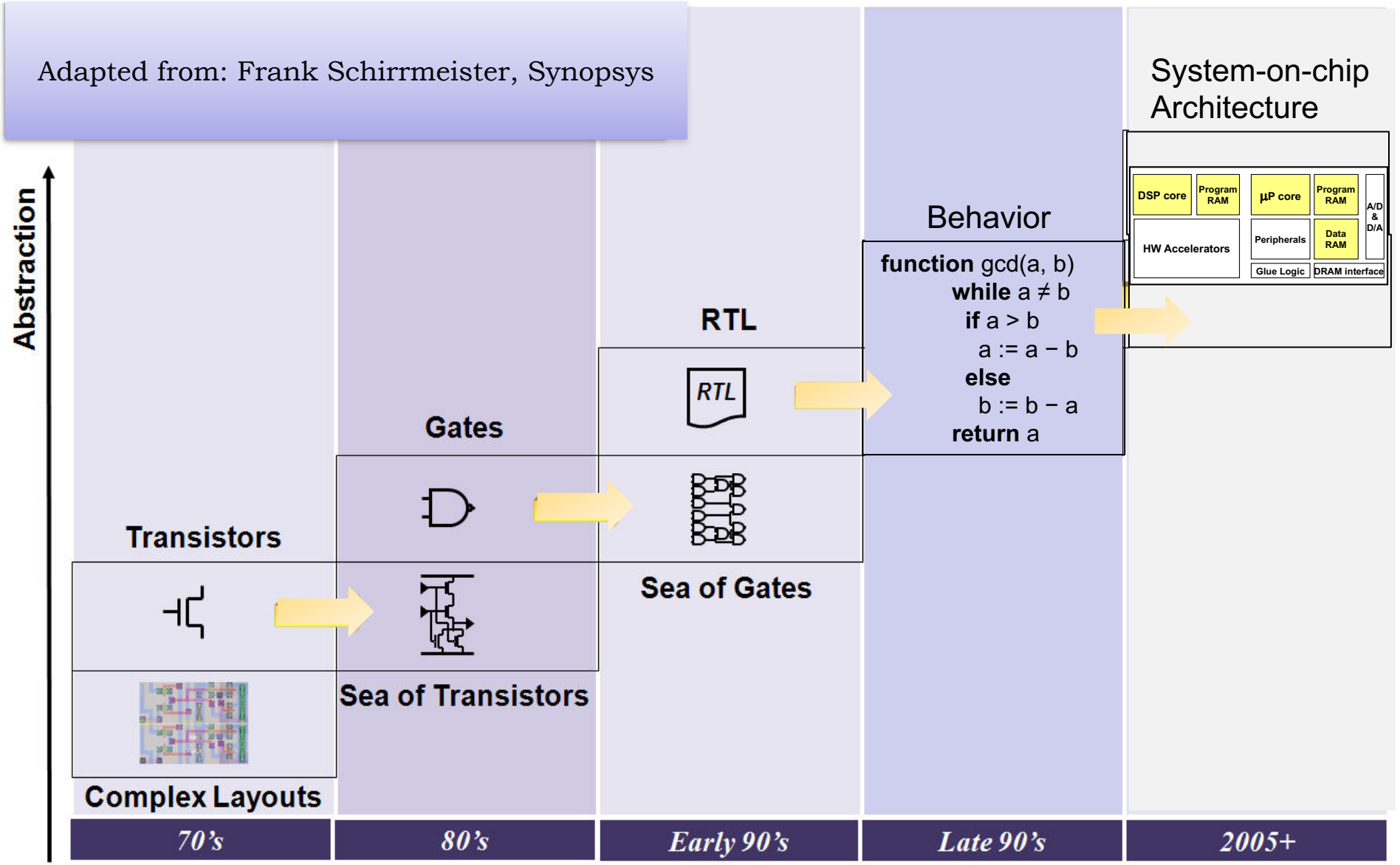


Levels of Abstraction in IC Design

- Abstraction is about hiding details

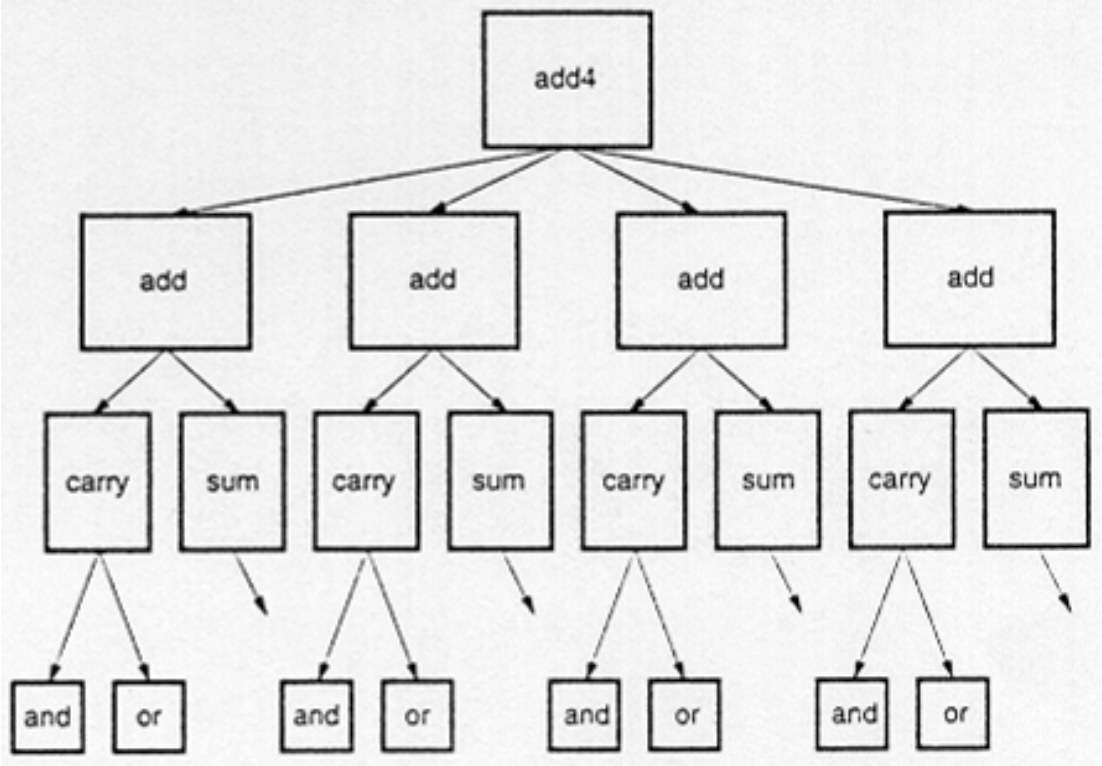


Evolution of IC Design Abstraction



Abstraction and Hierarchy in IC Design

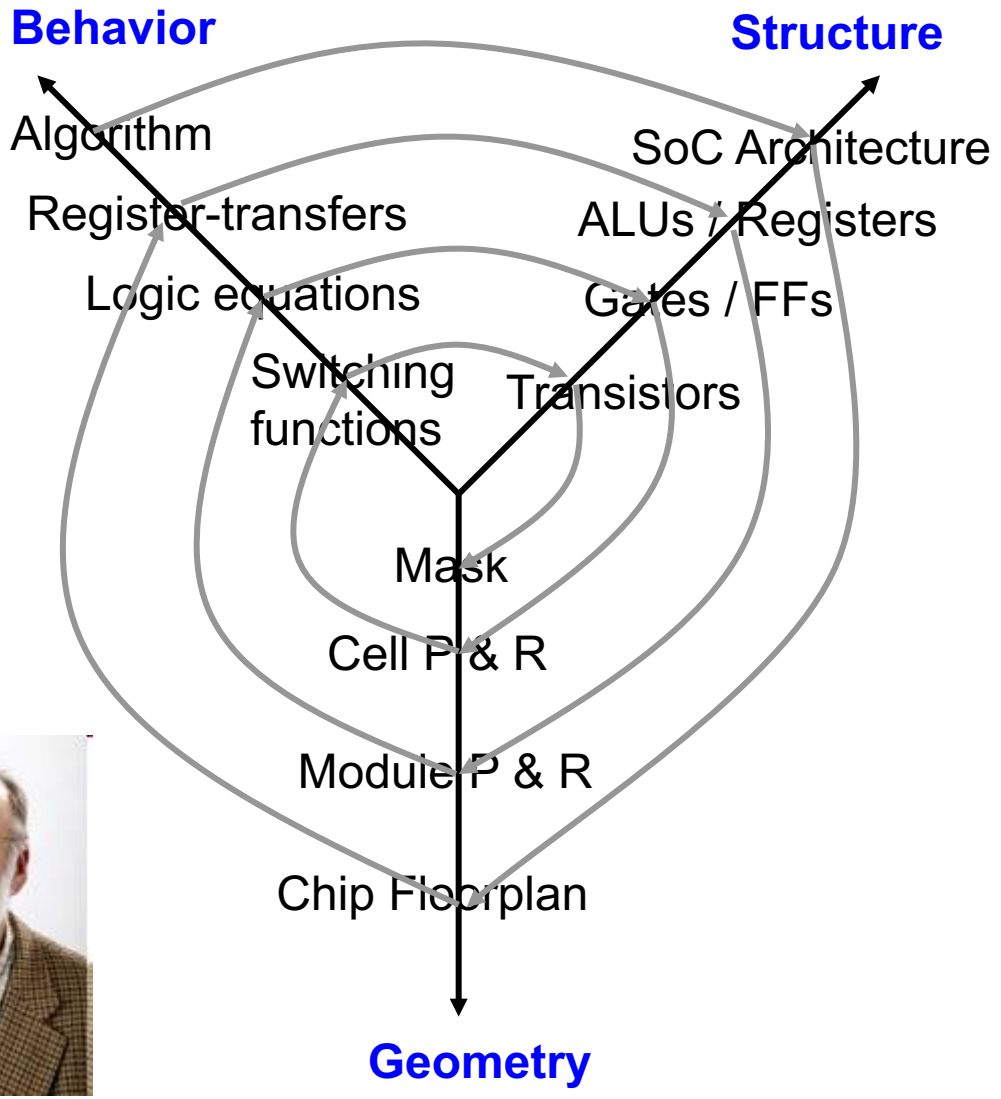
- **Abstraction**: Hiding detail
- **Hierarchy**: Compose larger components using smaller components
- Related but different, often confused



Hierarchical structural decomposition of a 4-bit adder

Y-Chart Representation of IC Design

- Three different domains or dimensions of modeling
  - Behavior, Structure, Geometry
- IC design can be viewed as an iterative "spiral" refinement along these three domains



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