

# **Computer Organization and Architecture**

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## **Chapter 1 Introduction**

# Architecture & Organization 1

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- Architecture is those attributes visible to the programmer
  - Instruction set, number of bits used for data representation, I/O mechanisms, addressing techniques.
  - e.g. Is there a multiply instruction?
- Organization is how features are implemented
  - Control signals, interfaces, memory technology.
  - e.g. Is there a hardware multiply unit or is it done by repeated addition?

# Architecture & Organization 2

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- All Intel x86 family share the same basic architecture
- The IBM System/370 family share the same basic architecture
- This gives code compatibility
  - At least backwards
- Organization differs between different versions

# **Structure & Function**

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- Structure is the way in which components relate to each other
- Function is the operation of individual components as part of the structure

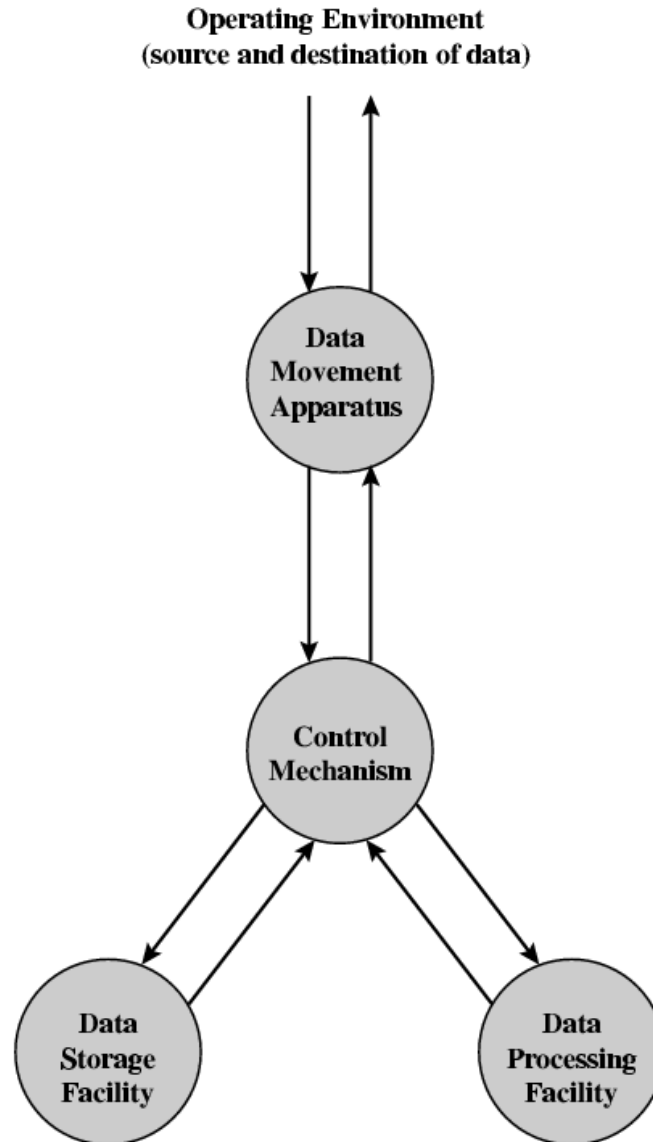
# Function

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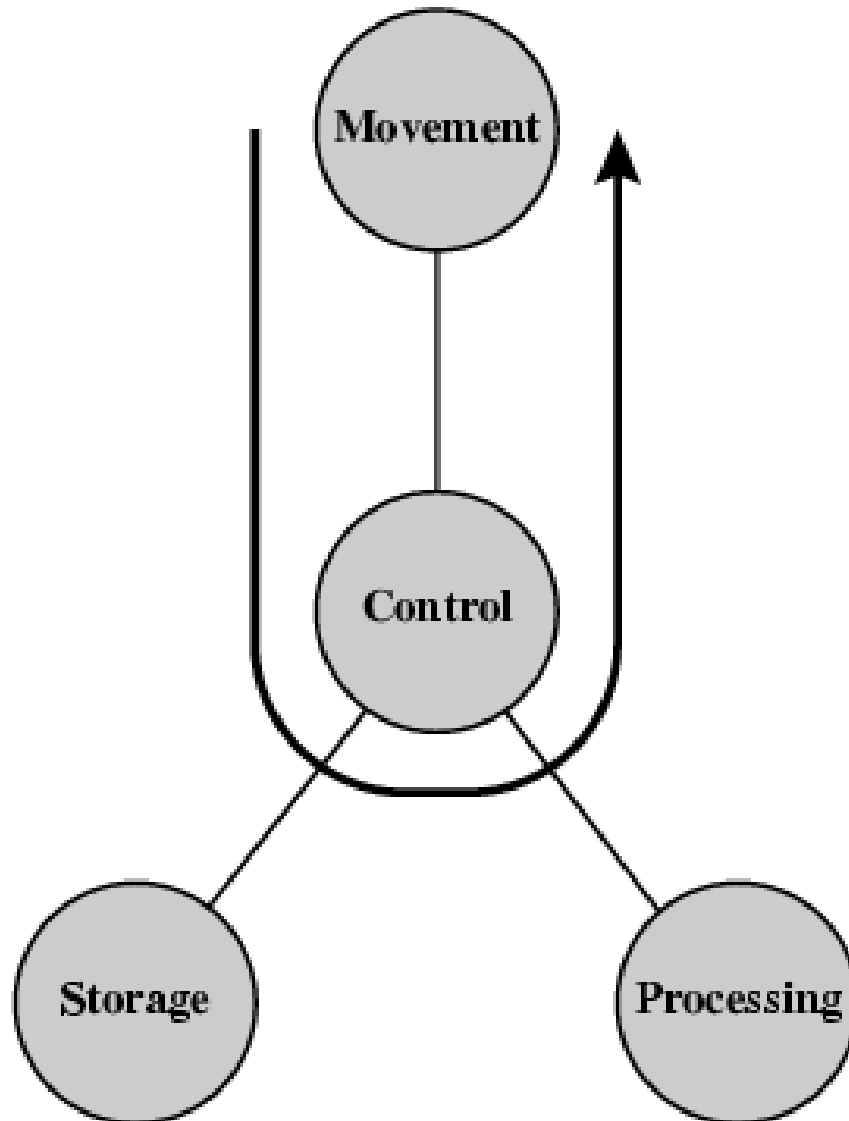
- All computer functions are:
  - Data processing
  - Data storage
  - Data movement
  - Control

# Functional View

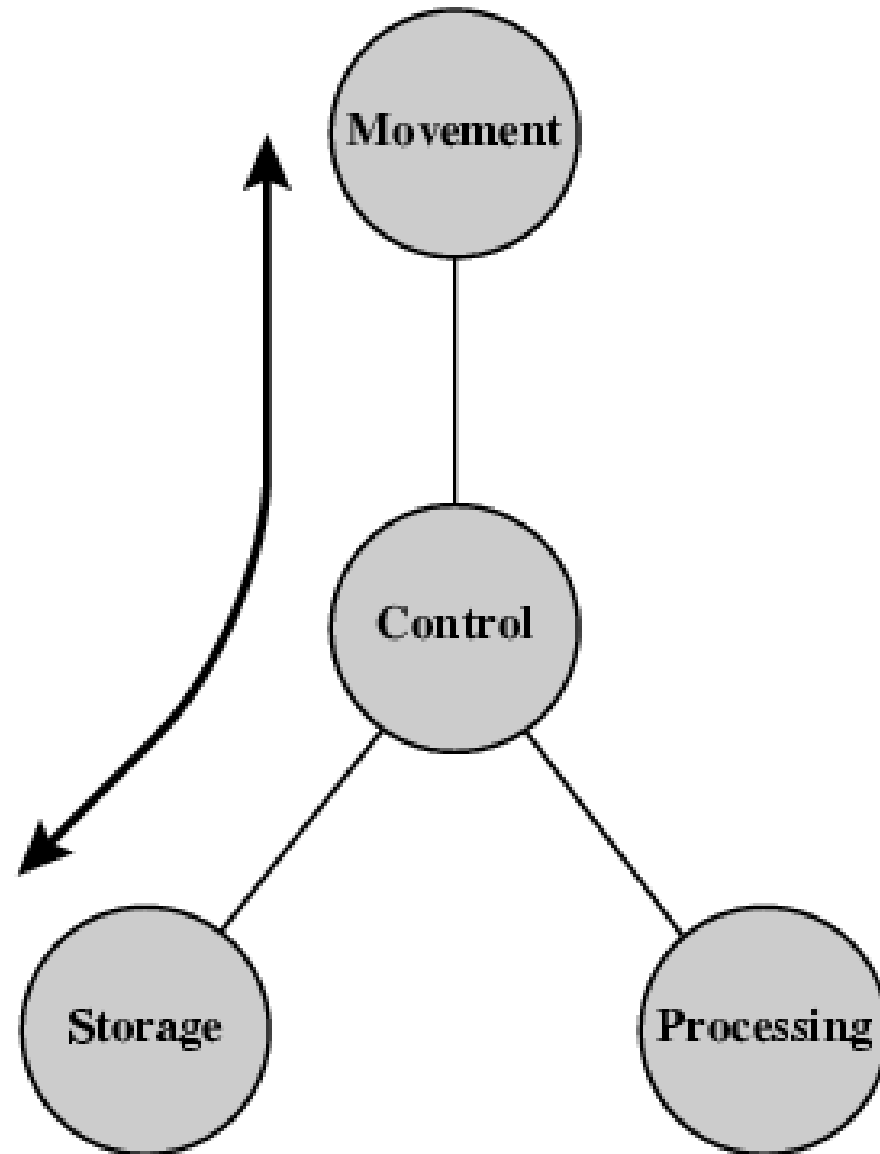
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# **Operations (a) Data movement**

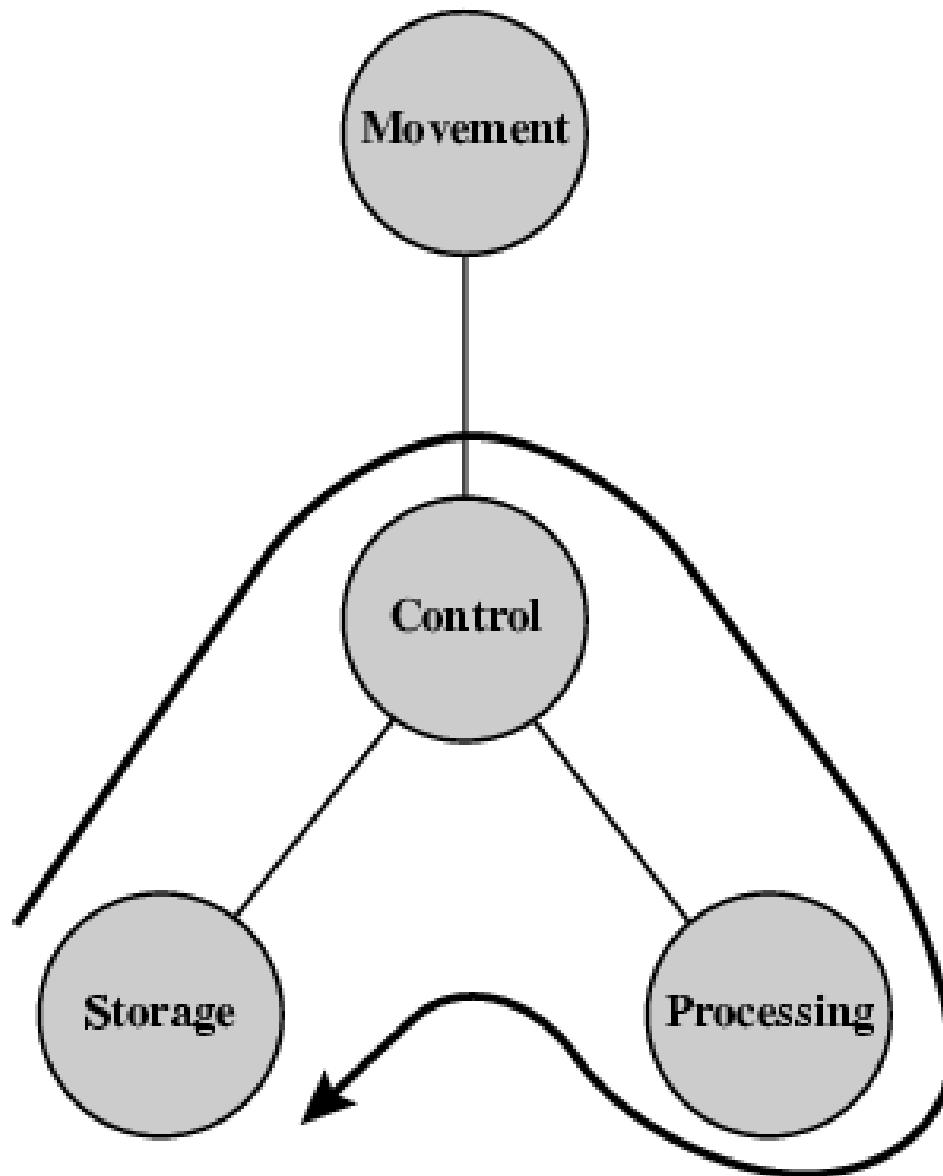


# **Operations (b) Storage**



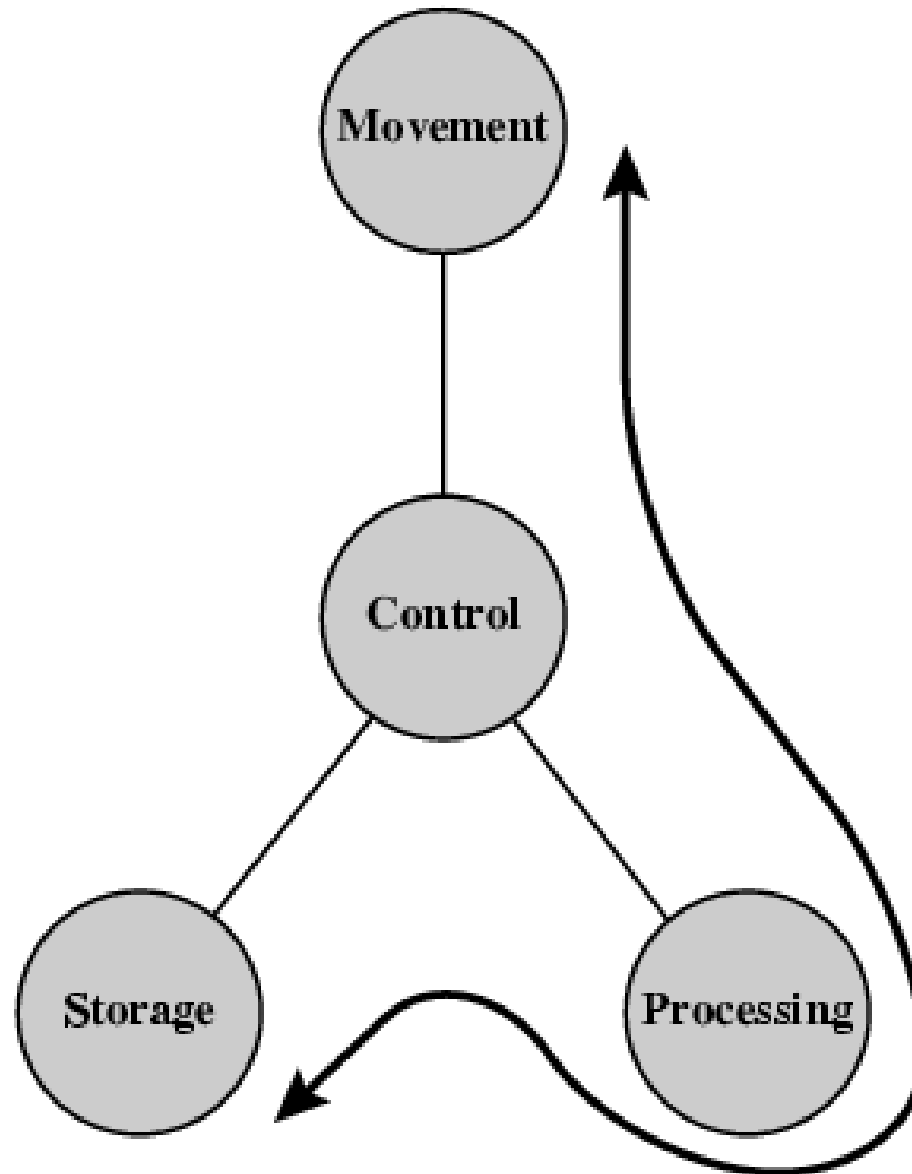


## **Operation (c) Processing from/to storage**

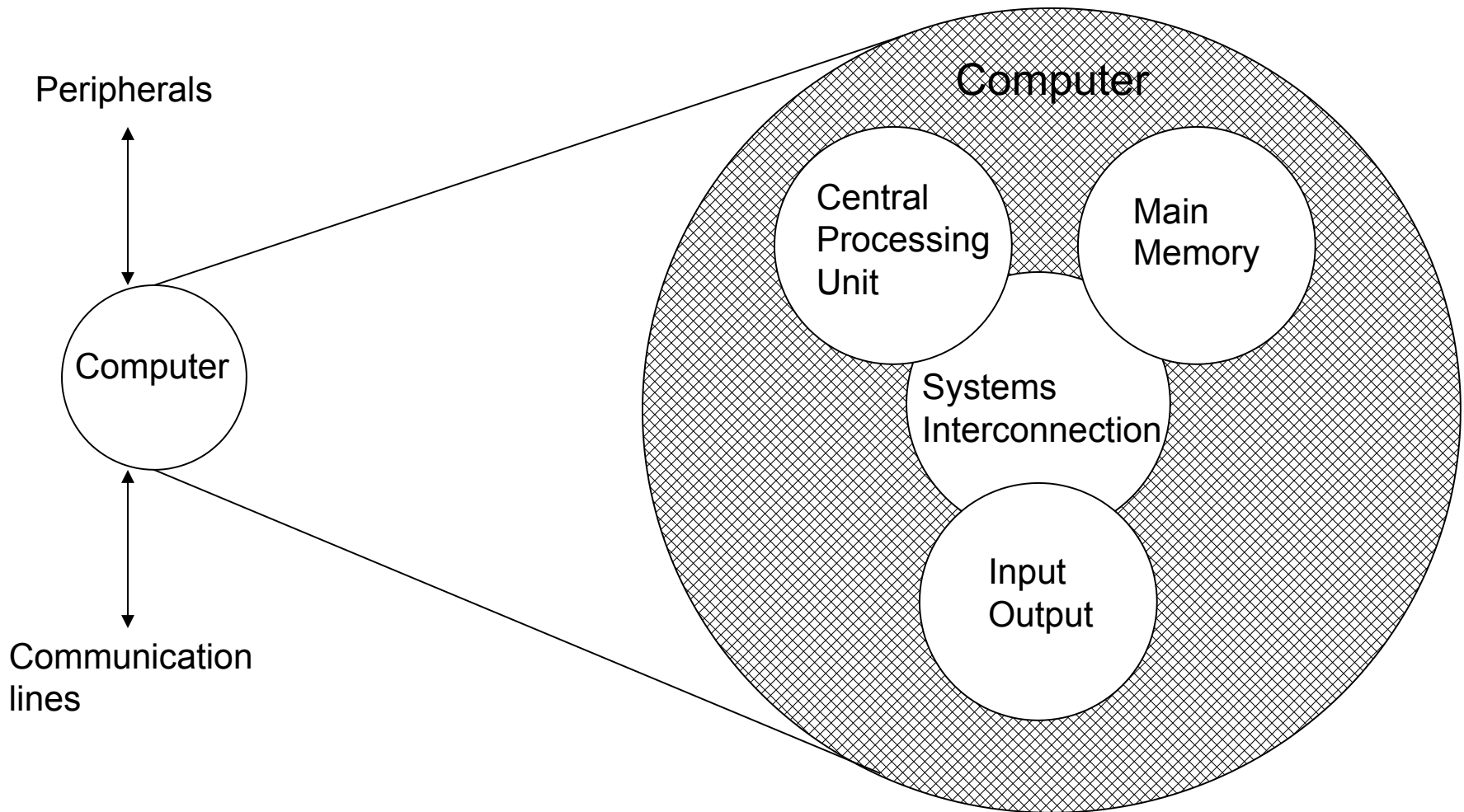


## Operation (d)

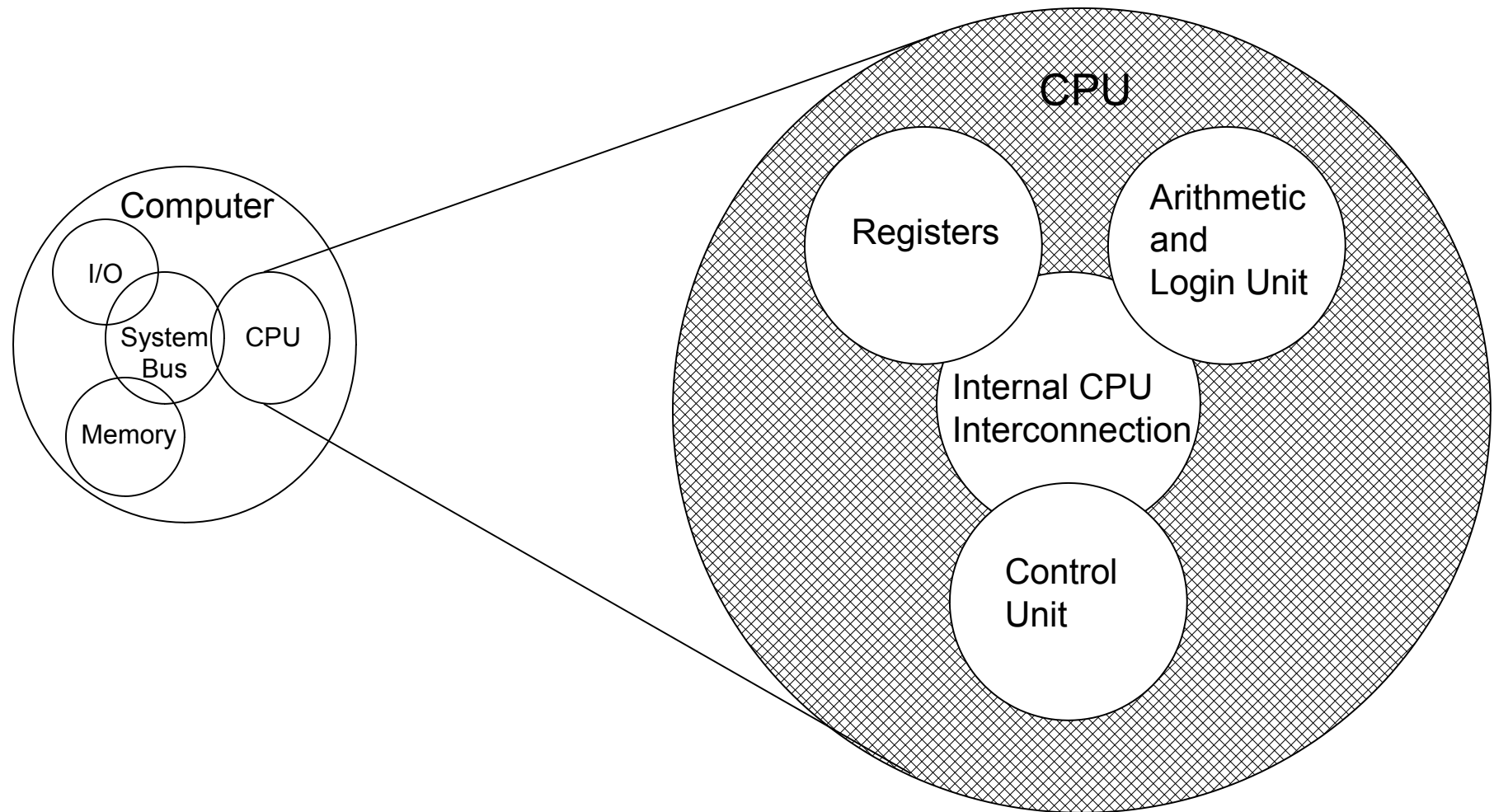
### Processing from storage to I/O



# Structure - Top Level



# Structure - The CPU



# Structure - The Control Unit

