



معهد مصر العالي للتجارة و الحاسبات بالمنصورة

# Computer Organization and Assembly language

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# 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

All **Intel** x86 family share the same basic architecture

The **IBM** System/370 family share the same basic architecture

**AMD**

This gives code compatibility

- At least backwards

Organization differs between different versions

- 3.2.1 System/370 Model 115
- 3.2.2 System/370 Model 125
- 3.2.3 System/370 Model 135
- 3.2.4 System/370 Model 138
- 3.2.5 System/370 Model 145
- 3.2.6 System/370 Model 148
- 3.2.7 System/370 Model 155
- 3.2.8 System/370 Model 158
- 3.2.9 System/370 Model 165
- 3.2.10 System/370 Model 168
- 3.2.11 System/370 Model 195
- 3.2.12 System/370-compatible



Intel Core 2 Duo – an example of an x86-compatible, 64-bit multicore processor



AMD Athlon (early version) – a technically different but fully compatible x86 implementation

# 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

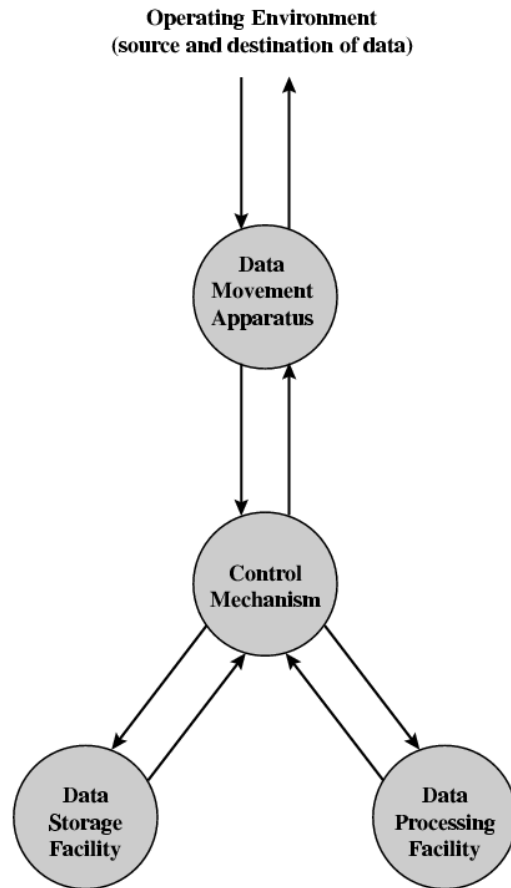
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All computer functions are:

- Data processing
- Data storage
- Data movement
- Control

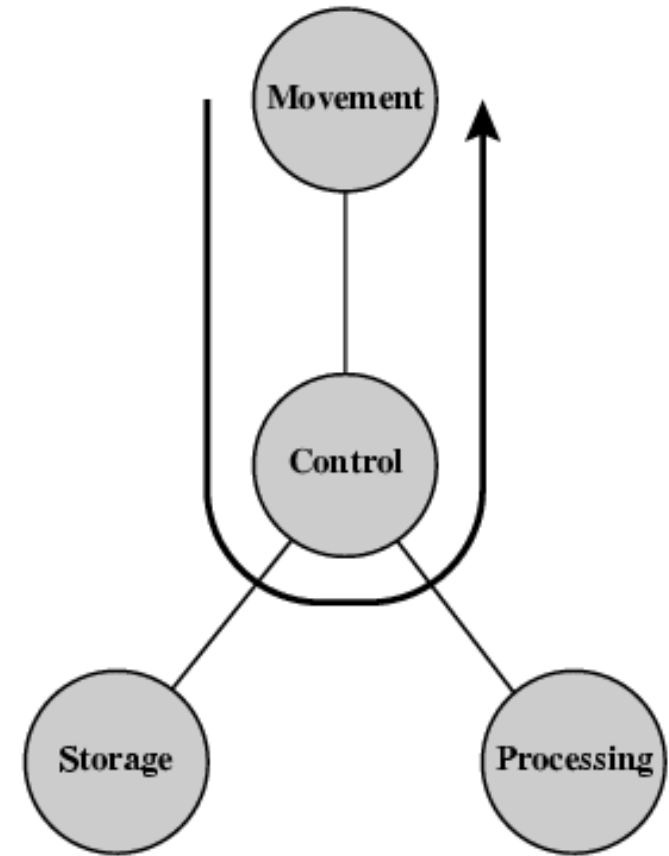
# Functional View

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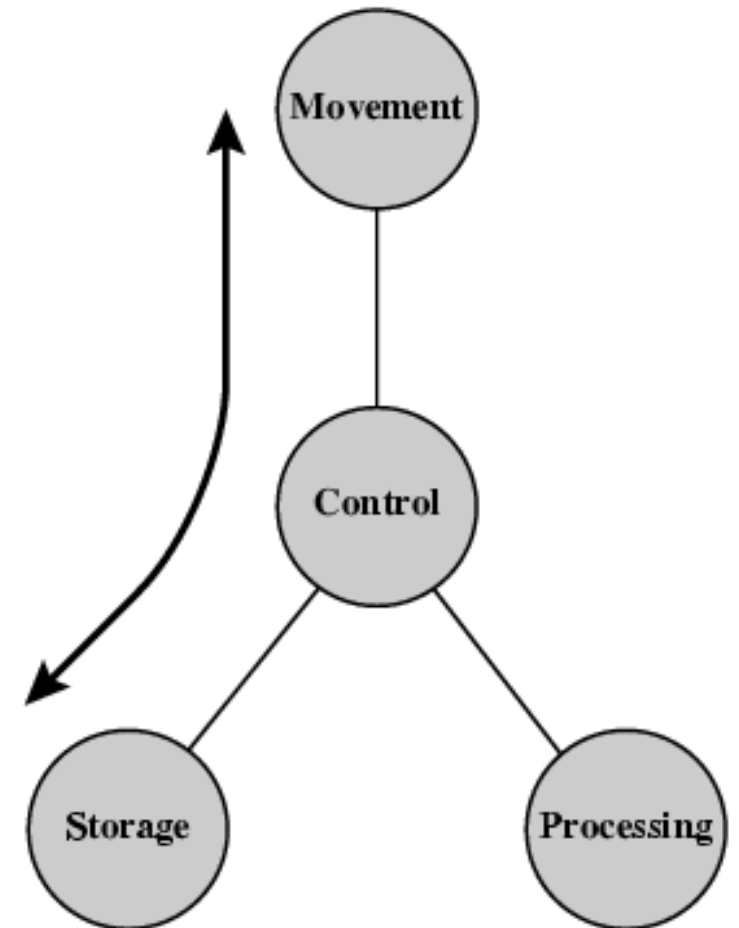
# Operations (a) Data movement

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# Operations (b) Storage

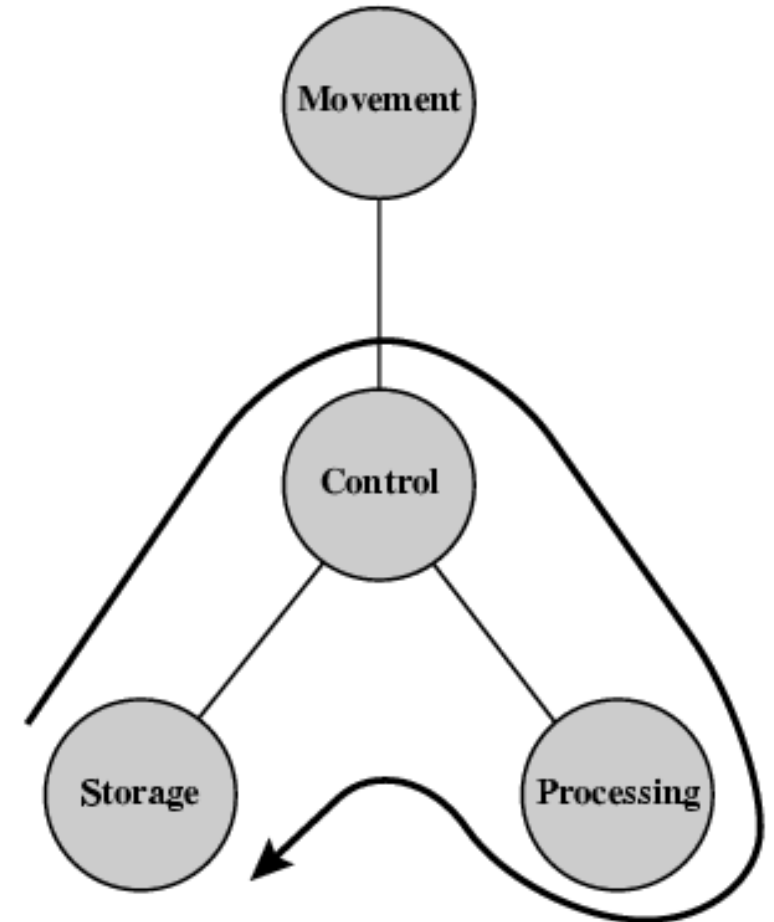
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# Operation (c) Processing from/to storage

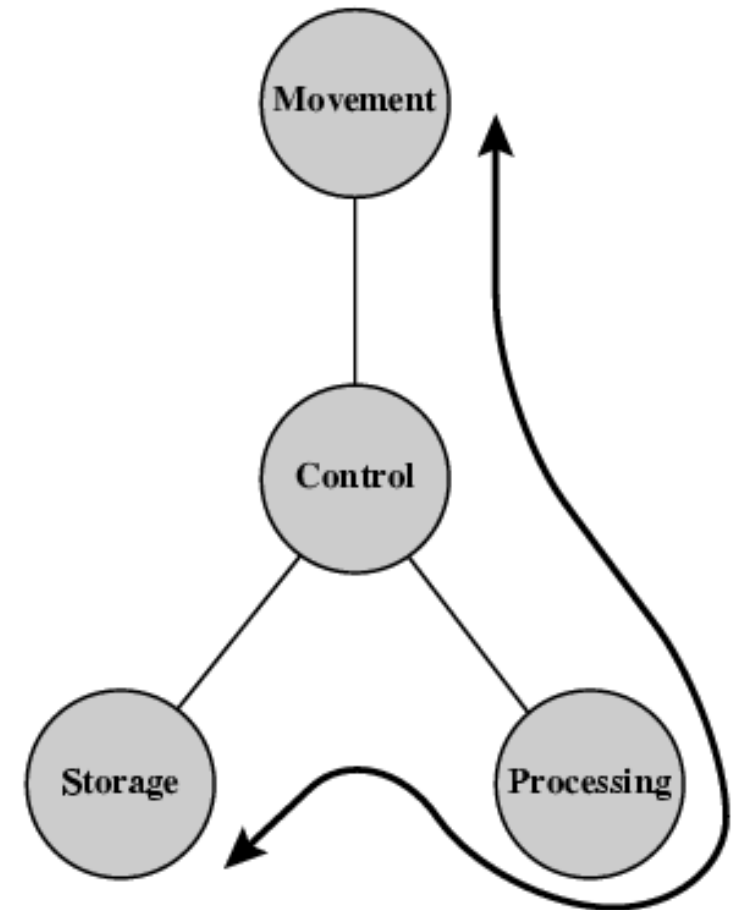
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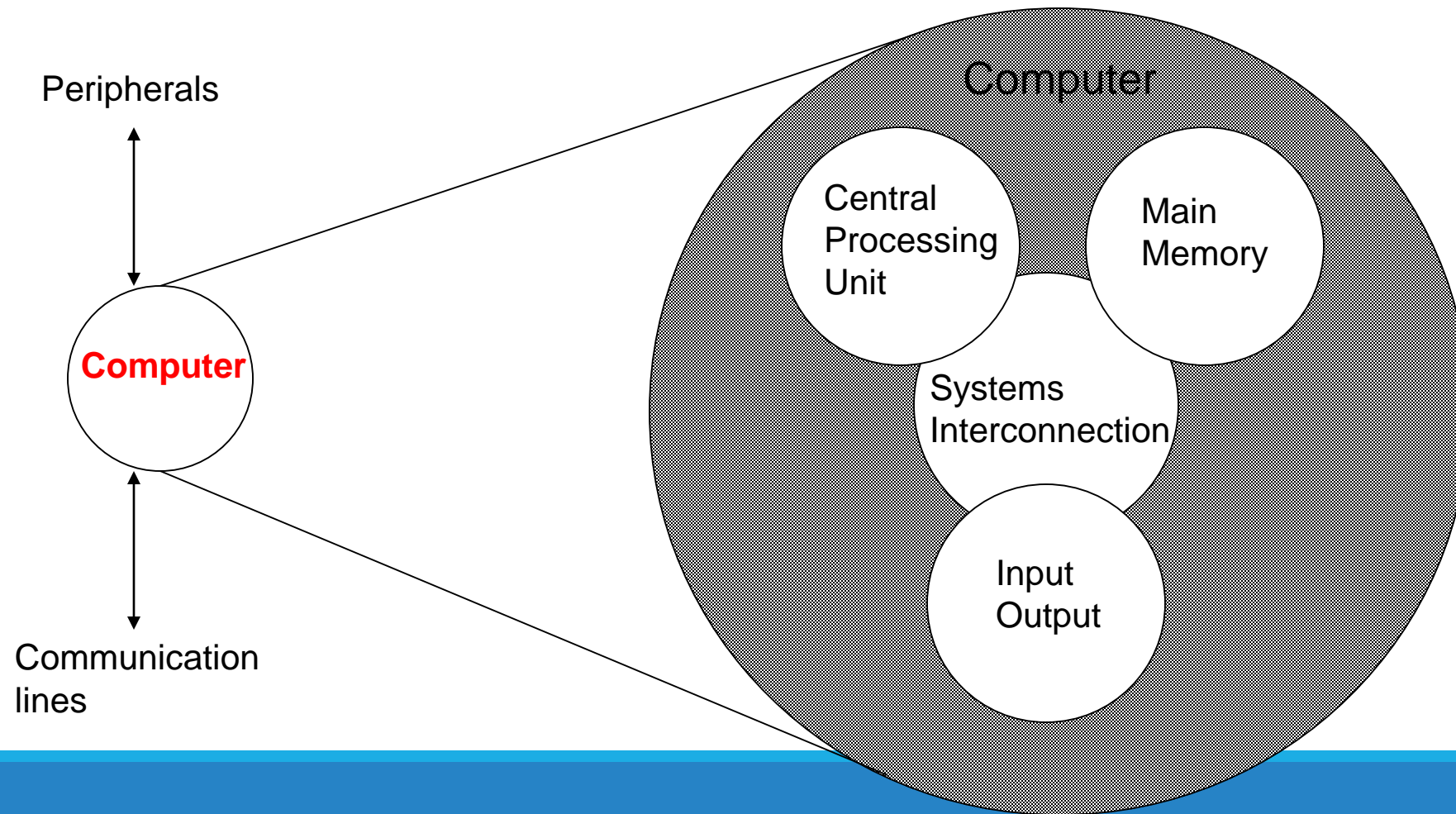
# Operation (d)

## Processing from storage to I/O

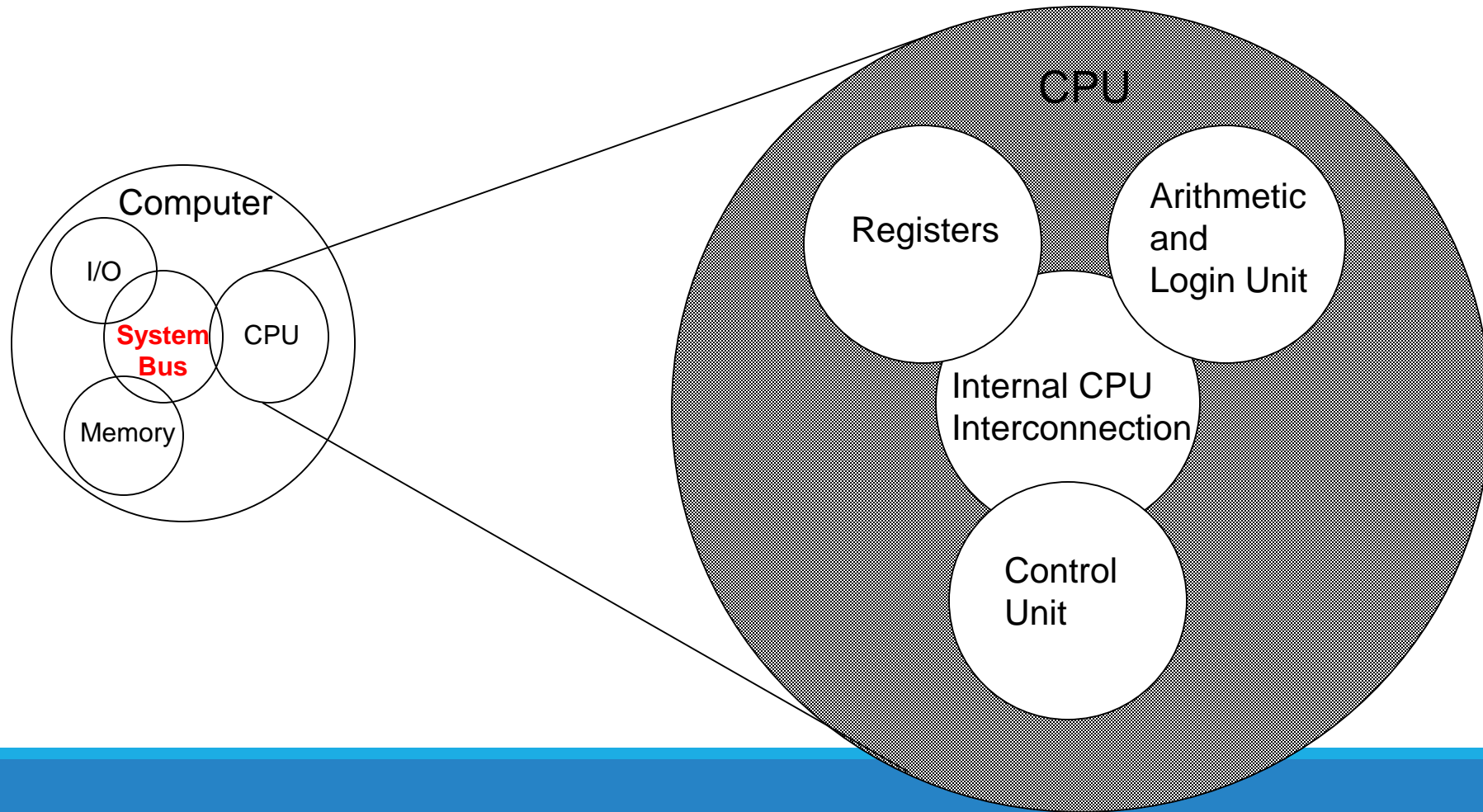
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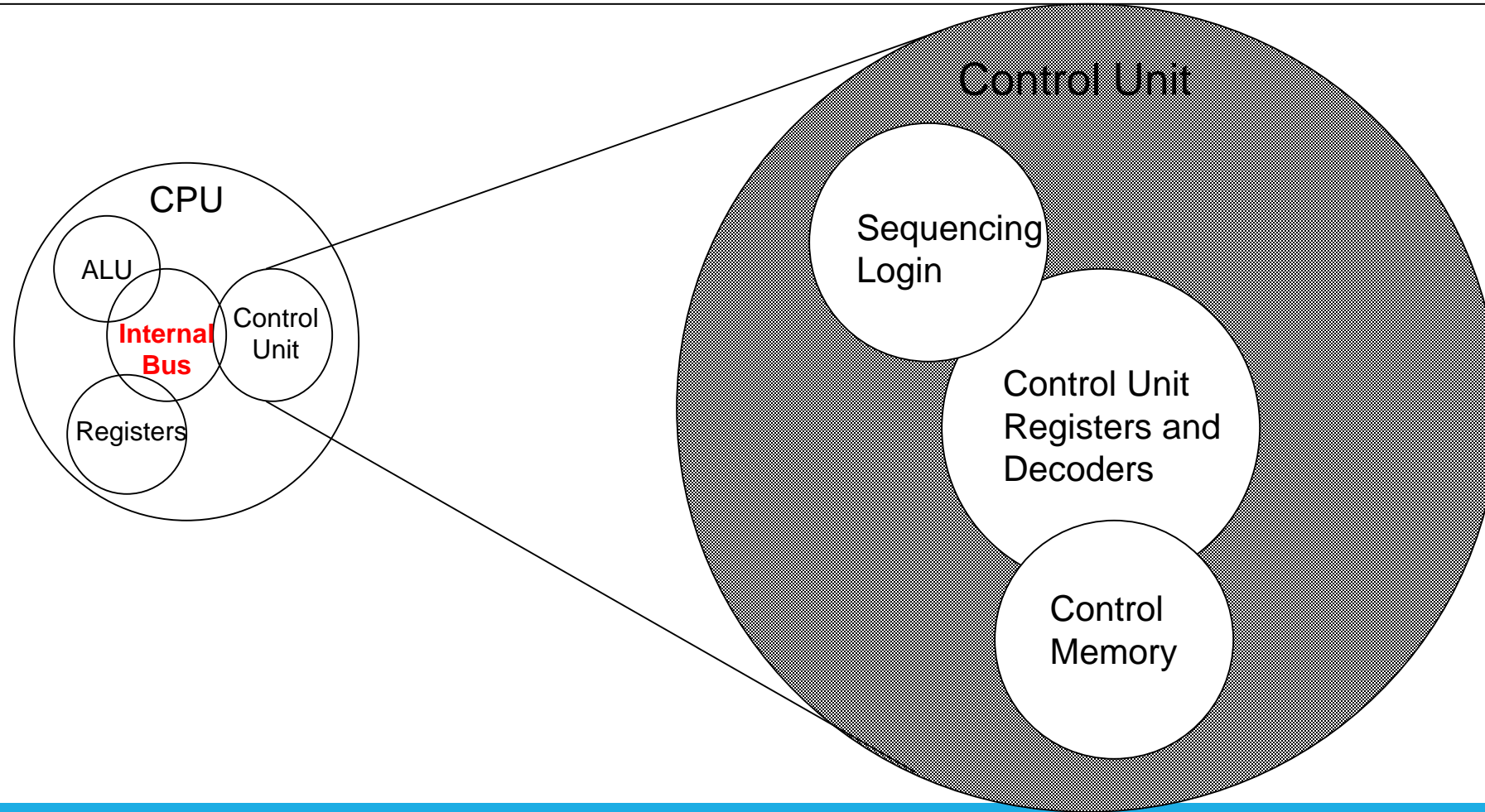
# Structure - Top Level



# Structure - The CPU



# Structure - The Control Unit




# Outline of the Book

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- ❖ **Computer Function and interconnection structure.**
- ❖ **Computer Memory**
- ❖ **Input/output**
- ❖ **Assembly language**

# Internet Resources

## - Github

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# Internet websites

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