Computer Organization and Architecture

Chapter 1
Introduction

Architecture & Organization 1

- 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

- 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

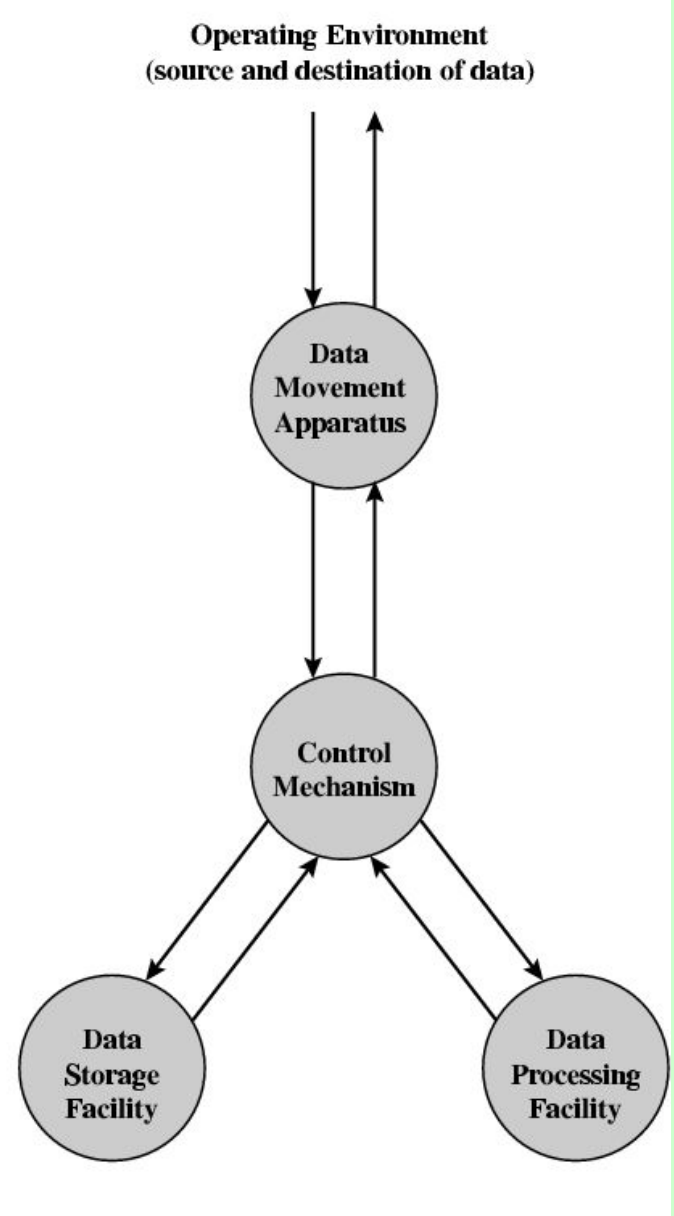
Structure & Function

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

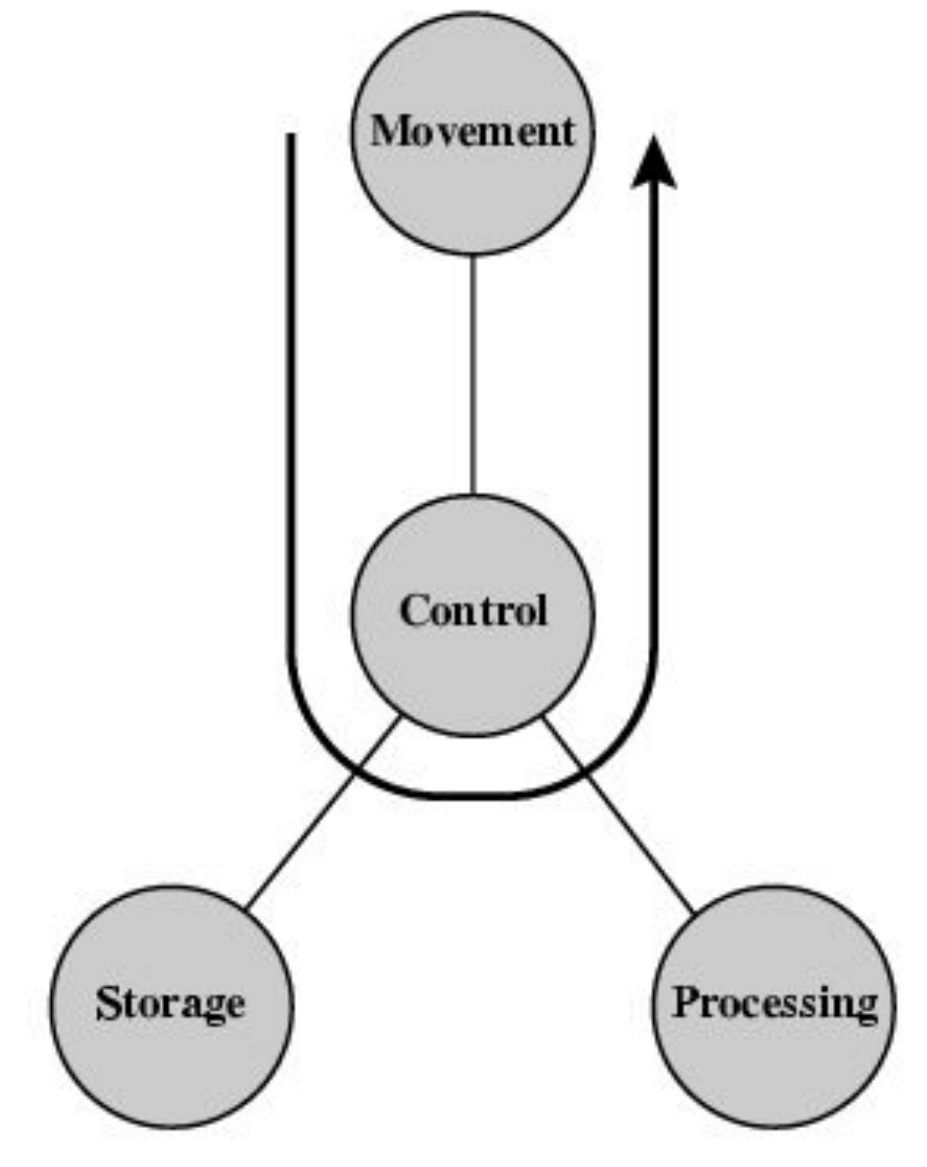
Function

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

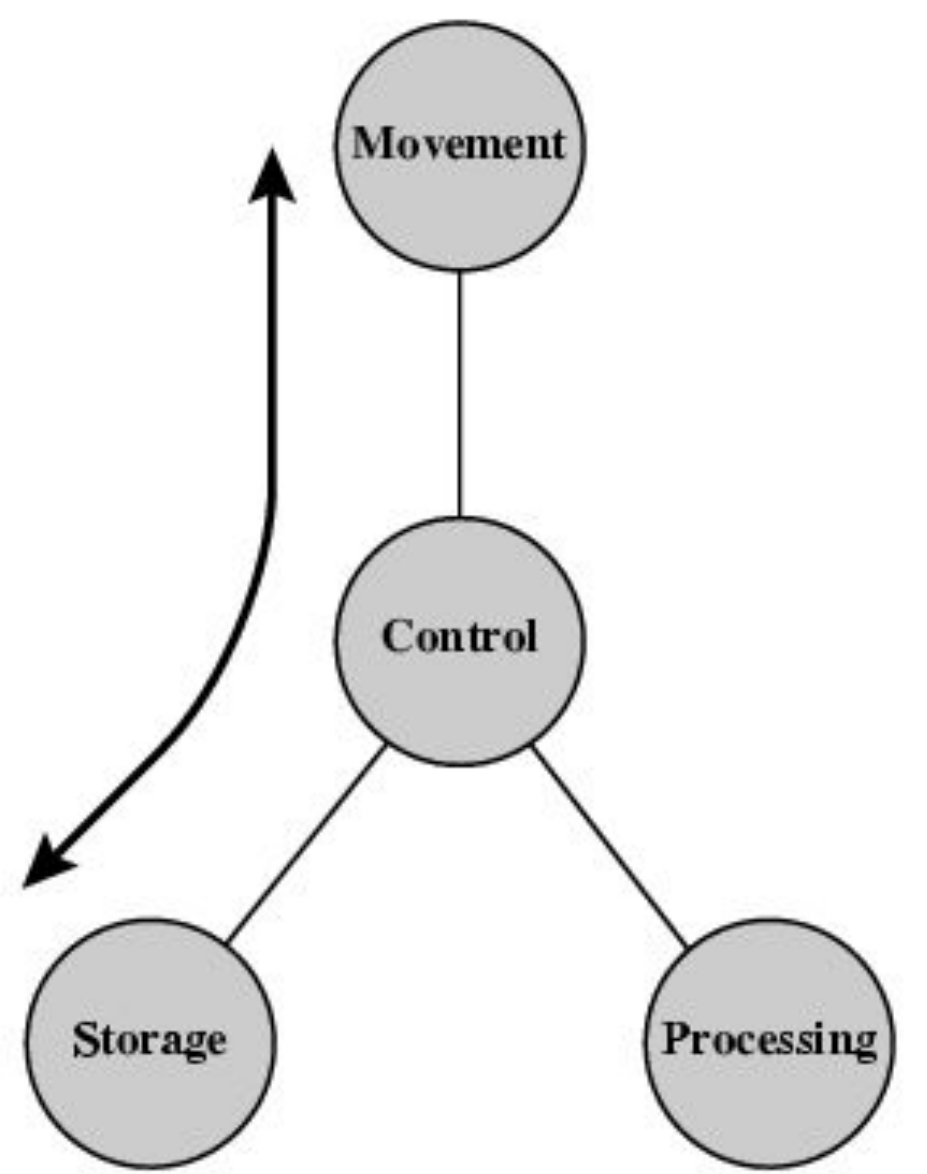
Functional View



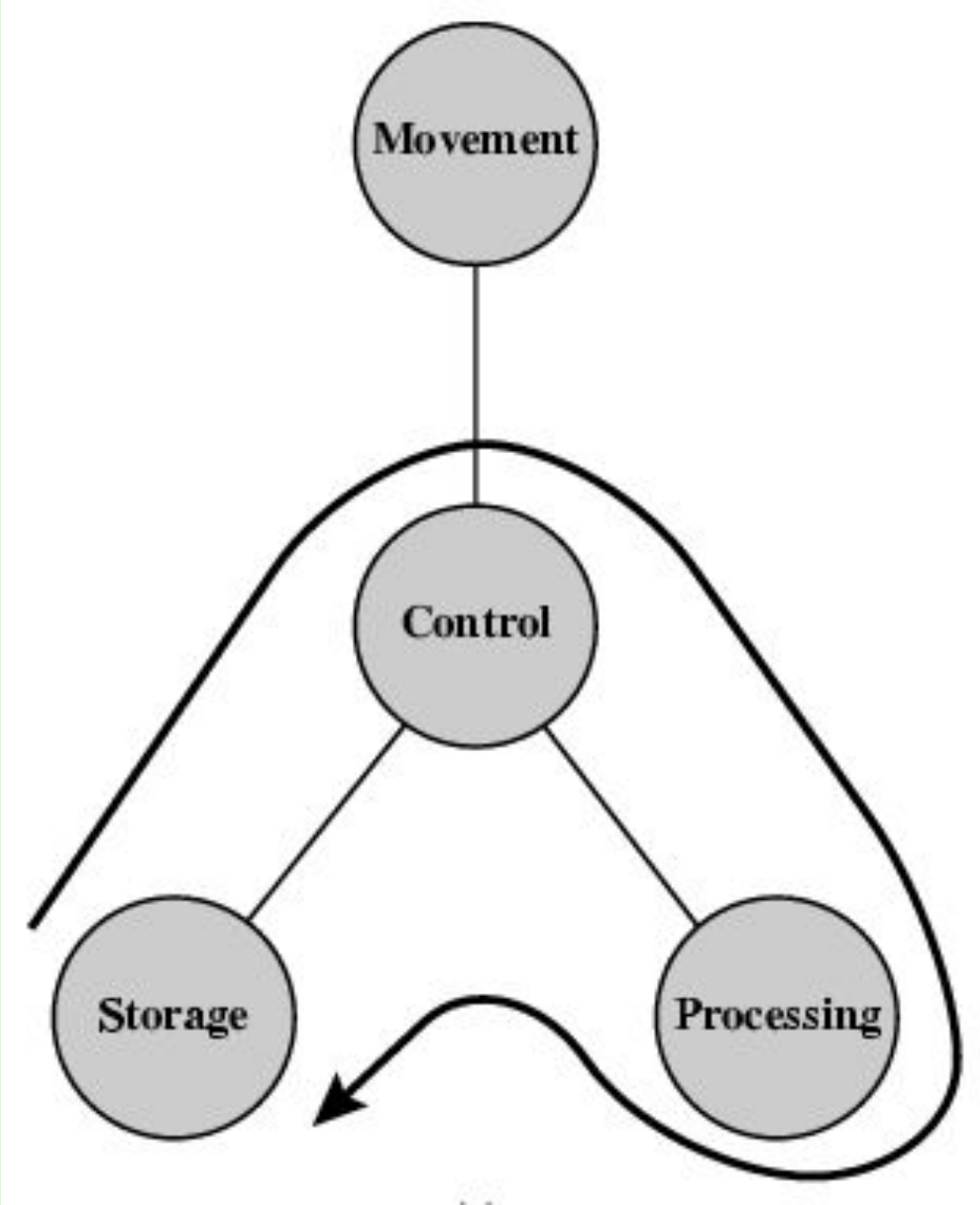
Operations (a) Data movement



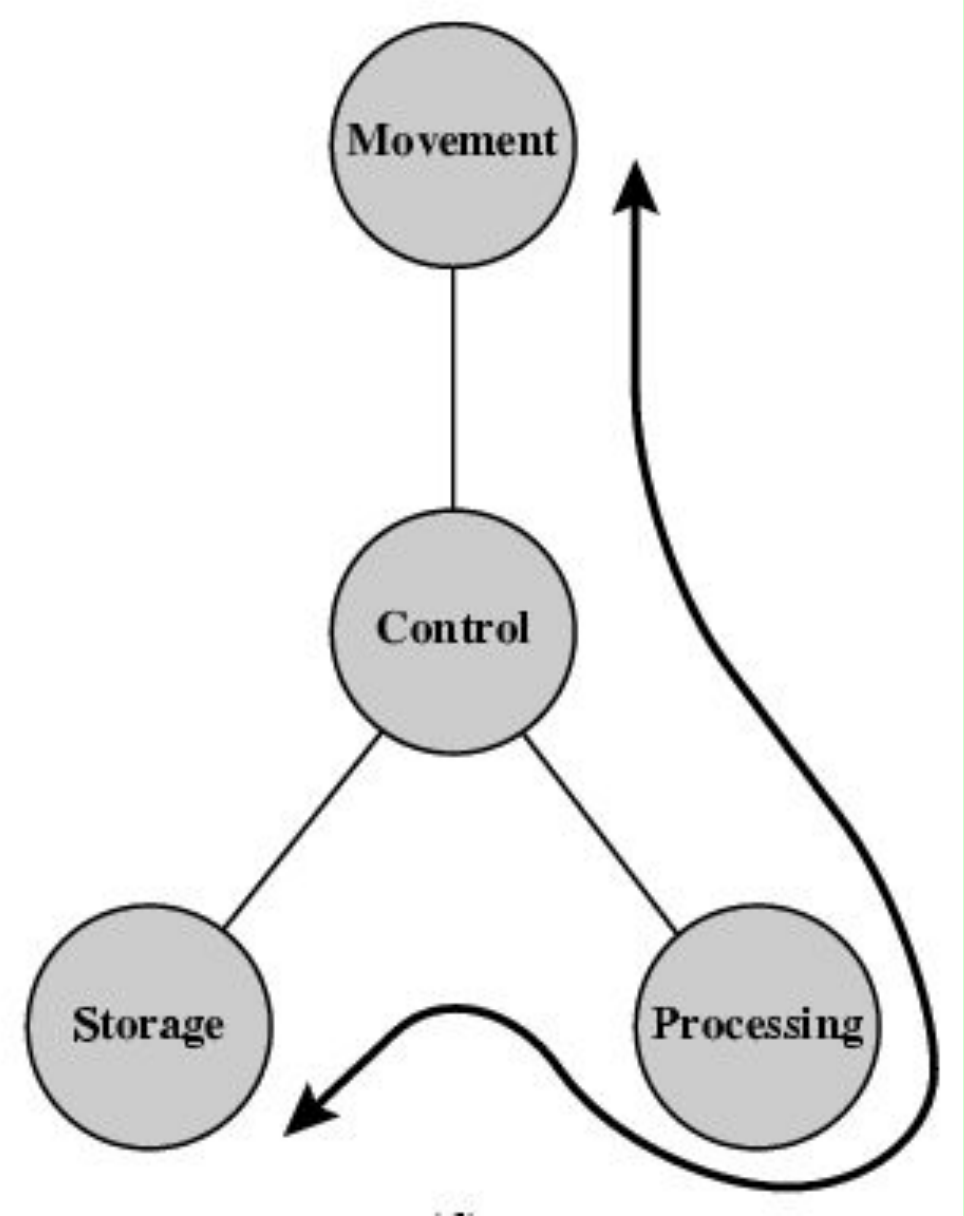
Operations (b) Storage



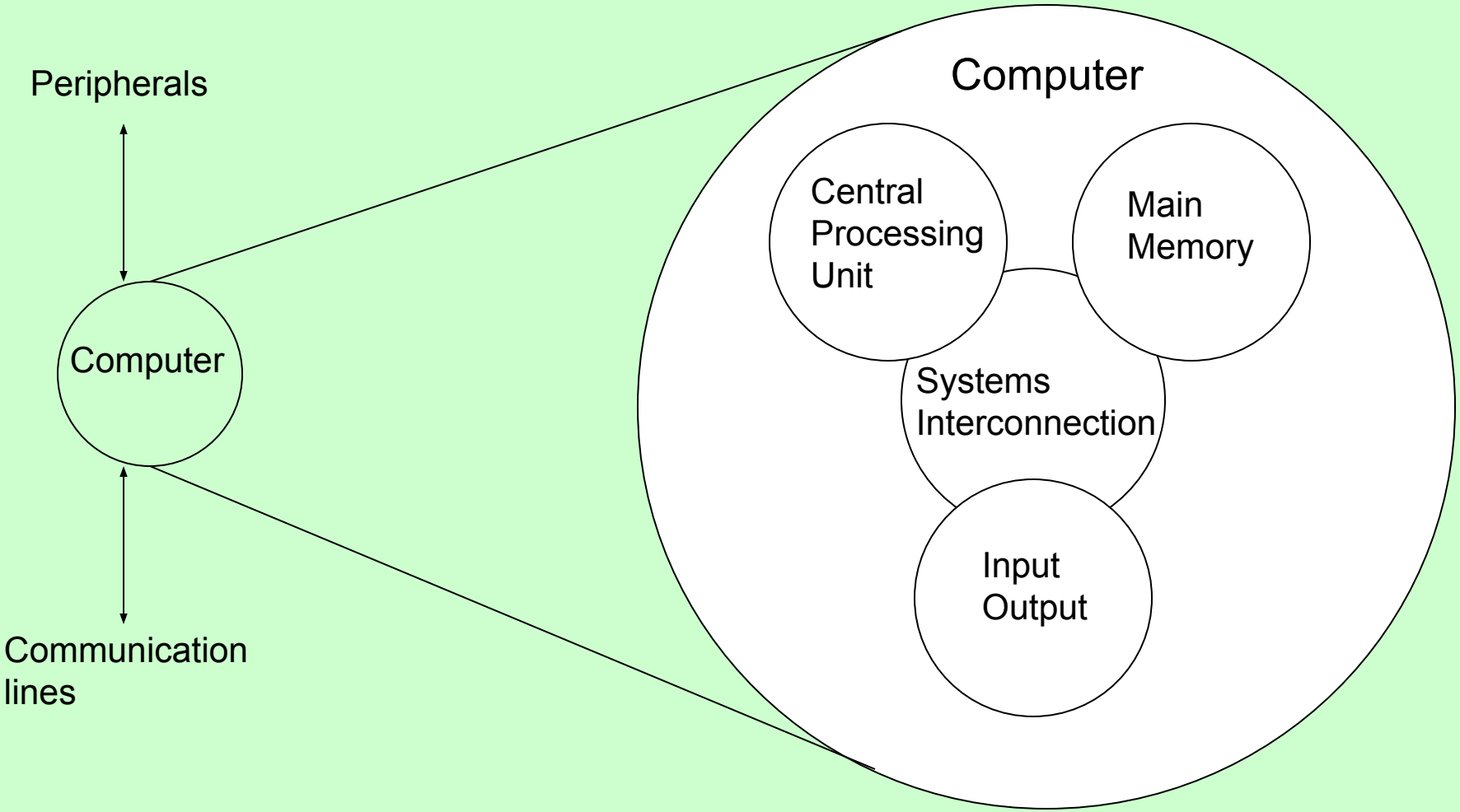
Operation (c) Processing from/to storage



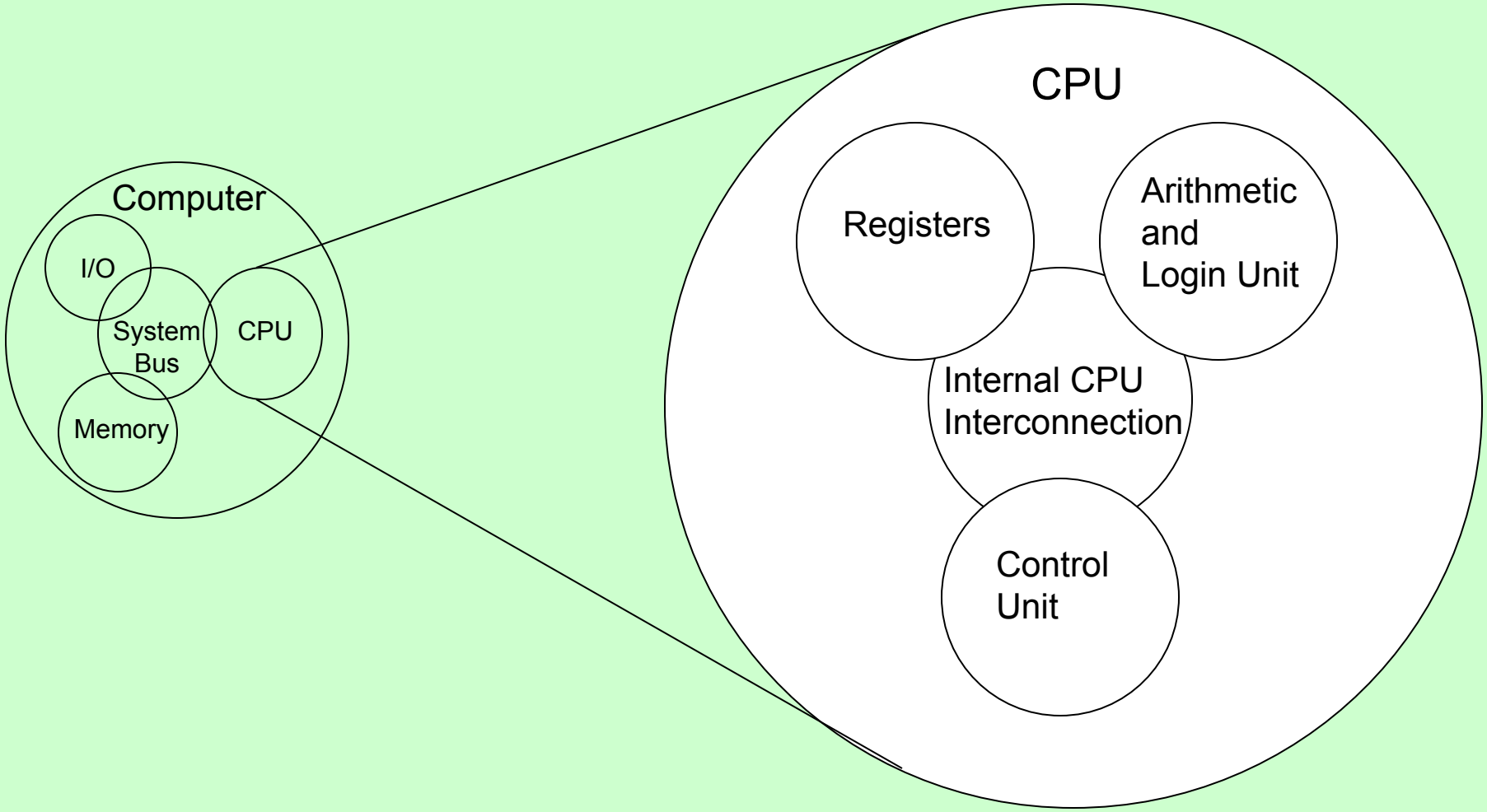
Operation (d)
Processing from storage to I/O



Structure - Top Level



Structure - The CPU



Structure - The Control Unit