

Unit 1

An Introduction to Hardware and Software



The text for this chapter
is on the web at:

www.skylit.com/javamethods

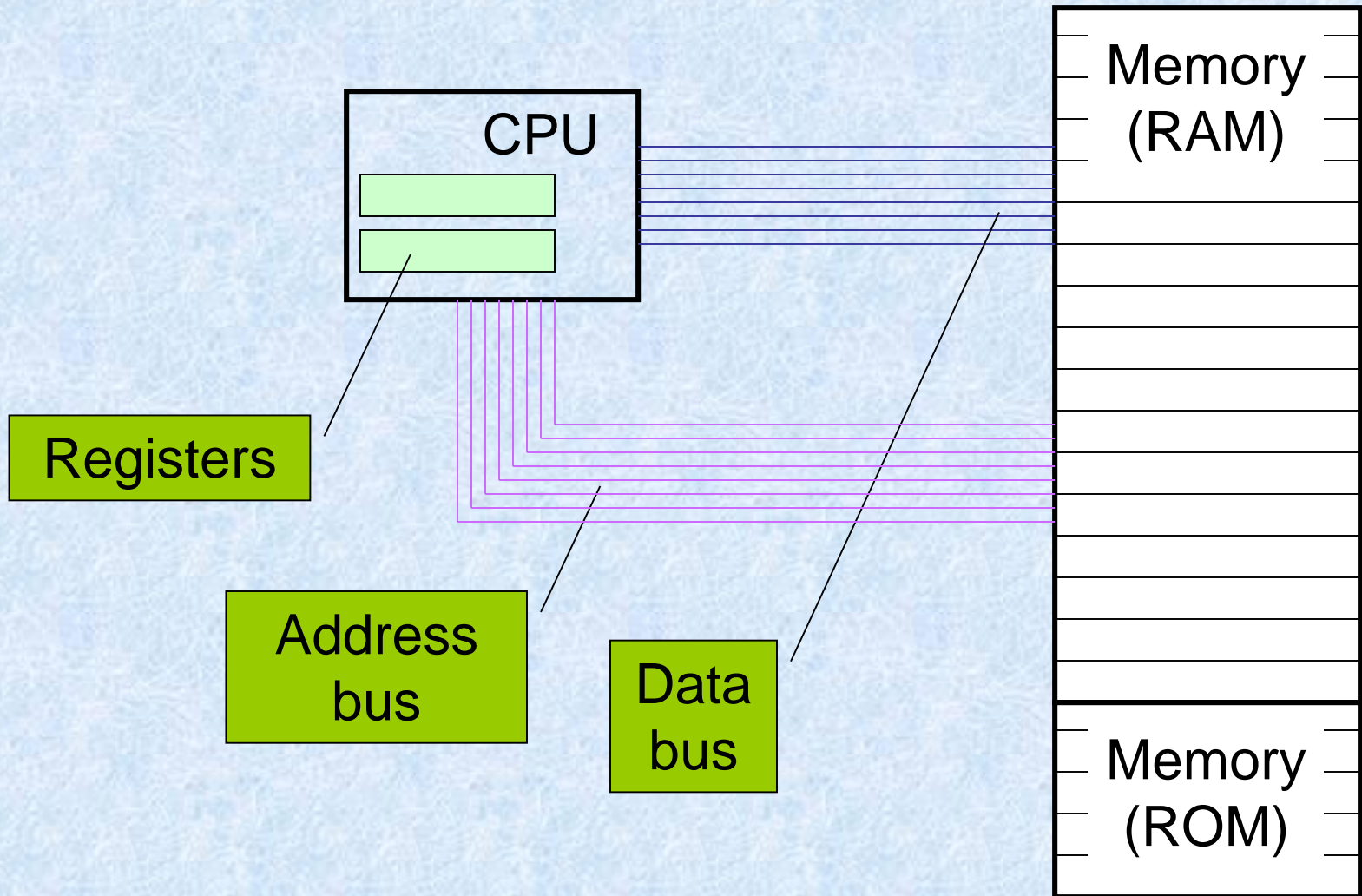


Hardware

- The CPU (Central Processing Unit) is made of millions of semiconductor devices, called transistors, etched into a silicon chip.
- Transistors are combined to form logical devices called gates.
- All digital electronics is basically made up of gates.

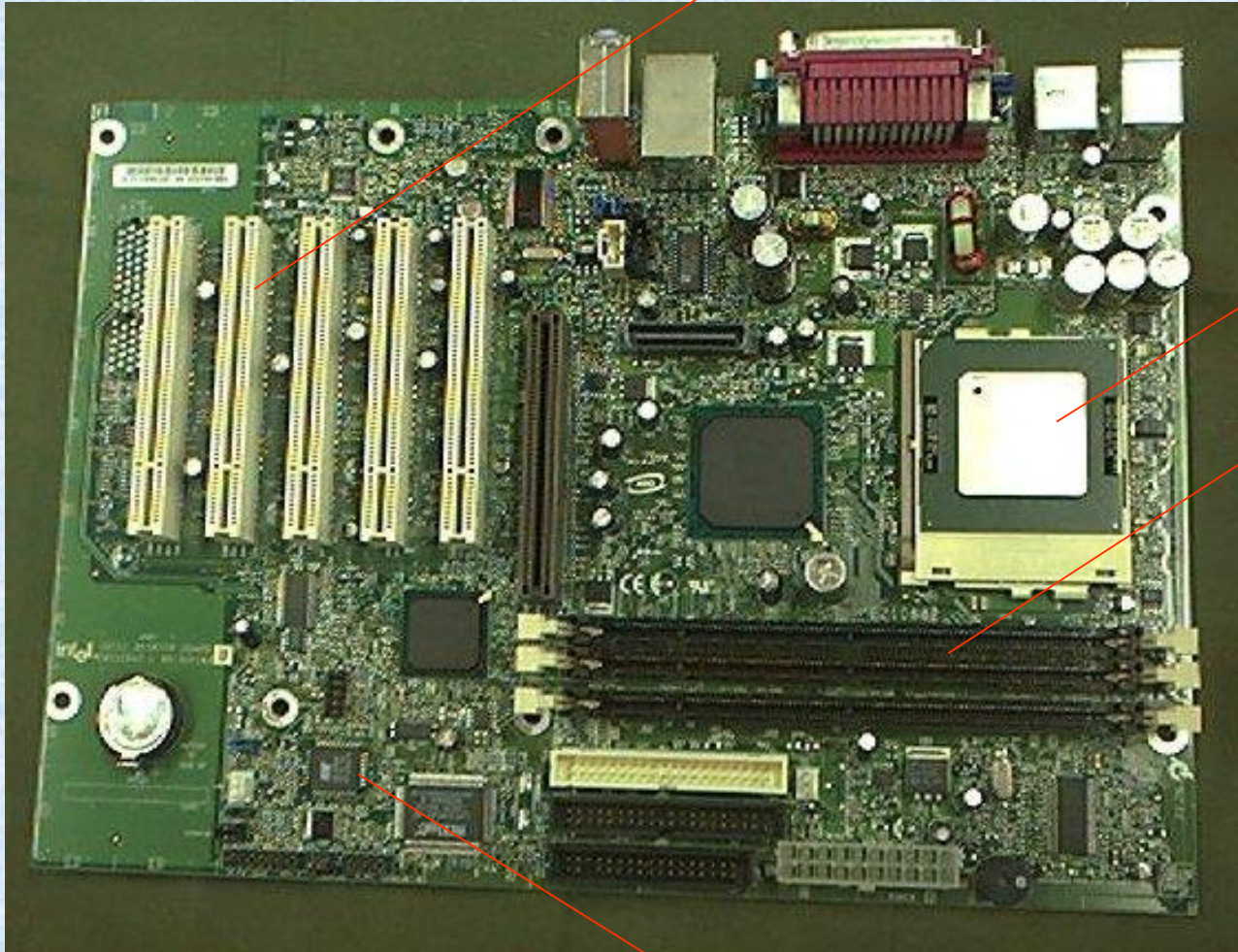


RAM, CPU, Bus



Motherboard

Extension slots



CPU

RAM
(SIMMs)

ROM



Hardware Terms

- CPU — Central Processing Unit
- RAM — Random-Access Memory
 - “random-access” means the CPU can read directly from and write to any memory location
 - holds both data and CPU instructions
- ROM — Read-Only Memory
 - holds initialization and hardware diagnostic programs



CPU

- In personal computers, the CPU is a microprocessor, contained on one chip.
- The CPU speed is measured in MHz (megahertz, millions of clock cycles per second) and GHz (gigahertz, billions of cycles).
- A CPU instruction takes one or several clock cycles.



RAM

1 byte = 8 bits

0 0 1 0 1 1 0 1

bit 7

bit 0

- 1 KB (kilobyte) = 1024 bytes
 2^{10}
- 1 MB (megabyte) = $1024 \cdot 1024$ bytes
 $2^{20} \approx 10^6$, a million
- 1 GB (gigabyte) = $1024 \cdot 1024 \cdot 1024$ bytes
 $2^{30} \approx 10^9$, a billion



Input/Output (I/O) Devices

- Monitor and video adapter
- Keyboard, mouse or touch pad
- Sound card, speakers, microphone
- Internet adapter, modem
- D/A (digital-to-analog) and A/D (analog-to-digital) converters
- Scanners, digital cameras, printers



Software Terms

- Operating system
 - a program that maintains the file system, dispatches applications, and provides other system-level services
- Console application
 - a program with simple text user interface
- GUI — Graphical User Interface
 - graphics, menus, buttons, icons, etc.
- OOP — Object-Oriented Programming



Software Developers Have To:

- Absorb and use emerging technical information
- Create sound software system architectures
- Understand and devise effective algorithms
- Be proficient with the syntax and style of programming languages
- Diagnose and correct programming errors (debug)



Software Developers Have To:

- Use software development tools and documentation
- Find and utilize reusable software components
- Design and implement friendly user interfaces
- Uphold the highest standards of professional ethics

