

# Java Programming AP Edition

## U1C1 Introduction to Computer, Programs and Java

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WHAT IS COMPUTER? COMPUTER TERMS

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IEEE SENIOR MEMBER



# What is computer? (from Wikipedia)

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com·put·er

/kəmˈpyʊdər/

*noun*

an electronic device for storing and processing data, typically in binary form, according to instructions given to it in a variable program.

*synonyms:* personal computer, PC, laptop, netbook, ultraportable, desktop, terminal;  
More

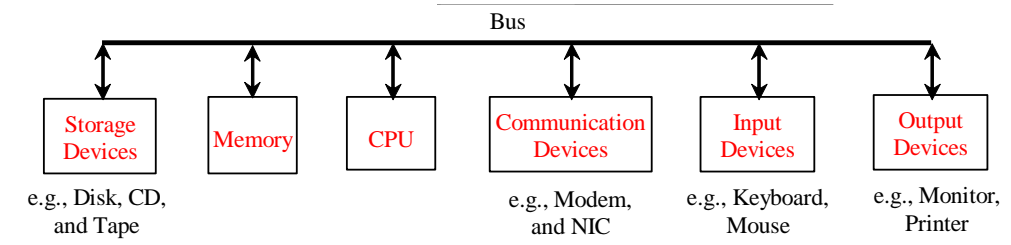
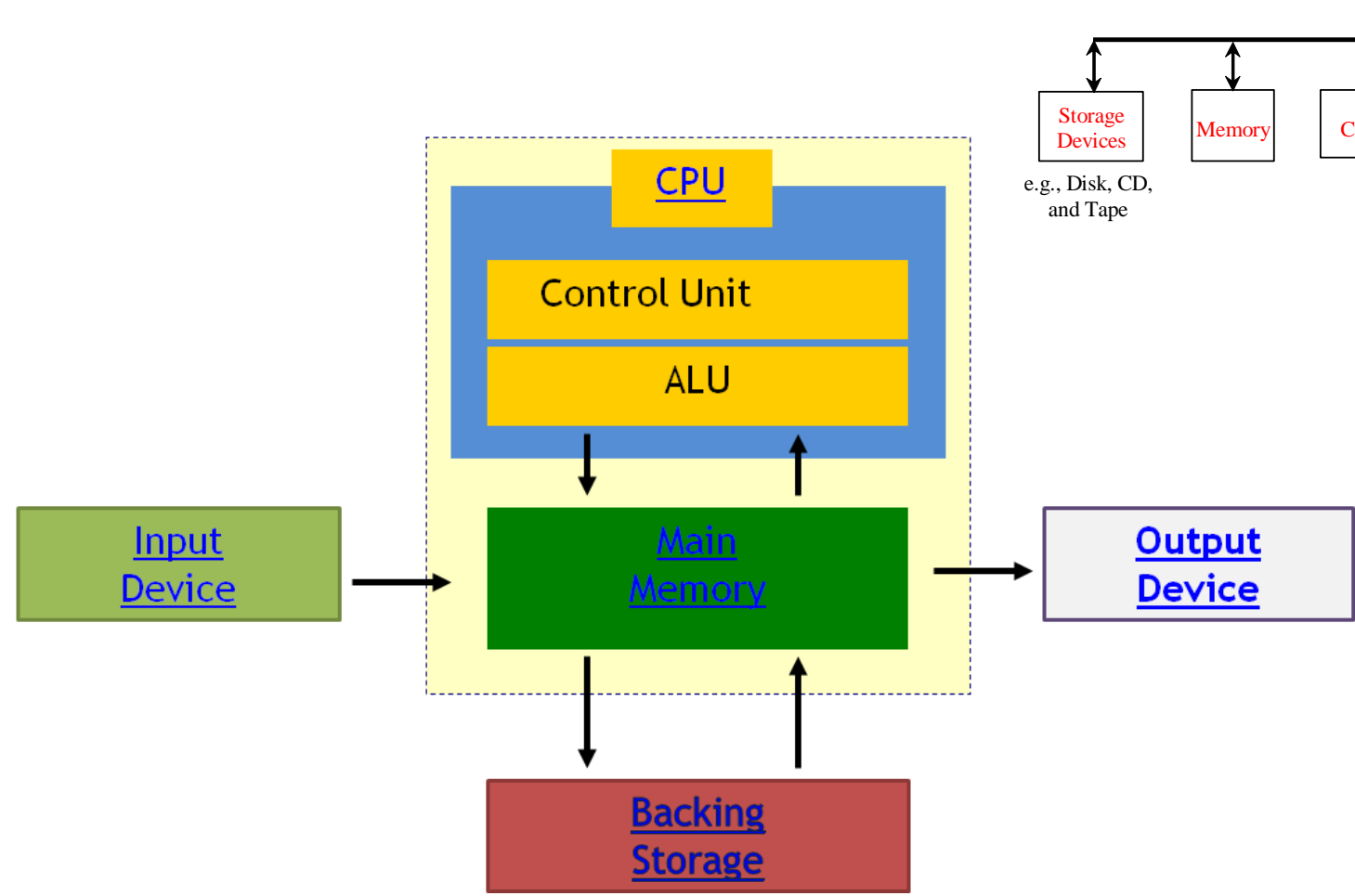
- a person who makes calculations, especially with a calculating machine.



# Computer System Diagram

## Hardware View

Keyboard  
Mouse  
Scanner  
Joystick  
CD-ROM  
Camera  
HardDisk  
Modem  
Networking

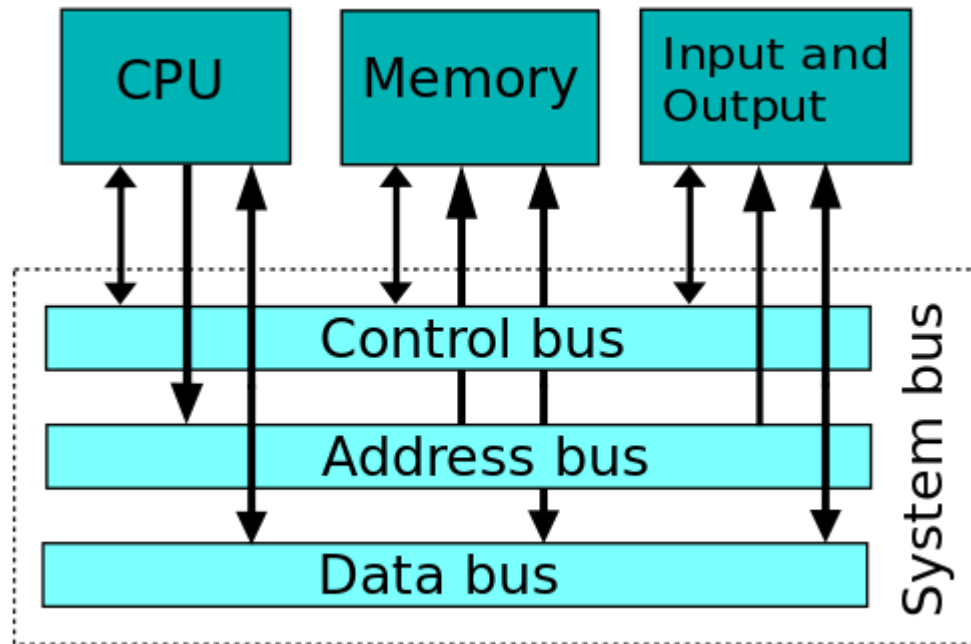


Networking  
Speaker  
Monitor  
Modem  
Harddisk

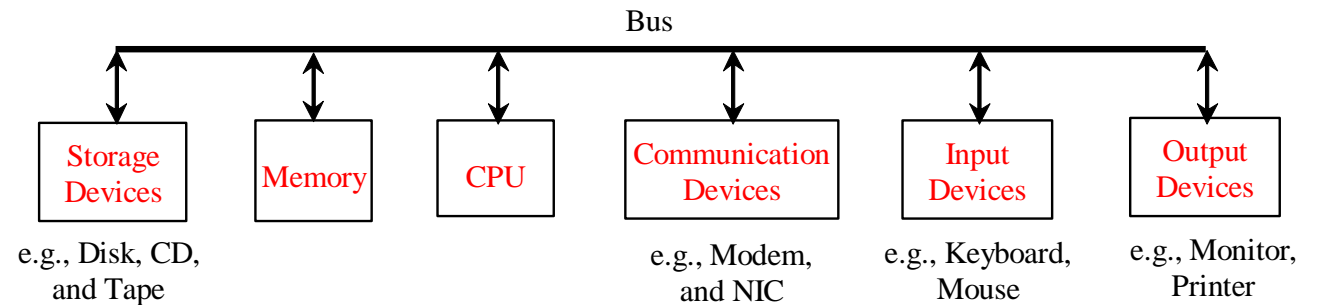


# Computer (System Bus View)

64-bit architecture is decided by width of system bus, not the data the CPU Processes.



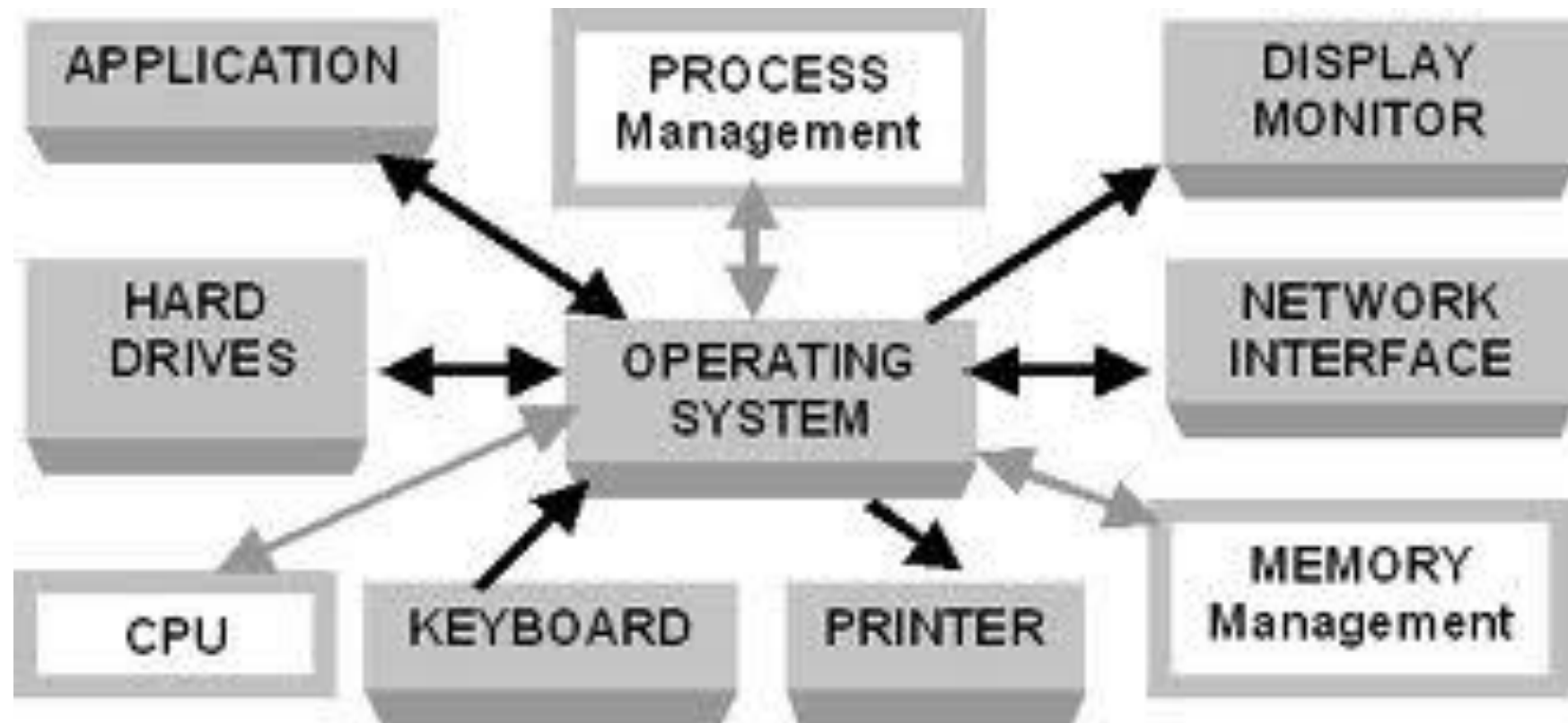
3-BUS Architecture





# Computer System Diagram

(Operation System/Software View)



Wider Definition:

# Computer Science



- The definition of computer science is a branch of **engineering science** that studies the technology and the principles of computers
- Computer science deals with the theoretical foundations of information and computation, together with practical techniques for the implementation and application of these foundations



# The Definition of Computer Science

- Gibbs and Tucker definition of computer science
  - The study of algorithms, including their:
    - Formal and mathematical properties
    - Hardware realizations
    - Linguistic realizations
    - Applications





# Program

An Encyclopædia Britannica Company

Dictionary Thesaurus Medical Scrabble® Spanish Central

program

**SEARCH** >

Games Word of the Day Video Blog: Words at Play My Faves

Dictionary

**program**

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*noun* | pro·gram | \ˈprō-gram, -grəm\

- : a plan of things that are done in order to achieve a specific result
- : a set of instructions that tell a computer what to do
- : a thin book or a piece of paper that gives information about a concert, play, sports game, etc.



# Binary Number System

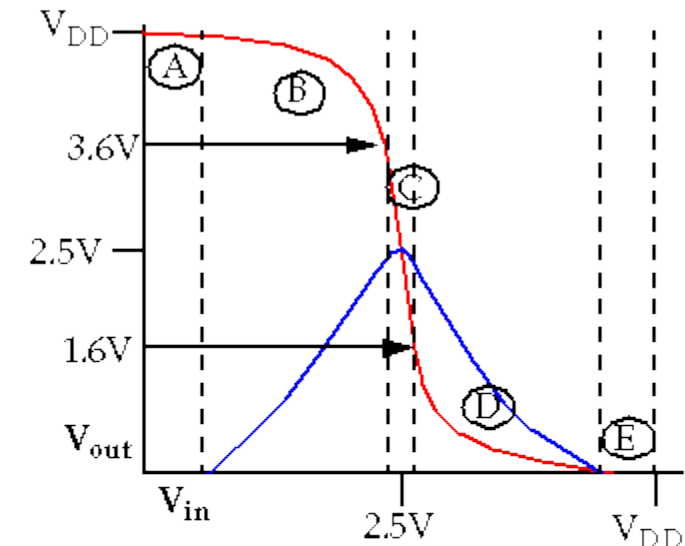
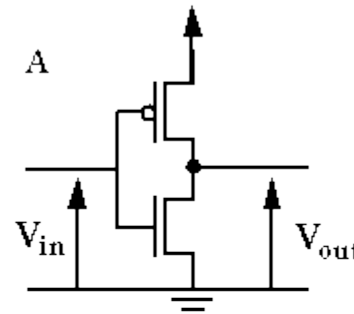
Binary Digit (Bit)	Electronic Charge	Electronic System
1		ON
0		OFF



1 1 0 1 1 0 0 1

$$\begin{aligned}
 1 \times 2^0 &= 1 \times 1 = 1 \\
 0 \times 2^1 &= 0 \times 2 = 0 \\
 0 \times 2^2 &= 0 \times 4 = 0 \\
 1 \times 2^3 &= 1 \times 8 = 8 \\
 1 \times 2^4 &= 1 \times 16 = 16 \\
 0 \times 2^5 &= 0 \times 32 = 0 \\
 1 \times 2^6 &= 1 \times 64 = 64 \\
 1 \times 2^7 &= 1 \times 128 = 128
 \end{aligned}$$

$$1 + 8 + 16 + 64 + 128 = 217$$



- (A)  $0 \leq V_{in} \leq V_{tn}$  ;n-device is cut off ( $I_{dsn}=0$ ), p-device in linear.
- (B)  $V_{tn} < V_{in} < V_{DD}/2 - \Delta$  ;n-device is in sat., p-device in linear.
- (C)  $V_{DD}/2 - \Delta \leq V_{in} \leq V_{DD}/2 + \Delta$  ;n-device is in sat., p-device in sat.
- (D)  $V_{DD}/2 + \Delta < V_{in} < V_{DD} + V_{tp}$  ;n-device is in linear, p-device in sat.
- (E)  $V_{DD} + V_{tp} \leq V_{in} \leq V_{DD}$  ;n-device is in linear, p-device in cut off ( $I_{dsp}=0$ ).

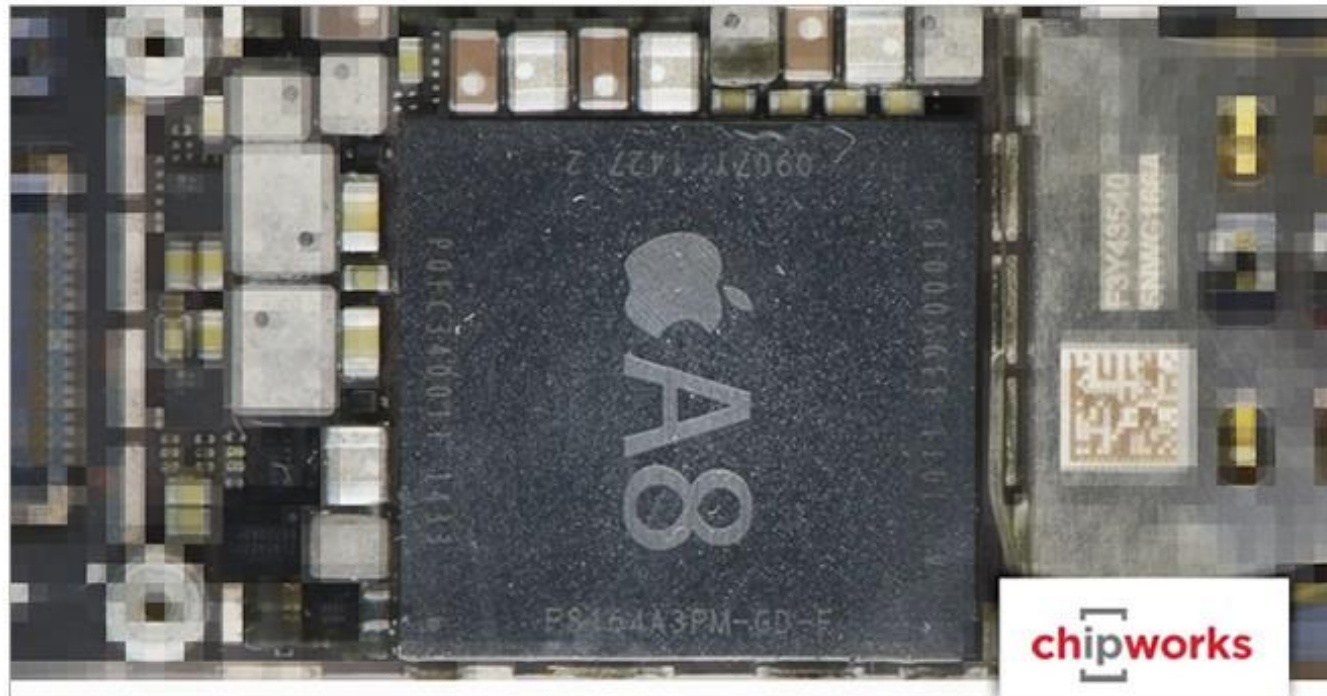


# Apple partner TSMC to mass produce 10nm chips by early 2017, on pace to beat Intel

By Neil Hughes

Friday, July 17, 2015, 06:44 am PT (09:44 am ET)

The race to make smaller and more efficient mobile processors continues, with iPhone chipmaker Taiwan Semiconductor Manufacturing Co. revealing it remains on track to mass produce its first 10-nanometer FinFET processors by early 2017 — a timeframe that would put it ahead of rival Intel.



iPhone 7's Brain is coming. (not the picture, A8 is an older version.) iPhone 6s already uses A9 processor.

Computer (Mobile device) technology is driven by semiconductor industry (Intel, Samsung, TSMC, Qualcomm, Broadcom)



# Computers are beyond computers now!

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## **Legacy Computers:**

- Desktop computer -> notebook computer -> all-in-one computer

## **Current computer technologies**

- Music MP3 player -> smart phone -> smart pad -> smart watch

## **Future of Computer Technology:**

- Auto-piloting, robotics, unmanned planes, and ...