Khoa
CÔNG NGHỆ THÔNG TIN
ĐH Khoa học Tự nhiên TPHCM

Bài 01: Tổng quan máy tính

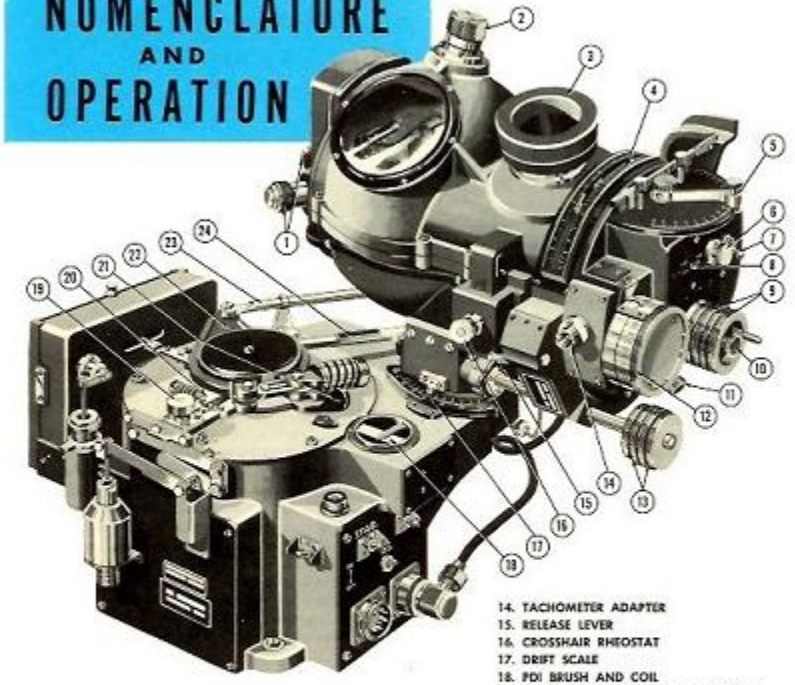
Phạm Tuấn Sơn

ptson@fit.hcmus.edu.vn

Non-digital Computer

RESTRICTED MARCH, 1945 SIF 6-1-1

NOMENCLATURE AND OPERATION



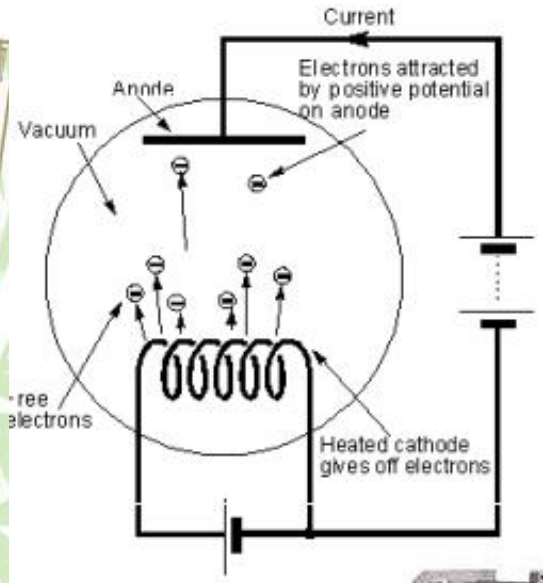
1. LEVELING KNOBS
2. CAGING KNOB
3. EYEPIECE
4. INDEX WINDOW
5. TRAIL ARM AND TRAIL PLATE
6. EXTENDED VISION KNOB
7. RATE MOTOR SWITCH
8. DISC SPEED GEAR SHIFT
9. RATE AND DISPLACEMENT KNOBS
10. MIRROR DRIVE CLUTCH
11. SEARCH KNOB
12. DISC SPEED DRUM
13. TURN AND DRIFT KNOBS
14. TACHOMETER ADAPTER
15. RELEASE LEVER
16. CROSSHAIR RHEOSTAT
17. DRIFT SCALE
18. PDI BRUSH AND COIL
19. AUTOPILOT CLUTCH ENGAGING KNOB
20. AUTOPILOT CLUTCH
21. BOMBSIGHT CLUTCH ENGAGING LEVER
22. BOMBSIGHT CLUTCH
23. BOMBSIGHT CONNECTING ROD
24. AUTOPILOT CONNECTING ROD

The bombsight has 2 main parts, **sighthead** and **stabilizer.** The sighthead pivots on the stabilizer and is locked to it by the dovetail locking pin. The sighthead is connected to the directional gyro in the stabilizer through the **bombsight connecting rod** and the **bombsight clutch.**

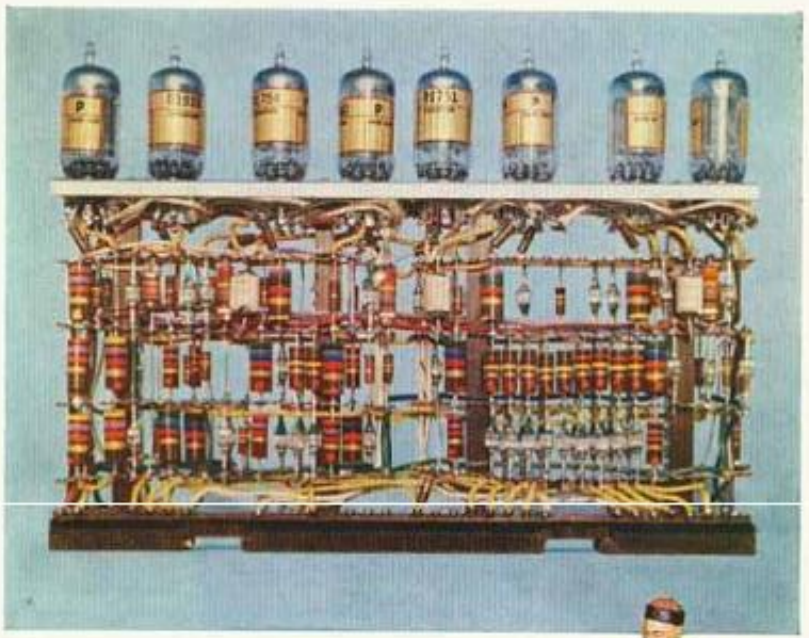
RESTRICTED

http://en.wikipedia.org/wiki/Analog_computer

Thế hệ 1 – Bóng đèn chân không (Vacuum Tube)



Vacuum tube



MODERN ABACUS

new tool for lightning-fast calculation

Resembling a Chinese abacus, this 12-inch electronic assembly operates at a speed of one million pulses a second. It is one of 274 similar electronic units that perform the computing and control functions of IBM's great new "701" Electronic Data Processing Machines.

These extraordinary machines are providing the nation's defense projects with the most flexible and productive computer ever manufactured in quantity.

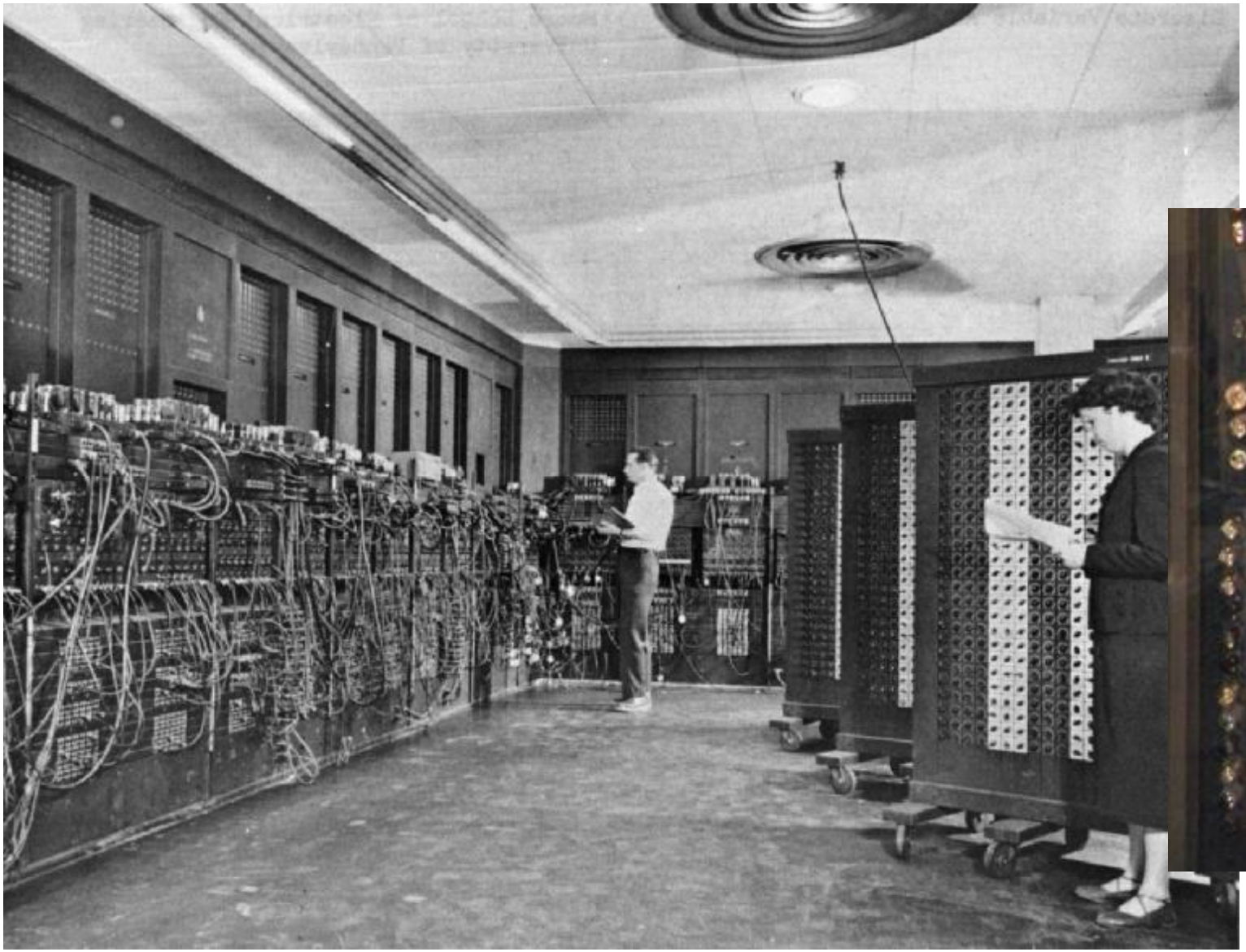
In *every* field of business, IBM machines reduce the drudgery and increase the speed and accuracy of computing and accounting operations.

IBM Electronic Business Machines
INTERNATIONAL BUSINESS MACHINES

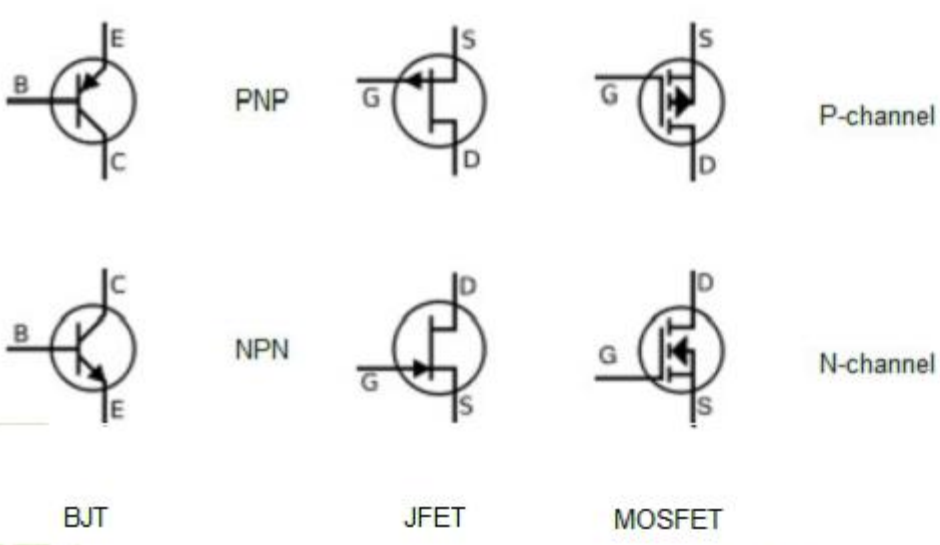
IBM 700

ENIAC (Electronic Numerical Integrator And Computer)

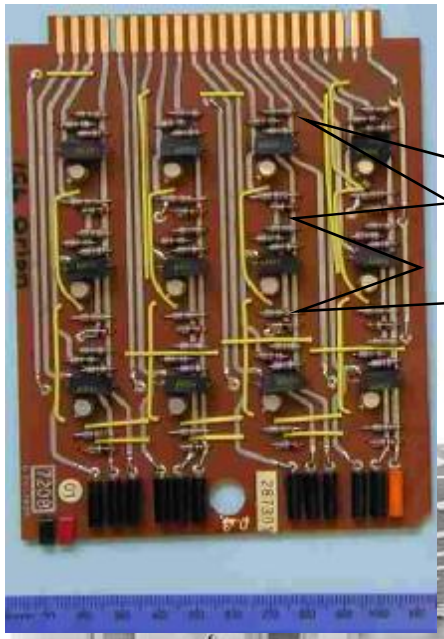
1943
1946
1955



Thế hệ 2 - Transistor



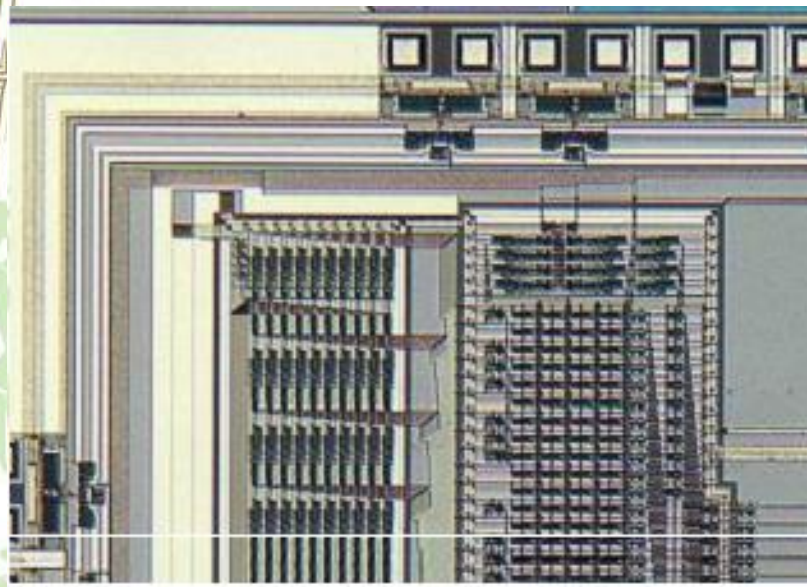
http://en.wikipedia.org/wiki/Transistor



10.000 transistors

IBM 7094

Thế hệ 3 – Integrated Circuit (IC)



Integrated circuit (IC)

IBM 360

http://en.wikipedia.org/wiki/IBM_360

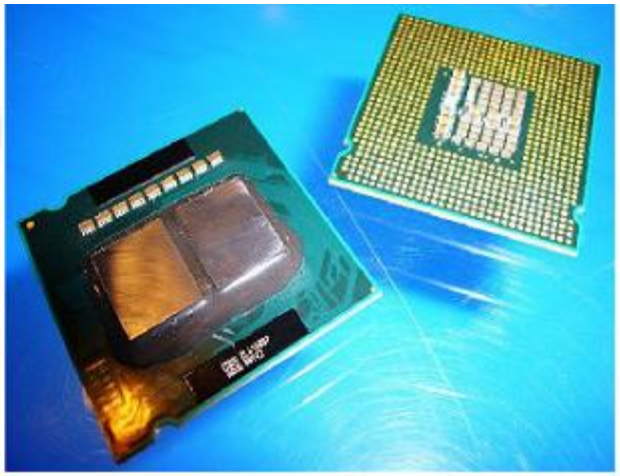
Thế hệ 4… – Micro…

Intel 4004 with 2300 transistors inside

XT computer with Intel 8086 chip

Ngày nay


intel
Core 2 Duo



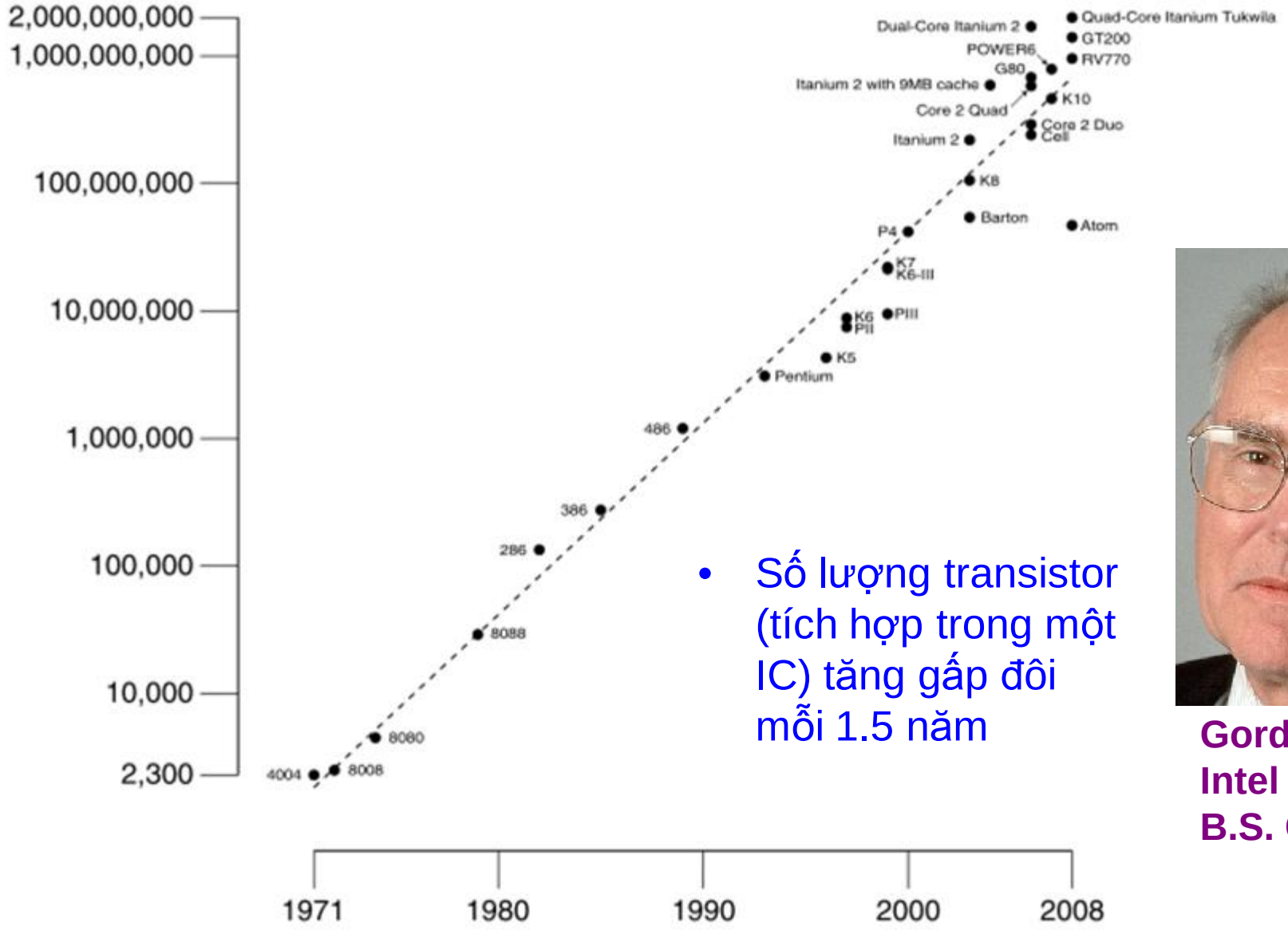

478.2 teraFLOPS
http://www.top500.org/system/8968

Các thế hệ máy tính

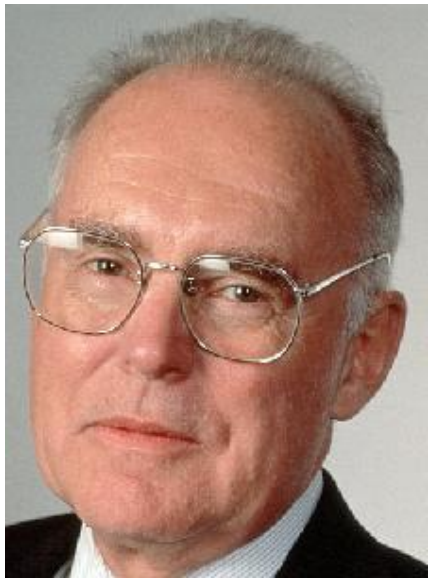
Generation	Approximate Dates	Technology	Typical Speed (ops/s)
1	1946-1957	Vacuum tube	40.000
2	1958-1964	Transistor	200.000
3	1965-1971	Small & medium scale integration (up to 3.000 devices/chip)	1.000.000
4	1972-1977	Large scale integration (LSI) (3.000-100.000 devices/chip)	10.000.000
	1978-1991	Very large scale integration (VLSI) (100.000-100.000.000 devices/chip)	100.000.000
	1991-	Ultra large scale integration (ULSI) (Over 100.000.000 devices/chip)	1.000.000.000

Khoa
CÔNG NGHỆ THÔNG TIN
ĐH Khoa học Tự nhiên TPHCM

Quy luật Moore



- Số lượng transistor (tích hợp trong một IC) tăng gấp đôi mỗi 1.5 năm



Gordon Moore
Intel Cofounder
B.S. Cal 1950!

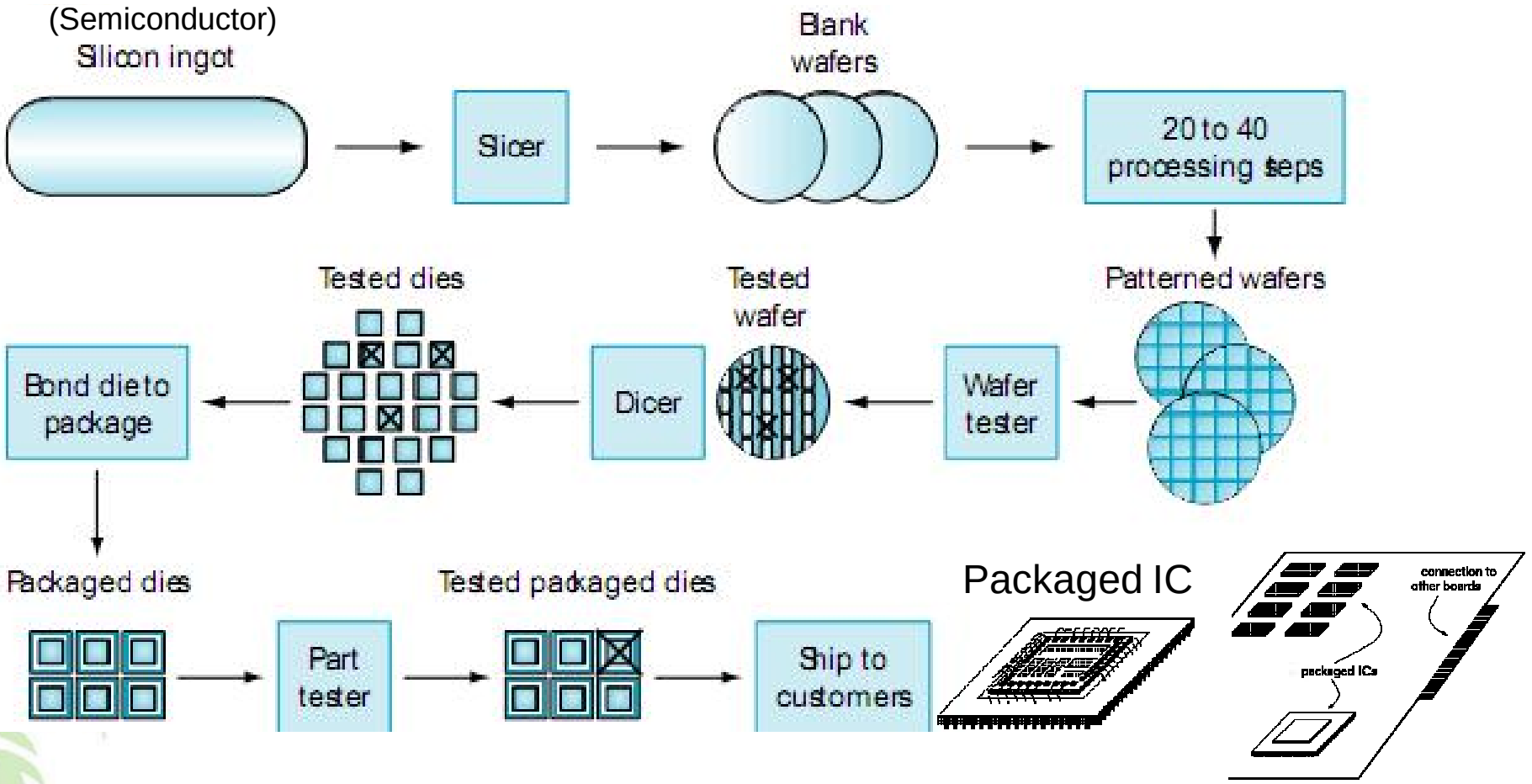
Sự phát triển…

- Processor
  - Speed 2x / 1.5 years (since ’85) [slowing!]
  - 100X performance last decade
  - When you graduate: 4 GHz, 32 Cores
- Memory (DRAM)
  - Capacity: 2x / 2 years (since ’96)
  - 64x size last decade.
  - When you graduate: 128 GibiBytes
- Disk
  - Capacity: 2x / 1 year (since ’97)
  - 250X size last decade.
  - When you graduate: 8 TeraBytes

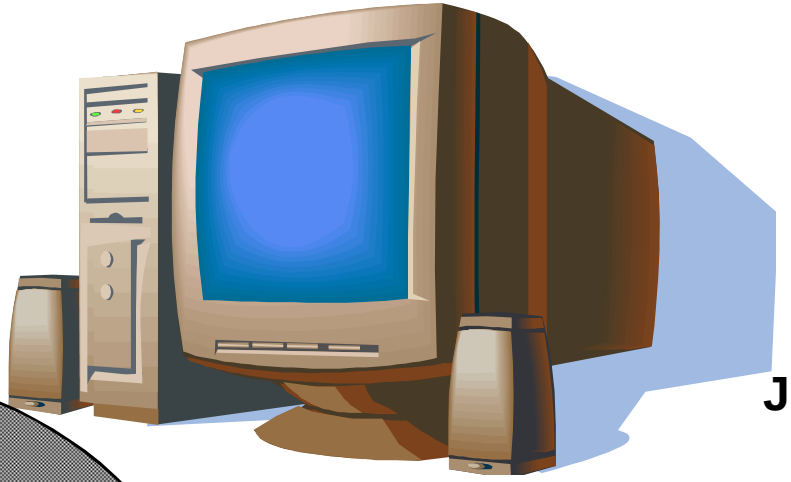
…Not nec all on one disk

Kilo (10^3) & Kibi (2^{10})
ê
Mega (10^6) & Mebi (2^{20})
ê
Giga (10^9) & Gibi (2^{30})
ê
Tera (10^{12}) & Tebi (2^{40})
ê
Peta (10^{15}) & Pebi (2^{50})
ê
Exa (10^{18}) & Exbi (2^{60})
ê
Zetta (10^{21}) & Zebi (2^{70})
ê
Yotta (10^{24}) & Yobi (2^{80})

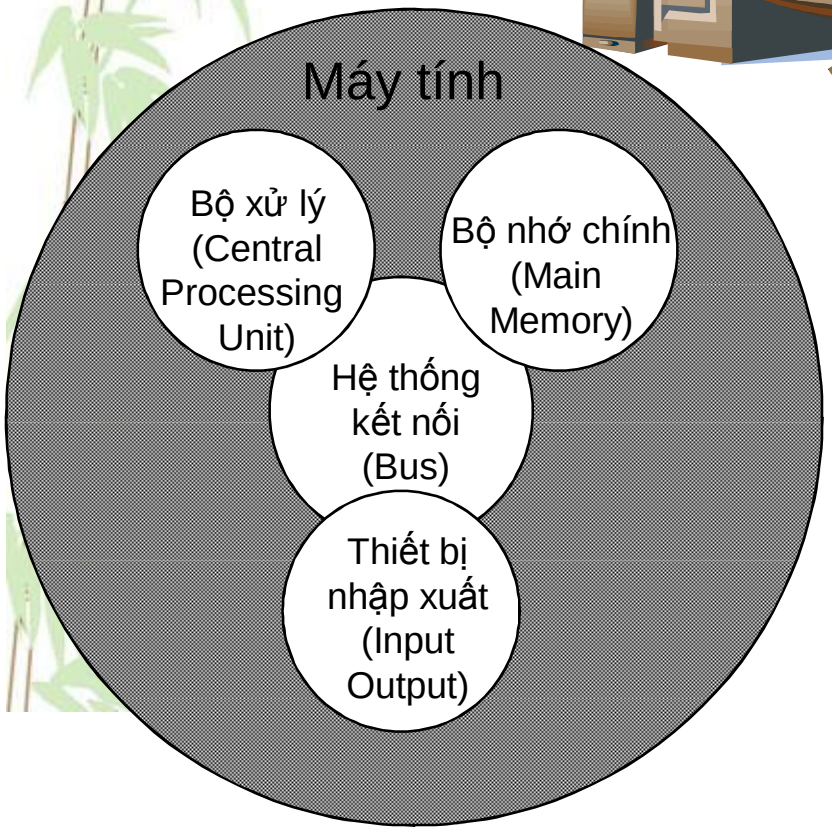
Quá trình sản xuất IC (Chip)

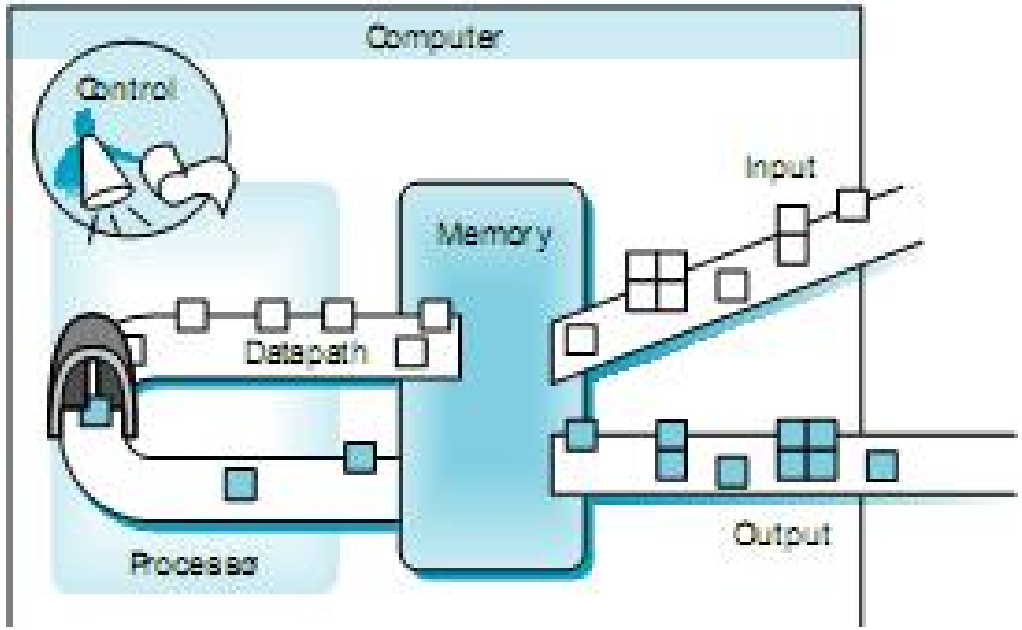


Cấu trúc và hoạt động máy tính

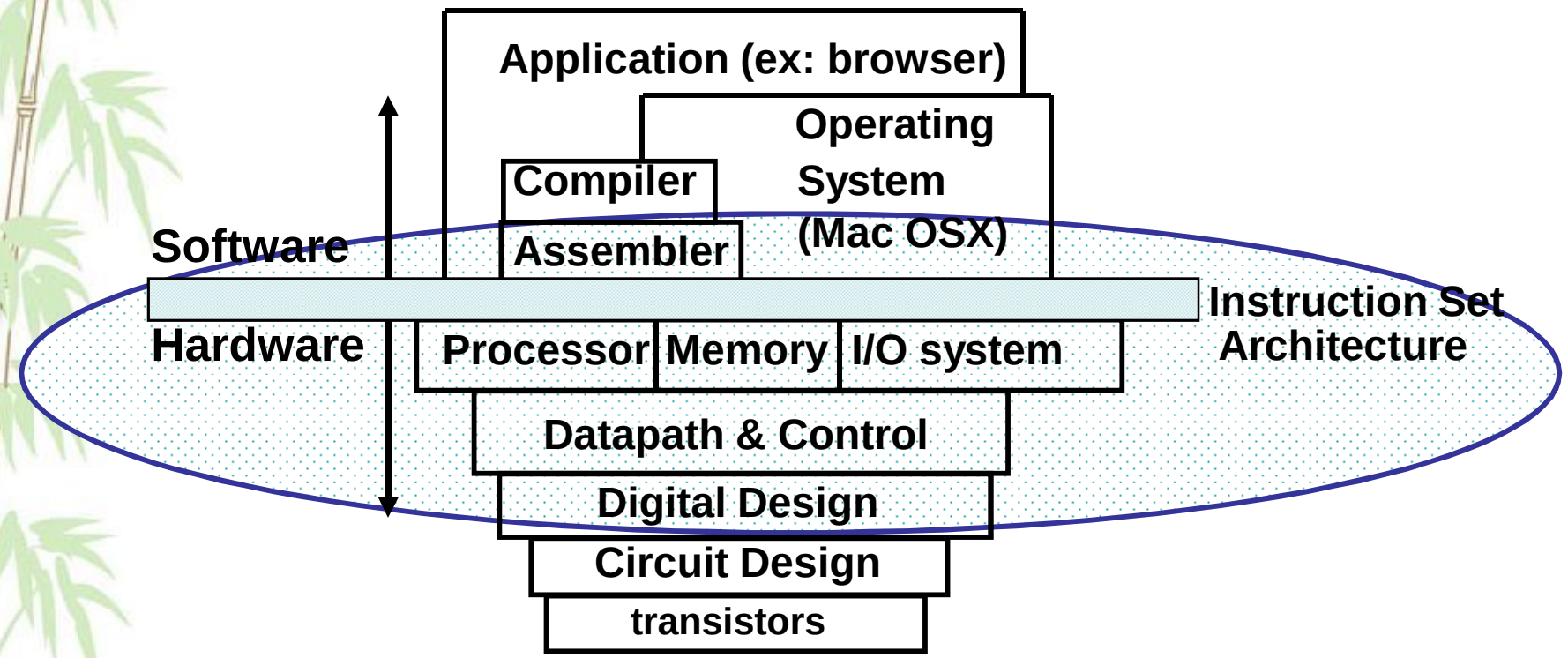


John von Neumann





Mô hình phân lớp hệ thống máy tính



Tham khảo

- Chương 1, P&H