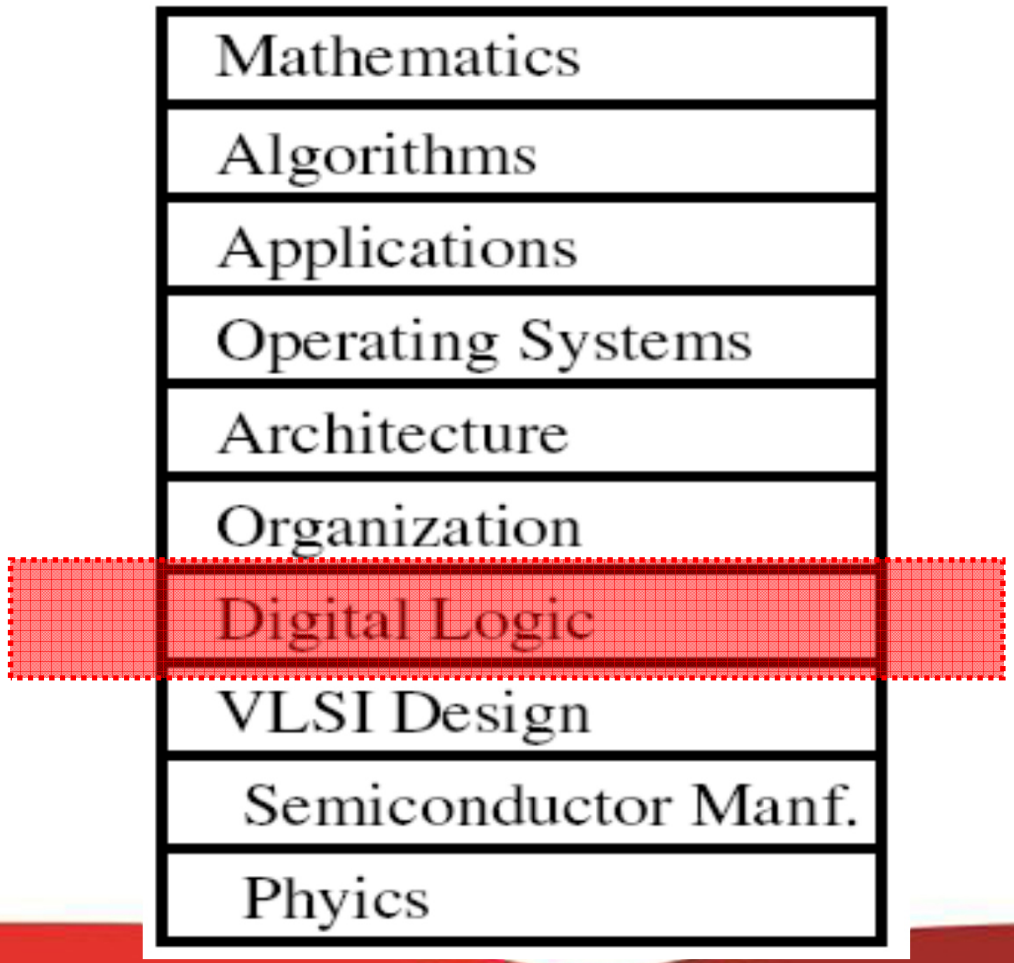
Fakultas Informatika
School of Computing
Telkom University

Sejarah Perkembangan Komputer

Tim Dosen Sistem dan Logika Digital (SLD)

Kelompok Keahlian Telematika
Gedung E Lantai 2

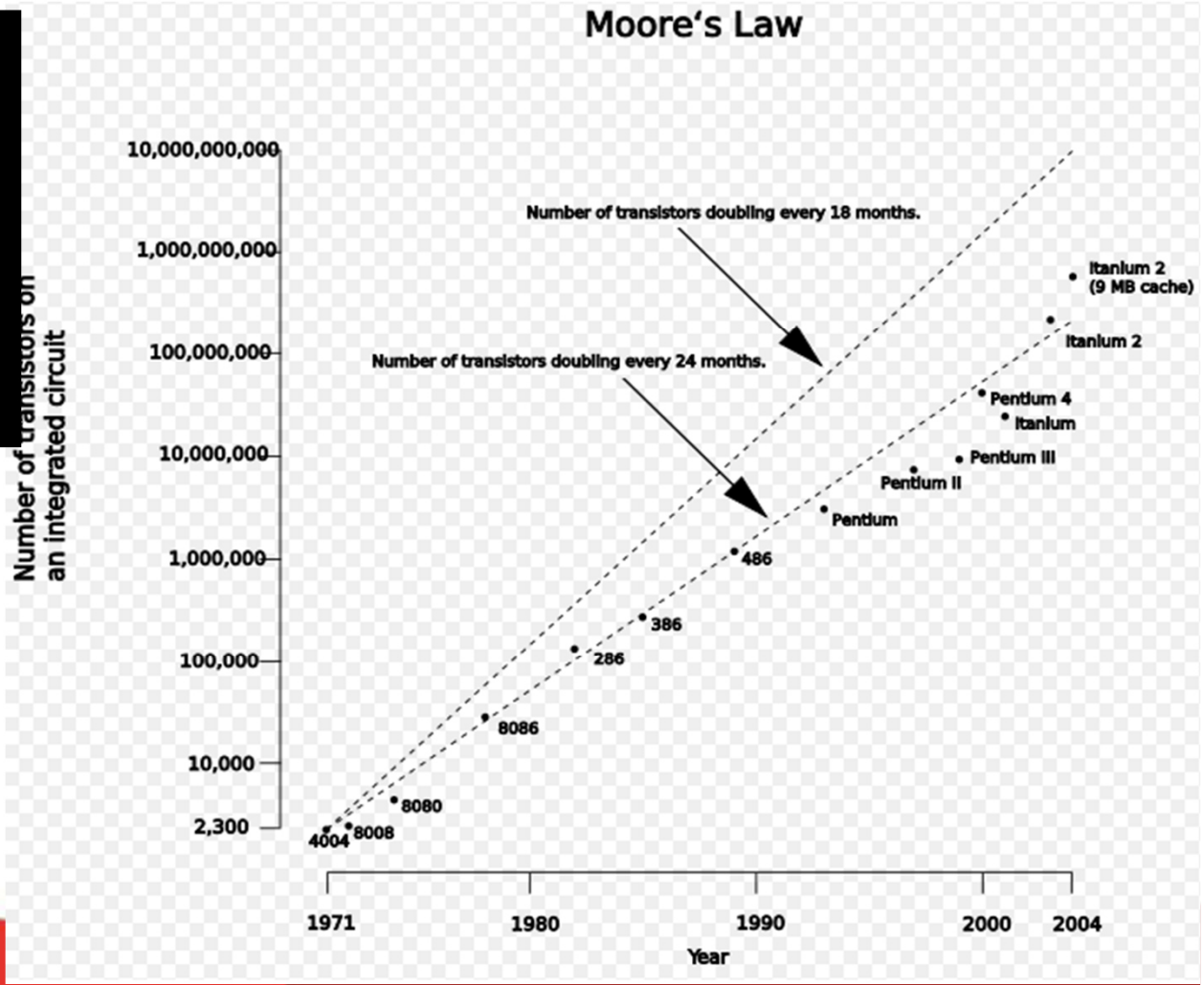
Di mana SLD berada? (1)



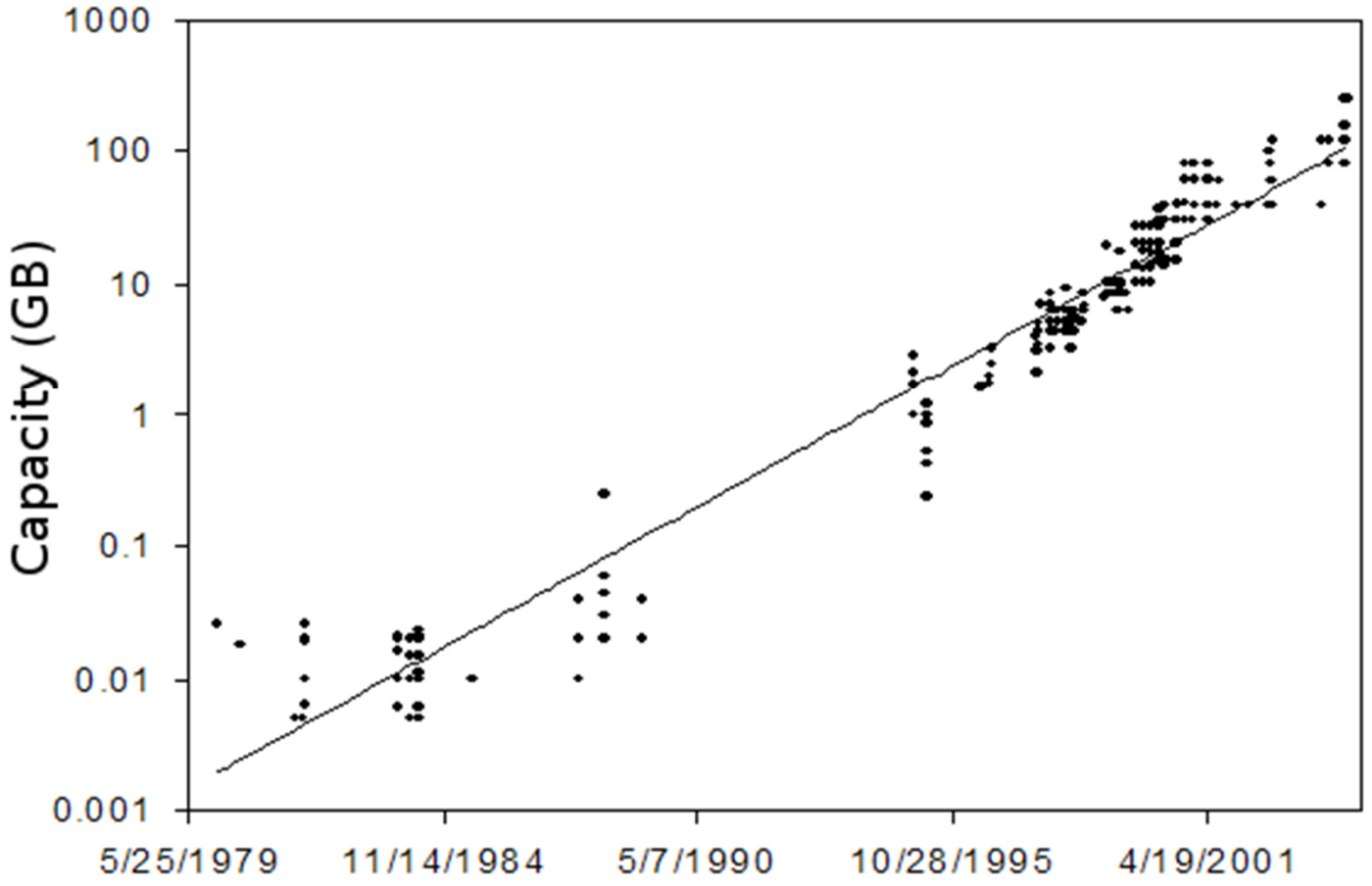
Di mana SLD berada? (2)

- Terletak antara ilmu komputer dan teknik komputer; menghubungkan matematika dan fisika melalui pengembangan peralatan praktis
- Di bawahnya adalah Organisasi dan Arsitektur Komputer
- Mendukung perkembangan konsep arsitektur komputer telah dikembangkan sejak lama
- Sebagian besar pengembangan hardware jauh lebih cepat daripada pengembangan software
- Hukum Moore menyatakan bahwa:
  - Jumlah transistor dlm IC) bertambah 2x lipat setiap 18 bulan
  - Harga per bit memori turun secara eksponensial
  - Power per bit turun secara eksponensial, semakin cepat, dan semakin handal (reliable)

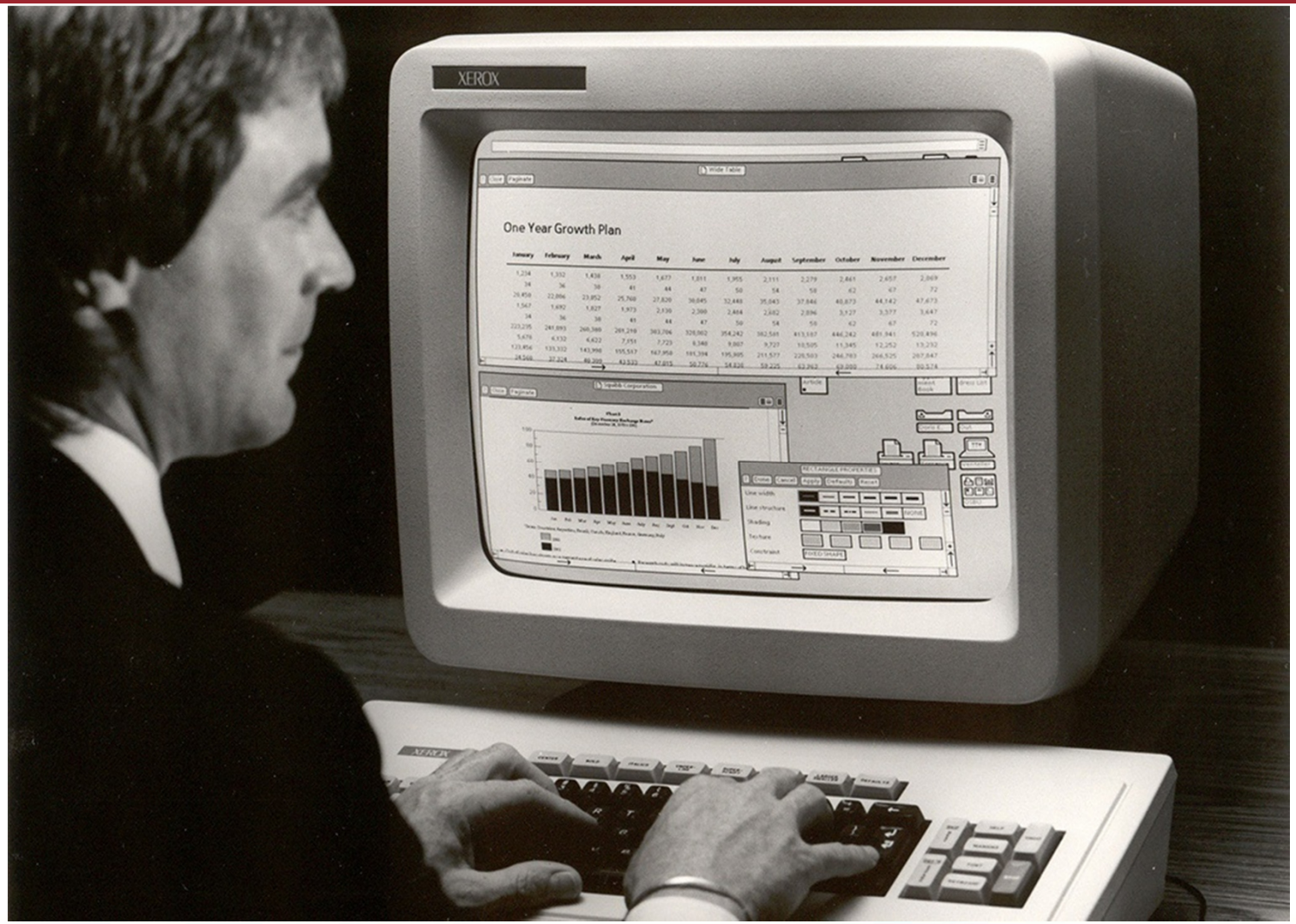
Hukum Moore (1)

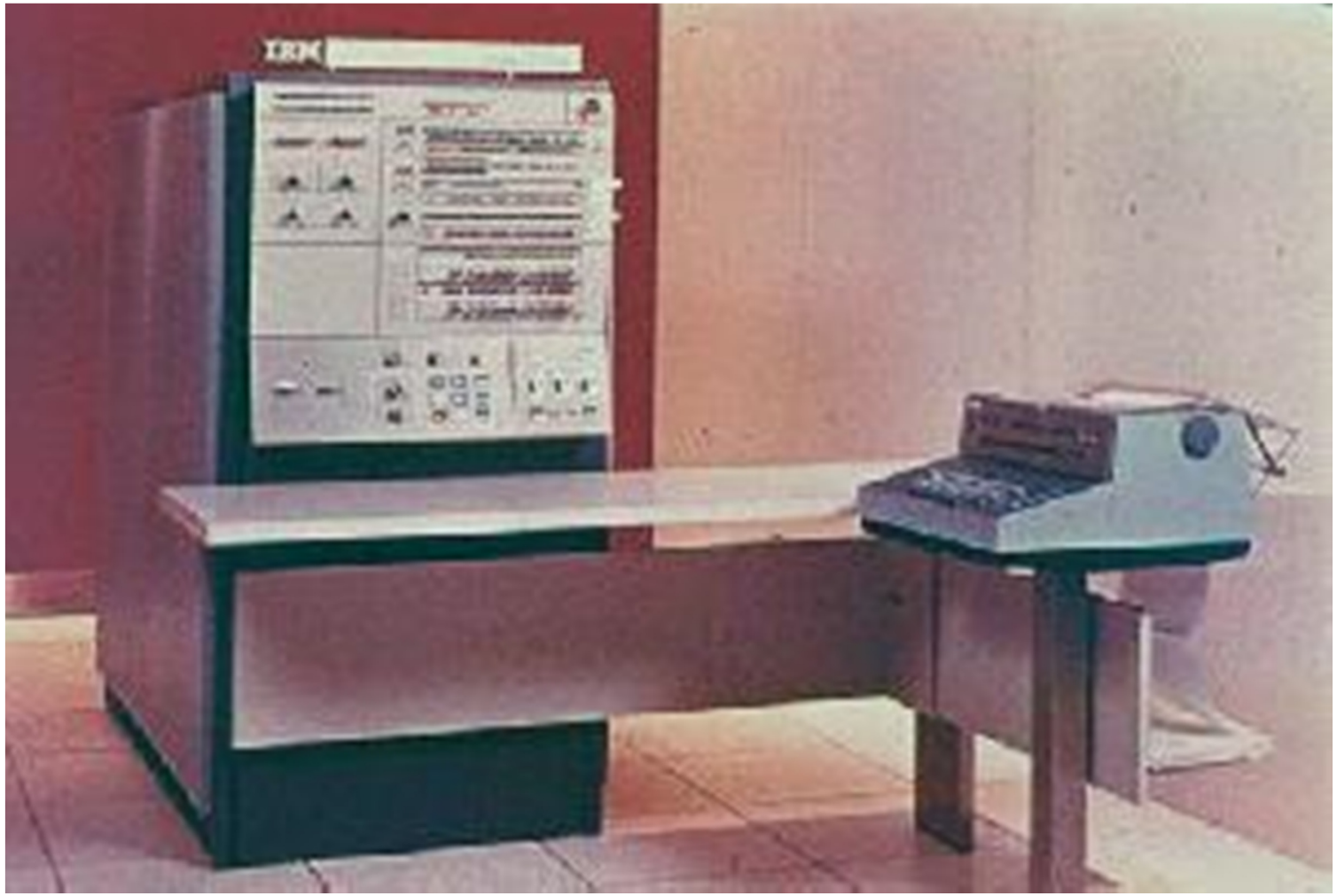


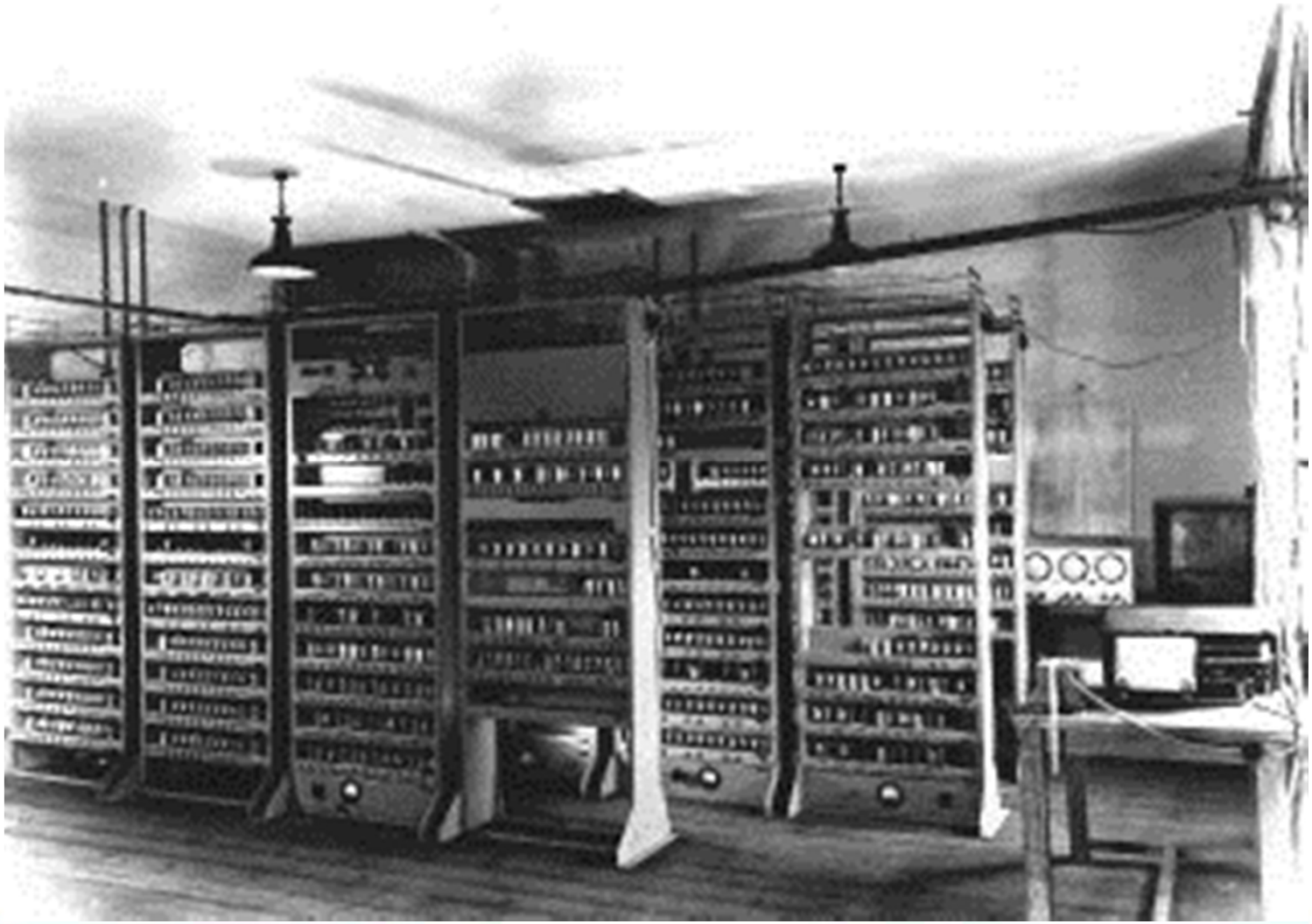
Hard drive capacity

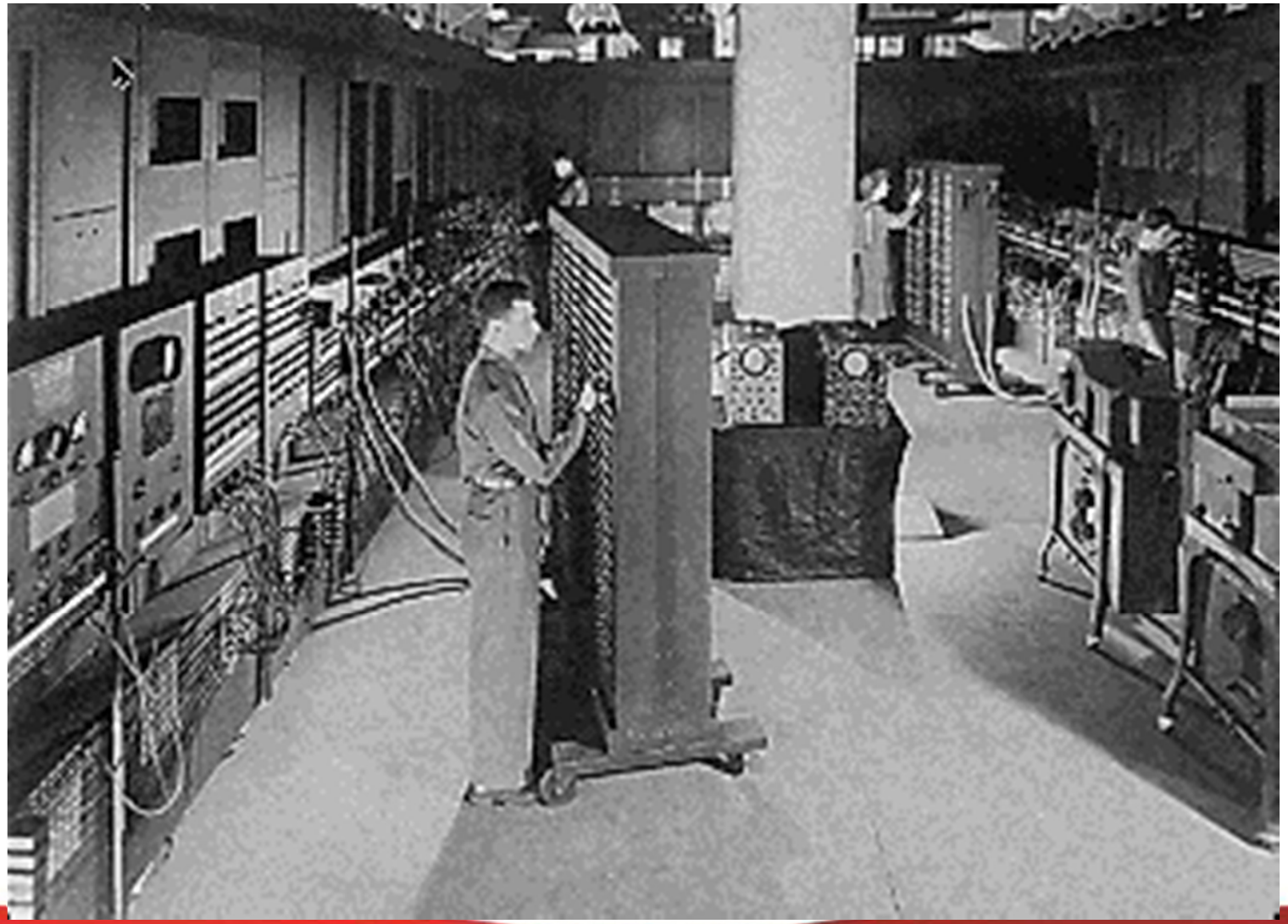


Perkembangan Komputer


XEROX
One Year Growth Plan


IBM





Generasi Komputer

- Pra – Generasi Komputer Modern
- Generasi I
- Generasi II
- Generasi III
- Generasi IV

Pra Generasi Komputer Modern

Evolusi Komputer : Generasi Mekanik

- 1642 - Blaise Pascal membangun mesin Kalkulator pertama kali
- 1672 - Leibniz menambahkan fungsi perkalian dan pembagian pada mesin kalkulator yang telah ada (Kalkulator pertama kali dengan 4 fungsi utama, Penjumlahan, Pengurangan, Perkalian dan Pembagian)

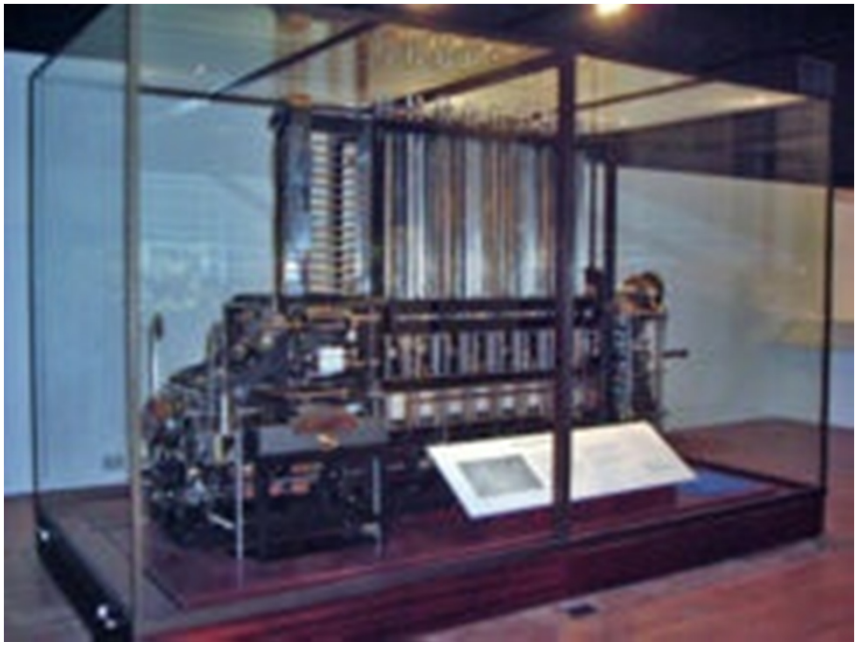
Pascal Calculator

Evolusi Komputer : Generasi Mekanik

150 tahun kemudian... (1820's)

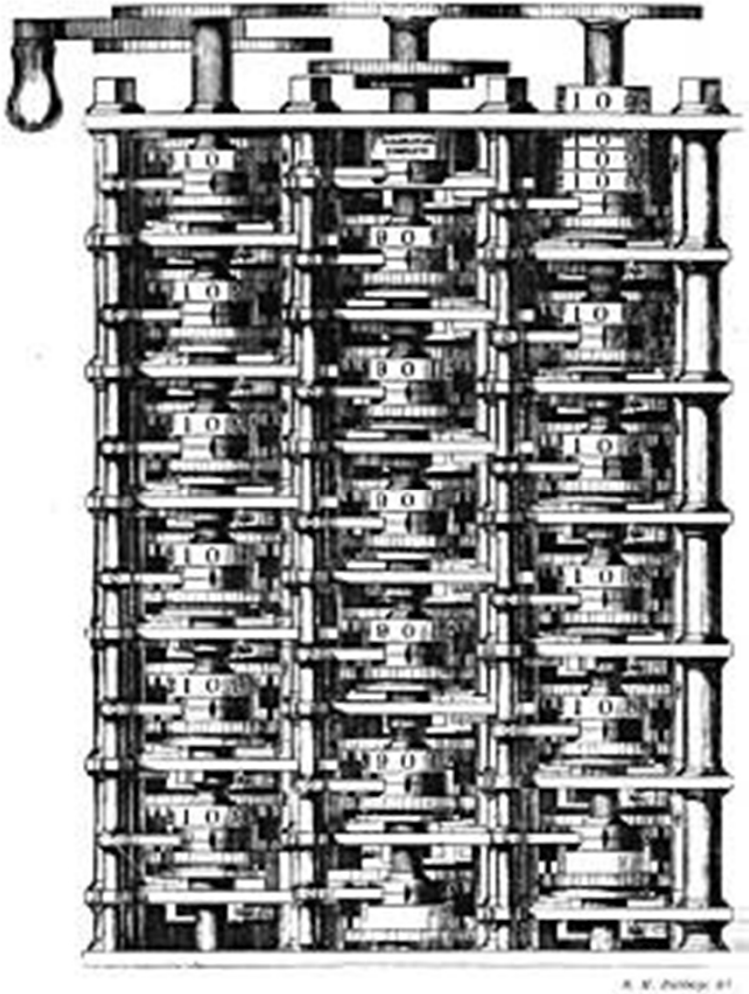
- Charles Babbage built the difference engine and then started work on the analytical engine.
  - The analytical engine had a memory, a computation unit, and input reader (punched cards) and an output unit (punched and printed output). The analytical engine was the First general purpose computer.
  - Ada Lovelace worked for him, and was the world's First computer programmer
  - Ada, the computer language, is named in her honor
  - The analytical engine never worked because technology at that time could not manufacture the precision gears needed to make it work
  - An analytical engine based on Babbage's design has been built and it works!

Charles Babbage (1791–1871)

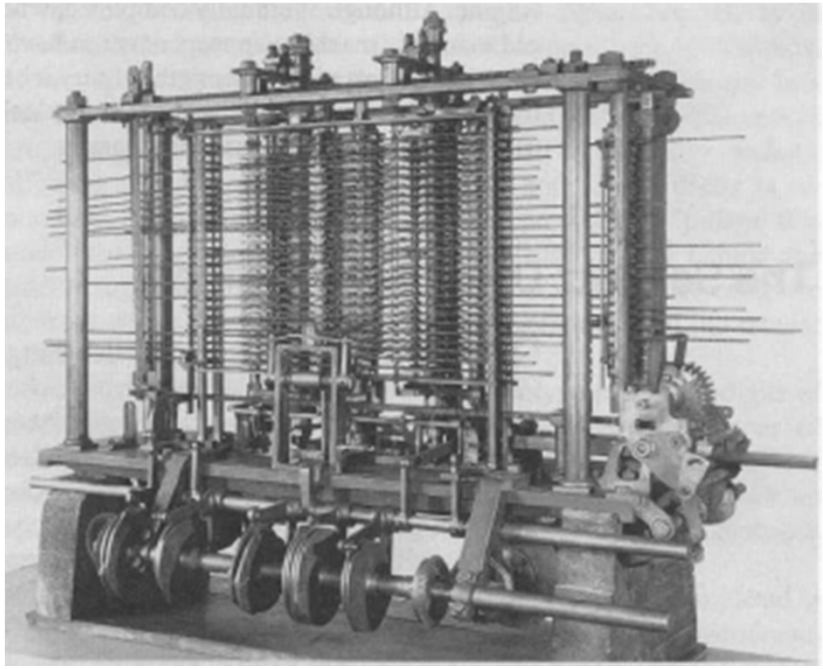


- Difference Engine

Babbage's Difference Engine



Analytical Engine



Evolusi Komputer

110 years later... (1930's)

- John Atanasoff (Iowa State College) and George Stibbitz (Bell) both built electric calculators
- Aiken built an electronic relay version of Babbage's machine that worked (Mark I)
- By the time he built the Mark II, relays were obsolete (too slow).
- Alan Turing, famous British mathemetician, developed COLOSSUS, the First computer
  - Since the British government didn't unclassify COLOSSUS for 30 years, none of it's science influenced later computer development

Then things started to move...

Howard

Harvard Mark

Generasi I

Lee de Forest (1906)

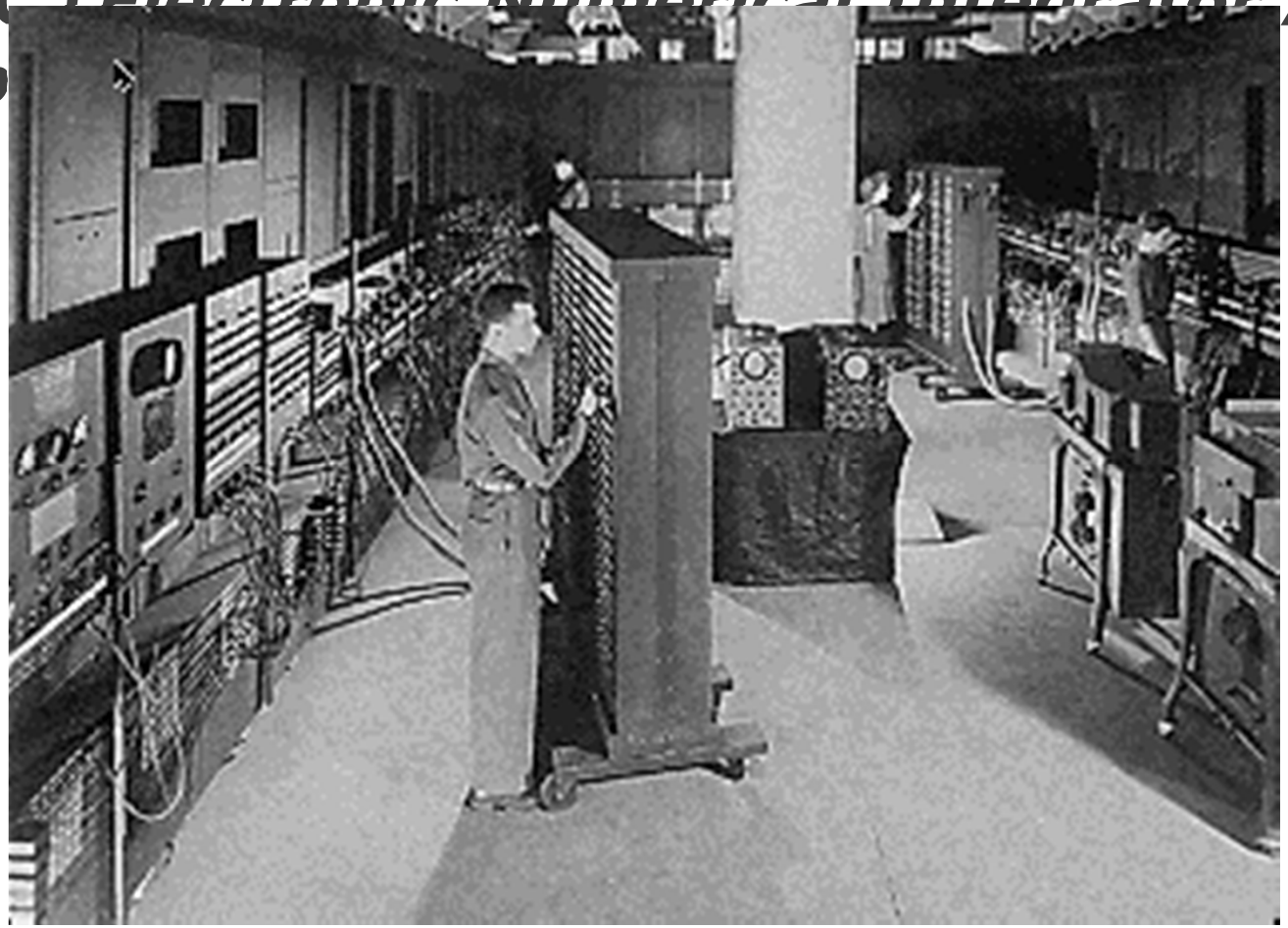
- Penemu Triode

Evolusi Komputer : Generasi Pertama

ENIAC (Electronic Numerical Integrator And Computer)

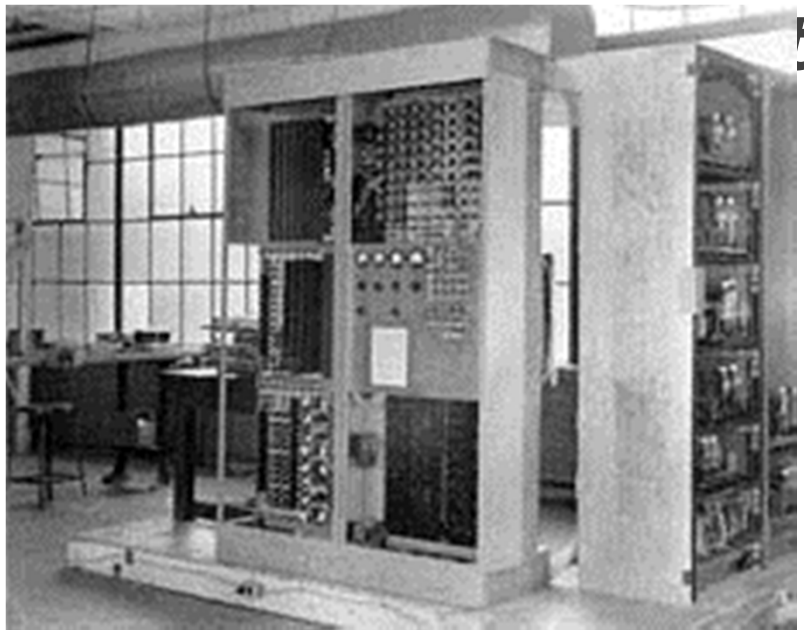
- Designed at UPenn by Mauchley and Eckert (Mauchley saw Stibbitz work at Dartmouth)
- Purpose was to do calculations for the Army Ballistics Laboratory
- 5000 calculations per second (much faster than mechanical calculators)
- Programs were entered by connecting jumper cables and setting switches (6000 of them)
- The computer weighed 30 tons and used 140kW of power (equivalent of 233 60W bulbs)
- Basic element was the vacuum tube
- Numbers were represented digitally by clusters of 10 vacuum tubes (one for each digit 0-9)
- Design started in 1943, started working in 1946, dissassembled in 1955
- It’s first major task was to help design the H-bomb

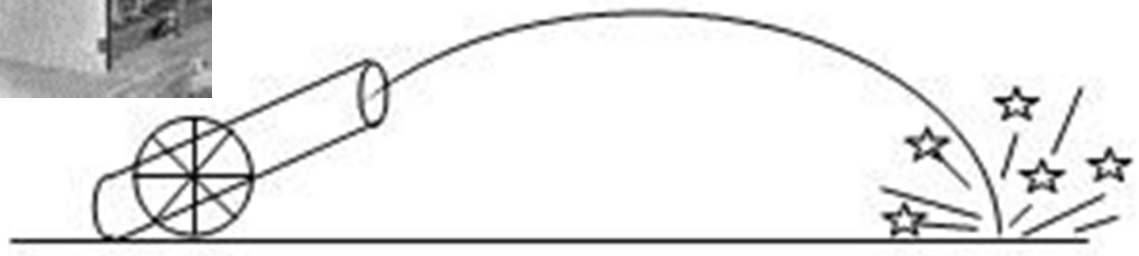
ENIAC *(Electronic Numerical Integrator And Comp*



Dr. J. Presper Eckert dan Dr. John W. Mauchly

EDVAC (*Electronic Discrete Variable ter*)





- Edvac mengukur sudut rudal balistik

Generasi II

Ditemukan Transistor

DEC PDP-1 (*Digital Equipment Corporation Programmable Data Processor* – 1)

Evolusi Komputer : Generasi Kedua

IBM

- IBM 701 - 1952 (it sold nineteen 701 computers)
- IBM 702 - 1955 First business computer (text processing)

Commercial Computers (Post-transistor)

- Transistors were developed at Bell labs in 1947
- NCR & RCA had small transistor computers before IBM (MIT first in 1954 with TX-0)
- IBM started its 7000 series using transistors in the late 1950's
  - Multiplexor bus design, I/O Channel concept

Evolusi Komputer : Generasi Kedua

- Transistors allowed for greater speed, larger memory capacity, and smaller size
- Second generation of computers began:
  - High-level programming languages (FORTRAN), and system software
  - More complex ALUs and control units
- DEC began building minicomputers (first PDP-1 sold for $120k in1959)
  - Large screen led to the Þrst video game at MIT: SpaceWar

Generasi III

Evolusi Komputer : Generasi Ketiga

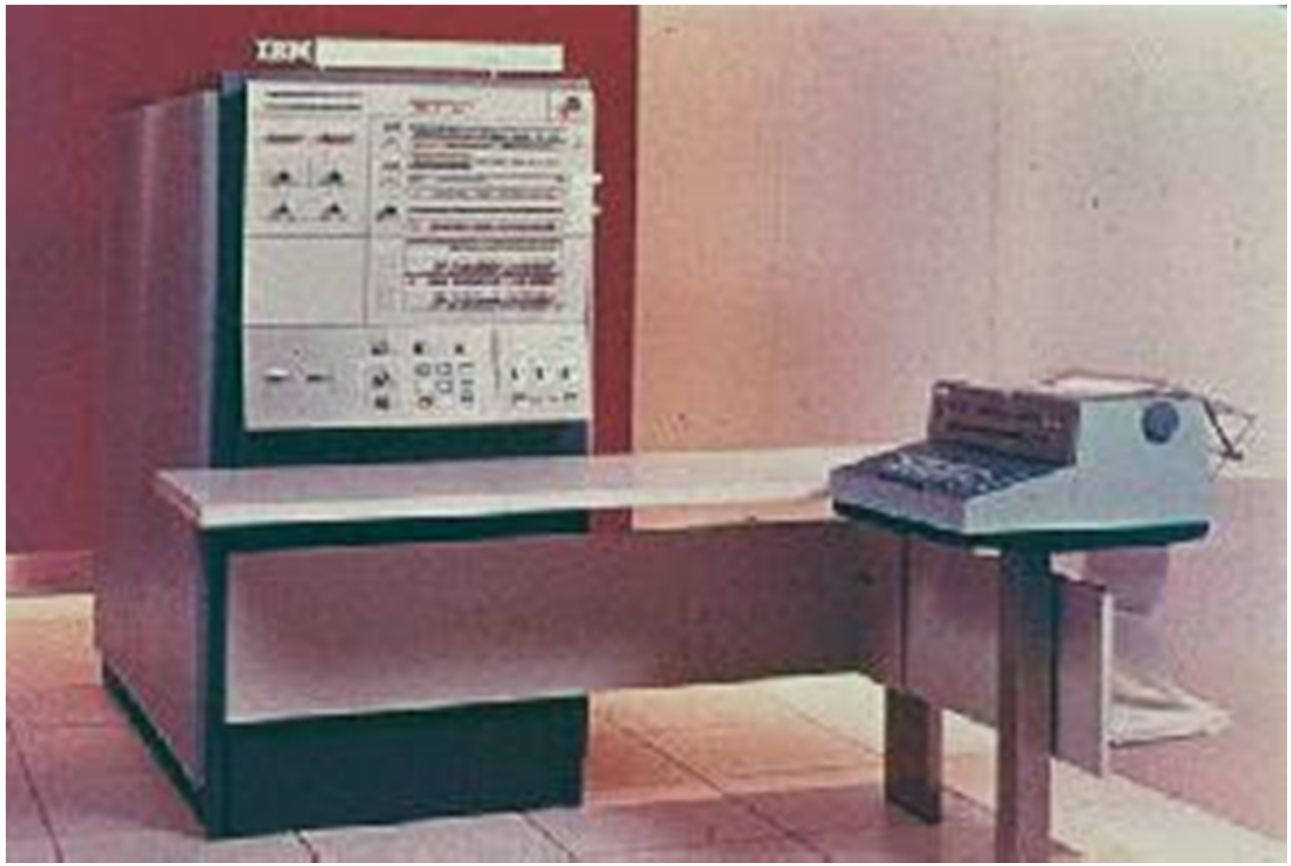
- 1958: Integrated circuit: you could put transistors and other circuit devices on a single chip.
- Old technology:
  - each transistor was the size of a pin head,
  - each resistor, capacitor, etc. had to be soldered on the board individually
  - up to a several 100,000 components to the more advanced computers
- Integrated circuits
  - One wafer (usually about 4' in diameter, although they're getting bigger)
  - One pattern: i.e. a CPU, or a quad NAND gate, etc..
  - Repeat the pattern in 2D across the chip
  - Saw the chip into the little blocks
  - Put each block in a little plastic case with some pins attached
  - As feature size gets smaller, a linear decrease in feature size in x and y is a squared increase in the number of components per wafer (wafer cost is the relevant thing)
- Current achievements are greater than 60 million transistors in a single chip

Evolusi Komputer : Generasi Ketiga

- IBM System 360 (introduced in 1964)
  - First non-upward compatible line, but they wanted to improve the architecture of the 7000 series, and it turned out to be the success of the decade, giving them a 70% market share.
    - This was IBM's major move to computers based on integrated circuits
  - The 360 architecture is still the basis for most of IBM's large computers.
  - The 360 series was the Þrst planned family of machines, with different capabilities for different prices.
  - 360 was the Þrst multi-tasking architecture with multiple programs stored in memory
- DEC PDP-8
  - Small enough to sit on a lab bench or be built into other equipment
  - It was cheap enough for a lab to purchase ($18k).
    - PDP-8, followed by the PDP-11, were DEC's glory years.
- PDP series was the first to use a bus architecture.

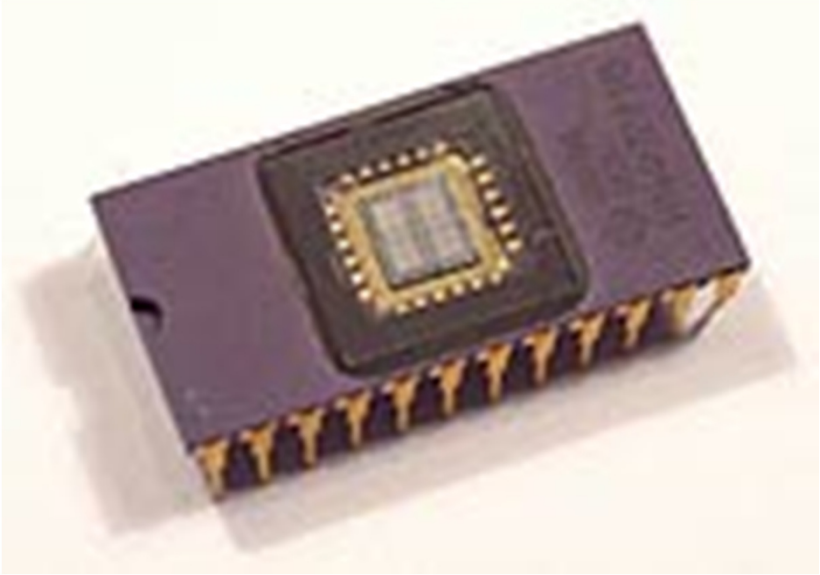
Penemuan IC (Integrated Circuit)

IBM S/360

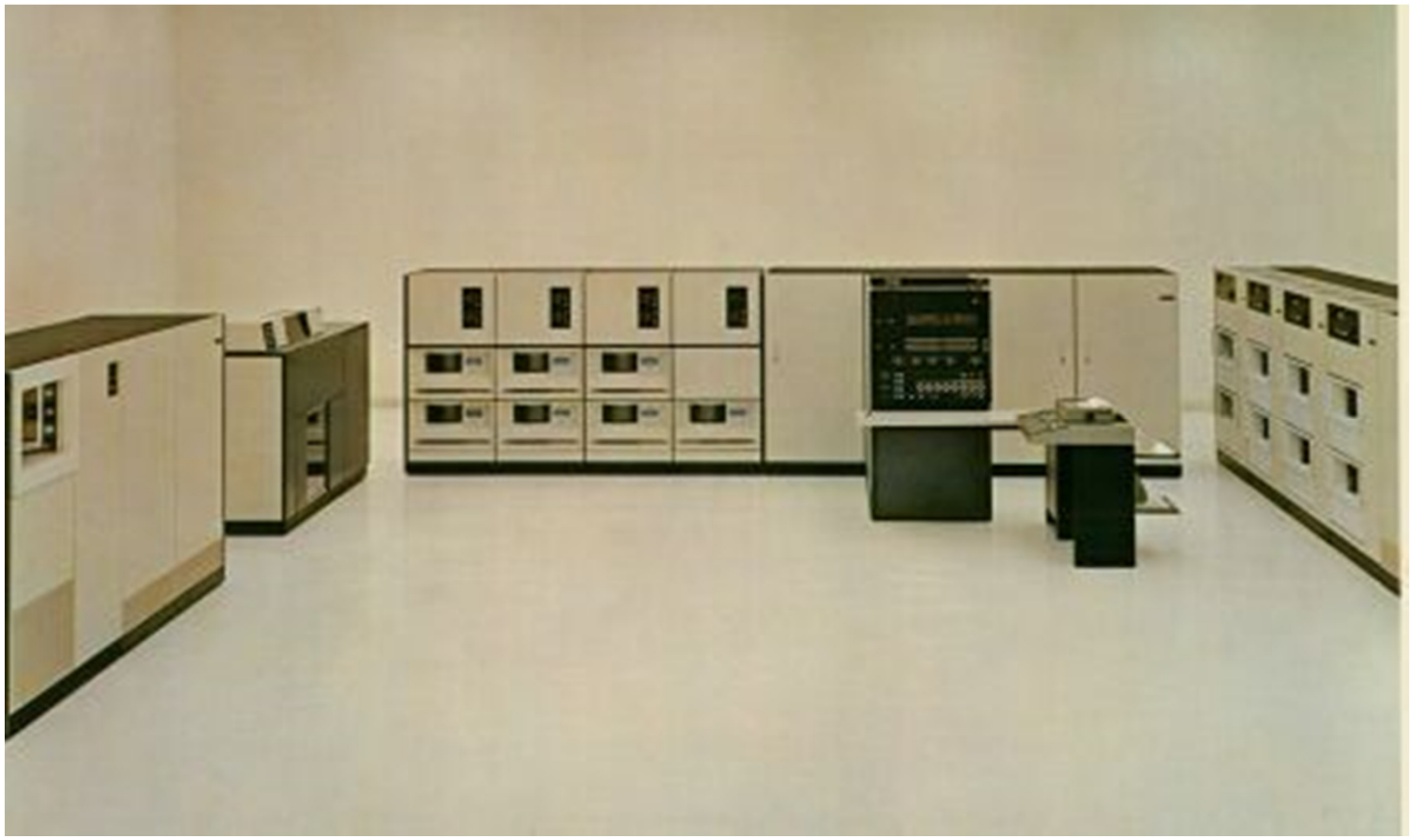


Generasi IV

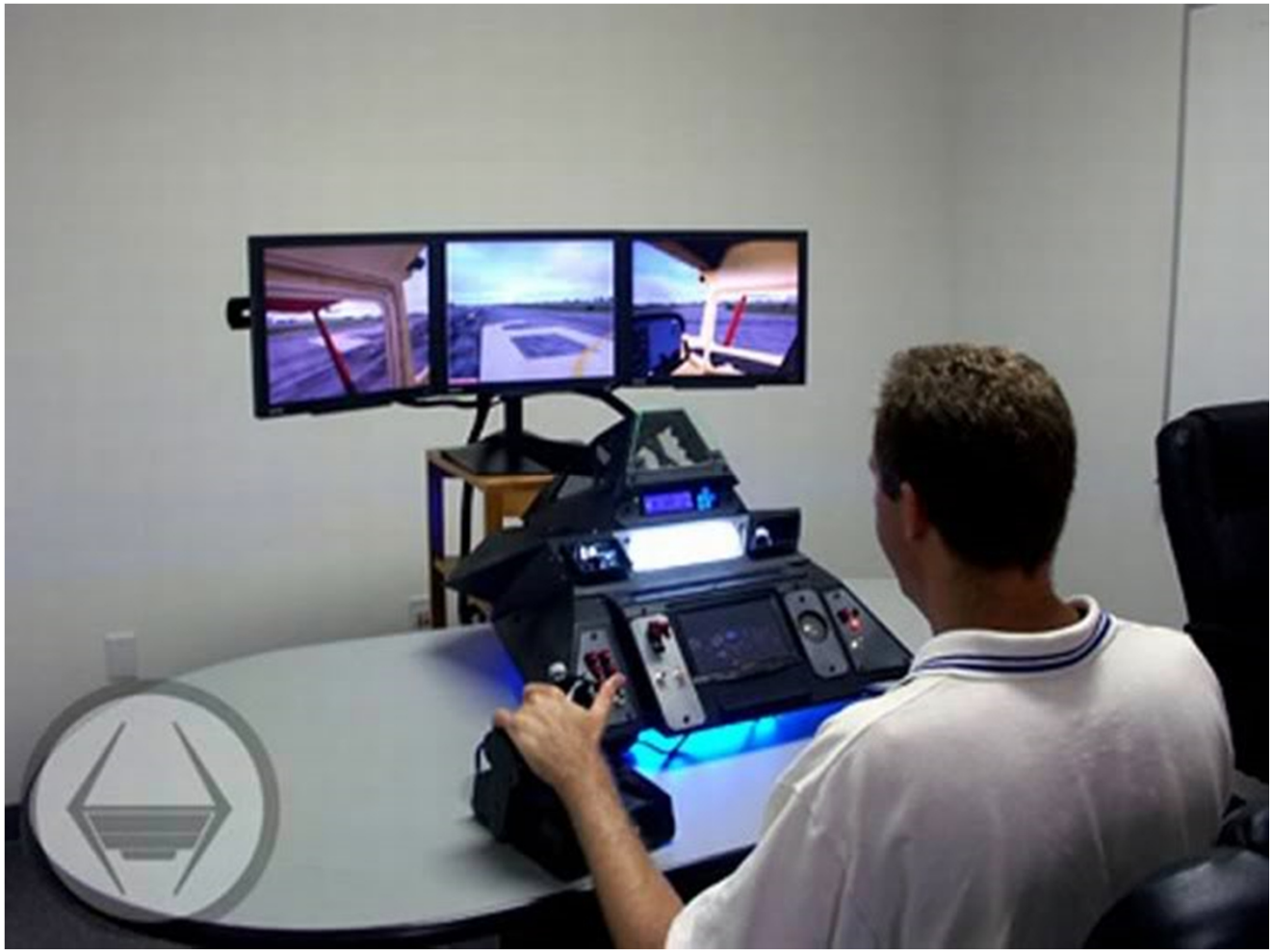
Komponen : LSI (*Large-Scale Integration*) dan VLSI (*Very Large-Scale Integration*)



IBM 2423PH3145 – 370



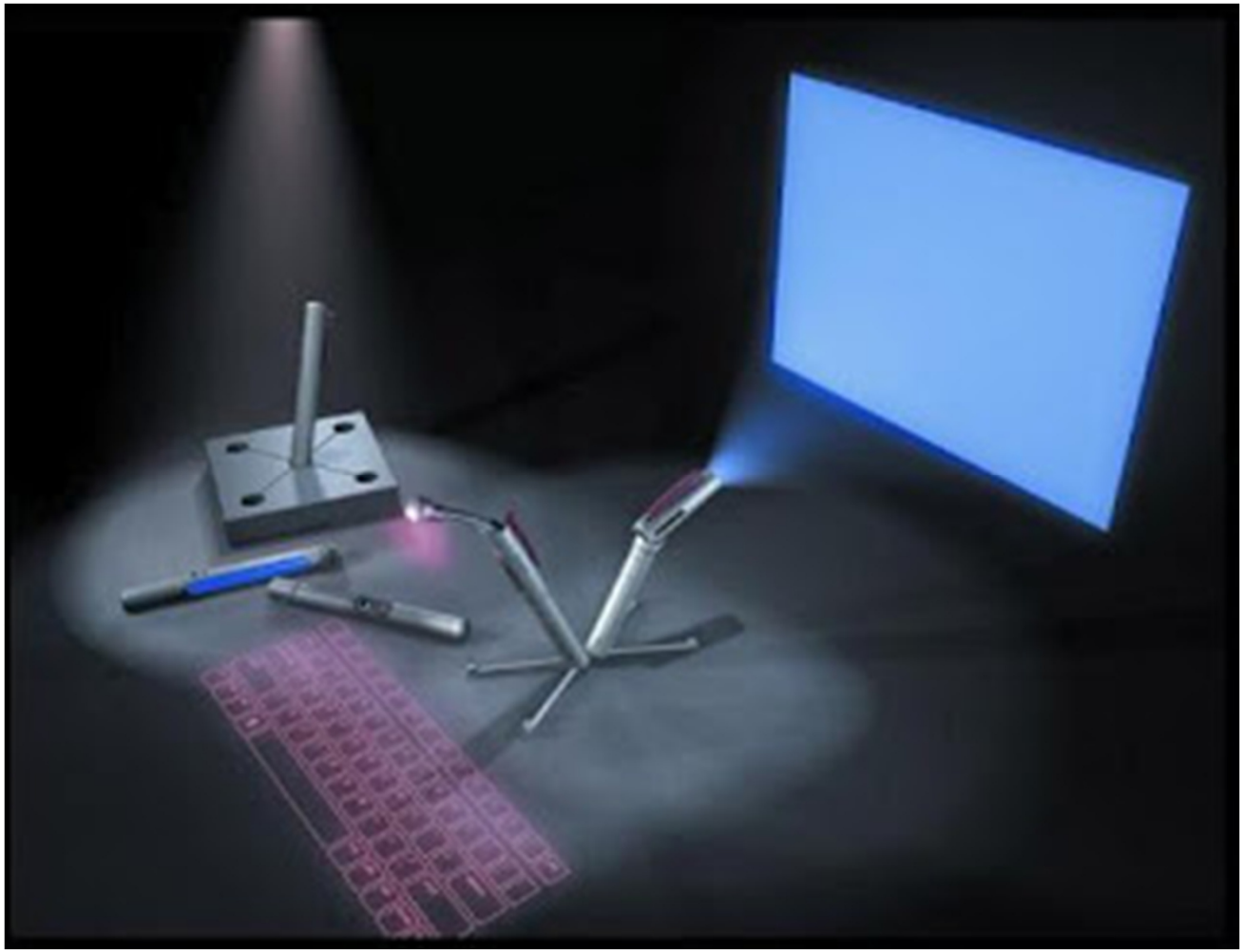
Generasi V ?
Next Generation Computer (Artificial Intelligence)




SONY
TechWeb
.com.cn


design your own
inspirations
signatures
decals
finish
purchase
Surface


Bonair Winery
Two Mountain Winery



HOLO2.0

More than a computer