



Informatica Aplicata

(Utilizarea Calculatoarelor si Servicii Internet)

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Introducere

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1



Cuprins

- Informatii utile
- Istoria calculatorului
- Structura calculatorului 1

2



Informatii utile – Structura cursului

- Cursul contine 2 parti principale care au ca scop:
 - familiarizarea utilizatorului cu partile componente ale calculatorului
 - Intoducerea si explicarea serviciilor internet
- Cursul se incheie cu examen
- Laboratorul se incheie cu colocviu de laborator
- Notare: 50p examen final (curs) + 50p laborator

3



Informatii utile – Utilizarea calculatorului

- Calculatorul – istoric si funcționalități
- Componentele calculatorului (HW si SW)
- Componente HW
- Componente SW
 - sisteme de operare
 - aplicatii (office, prelucrare de date,...)

4

Informatii utile – Servicii internet

- Introducere si istoricul Internet-ului
- Internet – notiuni de baza
 - Adrese IP
 - Arhitectura client-server
- Posta electronica (e-mail)
- World Wide Web (www)
 - Tehnologii web
 - Motoare de cautare
 - Baze de date
- Usenet si transferul de fisiere
 - FTP activ si FTP pasiv
 - File sharing – retele P2P
- Securitatea in Internet

5

Calculatorul – prieten sau dușman ??

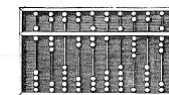
- Exista progres fără calculator?
- Existenta unui calculator garantează lipsa stresului?
- Funcționează conform principiului GIGO:
 Garbage In Garbage Out
- Unealta de lucru/mijloc de
informare/modalitate de relaxare



6

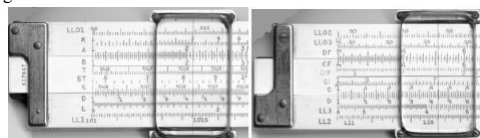
Istoria calculatorului

- Primul dispozitiv de calcul – abacul 3000 î.d.C.
- Calculatoare mecanice numite și ceasuri de calculat – sec XV
 - Wilhelm Schickard (1632), Blaise Pascal (1642)
- Gottfried Wilhelm von Leibniz (1671) introduce sistemul de numeratie binar
- Arithmometer – calculator mecanic în producție mare creat de Charles Xavier Thomas în 1820 realizează cele 4 operații de bază
- Rîgle de calcul – introduse între anii 1620-1630 după introducerea conceptului de logaritm
 - Calcule trigonometrice, ridicări la puteri și logaritmi
- Rîgilele de calcul folosite ca și simbol al meseriei de inginer.



<https://www.youtube.com/watch?v=nyCrDI7hRpE>

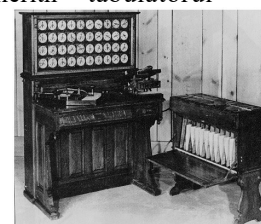
https://www.youtube.com/watch?v=xYhOoYf_XT0



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Istoria calculatorului

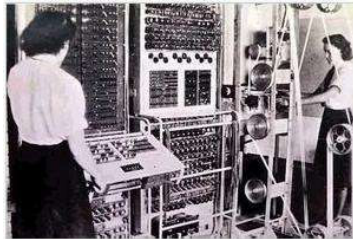
- Folosirea cartelor perforate în războaiele de țesut pentru a defini modelul – Joseph-Marie Jacquard 1801
- Calculator mecanic universal – Charles Babbage – “Analytical engine” 1837-1871
 - Folosește cartele perforate pentru programare
 - Folosește un motor cu aburi pentru a acționa mecanismele interne
 - Folosește sistemul zecimal de calcul
- Calcule pe baza de cartele perforate – Herman Hollerith – tabulatorul folosit la recensământul din 1890
 - Implementa operația de adunare cu acumulare – folosit în contabilitate
 - Rezultatele erau afișate cu ajutorul unor cadrane cu ac indicator



8

Istoria calculatorului

- Folosirea sistemului binar si implementarea lui cu relee electromecanice – calculatoare hibride electro-mecanice
 - Konrad Zuse – 1936 Z- series
- Colosus – primul calculator in totalitate electronic inventat de britanici pentru a descifra coduri
 - Foloseste tuburi cu vid – 1500
 - Procesa 5000 char/sec
 - Folosea banda perforata ca memorie



9

Istoria calculatorului

- 1946 – ENIAC – calculator pentru armata americana
 - Folosește tuburi cu vacuum – 17,000
 - Cântărea 27 tone ocupa 160 mc si consuma 160kWh
 - Perioada ceasului 200 microsecunde
 - Folosește sistemul zecimal, nu binar
 - A costat \$500,000
- 1949 – Manchester Mark1
 - Folosește un cilindru magnetic pentru a încărca programele in memorie
 - Memorie este implementata cu tuburi catodice
 - Timp de execuție pentru o instrucțiune 1,8 sec
- 1951 – UNIVAC – primul calculator comercial
 - 5,200 tuburi cu vid si consuma 125 kWh
 - Frecventa ceasului sistem 2,25 MHz

10

Istoria calculatorului – generatia a 2-a

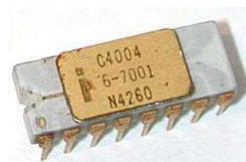
- Aparitia tranzistorului – Bell Telephone Laboratories 1947
- Texas Instruments si Fairchild Semiconductor inventeaza circuitul integrat in 1959
- IBM introduce seria 360 in aprilie 1964 care in scurt timp devine calculatorul mainframe folosit pe scara larga in institutii



11

Istoria calculatorului – home computer

- 1966 - memoria RAM dinamica Robbert Dennan IBM
- 1971 – Intel introduce primul procesor comercial 4004 – 2300 tranzistori, 10 μ m
 - Frecventa de ceas 740 kHz
 - 60,000 instructiuni pe secunda
 - 4 KB memorie, 4 biti, apoi 8008 – 8 biti
- 1978 -Intel introduce procesorul 8086 pentru calculatoare IBM PC
 - Frecventa de ceas 4,77 – 10 MHz
 - 640 KB memorie
 - 16 biti, 29000 tranzistori



12

Istoria calculatorului – home computer

- 1975 – MITS Altair 8800 primul calculator personal
 - Foloseste procesor Intel 8080A
 - Frecventa de ceas 2 MHz
 - Memorie 256 octeti
 - Pret aproximativ \$600
 - SW: Altair BASIC dezvoltat de Microsoft



<https://www.youtube.com/watch?v=suyiMfzmZKs>

13

Istoria calculatorului – SW

- Aparitia primului sistem de operare folosit de diferiti producatori de HW: CP/M-80 creat de Digital Research
- 1977 apare calculatorul Apple II produs de Steve Jobs and Steve Wozniack
- Succes de piata foarte mare datorita
 - Arhitecturii deschise (se puteau adauga componente ulterior)
 - Display in culori
 - Design avangardist
 - Rula primul program de tip spread-sheet : Visi-calc



Apple 1



Apple 2

14

Istoria calculatorului – IBM PC

- 1981 – IBM decide sa creeze calculatoare personale - IBM PC
 - Frecventa maxima 4,77 MHz
 - Ruleaza sistemul de operare PC-DOS licentia de la Microsoft
 - Foloseste casete audio pentru stocarea datelor
- 1983 – Aparitia modelului PC-XT (eXtended Technology)
 - Memorie interna 640KB
 - Exista posibilitatea folosirii unui hard-disk
- 1984 – Aparitia modelului PC-AT (Advanced Technology)
 - Foloseste procesorul 80286
 - Memoria interna 1 MB
- Folosirea unor specificatii publice care permitea si altor producatori sa creeze aceleasi produse au impulsionat dezvoltarea pietei PC-urilor



PC-XT



PC-AT

15

Home computer

Comodore PET , 1977

- CPU: 6502, 1 MHz
- RAM: 4 or 8 KB / 8, 16, or 32 KB / ROM: 18 KB, including BASIC 1.0 / 20 KB, including BASIC 2.0
- Monitor 9" monocrom
- HC 85
 - Procesor Z80, 3.5MHz
 - ROM 16kB, RAM 64kB, limbaj: BASIC
- CIP (Calculator de instruire personal), 1985, Electronica
 - Procesor echivalent Z80-A, 3.5 MHz
 - ROM 16-128 kB, RAM 16-256kB



16



Istoria calculatorului

- Mai multe pe Internet
- Ex:
 - https://en.wikipedia.org/wiki/History_of_computing_hardware
 - <http://www.techiwarehouse.com/engine/a046ee08/Generations-of-Computer>

17

Gottfried Leibniz,
Explication de
l'arithmétique binaire"
(1705)

Noțiuni de calcul binar

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| • 1001 277 | | | | | | | | | | | |
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| • 1011 279 | | | | | | | | | | | |
| • 1100 280 | | | | | | | | | | | |
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| • 1110 282 | | | | | | | | | | | |
| • 1111 283 | | | | | | | | | | | |
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| • 1110 410 | | | | | | | | | | | |
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Noțiuni de calcul binar

Un exemplu de reprezentare în baza 10 (uzuală)

Fie numărul: 135

Baza 10 constă în cifrele: 0, 1, 2, ..., 9

Folosim puteri ale lui 10: $10^0 = 1$, $10^1 = 10$, $10^2 = 100$ etc.

Deci putem scrie: $135 = 5 \cdot 10^0 + 3 \cdot 10^1 + 1 \cdot 10^2$

Baza 2 (sistemul binar) are doar cifrele **0** și **1**.

Conversie din binar în zecimal:

Exemplu, fie nr. 101

$$101 = 1 \cdot 2^0 + 0 \cdot 2^1 + 1 \cdot 2^2 = 5$$

Întrebare: cât este 1001?

Puteri ale lui 2:

$$2^3 = 8, 2^4 = 16, 2^5 = 32, 2^6 = 64, 2^7 = 128 \text{ etc.}$$

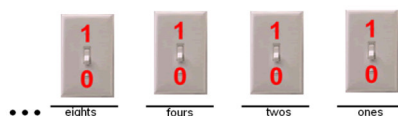
$$2^{10} = 1024$$

19

Noțiuni de calcul binar

De ce s-a ales sistemul binar și nu cel zecimal?

E nevoie doar de 1 switch pentru a reprezenta o cifră:



Exemplu: numărul 18:



○ = OFF = 0 ● = ON = 1

Pt. numărul 18, în binar ajungeau 5 tuburi electronice, față de 20 la ENIAC (sistem zecimal)

20

Noțiuni de calcul binar

Byte, kilobyte, megabyte, gigabyte etc.

1 bit = 0 sau 1

1 octet (byte) = 8 biți

8 biți – au fost considerați suficienți pentru a coda un caracter
8, fiind o putere a lui 2, permite adresarea la nivel de bit.

1 kilobyte = 1024 octeți (se folosesc puteri ale lui 2: $2^{10} = 1024$)

1 megabyte = 1024 kilobytes = 2^{20} bytes = 1048576 bytes

1 gigabyte = 1024 megabytes = 2^{30} bytes

1 terabyte = 1024 gigabytes = 2^{40} bytes

Exemplu – adunare în binar:

| | |
|-------|-------|
| 1010+ | 1011+ |
| 0101 | 0101 |
| 1110 | 10000 |

21

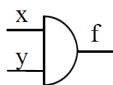
Porți logice

Porțile logice sunt componentele de baza ale oricărui sistem digital.

Există doar trei operații de bază:

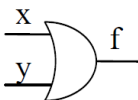
- SAU (OR) cu simbolul de operare “+” sau “ \cup ”.
- ȘI (AND) cu simbolul de operare “.” sau “ \cap ”.
- NU (NOT) cu simbolul de operare “-”.

Poarta ȘI:



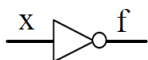
| y | x | f |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

Poarta SAU:



| y | x | f |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 1 |

Poarta NU:

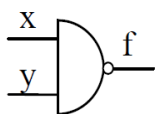


| x | f |
|---|---|
| 0 | 1 |
| 1 | 0 |

22

Porți logice

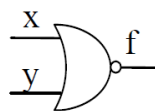
Poarta NAND (ȘI-NU):



| y | x | f |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

$$f = \overline{x \cap y}$$

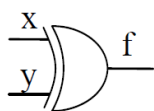
Poarta NOR (SAU-NU):



| y | x | f |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 0 |

$$f = \overline{x \cup y}$$

Poarta XOR (SAU EXCLUSIV):



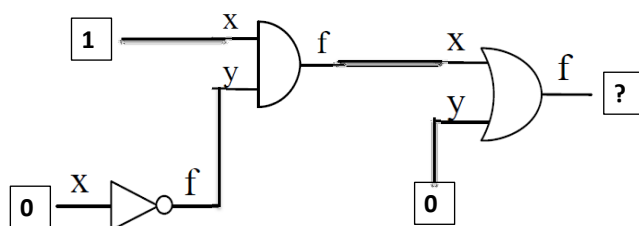
| y | x | f |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

$$f = x \oplus y$$

23

Porți logice

Intrebare:



De testat si pe:

<https://logic.ly/demo>

24

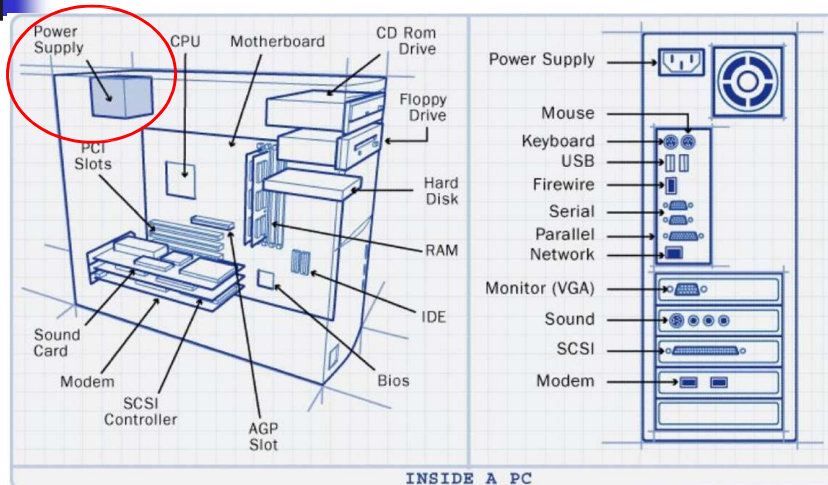
Structura unui PC – P1

- Unitatea Centrala
- Monitor
- Periferice
 - Tastatura
 - Mouse
 - Imprimanta
 - Scanner
 - ...



25

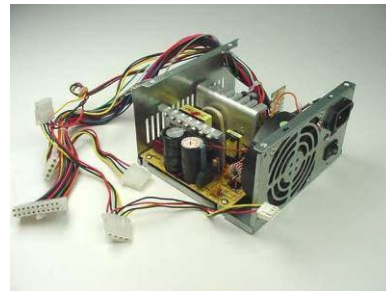
Unitatea Centrala



26

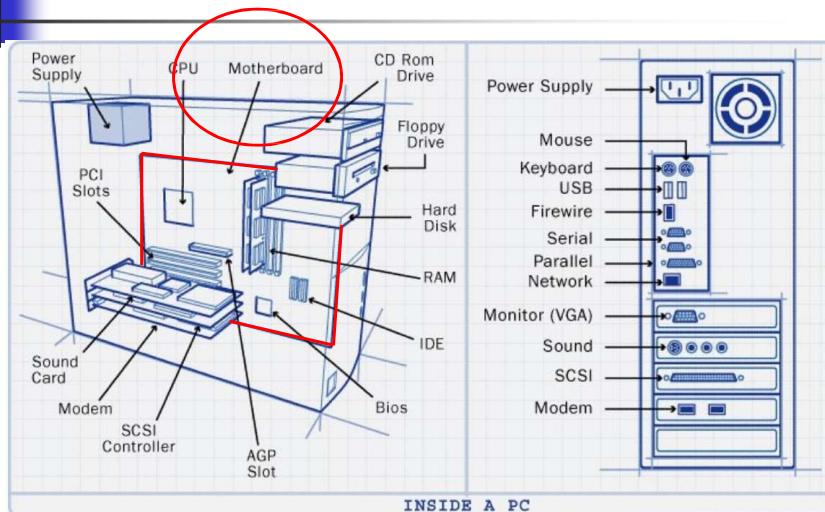
Sursa de Alimentare

- Converteste curentul alternativ (AC) de la retea in curent continuu (DC) necesar pentru functionarea PC-ului
- Se mai numeste si sursa in comutatie deoarece utilizeaza tehnologia de comutatie pentru convertirea AC in DC
- Tensiunile DC tipice date sunt:
 - 3.3 volts
 - 5 volts
 - 12 volts
 - ...
- 3.3- si 5-volti sunt folosite pentru circuitele digitale, iar 12-volti este folosita pentru alimentarea motoarelor pentru disk drives si ventilatoare
- Principala specificatie este in Wati



27

Unitatea Centrala



28

Placa de baza (Motherboard)

- Permite componentelor unui calculator sa primeasca energia necesara functionarii si sa comunice unele cu altele

