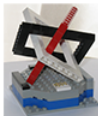


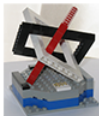
Lenguaje FORTRAN

Luis Rández

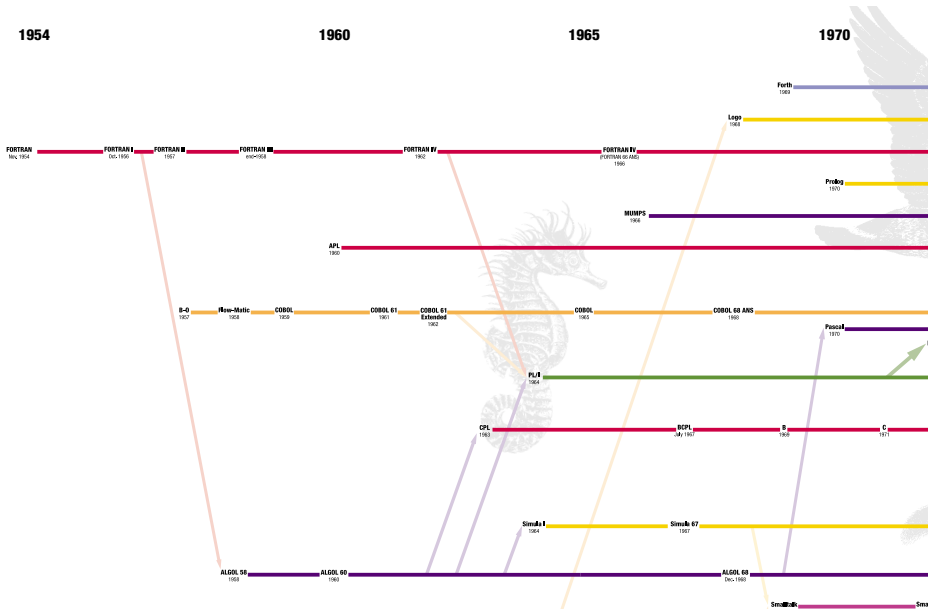
octubre-2014



A long time ago in...



Historia de los lenguajes de programación. O'REILLY



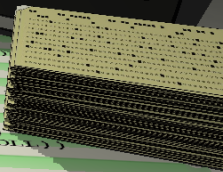
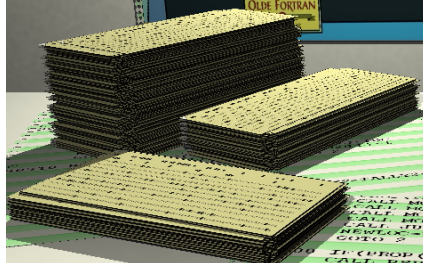
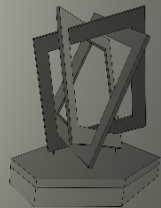


John Backus (1924-2007) fue un informático estadounidense. Ganador del Premio Turing en 1977 por sus trabajos en sistemas de programación de alto nivel, en especial por su trabajo con FORTRAN, lenguaje que desarrolló en 1954.

1957: IBM desarrolla el compilador optimizado de FORTRAN.

Uno de los *top ten algorithms* del siglo XX

```
parameter(n=1000)
real*8 a(n,n), b(n,n), c(n,n)
!  inicializar a, b
!  c=a*b
!  :
do i=1, n
  do j=1, n
    c(i,j)=0.0d0
    do k=1, n
      c(i,j)=c(i,j)+a(i,k)*b(k,j)
    end do
  end do
end do
stop
end
```

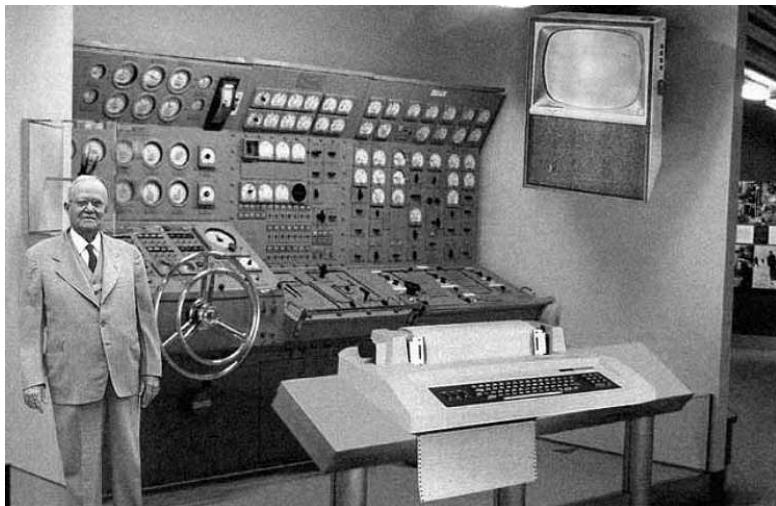


```
CALL MOVE(TROLL,100,0)
CALL MOVE(TROLL,PLAC(TROLL))
CALL MOVE(TROLL,100,FXD(TROLL))
NEWLOC=LOC
GOTO 2

300 IF (PROP (TROLL) .NE. 1) GOTO 30310
CALL RSPEAK (TROLL, 1)
PROP (TROLL) =0
CALL MOVE (TROLL2,0)
CALL MOVE (TROLL2+100,0)
CALL MOVE (TROLL, PLAC (TROLL))
CALL JUGGLE (TROLL+100, FXD (TROLL))
NEWLOC=LOC
GOTO 2

C
30310 NEWLOC=PLAC (TROLL) +FXD (TROLL) -LOC
IF (PROP (TROLL) .EQ. 0) PROP (TROLL) =1
IF (.NOT. TOTING (BEAR)) GOTO 2
CALL RSPEAK (162)
PROP (CHASM) =1
PROP (TROLL) =2
CALL RSPEAK (162)
```

1954: Apariencia de un *home computer* en 2004



Scientists from the RAND Corporation have created this model to illustrate how a "home computer" could look like in the year 2004. However the needed technology will not be economically feasible for the average home. Also the scientists readily admit that the computer will require not yet invented technology to actually work, but 50 years from now scientific progress is expected to solve these problems. With teletype interface and the Fortran language, the computer will be easy to use.

2004: hoax



Breve historia local de la evolución de los ordenadores «centrales»

D. Rafael Cid, Catedrático de «Astronomía General y Topografía y Geodesia» de la Facultad de Ciencias apoyó con entusiasmo cualquier propuesta que favoreciera el desarrollo de la Ciencia, y a principios de los años setenta impulsó la adquisición del primer ordenador IBM 1620 de esta Universidad, financiado por la Caja de Ahorros de Zaragoza.



Rafael Cid, (1918-2004)

1974

IBM 1620. Ordenador digital decimal (**B**inary**C**ode**D**ecimal). Memoria de 20000-60000 dígitos decimales y la velocidad de la CPU era $\approx 1\text{Mhz}$.
Ensamblador, FORTRAN.



1976

PDP-11/55. Procesador de 16 bits, Memoria de 128K. Ensamblador, FORTRAN, BASIC. **S.O.:** RSX-11.



1979

VAX-11/780. S.O.: VAX/VMS, Ultrix, BSD UNIX.



1987

VAX-8300. Procesador de 32 bits dual con frecuencia 5Mhz.

S.O.: VAX/VMS, Ultrix, BSD UNIX.

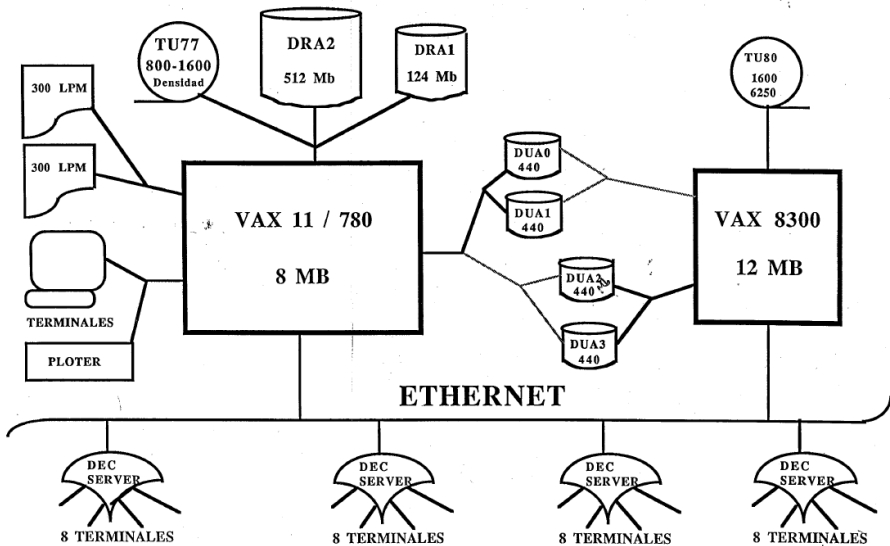


La famosa terminal de fósforo verde



Terminales para conexión con ordenadores centrales

ACTUAL CONFIGURACION DE LOS EQUIPOS VAX



Pero, ¿había juegos?

Los juegos de entonces... Advent

```
Welcome to Adventure!!  Would you like instructions?
>yes
Somewhere nearby is Colossal Cave, where others have found fortunes in
treasure and gold, though it is rumored that some who enter are never
seen again.  Magic is said to work in the cave.  I will be your eyes
and hands.  Direct me with commands of 1 or 2 words.  I should warn
you that I look at only the first eight letters of each word.
(Should you get stuck, type "HELP" for some general hints.  For infor-
mation on how to end your adventure, etc., type "INFO".)

- - -
This program was originally developed by Willie Crowther.  Most of the
features of the current program were added by Don Woods (DON @ SU-AI).
The current version was done by Kent Blackett and Bob Supnik.

- - -
Bug reports and other correspondence should be sent to:

    Digital Equipment Computer Users Society
    One Iron Way, MR2-3/E55
    Marlboro, Mass. 01752
    Attn:  Adventure Maintenance

You are standing at the end of a road before a small brick building.
Around you is a forest.  A small stream flows out of the building and
down a gully.
> go in
You are inside a building, a well house for a large spring.
There are some keys on the ground here.
There is a shiny brass lamp nearby.
There is food here.
There is a bottle of water here.
>take bottle
Ok
```

Los juegos de entonces... Super Star Trek

```
Short-range scan                                     Long-range scan
 1 2 3 4 5 6 7 8 9 10 Stardate      3056.7, Time Left 14.00      20  1  7
 1 . . . . . * . * . Condition     GREEN, 0 DAMAGES           1  5  1
 2 . . . . . . . . . Position      3 - 2 , 7 - 9            6 403  8
 3 . . . . . . . . . Life Support  ACTIVE
 4 . . . . . . . * . Warp Factor    5.0
 5 . . . . . . . . . Energy         5000.00
 6 . . . . . . . . . Torpedoes      10
 7 . . * . . . . . E . Shields       DOWN, 100% 2500.0 units
 8 . @ . . . . . . . Klingons Left  29
 9 . . . . . . . . . Major system   Daran V
10 . . . . . . . * .
10 torpedoes left.
Number of torpedoes to fire- 1
Target sector for torpedo number 1- 28

Beg your pardon, Captain?
Spock- "The inhabited planet Daran V
        is located at Sector 8 - 2, Captain."

COMMAND> █
```

1991

DEC ALPHA VAX-STATION 3100 Procesador alpha KA46-A de 64 bits a 25 MHz y 16 megabytes de memoria.

S.O.: VAX/VMS, Ultrix, BSD UNIX. FORTRAN, C...



2007

CAESARAUGUSTA



CAESARAUGUSTA

Nodo en Aragón de la Red Española de Supercomputación

<http://bifi.unizar.es/caesaraugusta>

El nodo de Zaragoza (BIFI) pertenece a la Red Española de Supercomputación.

2007

CAESARAUGUSTA

La potencia de cálculo es 4.5 TeraFLOPS

- 512 procesadores PowerPC 970FX a 2.2 GHz
- 1TB de memoria RAM
- 14 + 10 TBytes de espacio de almacenamiento
- Redes de interconexión Myrinet y Gigabit Ethernet
- S.O.: SUSE Linux
- GCC, LAPACK, MPICH, R...

2000–

- Desaparición MS/DOS, OS/2 Warp
- Desaparición progresiva de los clónicos

Aparición de nuevos equipos

- Portátiles
- *Netbooks*
- *Ultrabooks*
- *Tablets*
- ⋮

2000–

- Desaparición MS/DOS, OS/2 Warp
- Desaparición progresiva de los clónicos

Aparición de nuevos equipos

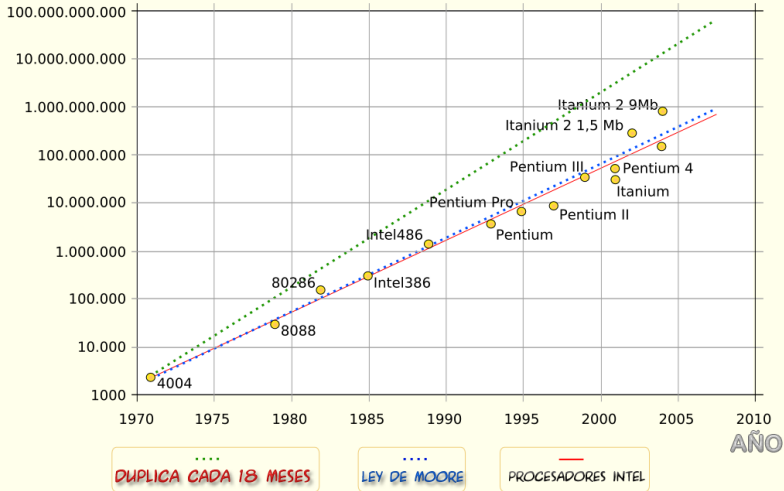
- Portátiles
- *Netbooks*
- *Ultrabooks*
- *Tablets*
- ⋮

y S.O. como *iOS* en 2007 y *Android* en el 2008.



Recientemente...

NUMERO DE TRANSISTORES



Gordon Moore (cofundador de Intel) afirmó en 1965 que aproximadamente cada dos años se duplica el número de transistores en un circuito integrado.

MDBNCH: molecular dynamics benchmark

Procesador/compilador	tiempo sg	fecha
Intel Dual Core E6700 2.66 Ghz Gnu g77	1.0	Jun07
AMD Athlon 64 bit 4000+ 2.6GHZ Gnu g77	1.4	Jul06
Intel Pentium IV 2.8 GHZ Gnu g77	2.3	Dic05
Intel Pentium III 1066 MHZ Gnu g77	5.0	Dic05
Intel-MMX 266MHz, OS/2 V4 FP10, Watcom F77	30.9	May99
Intel P133/60ns, Linux, glibc 2, g77	59.6	Ago97
Intel Pentium 100MHz, OS/2+DOS, Watcom F. 9.5	90.7	Feb96
Intel 486DX4/100MHz, Win95, g77+gcc	210.0	Jun98
IBM 3090E, MVS/XA, VS Fortran 2.3.0, opt(3), vector	99.0	Dic89
IBM 3090E, MVS/XA, VS Fortran 2.3.0, opt(3), scalar	118.0	Dic89
VAX 9000-410, Vax Fortran, scalar	101.0	Abr91
Vax 8800, VMS, Vax Fortran 5.4, /opt	854.0	Mar90
Cray T90, Unicos 9.0.1., cf77	15.6	Ene98
Cray C90, Unicos 7.C.3, cf77	28.4	Dic93
Cray XMP/48, cft77 2.0, 46-bit integers, vector	55.0	Dic88
Cray XMP/48, cft77 2.0, 46-bit integers, scalar	73.0	Dic88