Fastest Computers & Performance Metrics:

Key Metrics to Measure Computer Speed:
- FLOPS – Floating Point Operations per Second (TFLOPS, PFLOPS, EFLOPS)
- Clock Speed – GHz (CPU cycles per second)
- Cores/Threads – More = better parallelism
- Architecture – Efficiency (e.g., ARM vs x86)
- Memory – Size & bandwidth affect speed
- Storage – SSDs (especially NVMe) outperform HDDs
- Networking – Fast interconnects (e.g., InfiniBand)
- Power Efficiency – Performance per watt
- Benchmarks – LINPACK, Geekbench, Cinebench, MLPerf (AI)

Fastest Computers: Then vs Now:

1960 – IBM 7030 "Stretch":
- Speed: ~1 MFLOPS
- Memory: ~256 KB
- Size: Room-sized
- Use: Scientific research

2025 – Frontier (ORNL, USA):
- Speed: ~1.2 exaFLOPS
- Hardware: AMD CPUs + GPUs
- Memory: Hundreds of TBs
- Use: AI, health, climate modeling

Future – El Capitan (Expected 2025):
- Projected Speed: >2 exaFLOPS
- Use: National security simulations (LLNL)

Performance Leap (1960 to 2025):
- Speed increase: ~1.2 to 2 quintillion times faster
- Memory: KB to TB scale
- Power usage: <10 kW to >20 MW

What Are Back End Tubes?

Not a standard term. Possible meanings:
- Vacuum tubes – Used in early computers for logic/memory
- Back End of Line (BEOL) – Stage in chip manufacturing (wiring)
- CRTs – "Tubes" in old televisions or monitors

What Is Quantum Computing?

- Based on quantum mechanics
- Qubit – Can be 0, 1, or both (superposition)
- Entanglement – Qubits influence each other
- Advantage – Exponential speed-up for specific problems
- Applications – Cryptography, molecular simulation, optimization

BINARY:
Binary, Hexadecimal, representing fractional numbers, representing characters
Binary Base 2 Systen, Binary, 0 or 1, 2 unique digits,
8-bit (binary digit) binary number: 01101101^2 = 0 x 2^7 + 1x2^5 + 1x2^3+1x2^2+0x2^1+1x2^0
0x2^4

Manufactuer: Lenovo

Model/Brand: Thinkpad T14 Gen 4 0

Processor: AMD Ryzen 5 Pro 7540U w/Radeon 740M Graphics 3.2 GHz

Installed RAM: 16.0GB, (14.7GB usable)

Device ID: bC9B7F88-D3F3-42AD-AC65-F82421BED9

Product ID: 00329-10183-86144-AA907

System type: 64-bit operating system, x64-based processor

Edition: Windows 11 Enterprise

Vession: 23H2

Installed on: 1/28/2025

OS Build: 22631.2861

Experience: Windows Feature Experience Pack 1000.22681.1000.0

09

0	0	0	0	9	1	0
128	64	32	16	8	4	2

10 00

hexadecimal

IPv6

[illegible] RGB [illegible]

2015

00100000 0000

[illegible] 109.407510

$= 1 \times 10^2 + 0 \times 10^1 + 9 \times 10^0 + 4 \times \ldots$