

(Part 1)

How Google Willow is 1 Nonillion+ times faster than ordinary supercomputers (in standard benchmark test) - 10 Septillion years divided by 5 minutes = 1,051,200,000,000,000,000,000,000,000

- Google Willow chip spectacle:
 - https://youtu.be/W7ppd_RY-UE?si=Hyu77K9X6E6wD5B_&t=29
 - https://youtu.be/NB9K4CoYSIM?si=6jedW8Tz5t_upnKQ
 - https://youtu.be/G3o4sPpGWFI?si=IZCS0b_v67oJWGzv
- Quantum computers can Increase Human Lifespan
 - <https://www.sify.com/science-tech/want-to-live-150-years-digital-biology-will-soon-crack-it/#:~:text=The%20modelling%20and,case%20you%20m,issued%3A>
- Quantum Computer technology @Xanadu
 - <https://thelogic.co/news/federal-fund-backs-xanadu-with-40m-to-develop-quantum-computing-technology/>
- Antikythera Mechanism Device details
 - <https://historified.in/2024/04/16/decoding-the-antikythera-mechanism-unraveling-the-secrets-of-ancient-technology/>
 - [https://en.wikipedia.org/wiki/Antikythera_mechanism#:~:text=The%20Antikythera%20mechanism%20\(/,and%20worked.%5B20%5D](https://en.wikipedia.org/wiki/Antikythera_mechanism#:~:text=The%20Antikythera%20mechanism%20(/,and%20worked.%5B20%5D)
 - <https://www.nature.com/articles/s41598-021-84310-w#:~:text=Reconstructing%20the%20Cosmos%20at%20the,in%20Supplementary%20Discussion%20S2.>
- Charles Babbage and his models
 - What exactly is a computer?
<https://www.hpe.com/in/en/what-is/compute.html#:~:text=The%20term%>

[20%22compute%22%20in%20the,algorithm%20execution%2C%20and%20mathematical%20operations.](#)

- b. [<https://www.sciencemuseum.org.uk/objects-and-stories/charles-babbage-s-difference-engines-and-science-museum#:~:text=Example%20of%20a,Science%20Museum%20Group>](#)
- c. Clips - [\[https://youtu.be/0anlyVGeWOI?si=g8P4YUL__g2PH0Fe&t=35\]\(https://youtu.be/0anlyVGeWOI?si=g8P4YUL__g2PH0Fe&t=35\)](#)
- d. [<https://youtu.be/BlbQsKpq3Ak?si=SkMwD9GBDhjQcqiY&t=91>](#)
- e. Punch Cards as initial algorithms - [<https://www.wowstem.org/post/ada-lovelace#:~:text=This%20one%20was,really%20clever%20idea!>](#)
- f. [\[https://en.wikipedia.org/wiki/Note_G#:~:text=In%20the%20modern%20era%2C%20thanks,to%20a%20minor%20typographical%20error.\]\(https://en.wikipedia.org/wiki/Note_G#:~:text=In%20the%20modern%20era%2C%20thanks,to%20a%20minor%20typographical%20error.\)](#)

6. First Transistor:

- a. [\[https://en.wikipedia.org/wiki/History_of_the_transistor#:~:text=The%20Bell%20team%20made,transistor%20had%20been%20invented.\]\(https://en.wikipedia.org/wiki/History_of_the_transistor#:~:text=The%20Bell%20team%20made,transistor%20had%20been%20invented.\)](#)
- b. [\[https://engineerguy.com/making/background-transistor-operation.pdf?utm_source=chatgpt.com\]\(https://engineerguy.com/making/background-transistor-operation.pdf?utm_source=chatgpt.com\)](#)
- c. [<https://www.intel.com/content/www/us/en/newsroom/tech101/the-transistor-explained.html#gs.j64res:~:text=How%20the%20Modern,of%20the%20universe.>](#)
- d. Vacuum Tube technology - [\[https://youtu.be/FU_YFpfDqqA?si=Jex73SE2WrHNMpq0&t=168\]\(https://youtu.be/FU_YFpfDqqA?si=Jex73SE2WrHNMpq0&t=168\)](#)
- e. [\[https://en.wikipedia.org/wiki/History_of_the_transistor#:~:text=First%20working%20transistor%5B,transistor%20had%20been%20invented.\]\(https://en.wikipedia.org/wiki/History_of_the_transistor#:~:text=First%20working%20transistor%5B,transistor%20had%20been%20invented.\)](#)

7. Moore's Law and it's implications -

- a. <https://www.waferworld.com/post/how-small-can-transistors-get#:~:text=How%20Big%20Is%20the%20Typical,point%20are%20sub%2D100%20nanometers.>
- b. <https://www.investopedia.com/terms/m/mooreslaw.asp#:~:text=seconds Volume%200%25-,What%20Is%20Moore%27s%20Law%3F,was%20an%20observation%20and%20extrapolation%20that%20has%20held%20s teady%20since%201965.,-KEY%20TAKEAWAYS>
- c. https://en.wikipedia.org/wiki/Transistor_count#Microprocessors:~:text=Pl ot%20of%20MOS%20transistor%20counts%20for%20microprocessors%20against%20dates%20of%20in%C2%ADtro%C2%ADduction.%20Th e%20curve%20shows%20counts%20doubling%20every%20two%20yea rs%2C%20per%20Moore%27s%20law.

8. More about Scilly Naval Disaster

<https://historicengland.org.uk/listing/what-is-designation/heritage-highlights/sin king-of-ship-lead-to-invention-of-marine-chronometer/#:~:text=On%2021%20O ctober,25%20mariners%20survived.>

9. Pascaline Calculator technology -

<https://www.britannica.com/technology/Pascaline#:~:text=Pascaline%2C%20t he%20first,next%2010%20years.>

10. Thermionic Emission and Edison Effect

https://en.wikipedia.org/wiki/Thermionic_emission#:~:text=This%20effect%20h ad,%5B23%5D

11. Richard Feynman On Quantum computers -

<https://www.forbes.com/sites/ibm/2016/05/04/with-the-dawn-of-quantum-comp uting-lets-build-a-quantum-community/#:~:text=In%201981%2C%20at,look%2 0so%20easy.%22>

12. Feynman proposing the idea of using Spin of electrons as computer bits
<https://drive.google.com/file/d/1whKp9Y4lwNUKqoN8MkZXOynG9vTI66wy/view?usp=sharing>
13. Potential applications of Quantum Computers and their power
- <https://builtin.com/hardware/quantum-computing-applications#:~:text=10%20Quantum%20Computing%20Applications%20to,new%20era%20in%20quantum%20computing.>
 - <https://pixelplex.io/blog/quantum-computing-applications/>
 - <https://www.sify.com/science-tech/want-to-live-150-years-digital-biology-will-soon-crack-it/#:~:text=The%20modelling%20and,case%20you%20missed%3A>
14. Google Willow performance statistics
- https://youtu.be/W7ppd_RY-UE?si=I951ryaop1I8ZXeN&t=110
 - <https://www.quantum-machines.co/blog/understanding-googles-quantum-error-correction-breakthrough/#:~:text=At%20the%20heart%20of%20the%20system%20was%20real%2Dtime%20synchronization.%20Every%20correction%20cycle%20had%20to%20complete%20within%201.1%20%C2%B5s%E2%80%94a%20narrow%20window%20in%20which%20the%20qubits%20were%20measured>