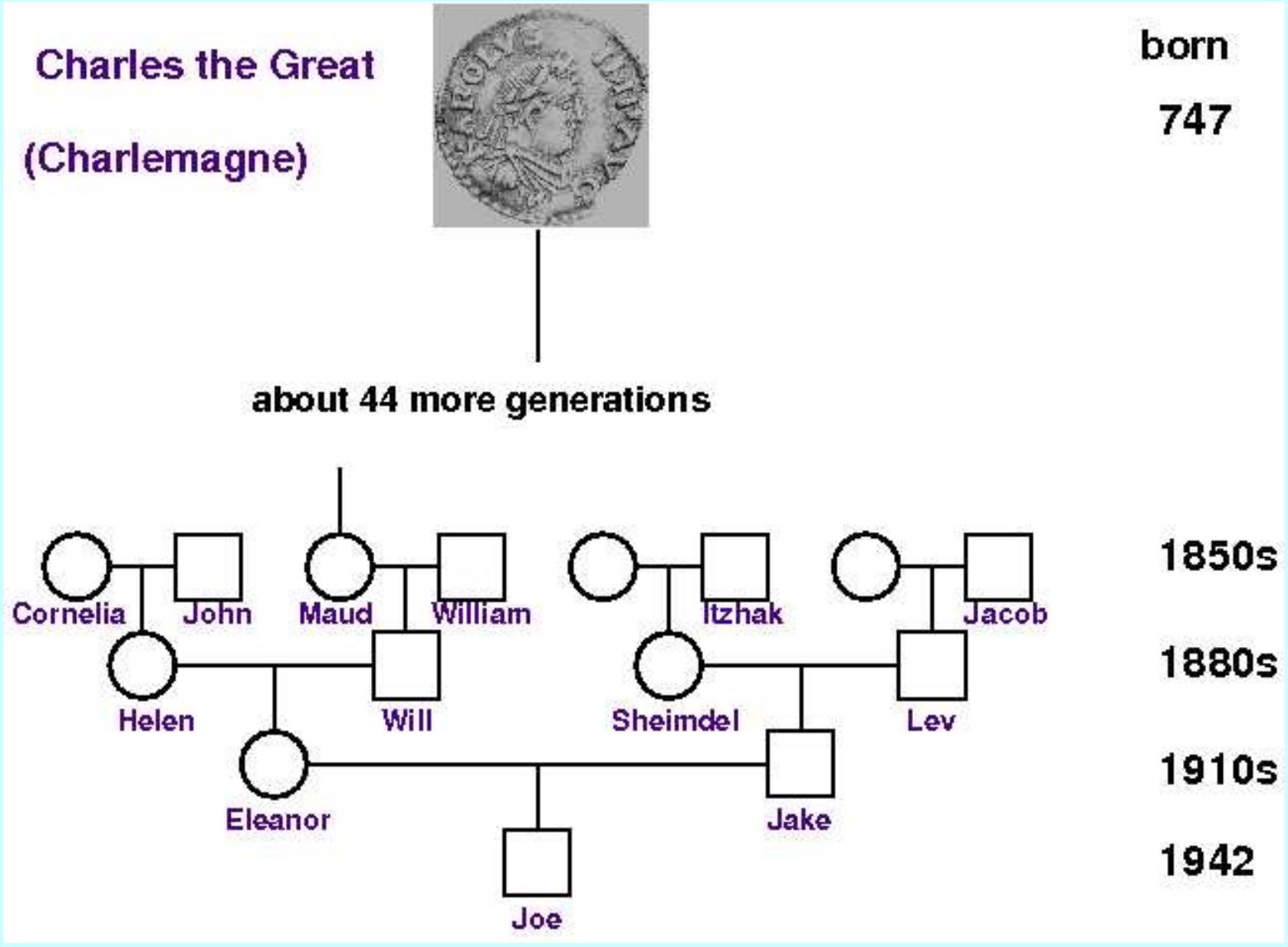
Who your genes come from – in the short term and in the long term

6 August 2018.

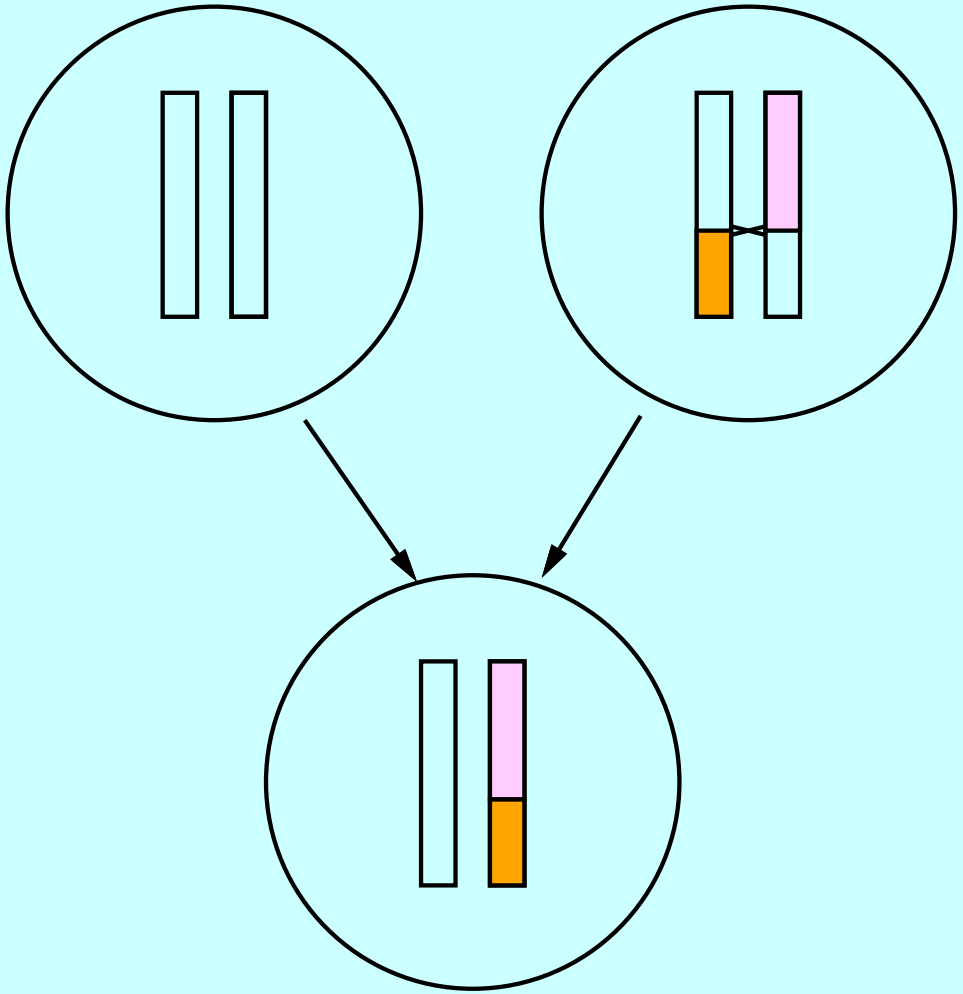
Joe Felsenstein

Tech Forum

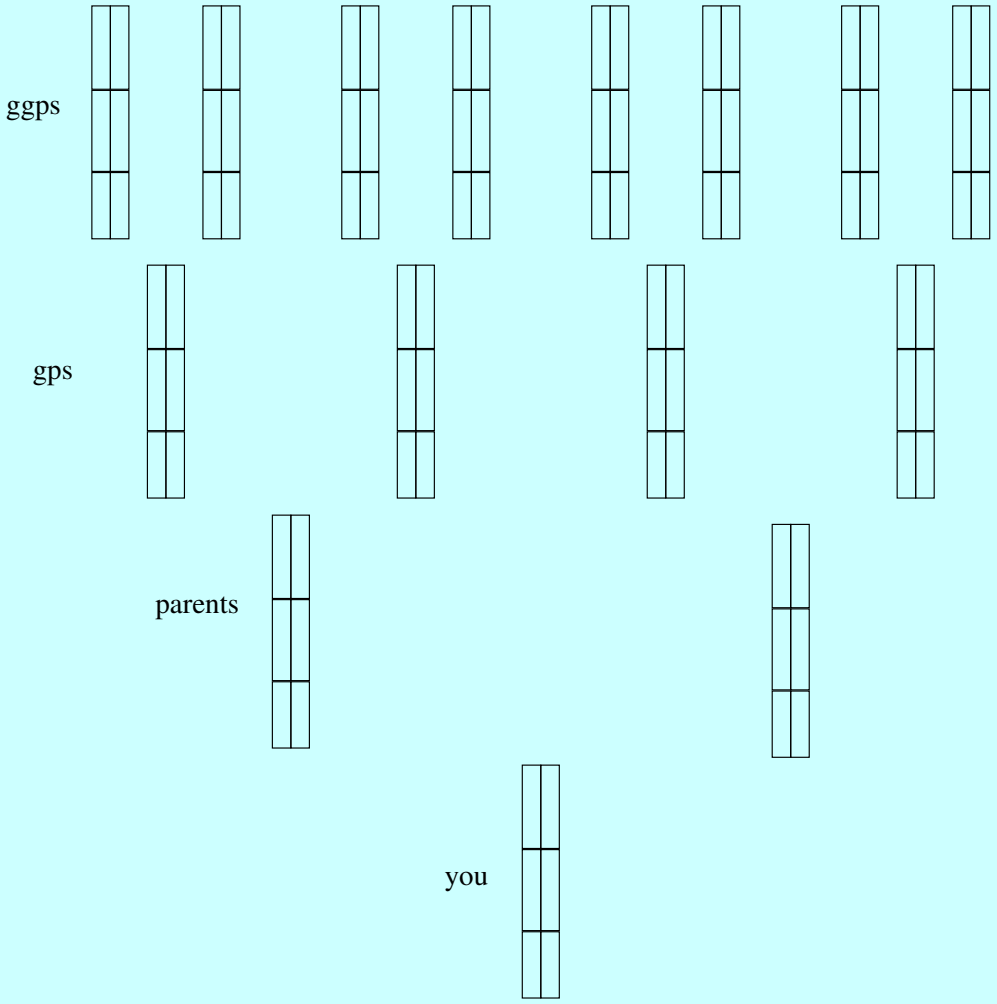
My ancestor?


Charles the Great
(Charlemagne)
born
747
about 44 more generations
Cornelia
John
Maud
William
Itzhak
Jacob
1850s
Helen
Will
Sheimdel
Lev
1880s
Eleanor
Jake
1910s
Joe
1942

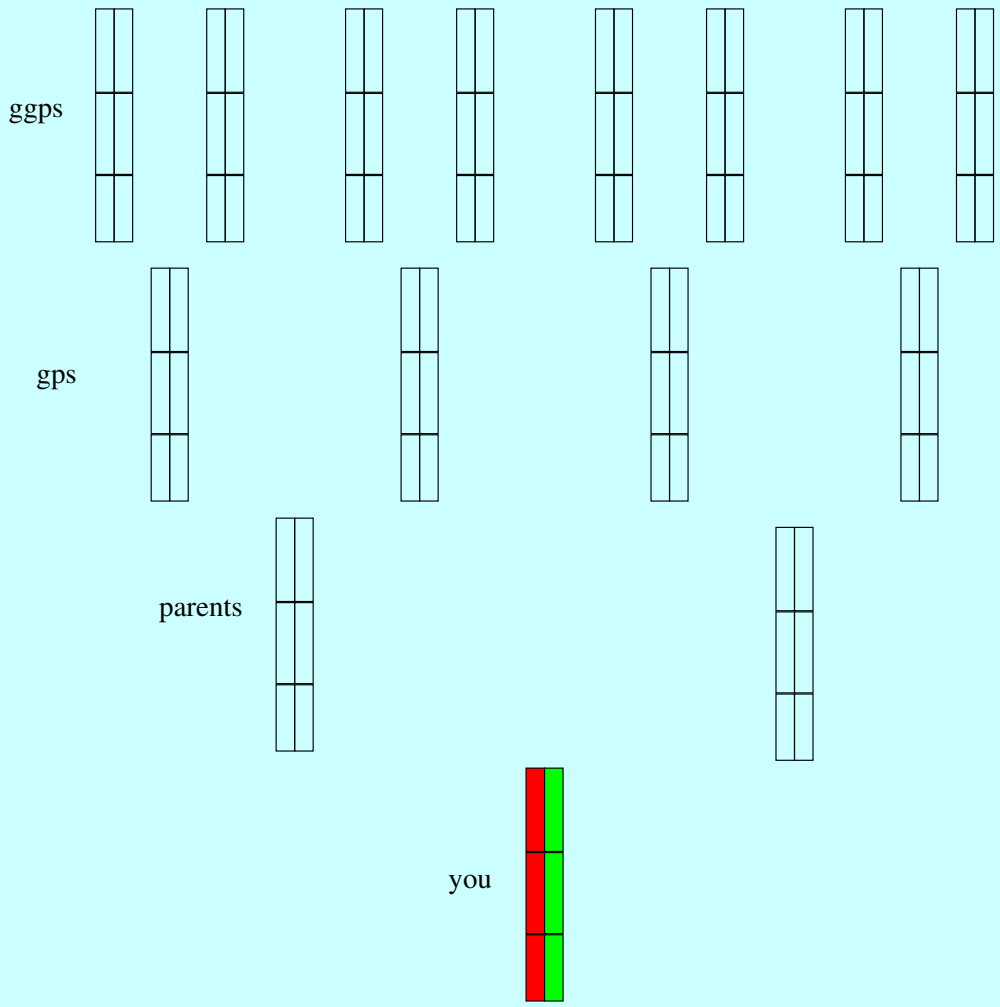
Crossing over (recombination)



Genes being inherited in a pedigree



Genes being inherited in a pedigree



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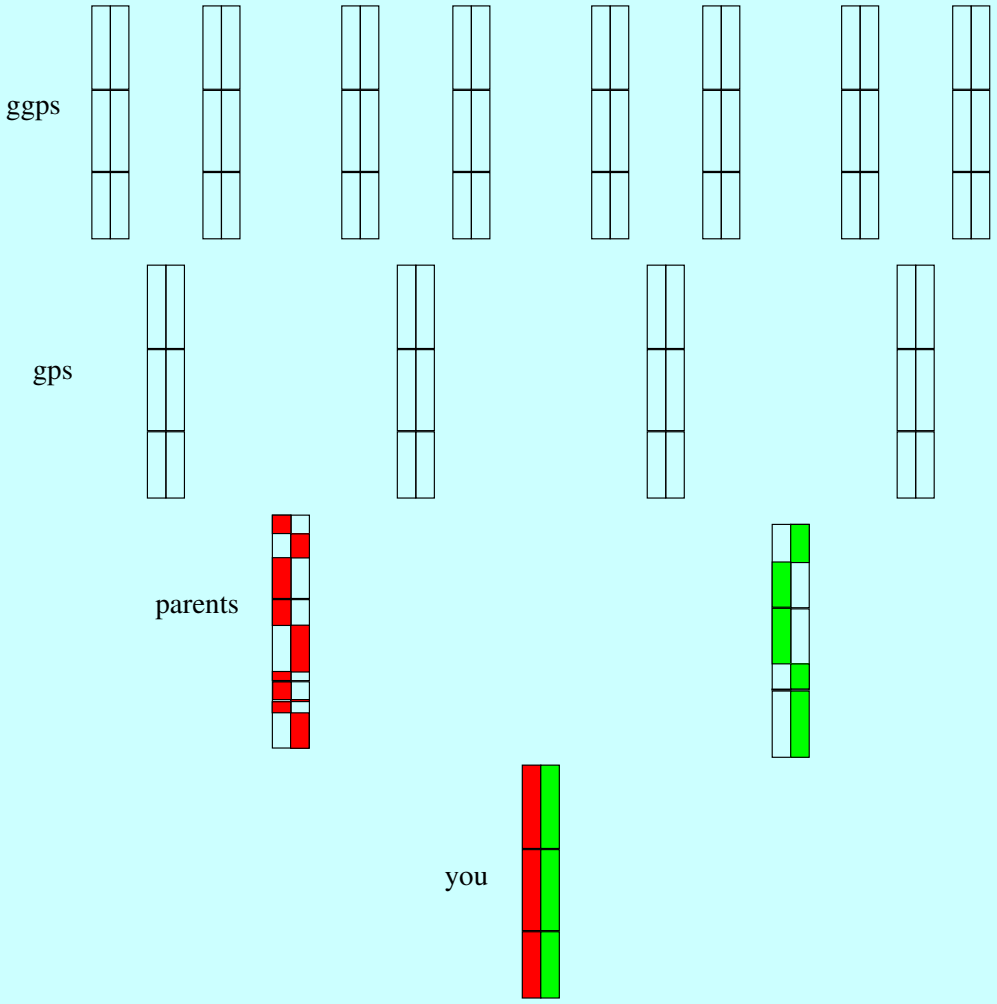

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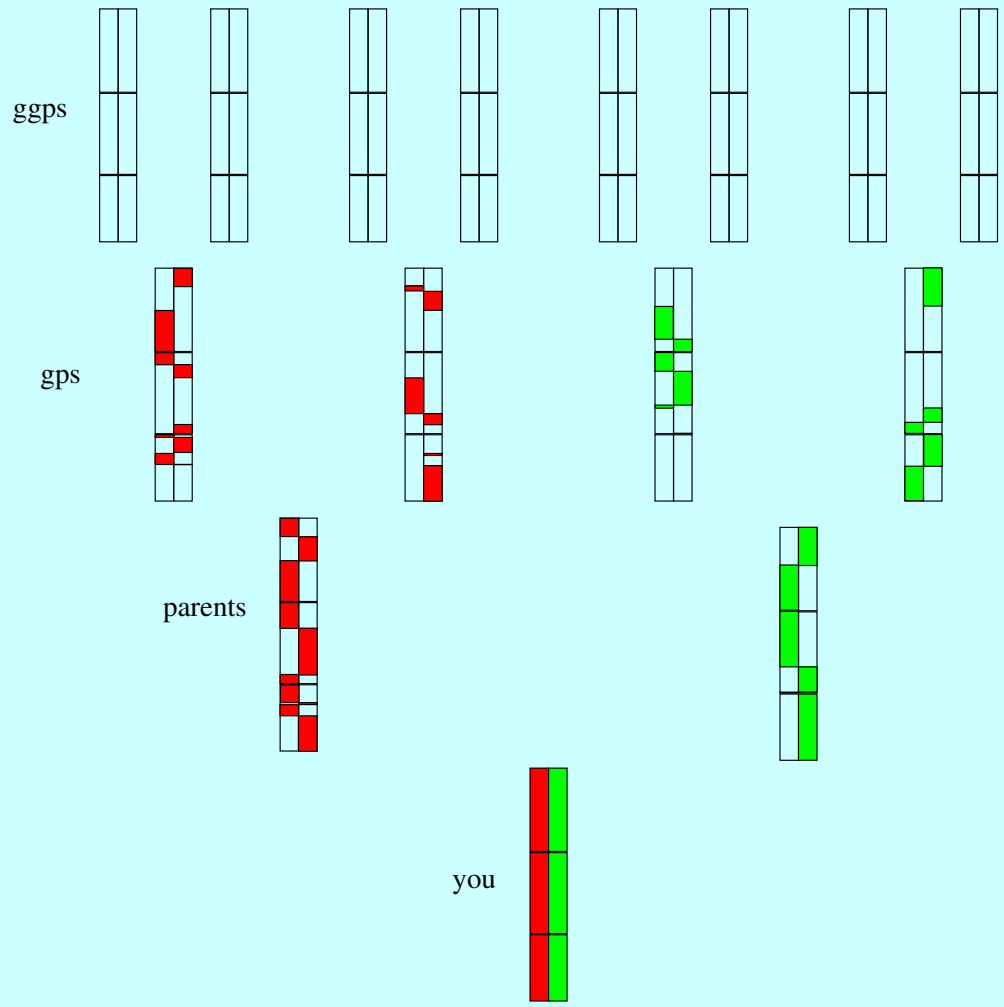

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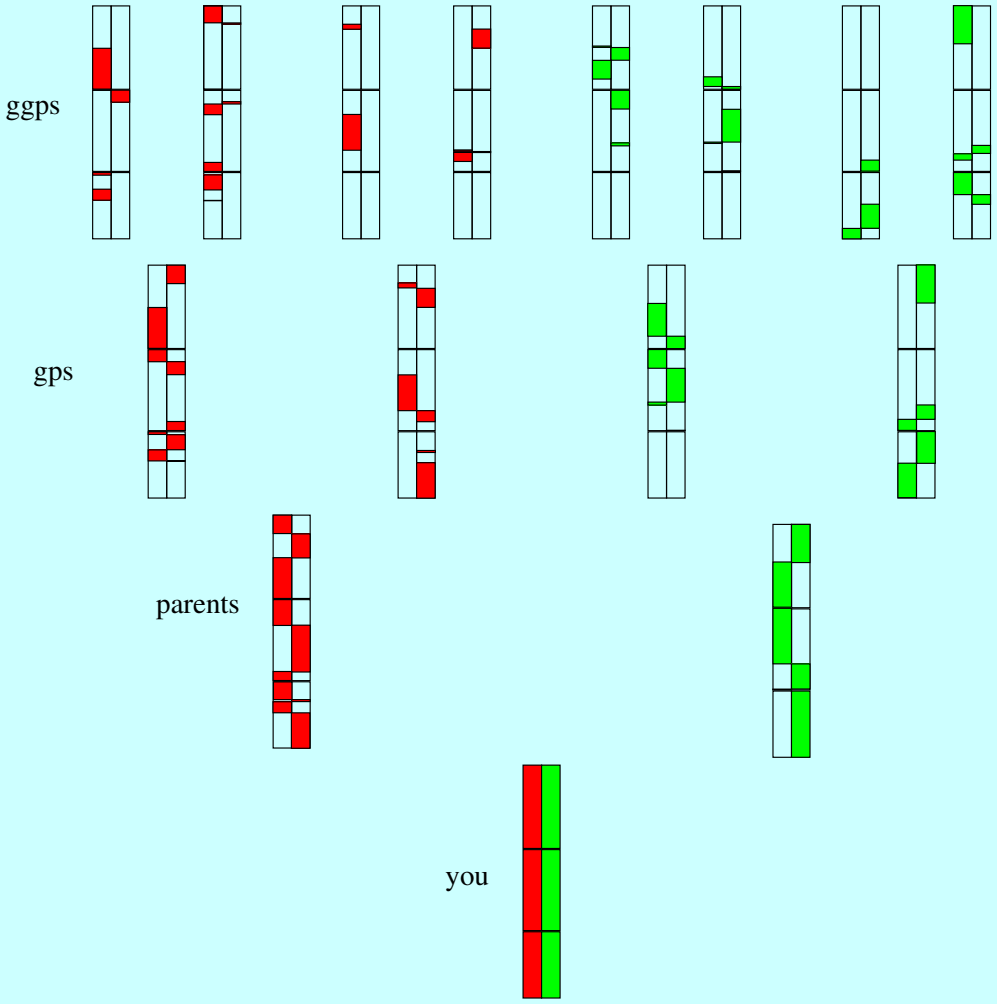
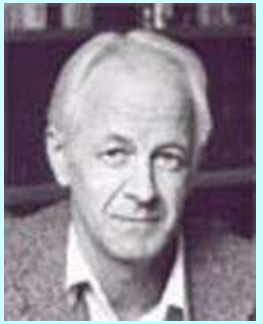


Number of ancestors and number of blocks of genome

generations ago	approx. year	number of ancestors	total no. of blocks	blocks per ancestor
0	2018	1	46	46
1	1991	2	112	56
2	1964	4	178	44.5
3	1937	8	244	30.5
4	1910	16	310	19.375
5	1883	32	376	11.75
6	1856	64	442	6.90625
7	1829	128	508	3.96875
8	1802	256	574	2.242188
9	1775	512	640	1.250000
10	1748	1024	706	0.6894531
11	1721	2048	772	0.3769531
12	1694	4096	838	0.2045898
13	1667	8192	904	0.1103516
14	1664	16384	970	0.0592041
15	1613	32768	1036	0.03161621

The “mitochondrial Eve” study in 1987





Rebecca Cann, Mark Stoneking, and the late Allan Wilson. In 1987 they made a molecular tree of mitochondria from humans.

One female ancestor? of what? When? Where?

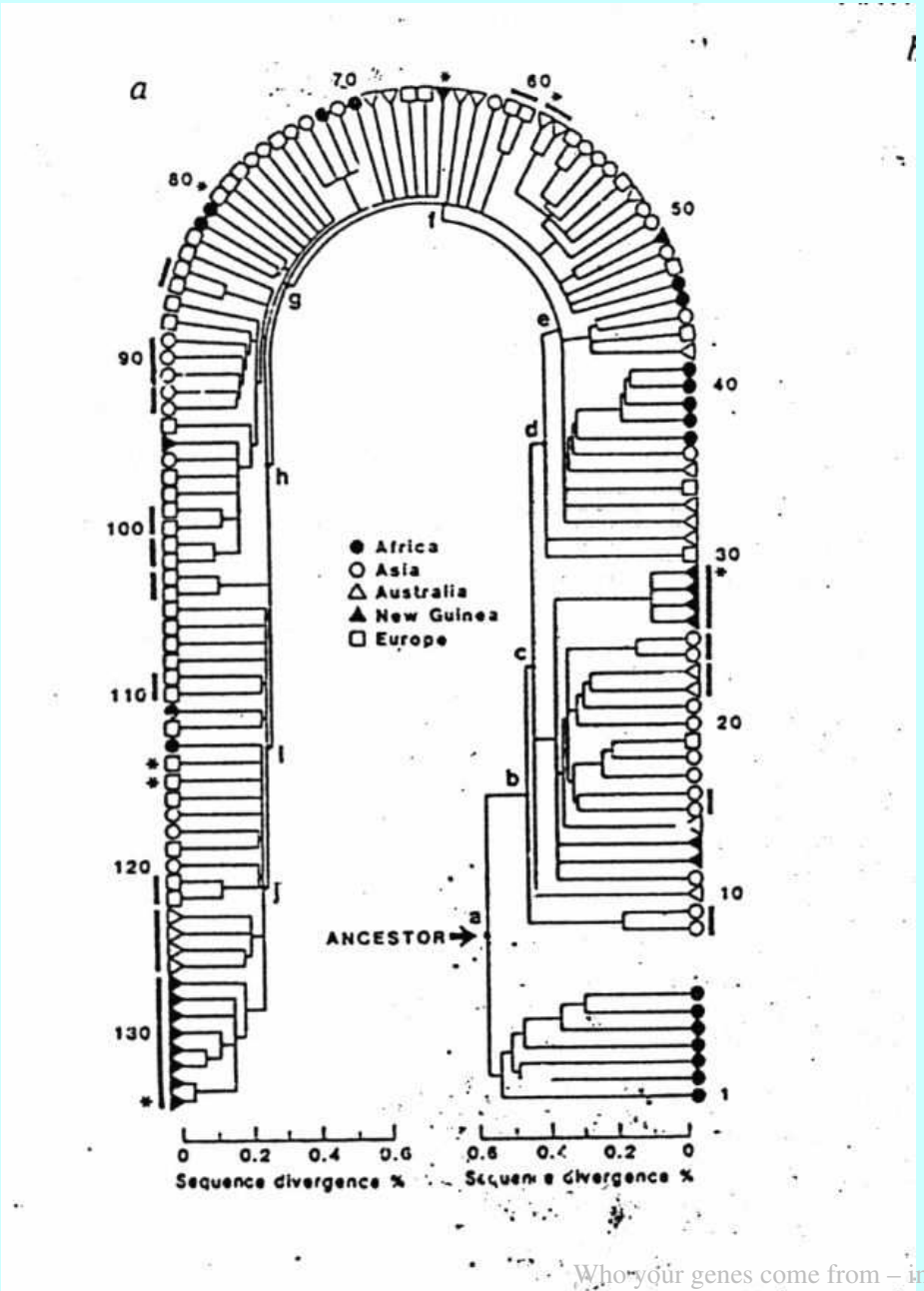
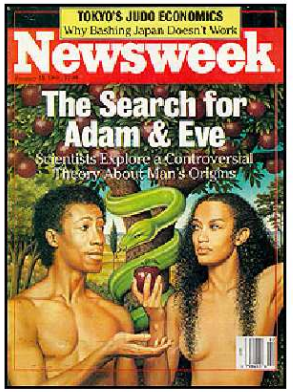


Fig. 3 *a*, Genealogical tree for 134 type[illegible] of human mtDNA (133 restric

“Scientists find Eve”



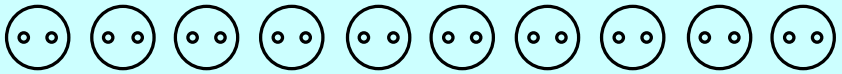
The Search for Adam and Eve

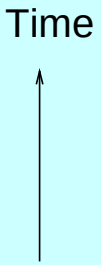
John Tierney
Newsweek

Source: *Newsweek* 111 (Jan. 11, 1988): 46-52.

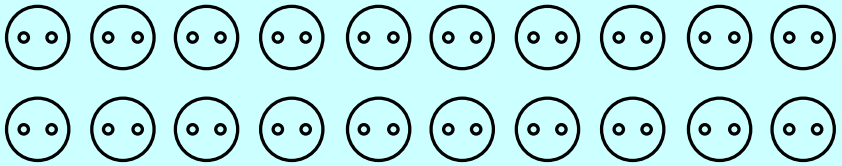
Scientists are calling her Eve, but reluctantly. The name evokes too many wrong images -- the weak-willed figure in Genesis, the milk-skinned beauty in Renaissance art, the voluptuary gardener in "Paradise Lost" who was all "softness" and "meek surrender" and waist-length "gold tresses." The scientists' Eve -- subject of one of the most provocative anthropological theories in a decade -- was

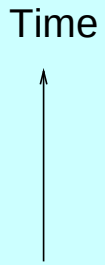
One generation of a (small) population



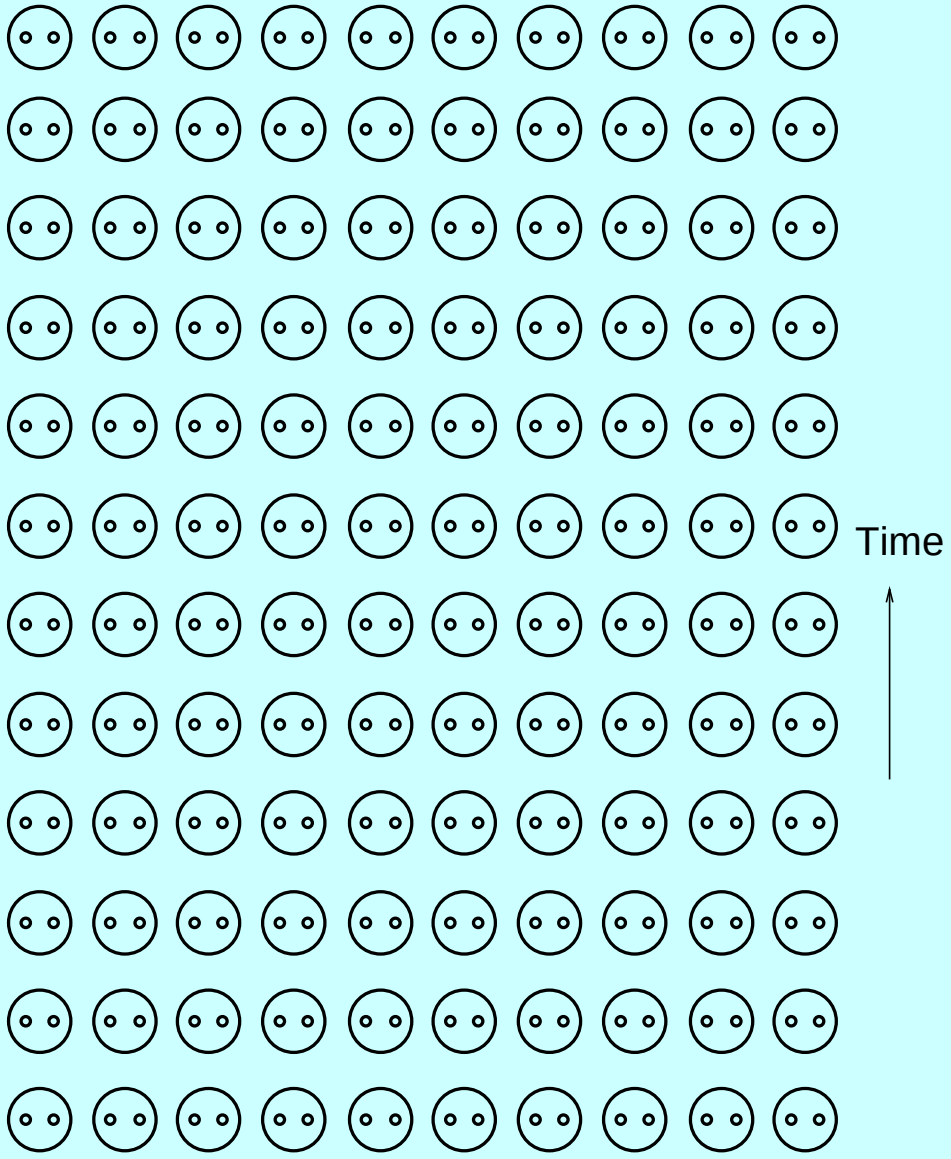


... and its parent generation

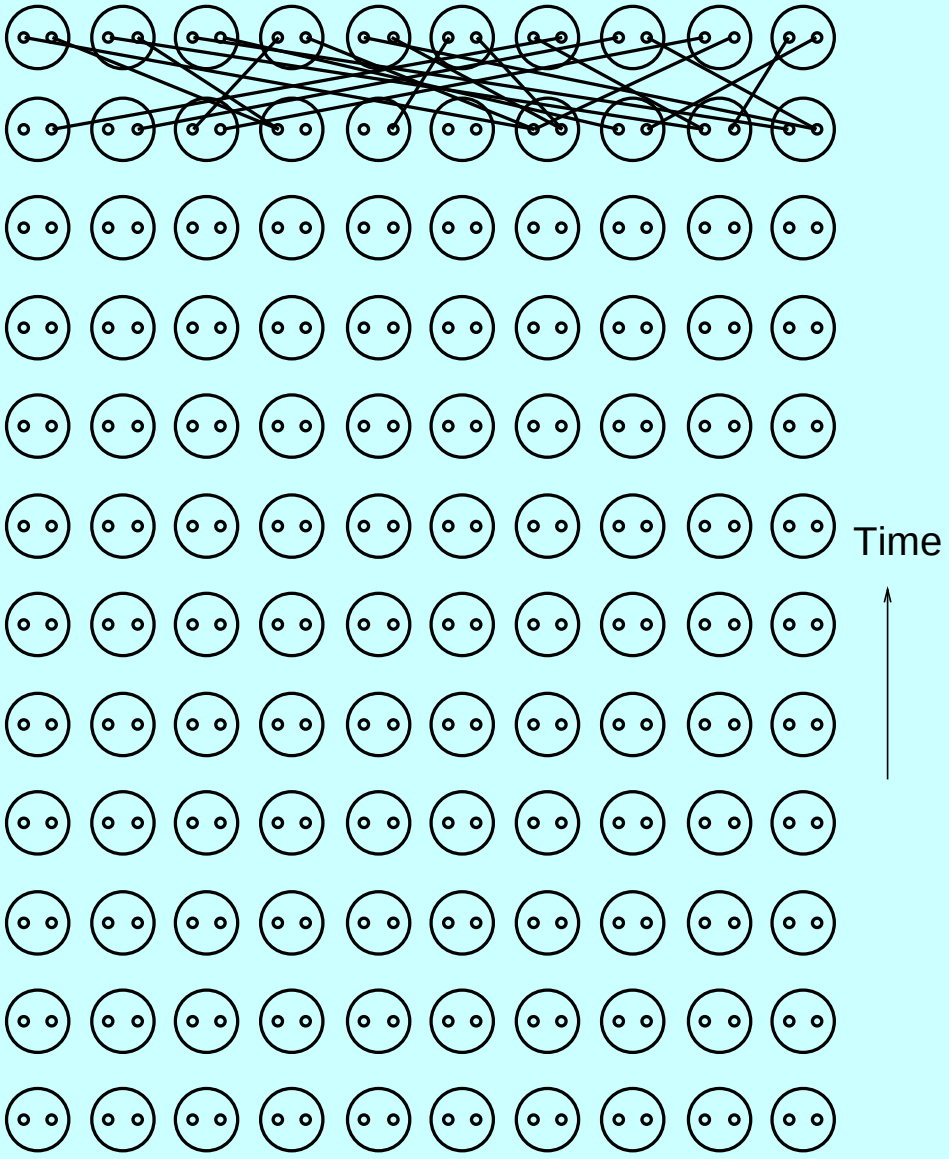




Where do the copies of the genes come from?



Coalescent genealogy for one gene



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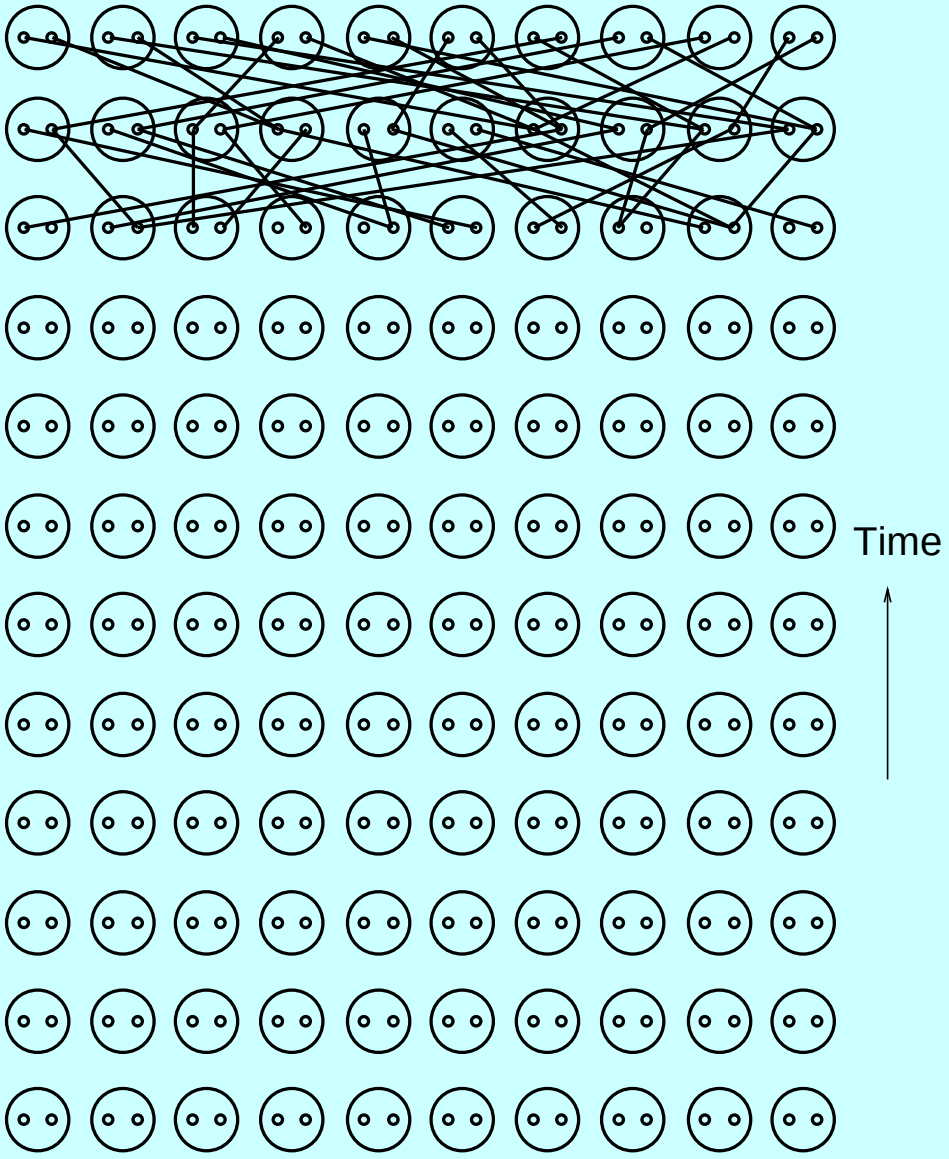

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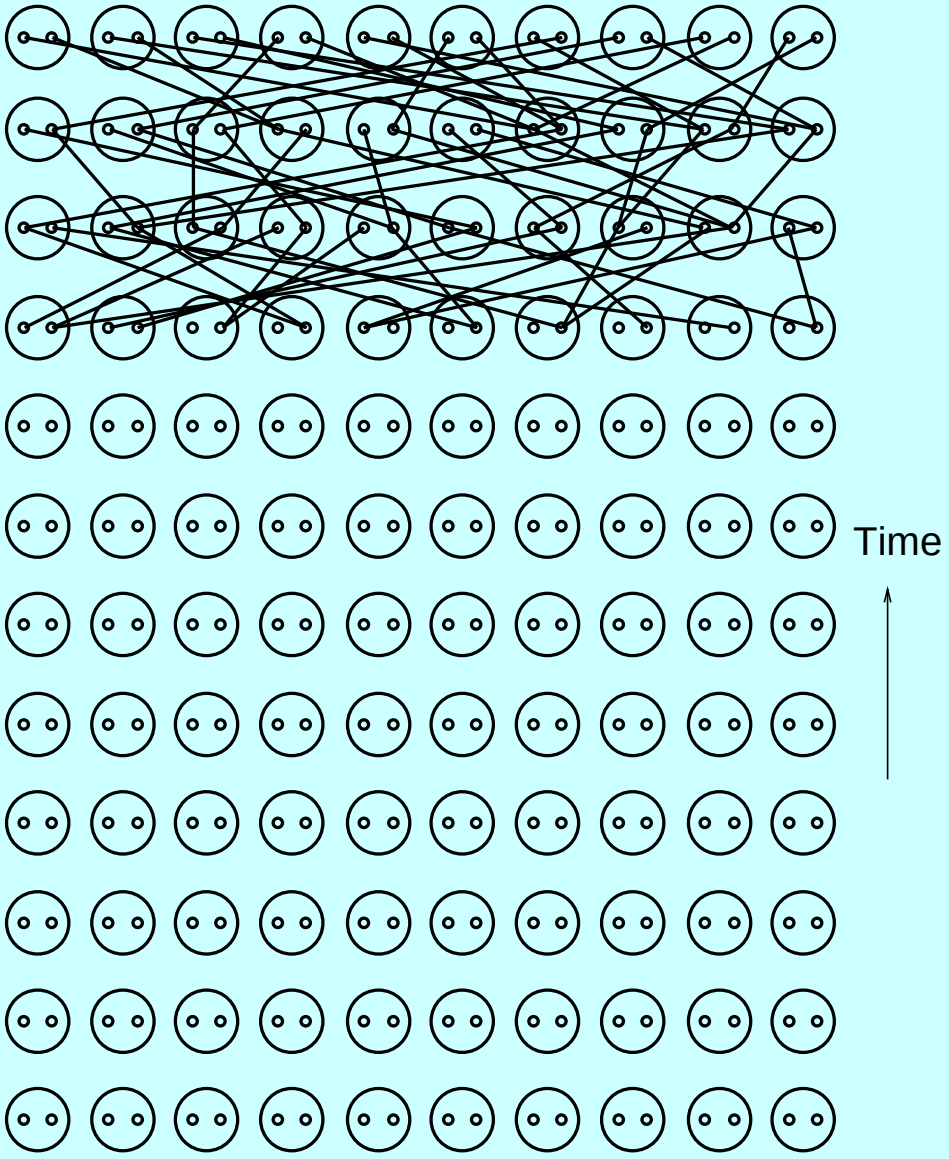

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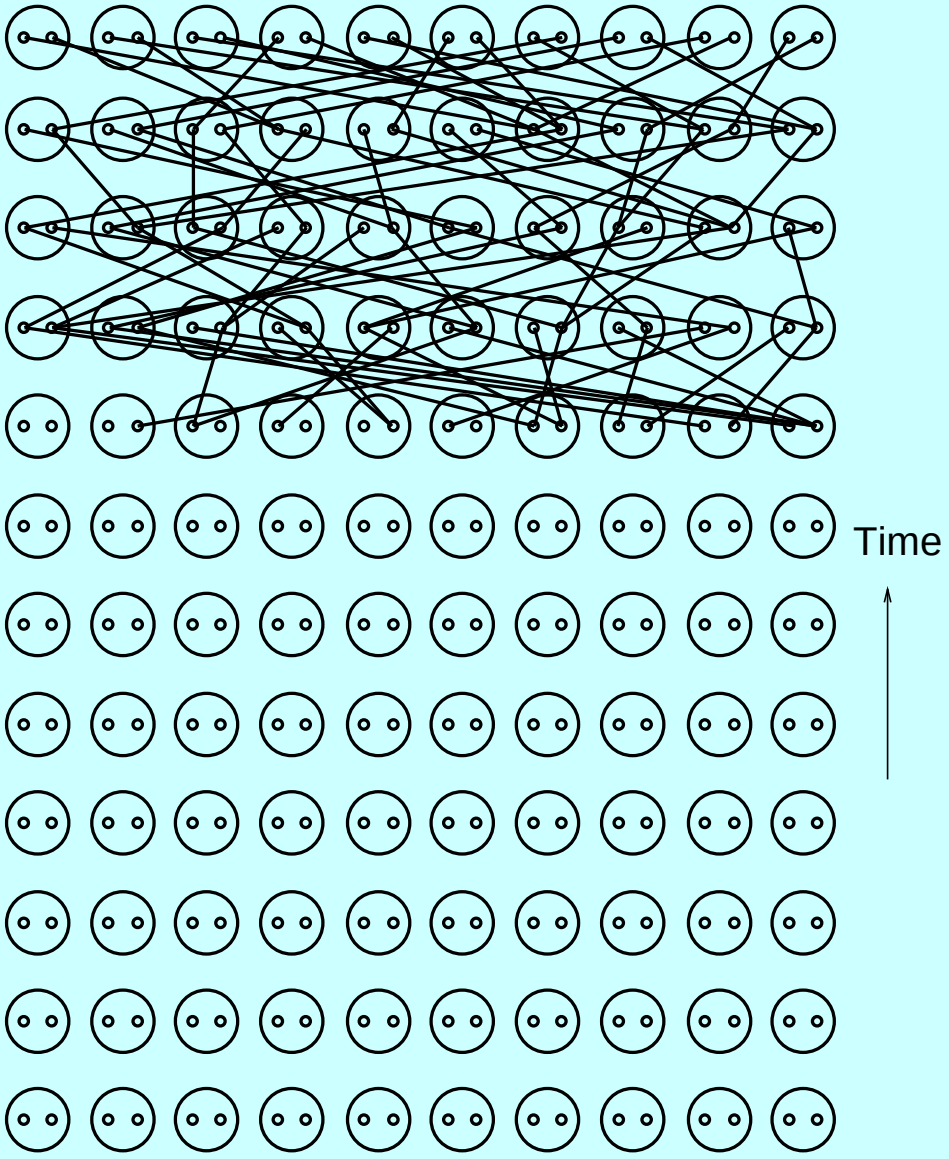

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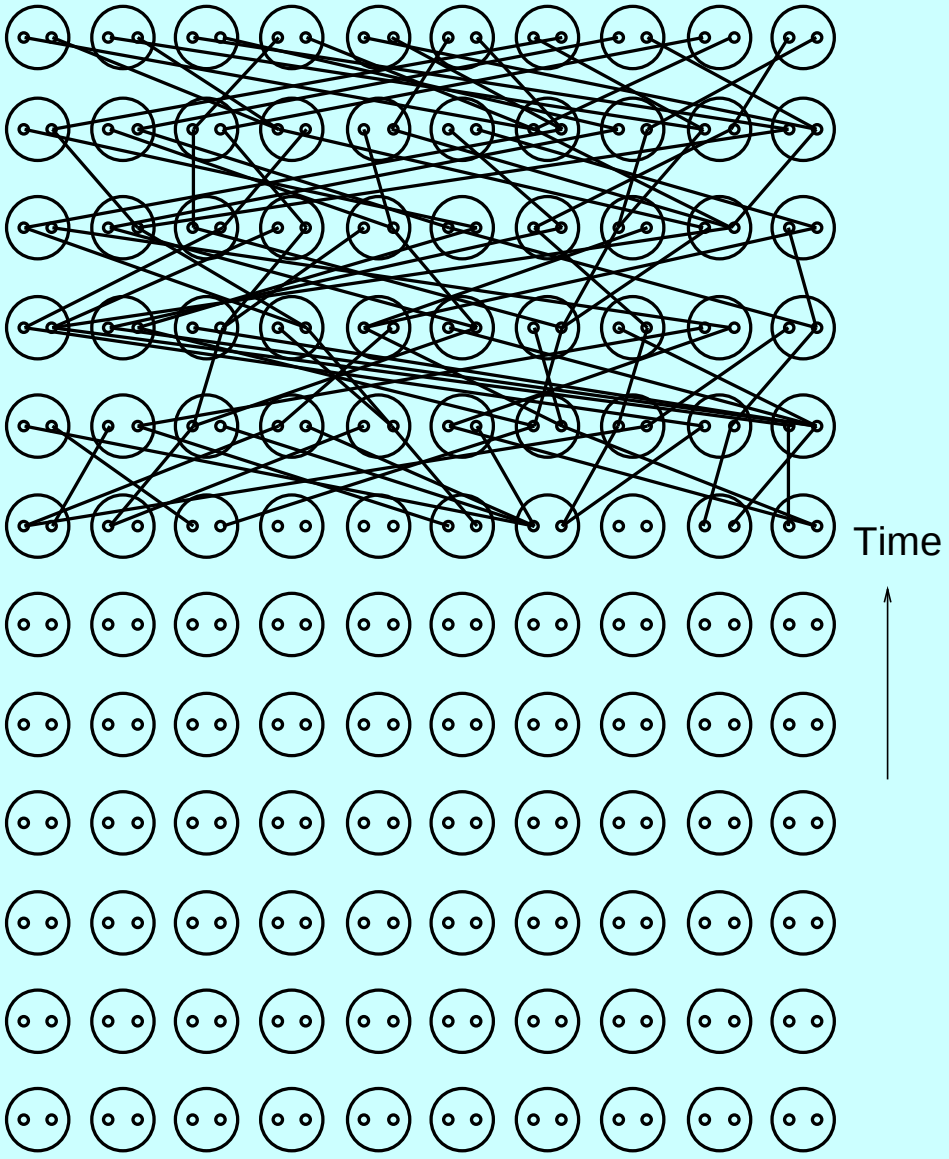

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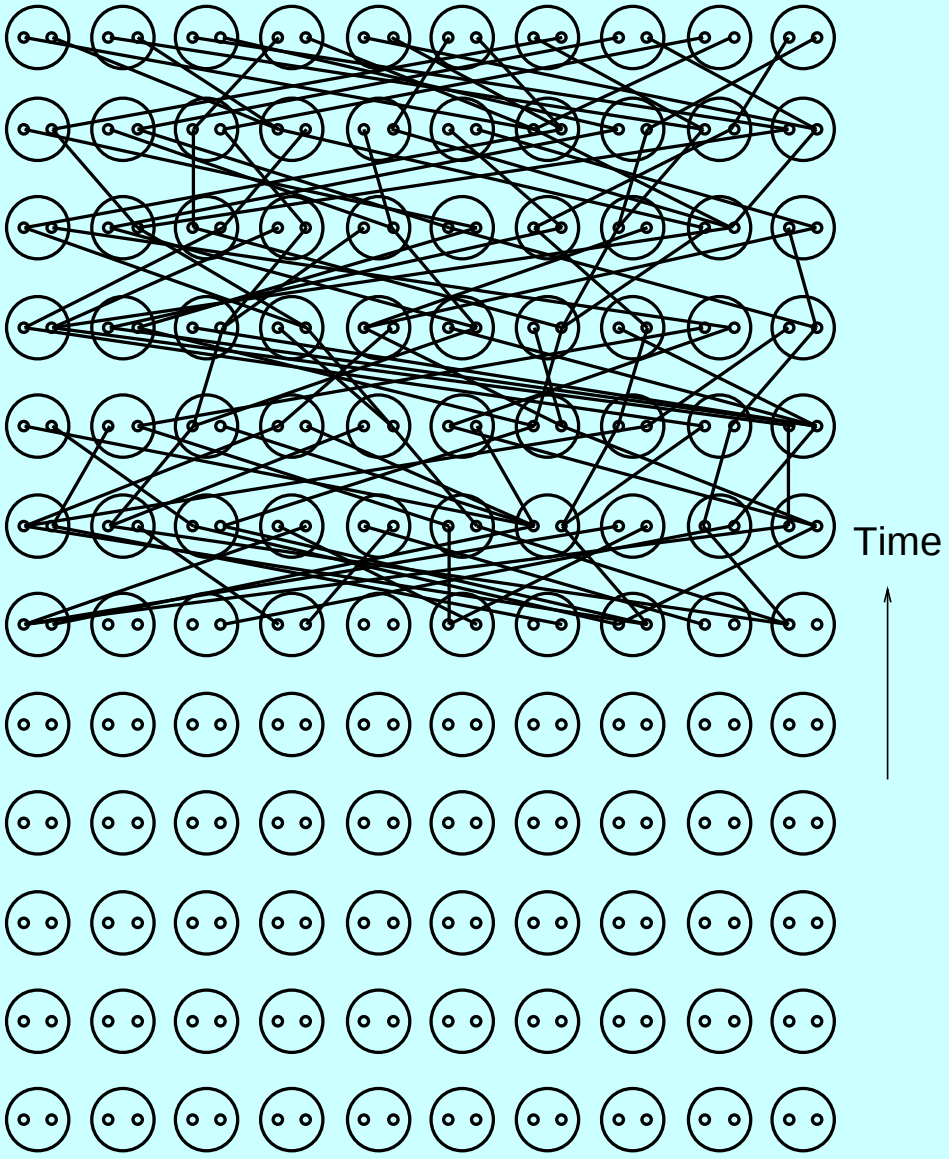

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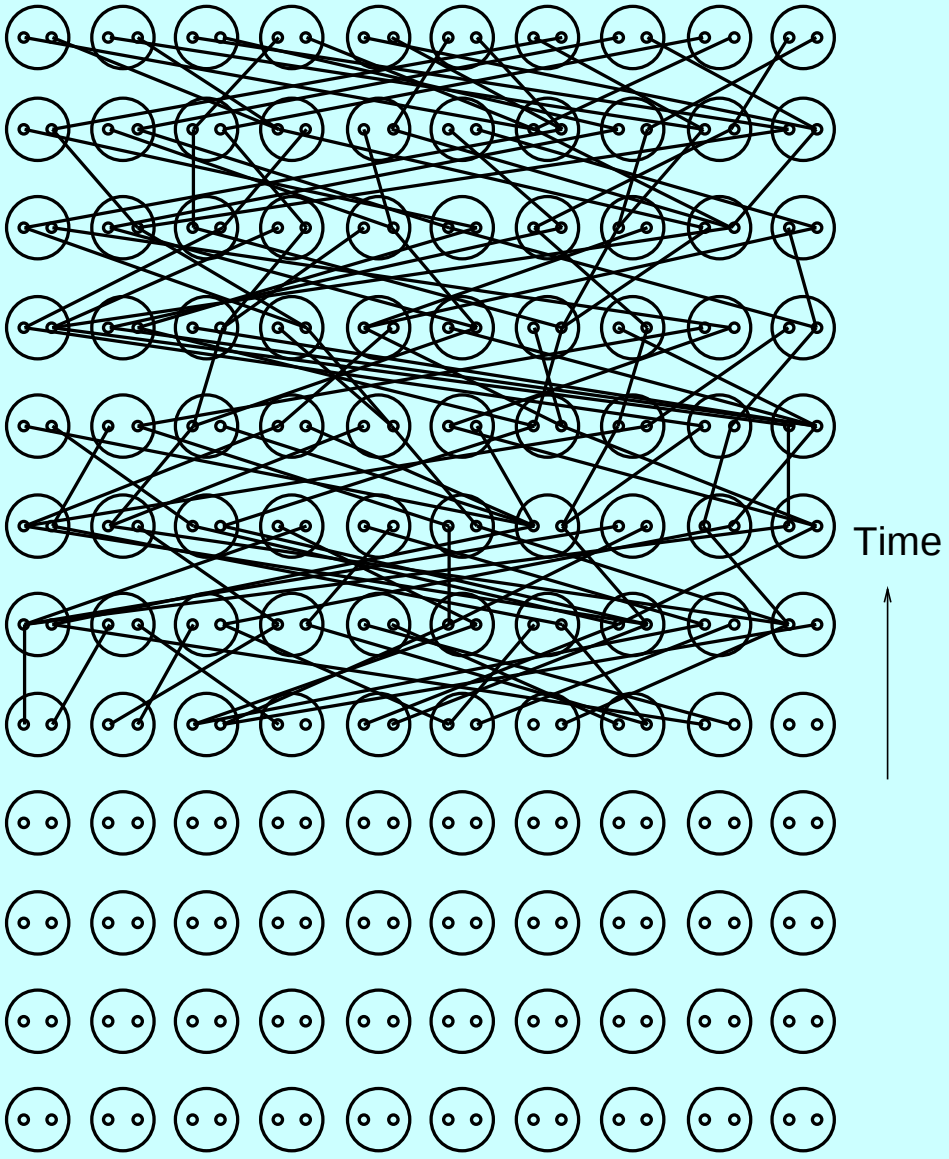

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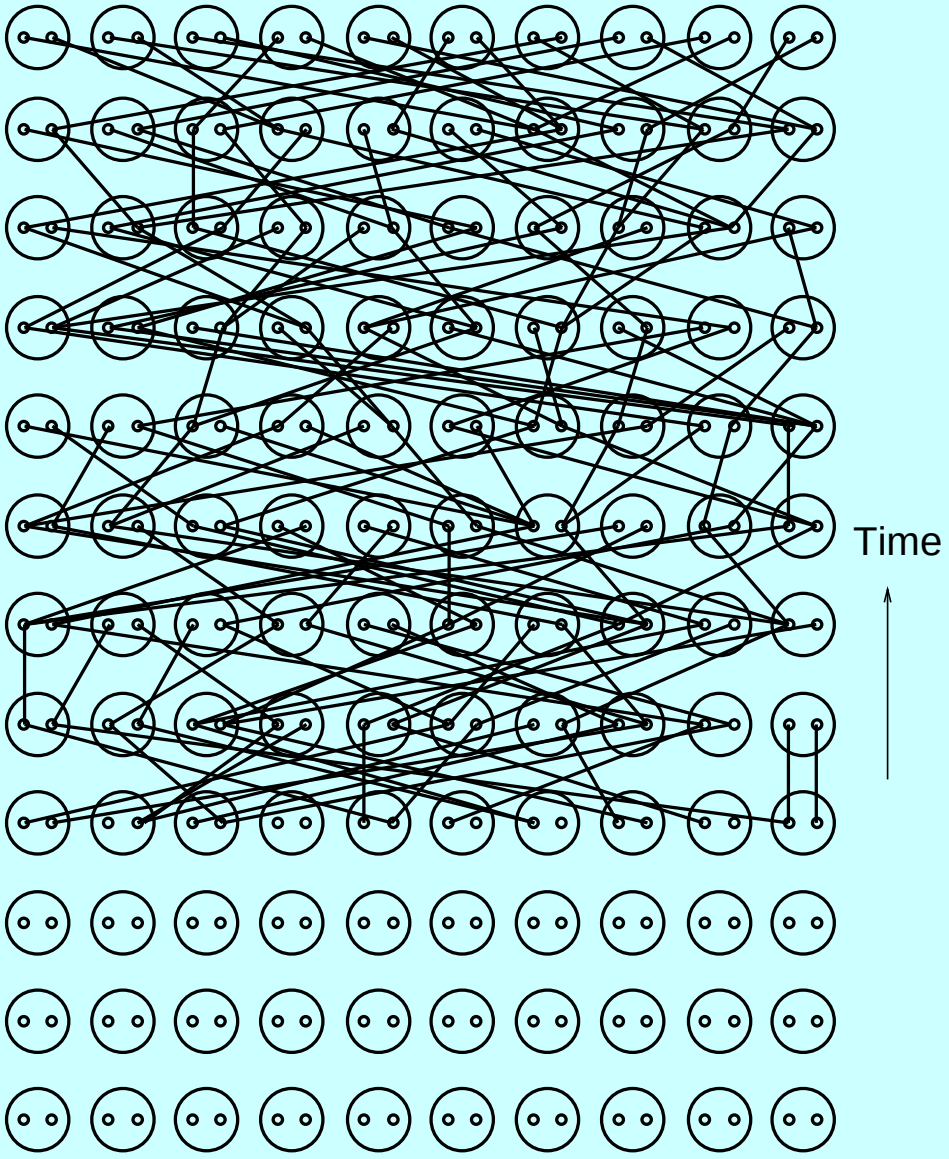

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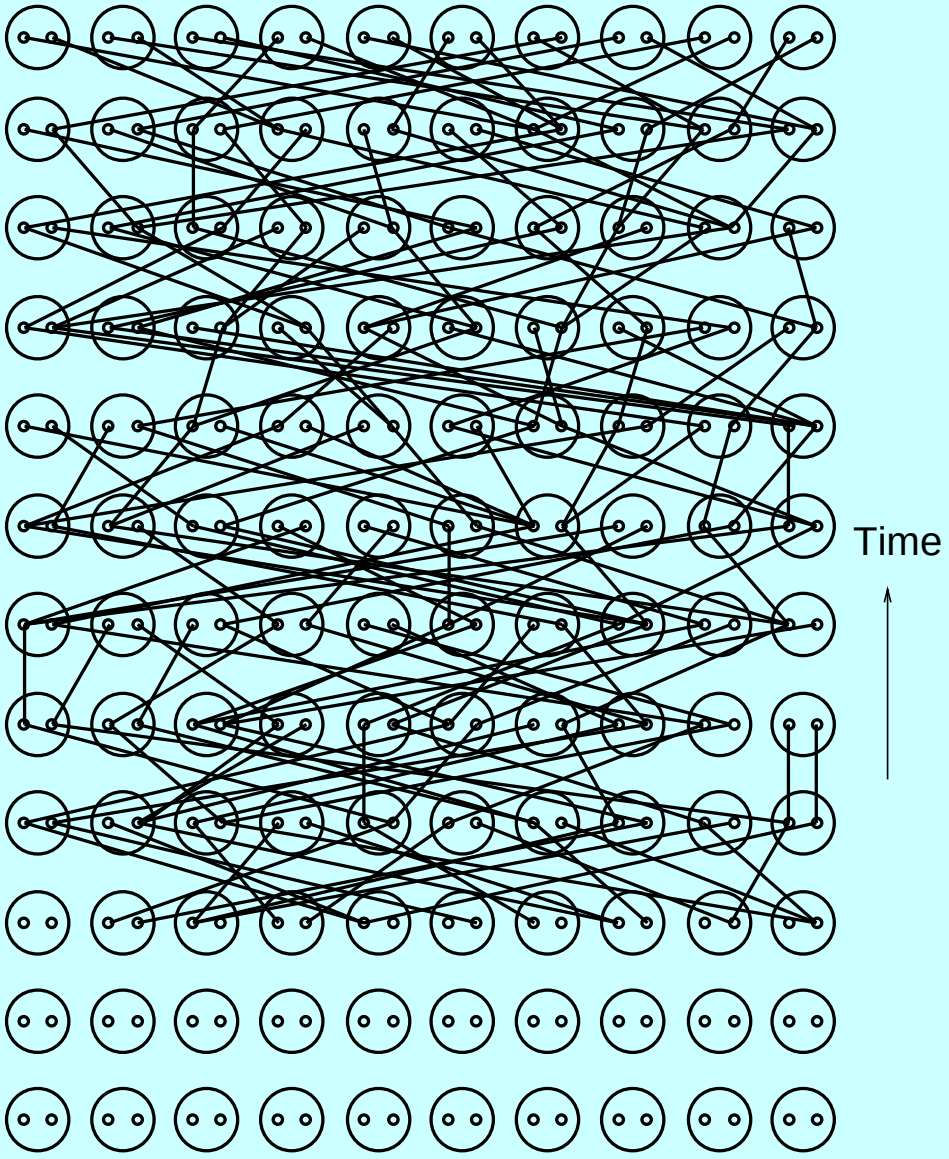

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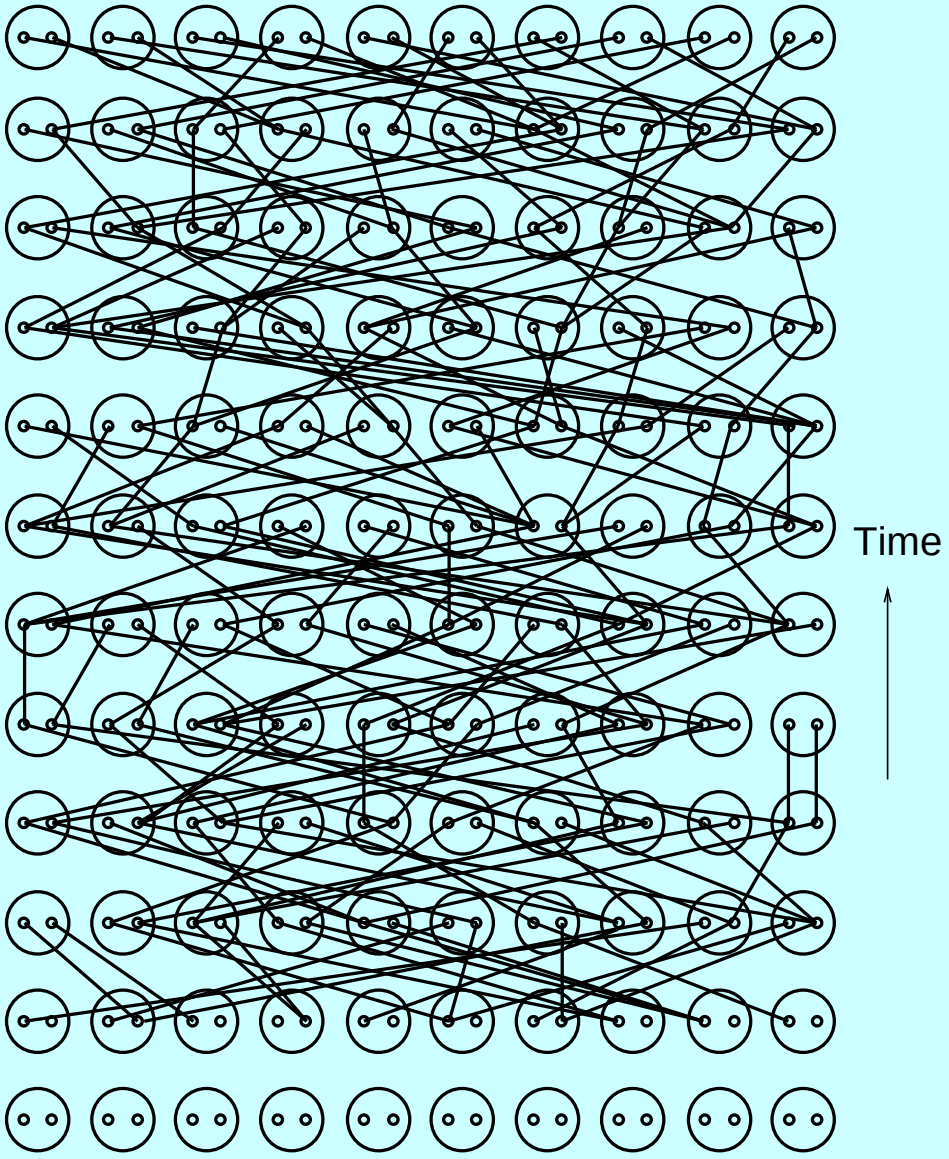

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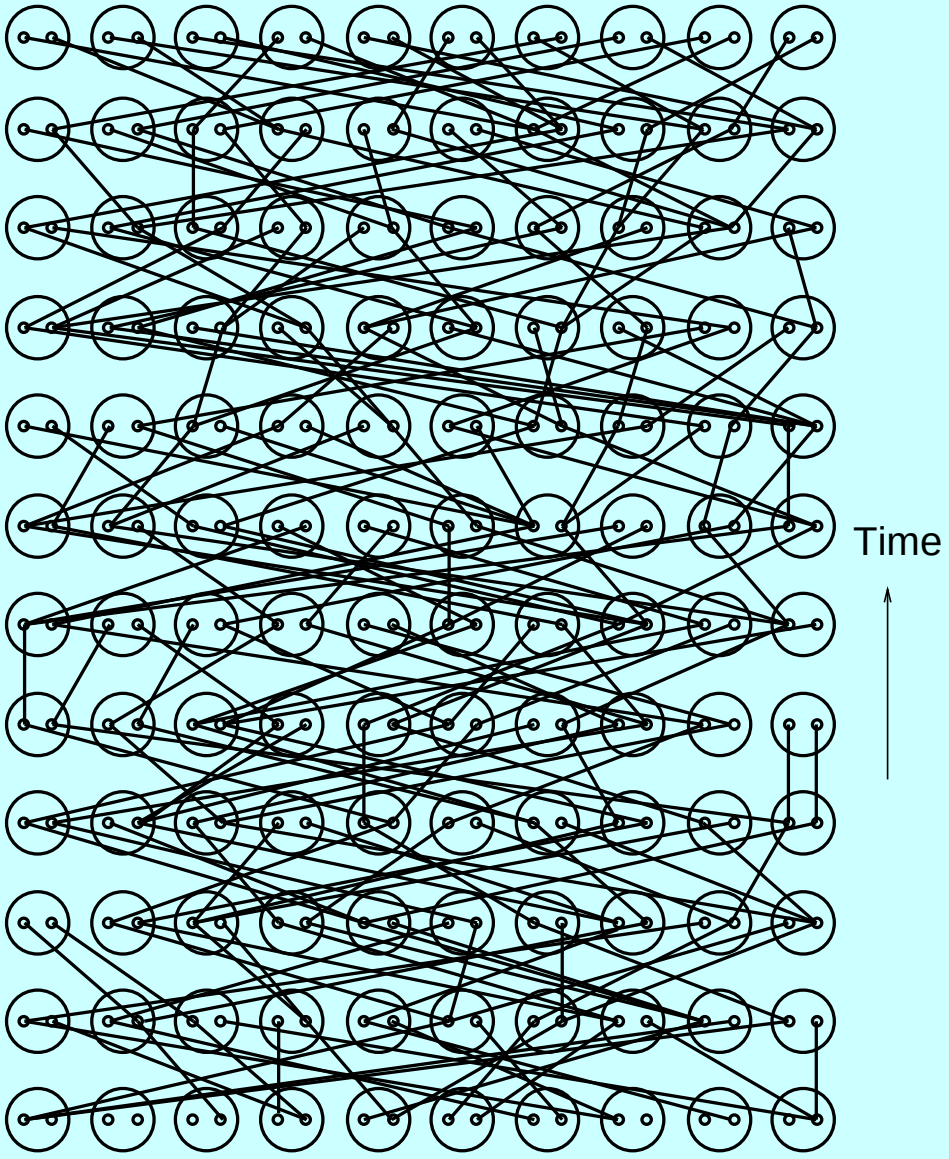
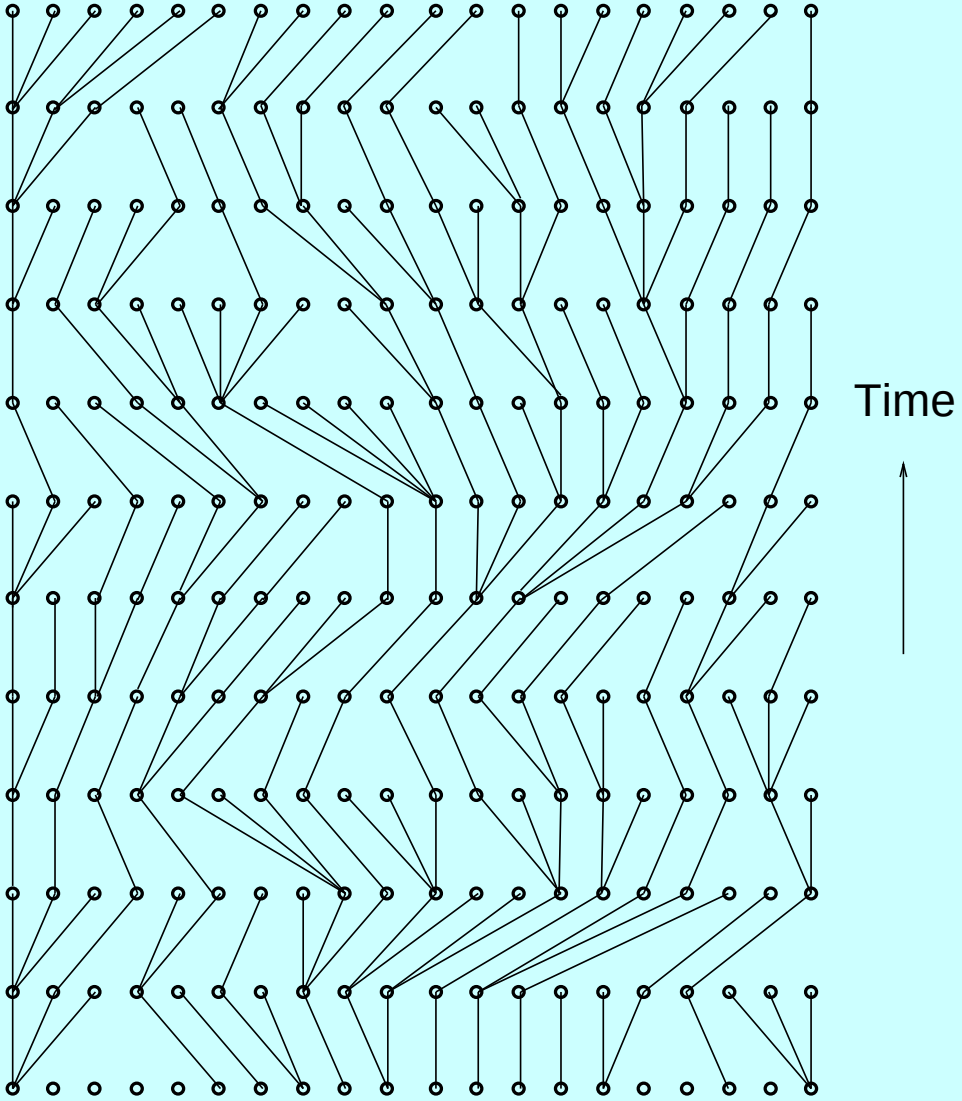
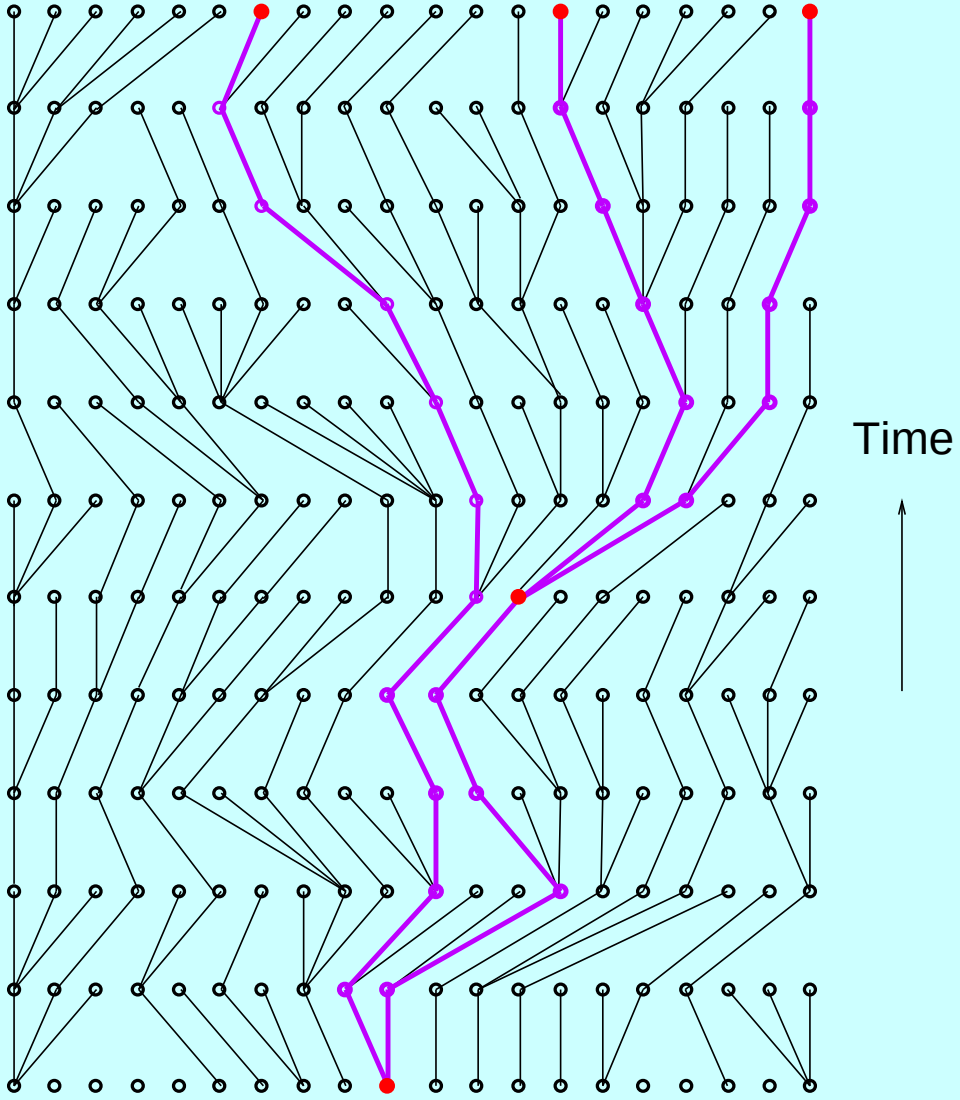


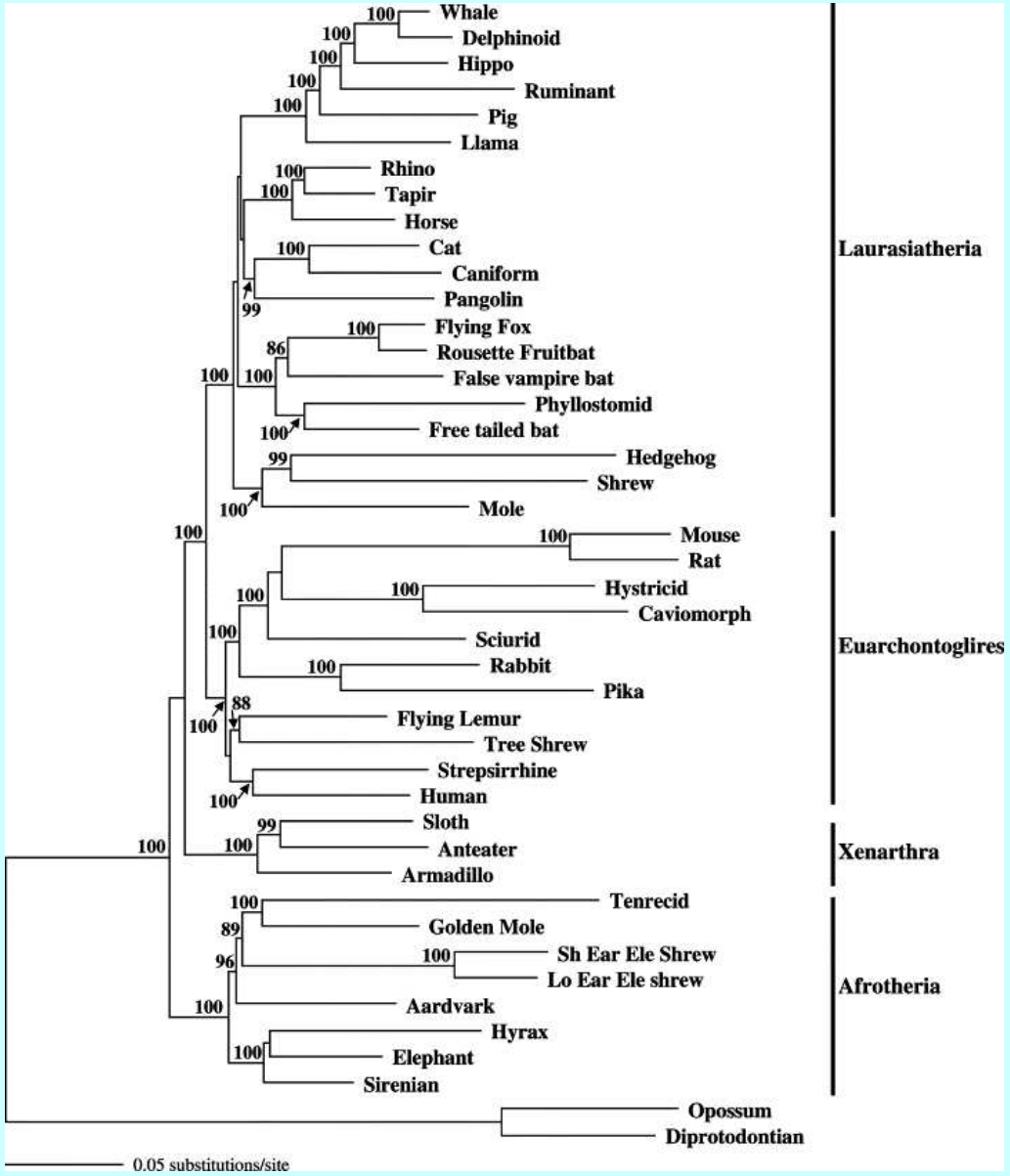
Untangling the crossed lines ...



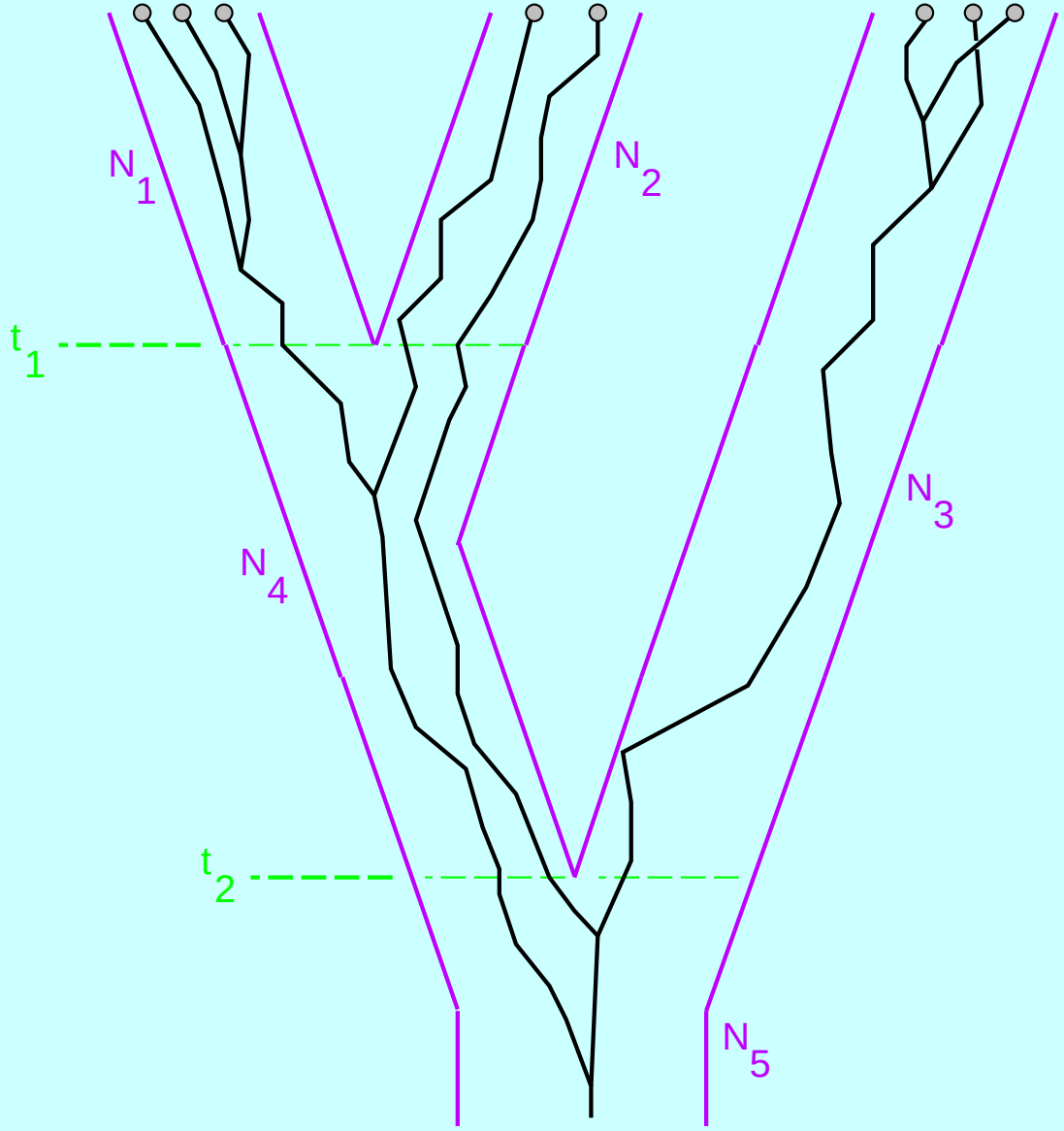
Genealogy of a sample of 3 copies



A molecular phylogeny showing statistical support



Species trees and trees of gene copies



Charlemagne's cathedral in Aachen, Germany

The octagonal tower center-left is Charlemagne's part of it.