

Merging Fast Neutron Induced Deletions in Peas

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The Scenario



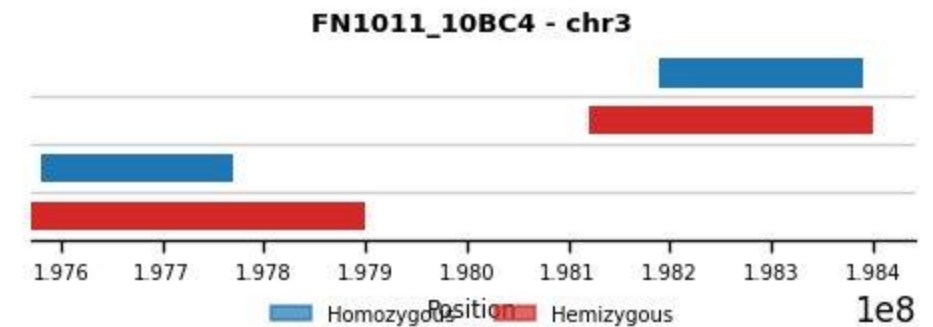
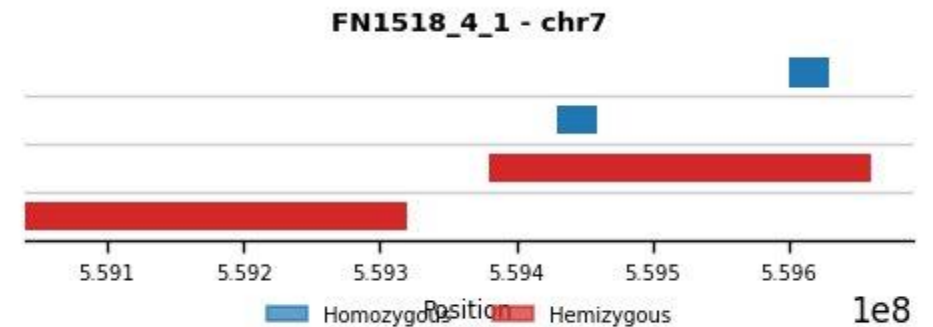
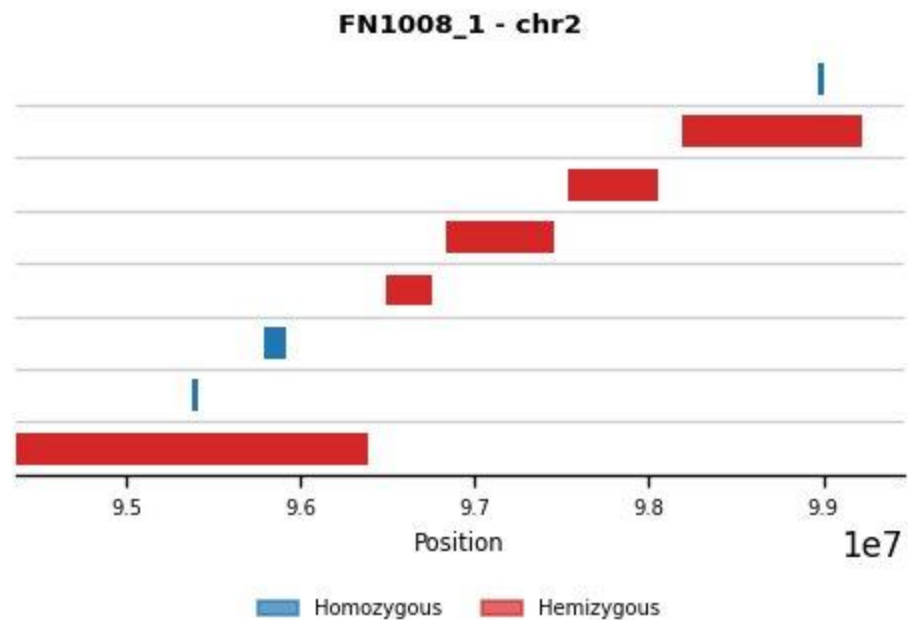
- Peas bombarded with fast neutrons in a nuclear facility!
- Neutron radiation caused deletions in DNA.

line/sub	line	chr	start	end	line	line/sub	line	chr	start	end
FN1008/1	FN1008	chr2	94370000	96390000	FN1008	FN1008/1	FN1008	chr2	95380000	95410000
					FN1008	FN1008/1	FN1008	chr2	95790000	95920000
FN1008/1	FN1008	chr2	96490000	96760000	FN1008					
FN1008/1	FN1008	chr2	96840000	97460000	FN1008					
FN1008/1	FN1008	chr2	97530000	98050000	FN1008					
FN1008/1	FN1008	chr2	98190000	99220000	FN1008	FN1008/1	FN1008	chr2	98970000	99000000
FN1011/10BC4	FN1011	chr3	197570000	197900000	FN1011	FN1011/10BC4	FN1011	chr3	197580000	197770000
FN1011/10BC4	FN1011	chr3	198120000	198400000	FN1011	FN1011/10BC4	FN1011	chr3	198190000	198390000
FN1023/6	FN1023	chr3	434010000	434280000	FN1023	FN1023/6	FN1023	chr3	434020000	434280000
					FN1023					
FN1023/6	FN1023	chr5	641200000	641780000	FN1023	FN1023/6	FN1023	chr5	641600000	641630000
FN1032/4	FN1032	chr1	256580000	256690000	FN1032	FN1032/4	FN1032	chr1	256580000	256690000
FN1032/4	FN1032	chr1	357780000	357980000	FN1032					
FN1032/4	FN1032	chr1	370810000	373130000	FN1032	FN1032/4	FN1032	chr1	370820000	373130000
					FN1032					
FN1032/4	FN1032	chr4	81950000	82360000	FN1032					
FN1032/4	FN1032	chr4	82440000	83920000	FN1032					
FN1032/4	FN1032	chr4	84020000	84120000	FN1032					
FN1032/4	FN1032	chr4	84180000	89910000	FN1032	FN1032/4	FN1032	chr4	85330000	85360000
					FN1032	FN1032/4	FN1032	chr4	85770000	85810000
					FN1032	FN1032/4	FN1032	chr4	87490000	87520000
					FN1032	FN1032/4	FN1032	chr4	87930000	87960000
					FN1032	FN1032/4	FN1032	chr4	88190000	88220000
					FN1032	FN1032/4	FN1032	chr4	89210000	89260000
					FN1032	FN1032/4	FN1032	chr4	89550000	89580000
					FN1032	FN1032/4	FN1032	chr4	89690000	89730000
FN1032/4	FN1032	chr4	90000000	90300000	FN1032	FN1032/4	FN1032	chr4	90270000	90300000



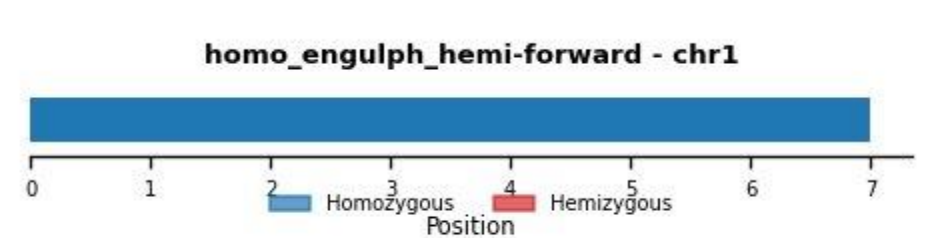
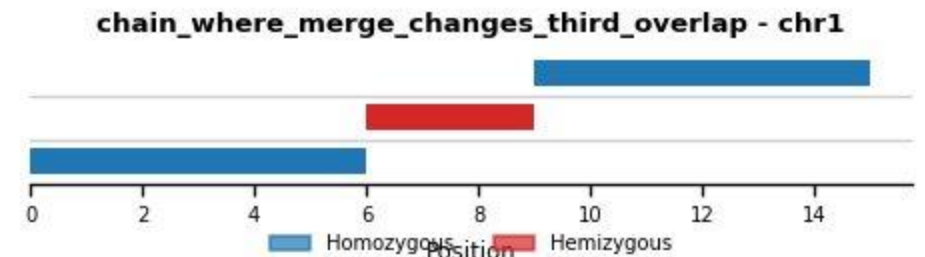
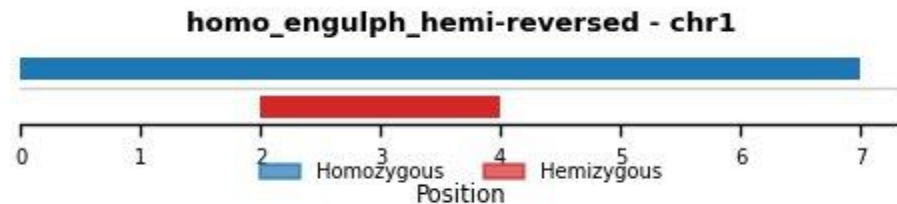
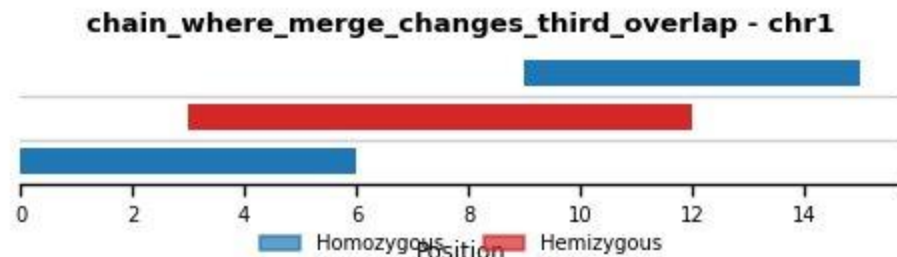
The Problem

- How can you have heterozygous and homozygous deletions in the same place?



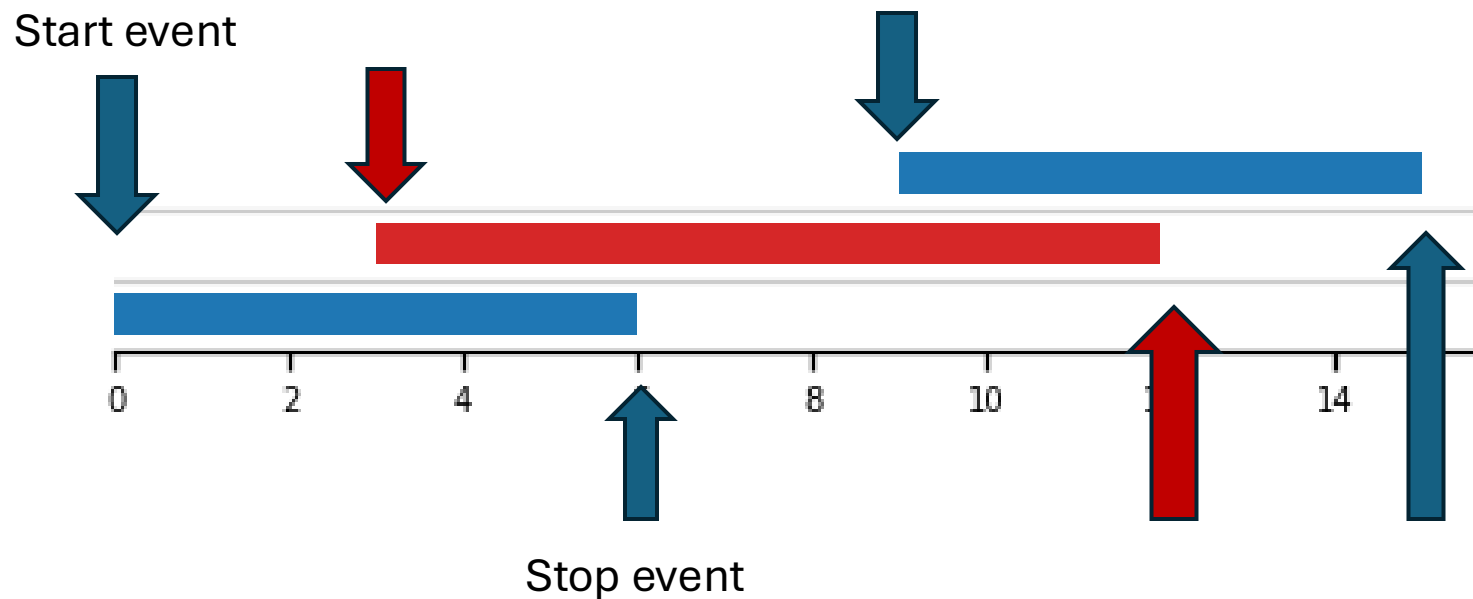
The Solution!

- LeetCode finally comes in handy!
- Priority aware merging.

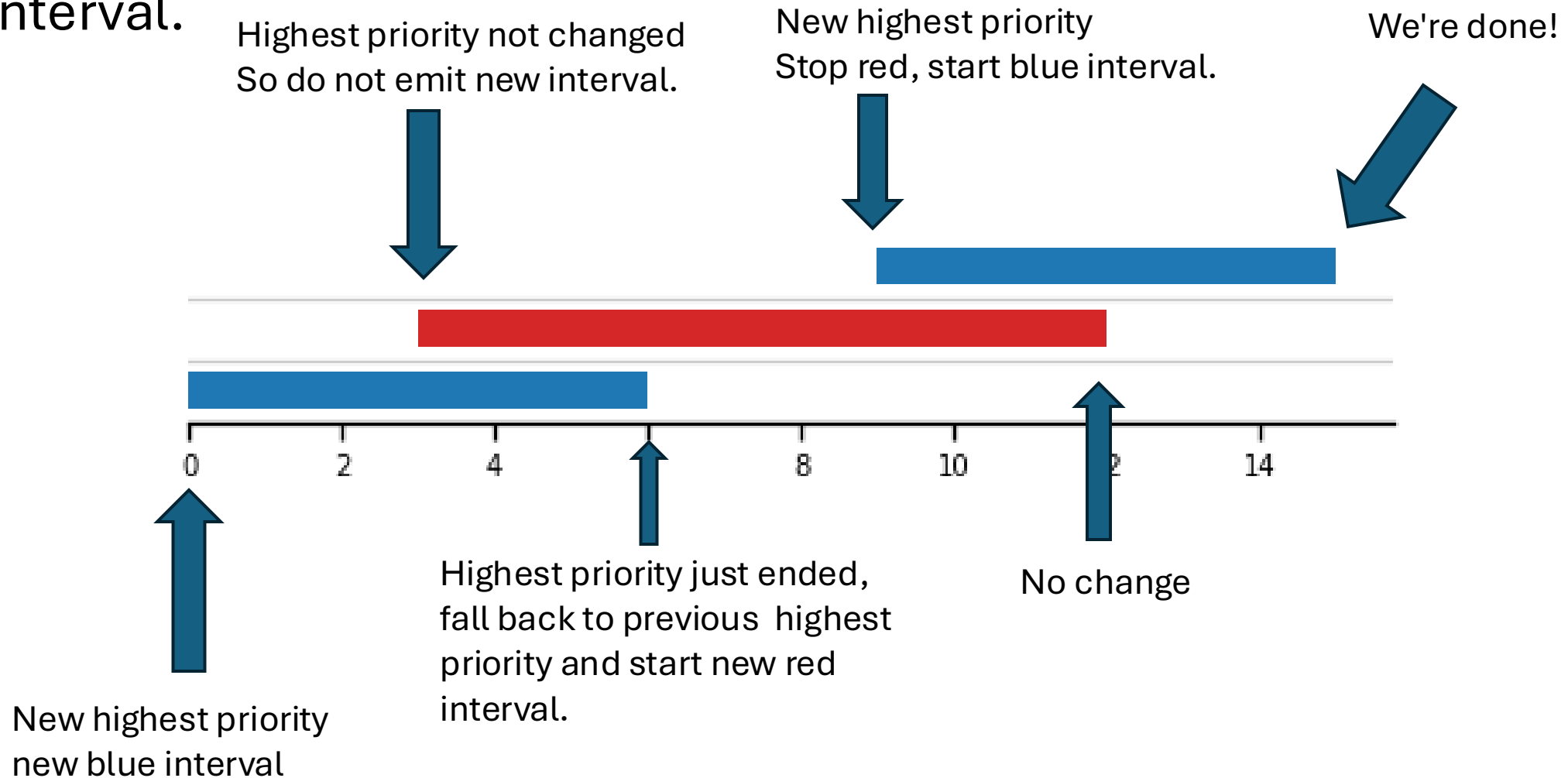


Line Sweep

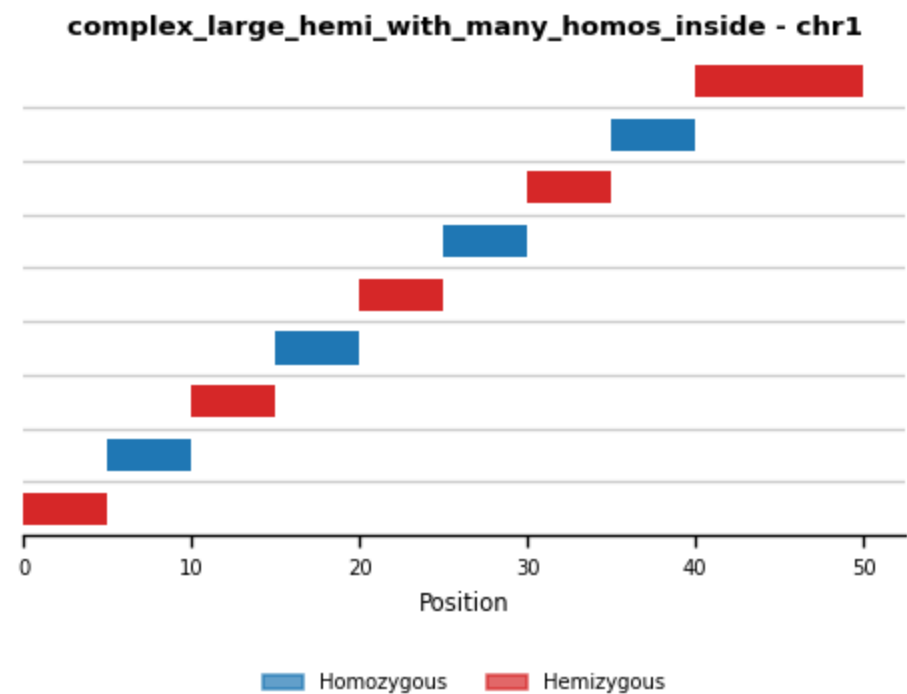
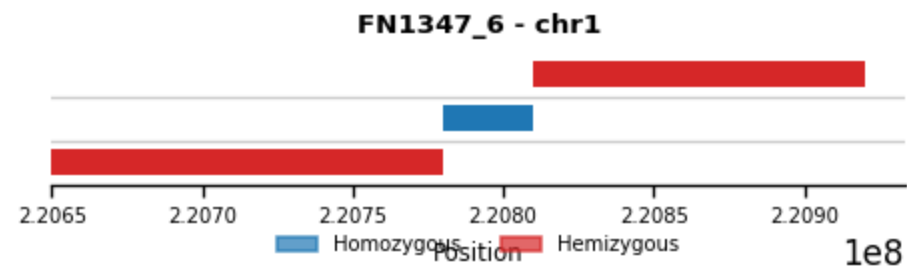
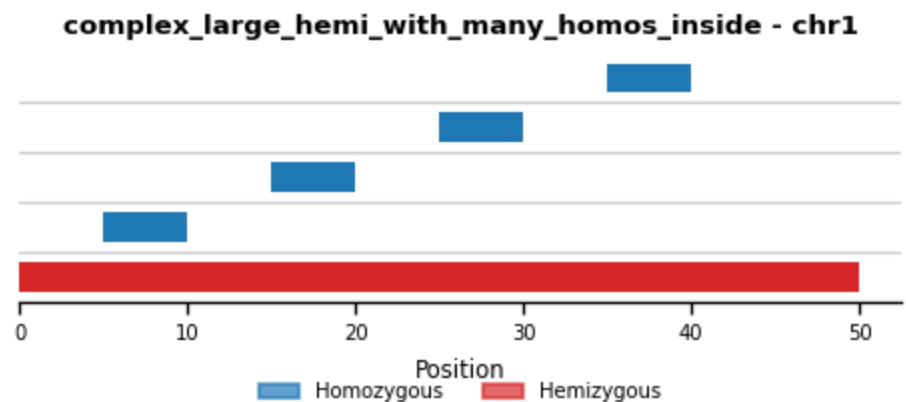
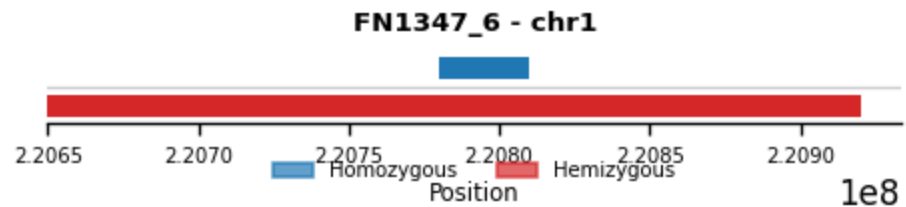
- Line sweep algorithms work by using a conceptual "sweep" across our data by giving it some x axis (time, distance etc) emitting "events" as sweep across.



- We loop the start/stop events
- We keep track of the current highest priority using a **max heap**.
- Only when the current highest priority **changes** do we emit a new interval.



<https://github.com/Informatics-John-Innes-Centre/pea-neutron-deletion-lines>



Acknowledgements



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