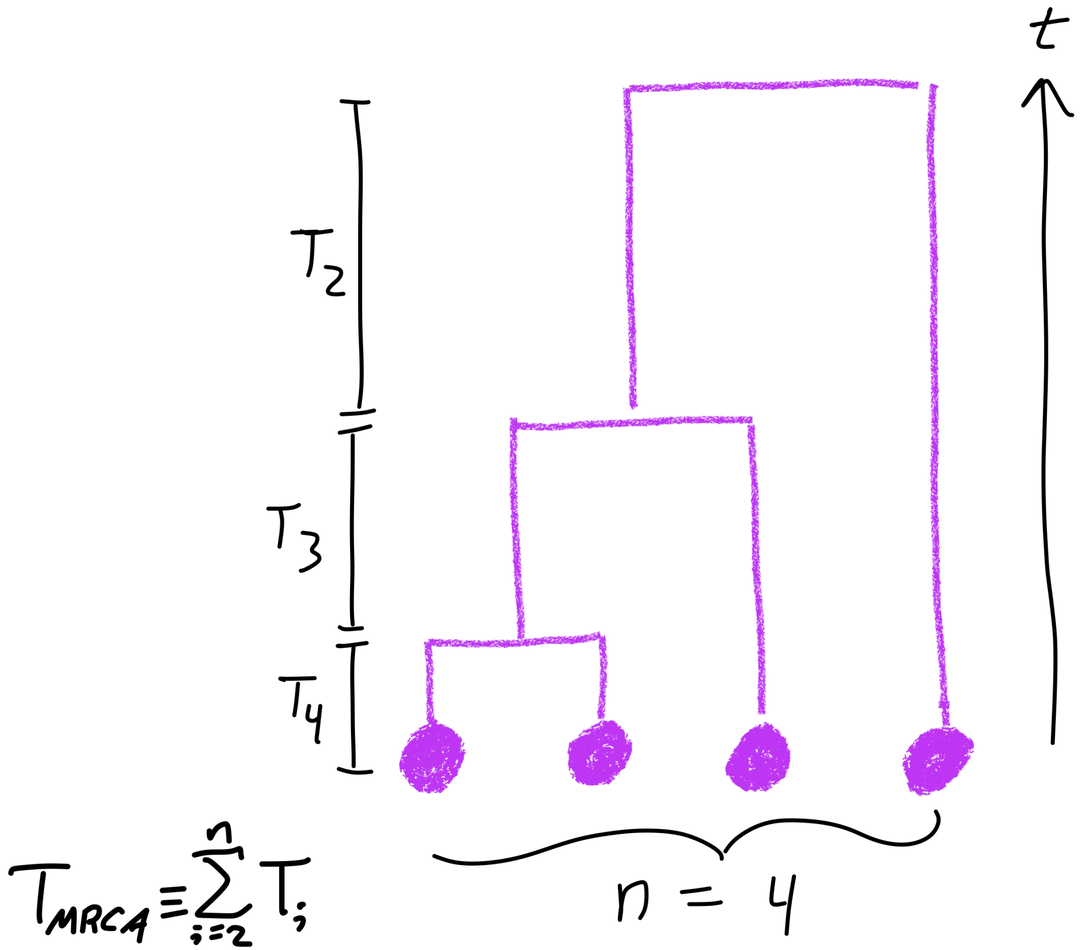
Previously on...



"intercoalescence times"

$$\mathbb{E}[T_i] = \frac{2N}{\binom{i}{2}}$$

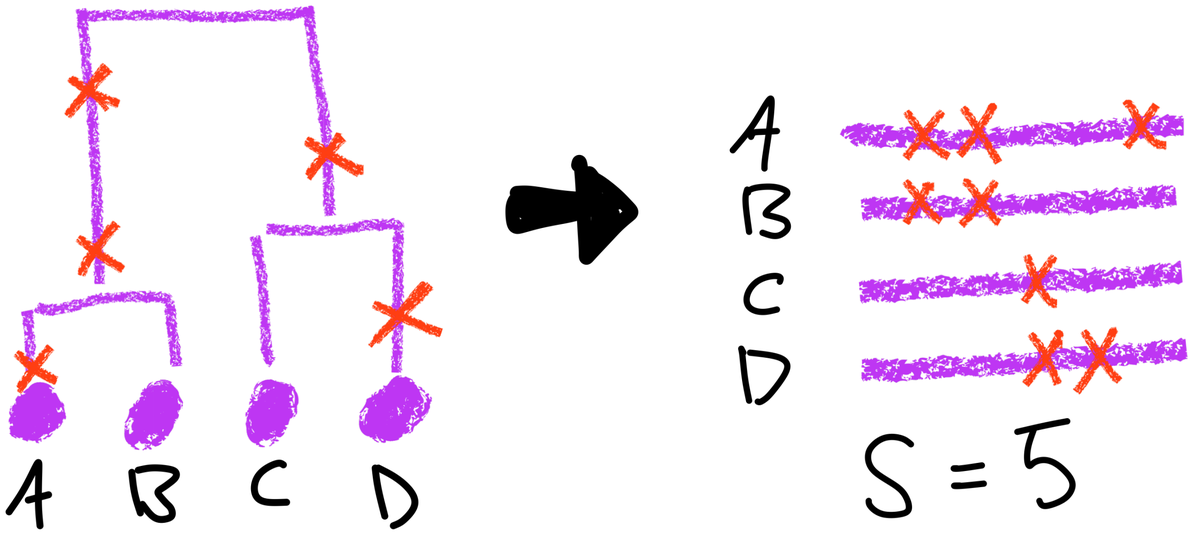
Exp. dist.

$$p(t_i) = \frac{\binom{i}{2}}{2N} e^{-\frac{\binom{i}{2}}{2N} t_i}$$

- Each pair is a process w/ rate $\frac{1}{2N}$
- The pairs race to coalesce

Previously on...

segregating sites, S, equals # mutations in the sample's history (infinite sites approximation)



Constant N case:

total branch length

$$\mathbb{E}[S] = \mu \mathbb{E}[T_{total}]$$

$$= \mu \sum_{i=2}^{n} i \mathbb{E}[T_i]$$

$$= \mu \sum_{i=2}^{n} i \frac{2N}{\binom{i}{2}}$$

$$= 4\mu N \sum_{i=1}^{n-1} \frac{1}{i}$$