

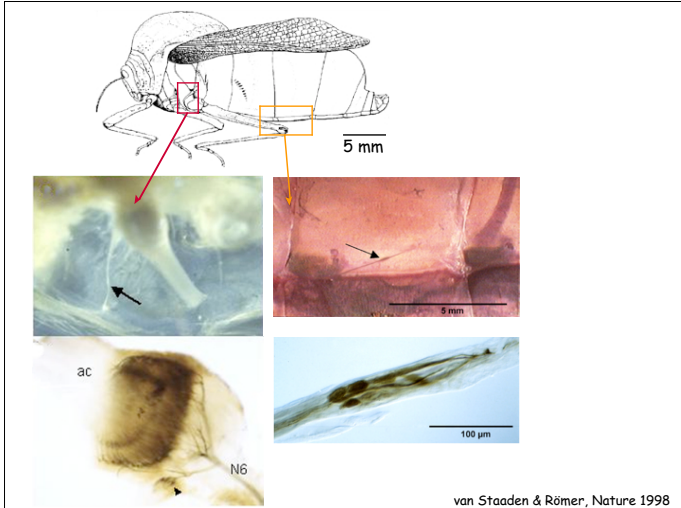
# Introduction to Phylogenetic Analysis

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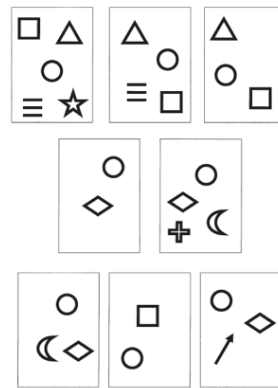
<http://tolweb.org/tree/>

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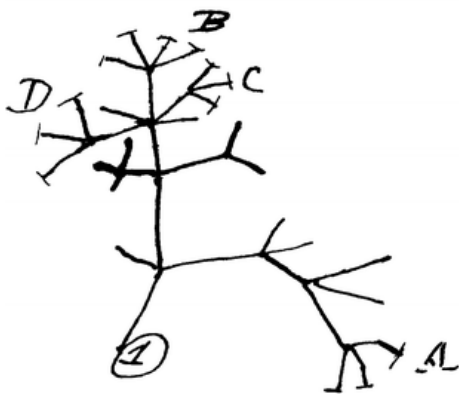
van Staaden & Römer, Nature 1998

2



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I think



3



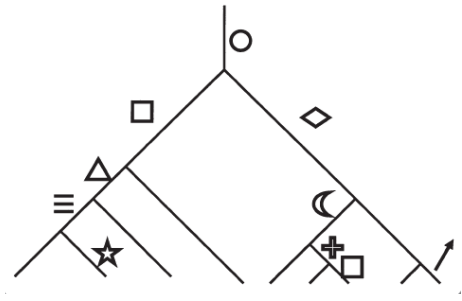
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**Task:**  
Draw a map of the racecourse,  
complete with check-in stations.

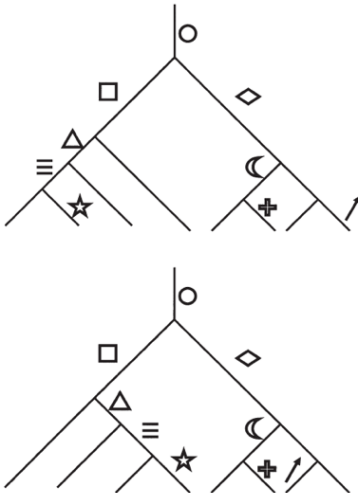
- Rules:**
1. All runners must complete the race.
  2. Paths branch only into 2 new paths - never more.
  3. Two paths branched off from one another, can never reunite.
  4. Check-in stations are located along straightaways between branching points.

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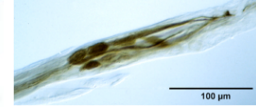
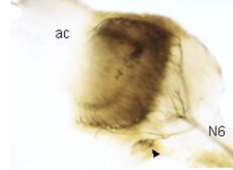
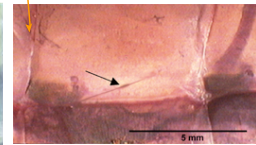
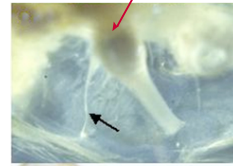
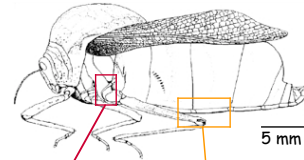


Parsimony

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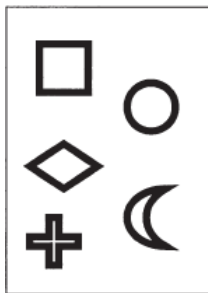


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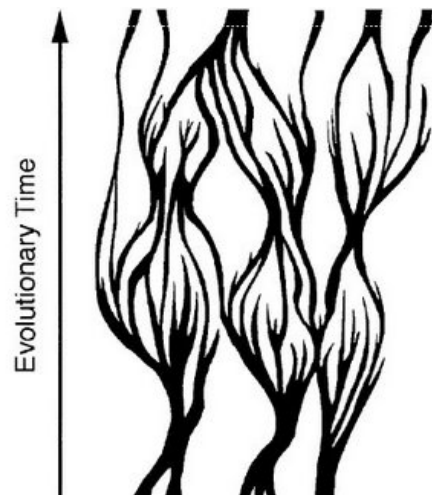


Beyond classification.....

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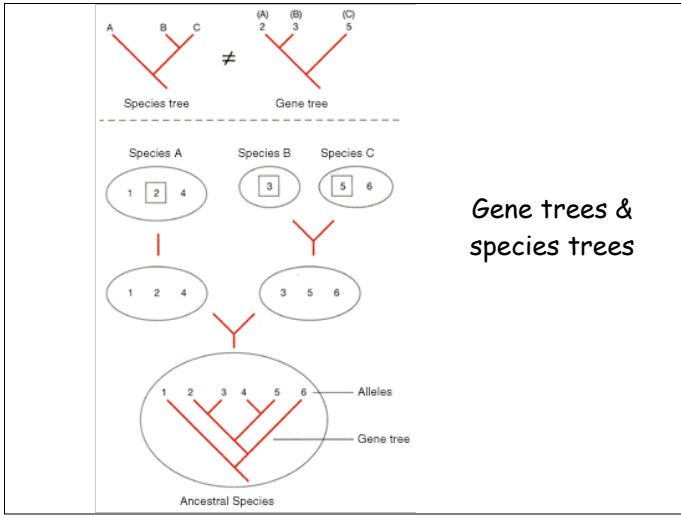


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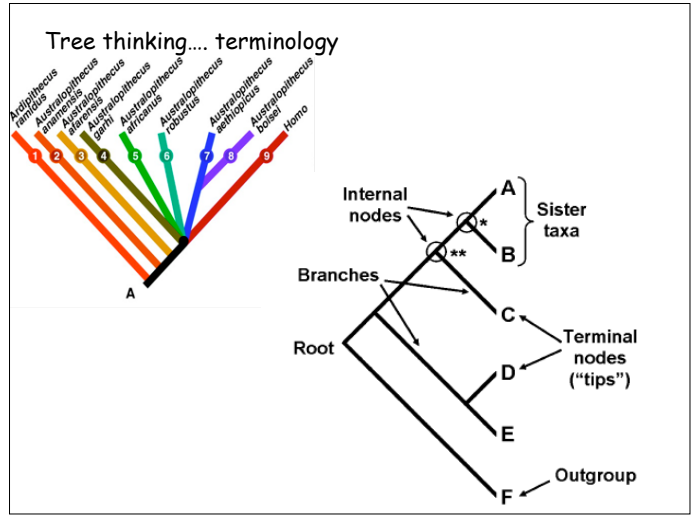


Reticulate  
Evolution  
&...

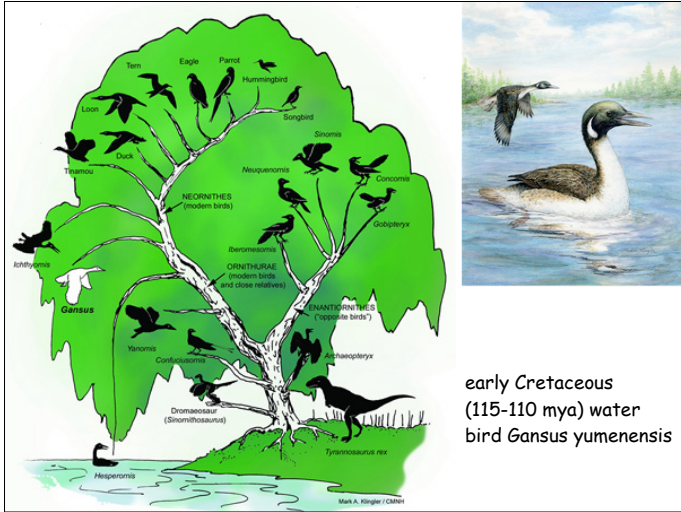
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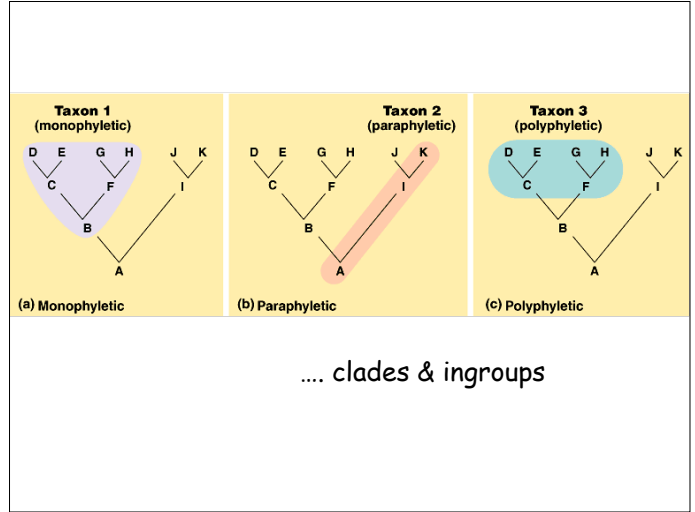
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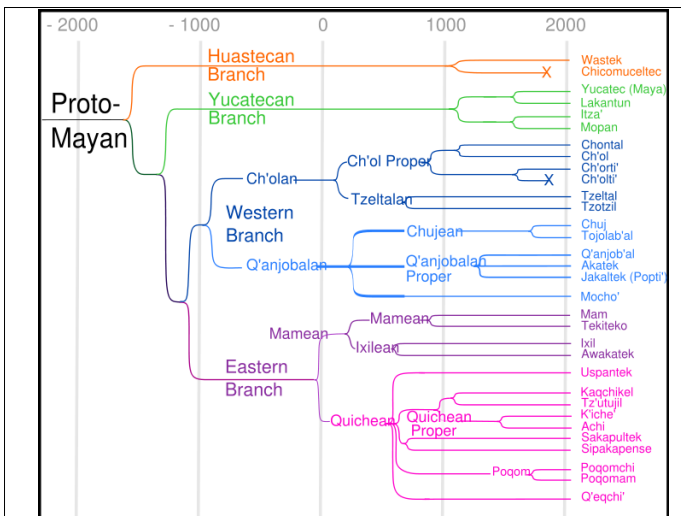
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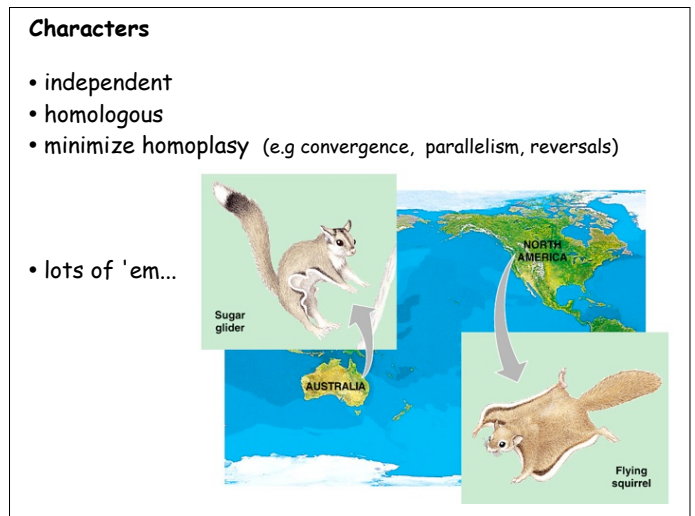
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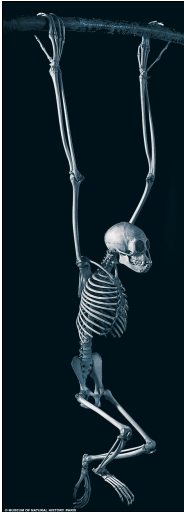
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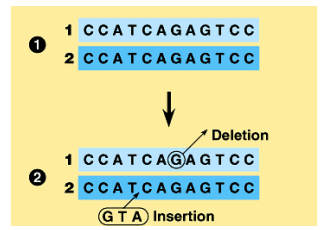


### Morphological

- homology across taxa
- lack of independence
- higher measurement error & subjectivity

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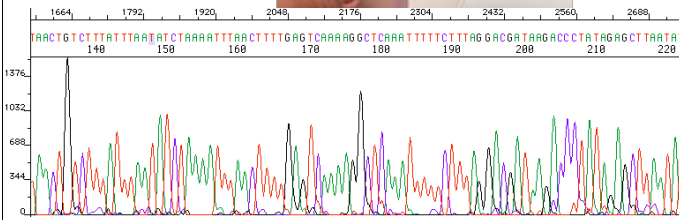
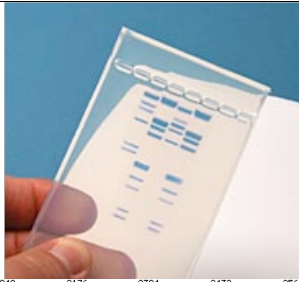
- homology & alignment across taxa
- independence of base substitutions



	-20		1	20
talA	CTTTTCAAGG	AGTATTTCT	ATGAACGAGT	TAGACGGCAT
evgA	CATTGCAAAG	GGAATAATCT	ATGAACGCCAA	TAATTATTGA
ypdI	CATTTTCAGG	ATAACTTTCT	ATGAAAGTAA	ACTTAATACT
nirB	GAAAAGAAAT	CGAGGCCAAA	ATGAGCAAAG	TCAGACTCGC
hmpA	TGCAAAAAAA	GGAAGCCAT	ATGCTTGACG	CTCAAACCAT
narQ	TTTTTGTGGA	GAAGACGCGT	GTGATTGTTA	AAAAGCCCGT
glfF	GTTATTAAGG	ATATGTTTCA	ATGTTTTTCA	AAAAGAACCCT
intS	TACCCACCGG	ATTTTTACCC	ATGCTCACCG	TAAAGCAGAT
ytdF	AATCAAATG	GAATAAATC	ATGCTACCAT	GTATTTCAAT
dsdX	ATCACAGGGG	AAGGTGAGAT	ATGCACTCTC	AAATCTGGGT
suhB	ACATCCAGTG	AGAGAGACCG	ATGCATCCGA	TGCTGAACAT

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### Molecular



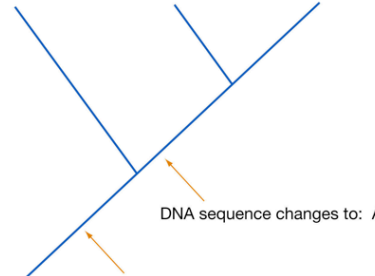
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- minimizing homoplasy

(a) Mutations can create synapomorphies

DNA sequences in descendants:

ATTGCTATTC    ATTGCTTTTC    ATTGCTTTTC

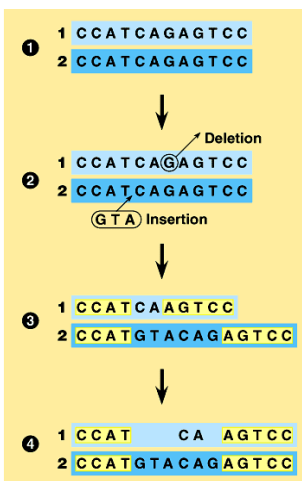


DNA sequence changes to: ATTGCTTTTC

Ancestral DNA sequence: ATTGCTATTC

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- homology & alignment across taxa
- independence of base substitutions



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(b) Reversals ("back-mutations") can remove synapomorphies

DNA sequences in descendants:

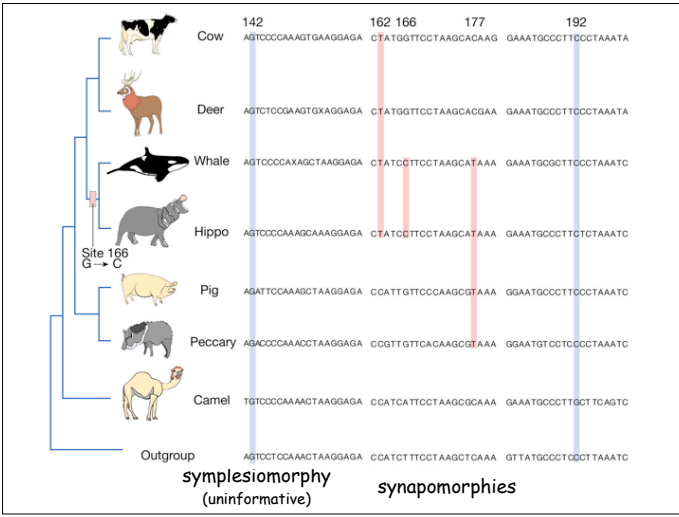
ATTGCTATTC    ATTGCTTTTC    ATTGCTTTTC    ATTGCTTTTC    ATTGCTATTC



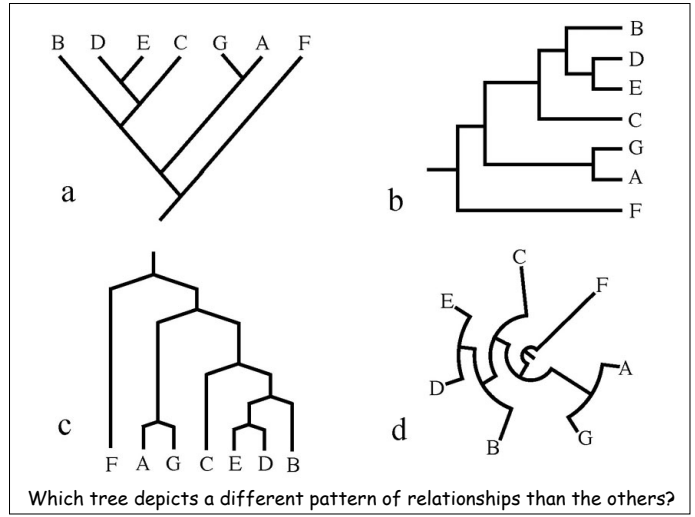
DNA sequence changes to: ATTGCTTTTC

Ancestral DNA sequence: ATTGCTATTC

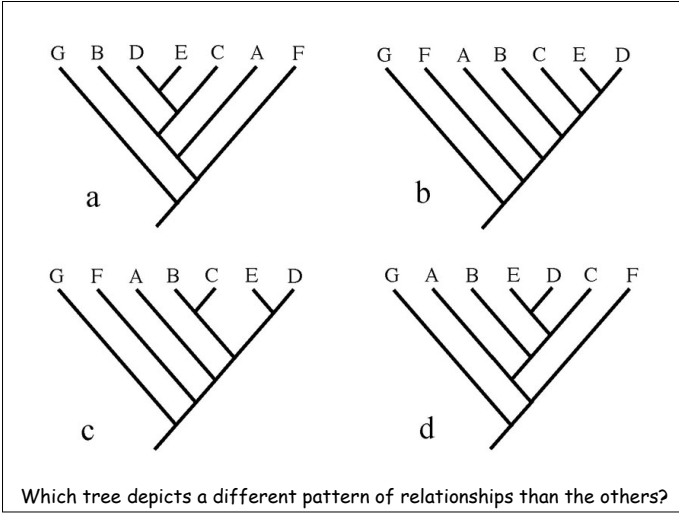
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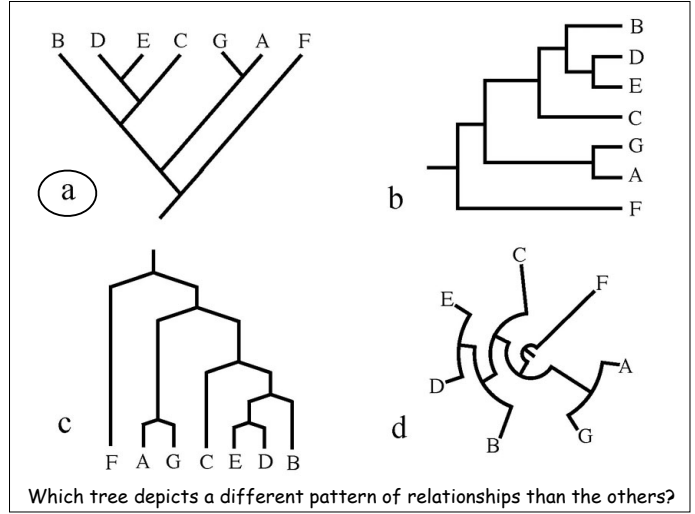
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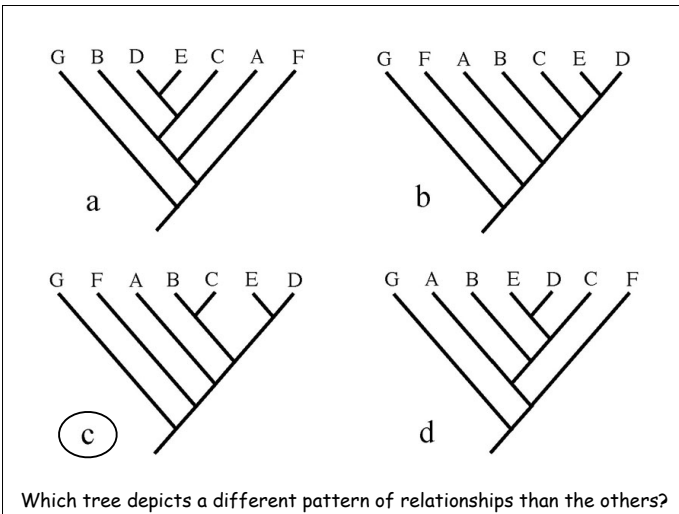
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