Graph Theory for Biologists

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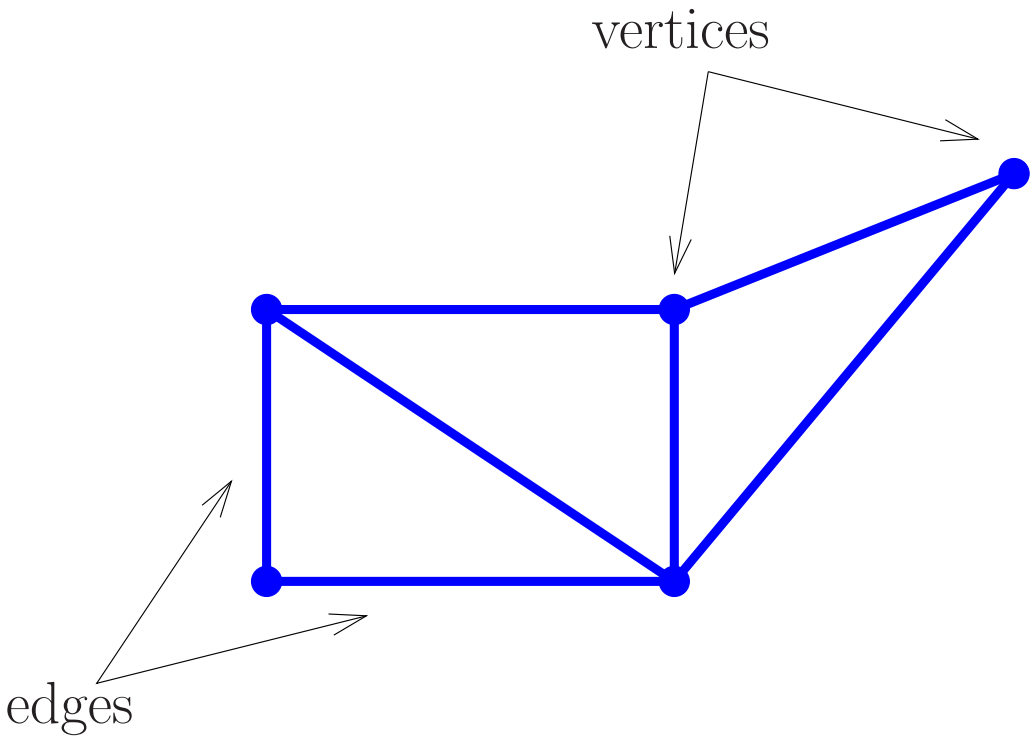
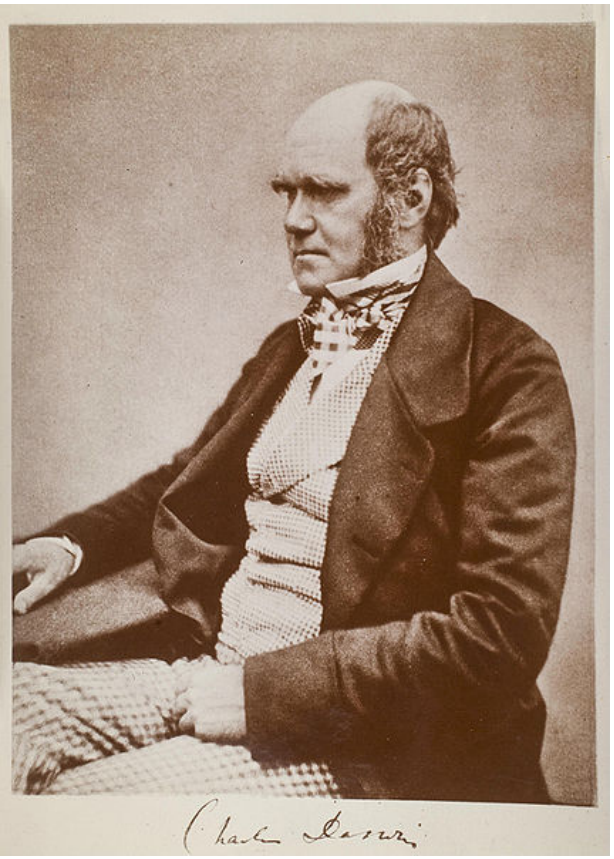
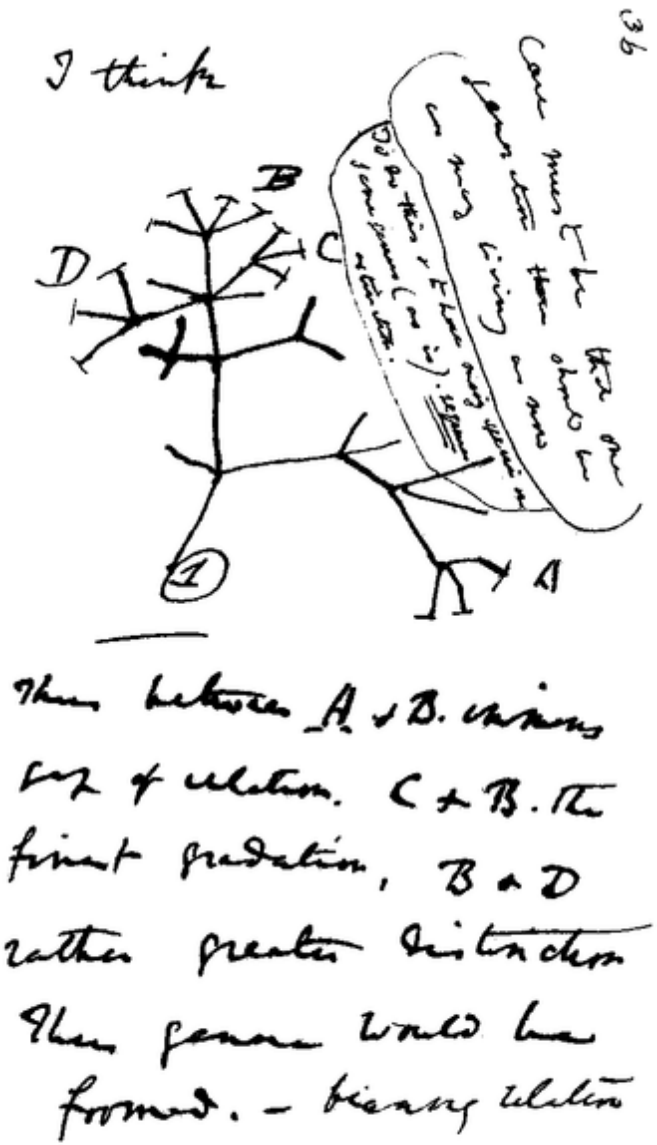
What is a graph?

Graph = collection of points (vertices) joined together by lines (edges)

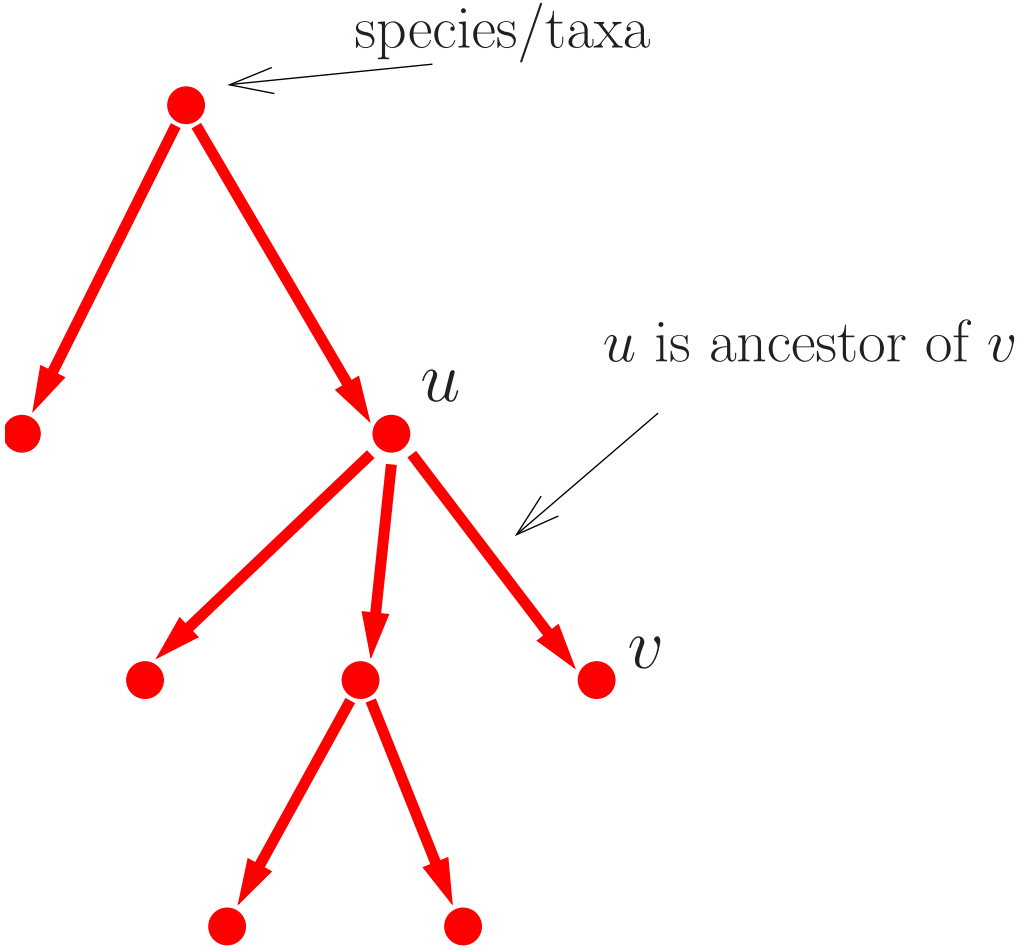


Darwin's tree of life





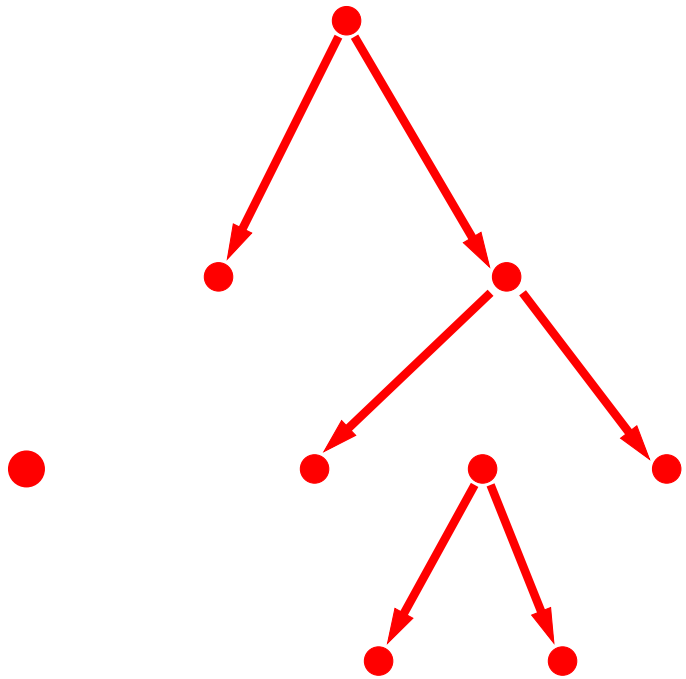
Phylogenetic trees



What kind of problems do mathematical biologists look at?

Graph reconstruction/Hereditary properties

• Given some information about our tree can we obtain more information (or even work out what the entire tree looks like)



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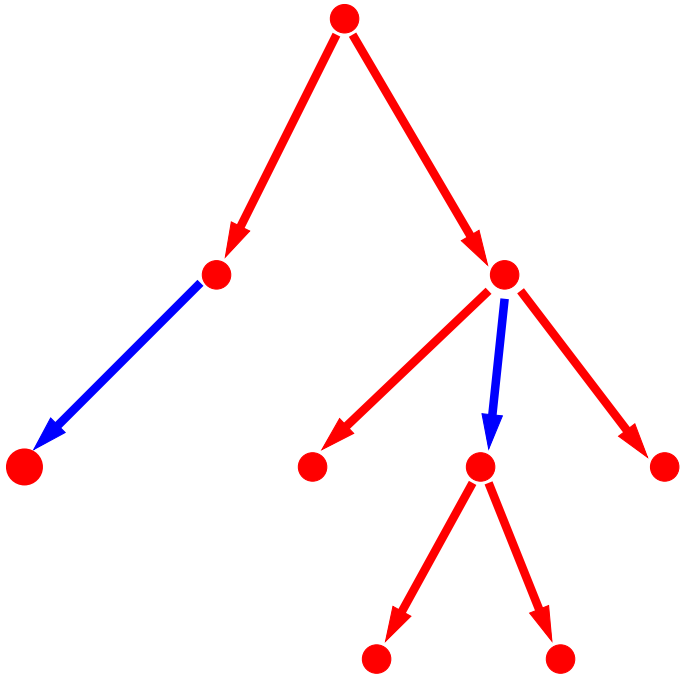

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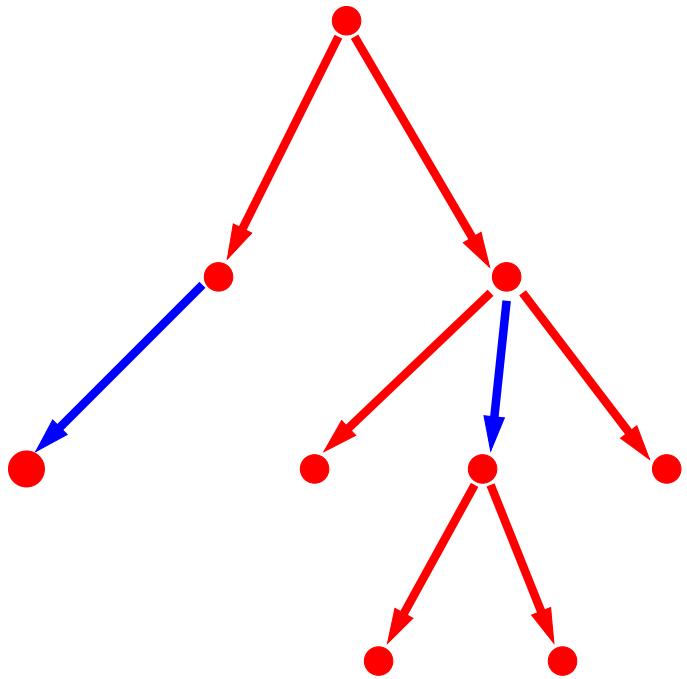
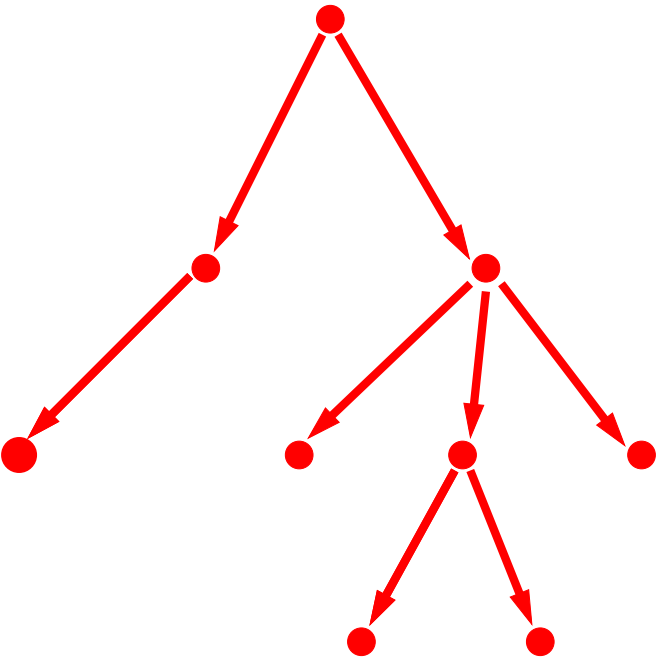
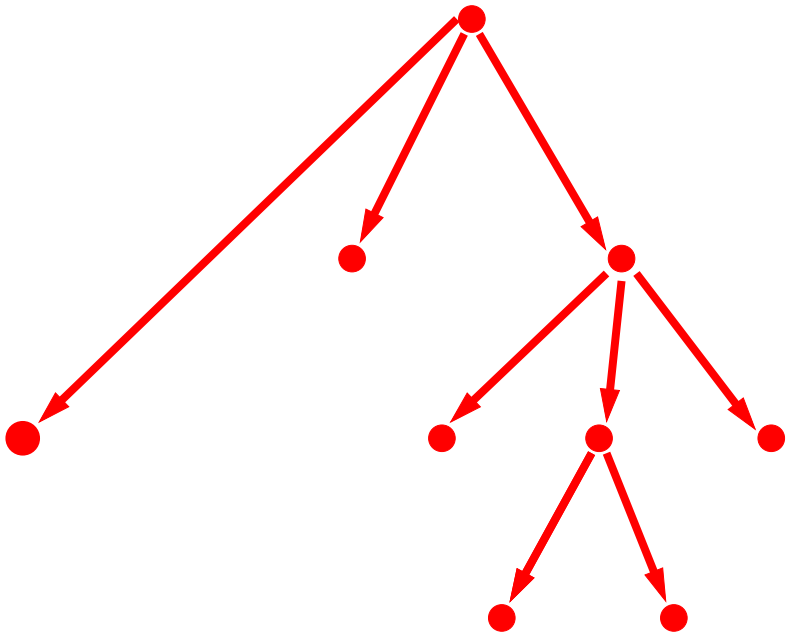


- Stephen Willson (Iowa State) works on such problems

The tree space

Given different pieces of information we may obtain different 'candidates' for our phylogenetic tree





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The tree space

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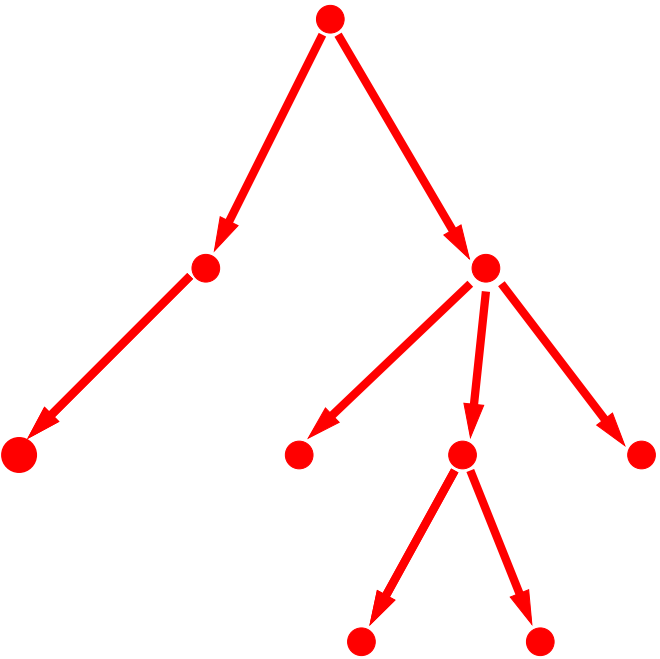

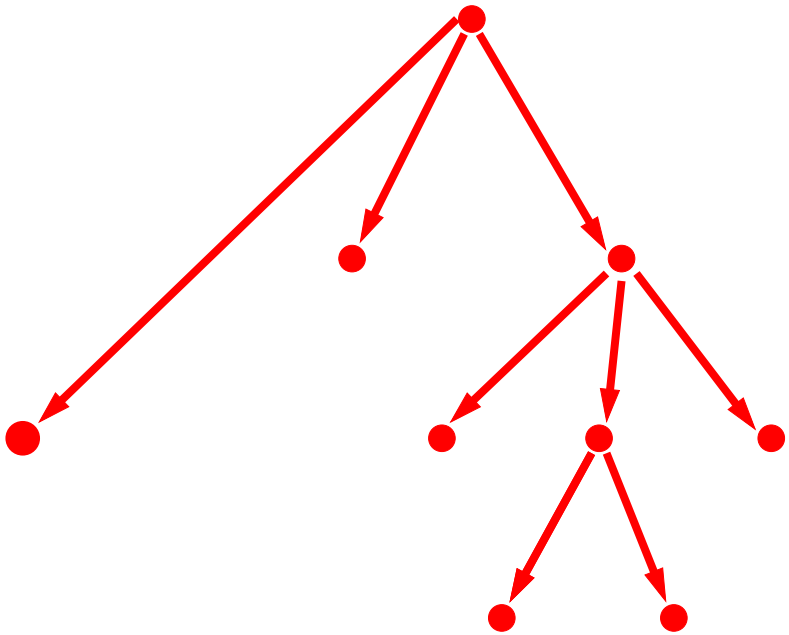

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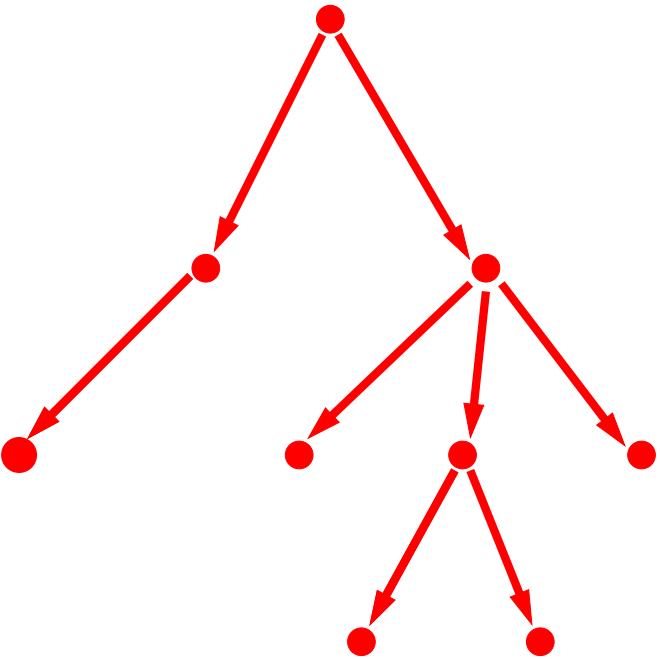

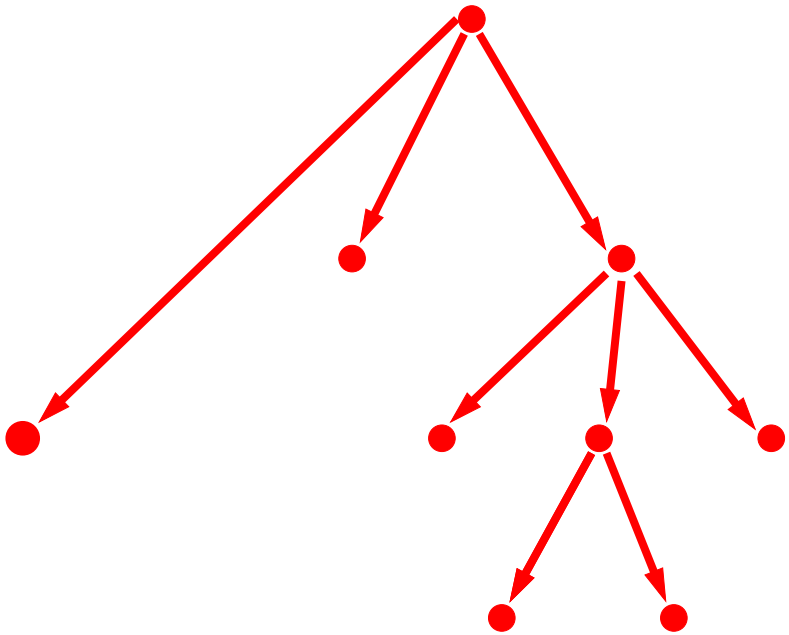

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