

**Exercise 2 help file:** This file also contains an annotated portion of the results output by codeml for a pairwise ML analysis. This file annotates the additional information required to complete exercise 2.

```
.  
. .  
pairwise comparison, codon frequencies: Fequal.  
  
2 (Sim) ... 1 (Me1)  
lnL = -926.280300  
0.10533 1.88371 ← 0.32004  
  
t= 0.1053 S= 165.8 N= 434.2 dN/dS= 0.3200 dN= 0.0221 dS= 0.0691
```

Note that the user-specified model for codon frequencies is indicated here.

The middle value in this line is the ML estimate of kappa (ts/tv)

This is the ML estimate of branch length (t) between the pair of sequences. It is measured as the mean number of substitutions per codon site.

N is the number of non synonymous sites  
S is the number of synonymous sites.

dN is the nonsynonymous substitution rate  
dS is the synonymous substitution rate