

Vertebrate Phylogeny
Observing Morphological Characters in Several Different Species

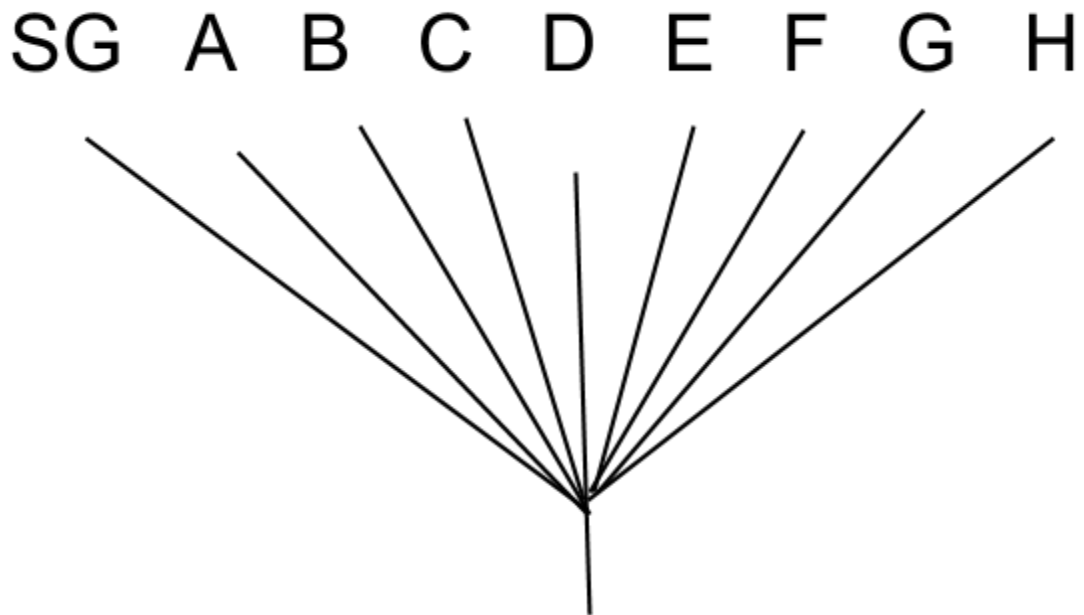
BIO1130 Section A6

Demonstrators:

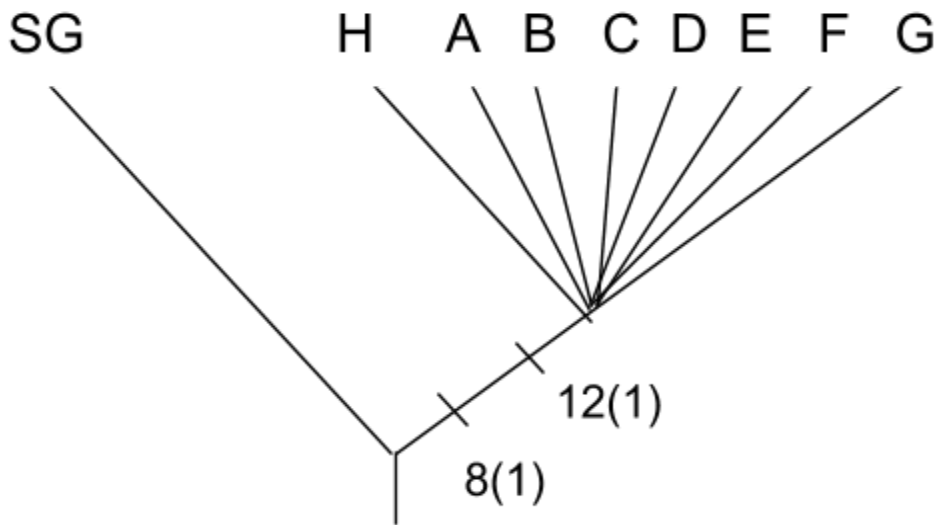
Monday, November 5, 2018

Department of Biology

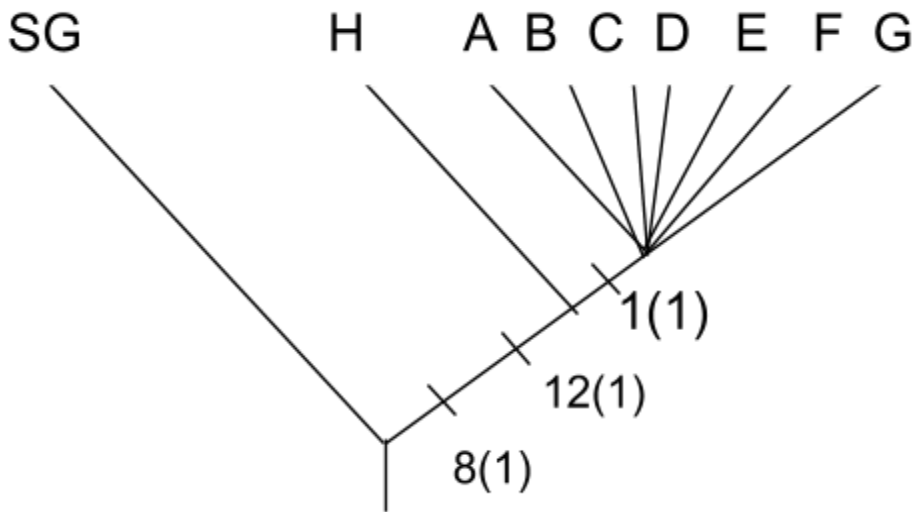
University of Ottawa



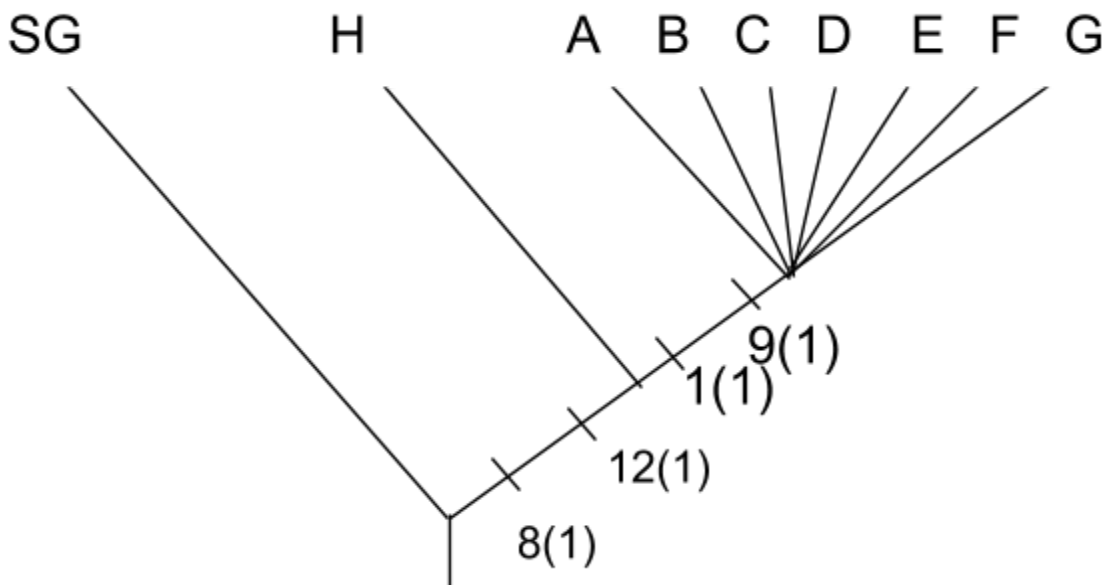
Cladogram 1: Initial cladogram with no resolution



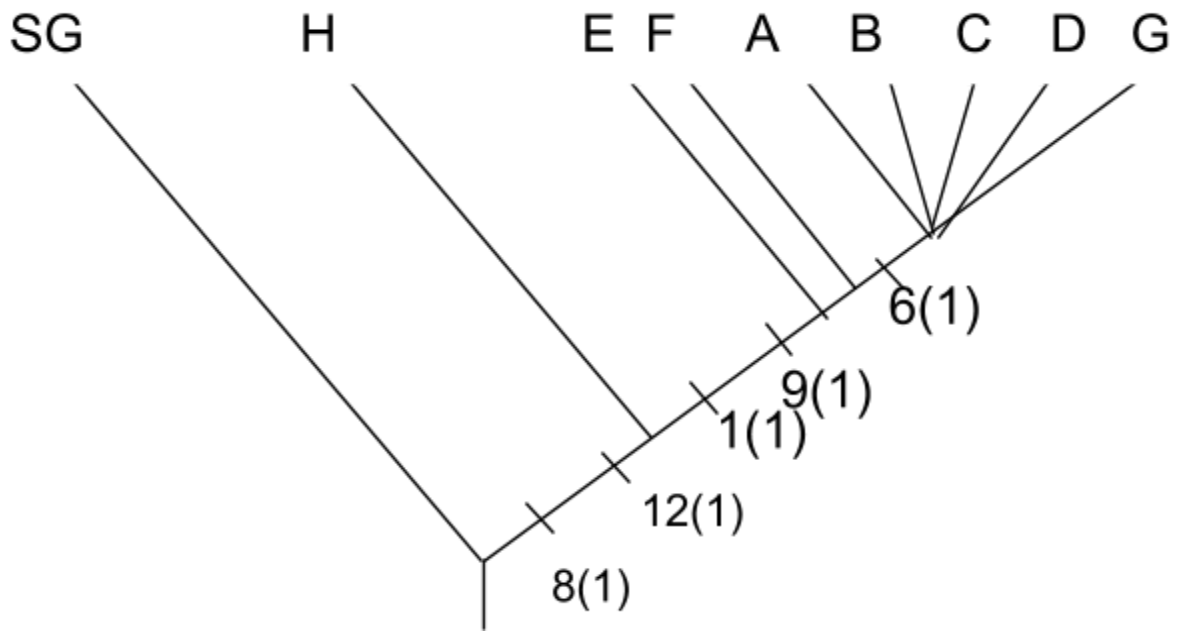
Cladogram 2: Jaws and a stomach evolved in all species A-H



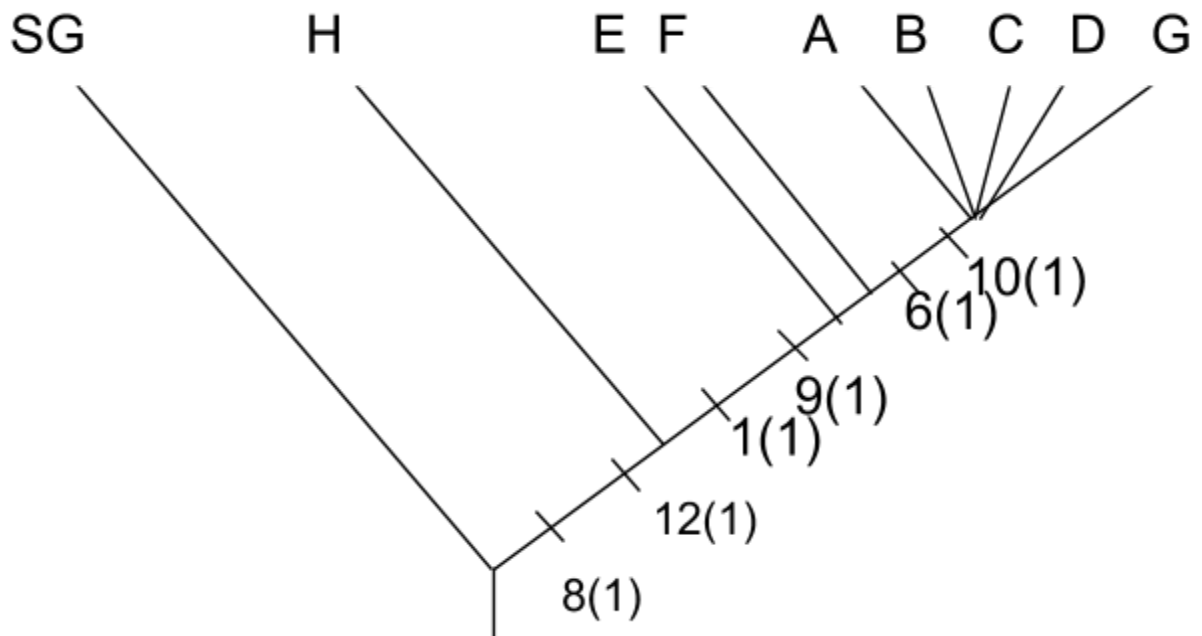
Cladogram 3: A bony skeletal structure evolves in species A-G



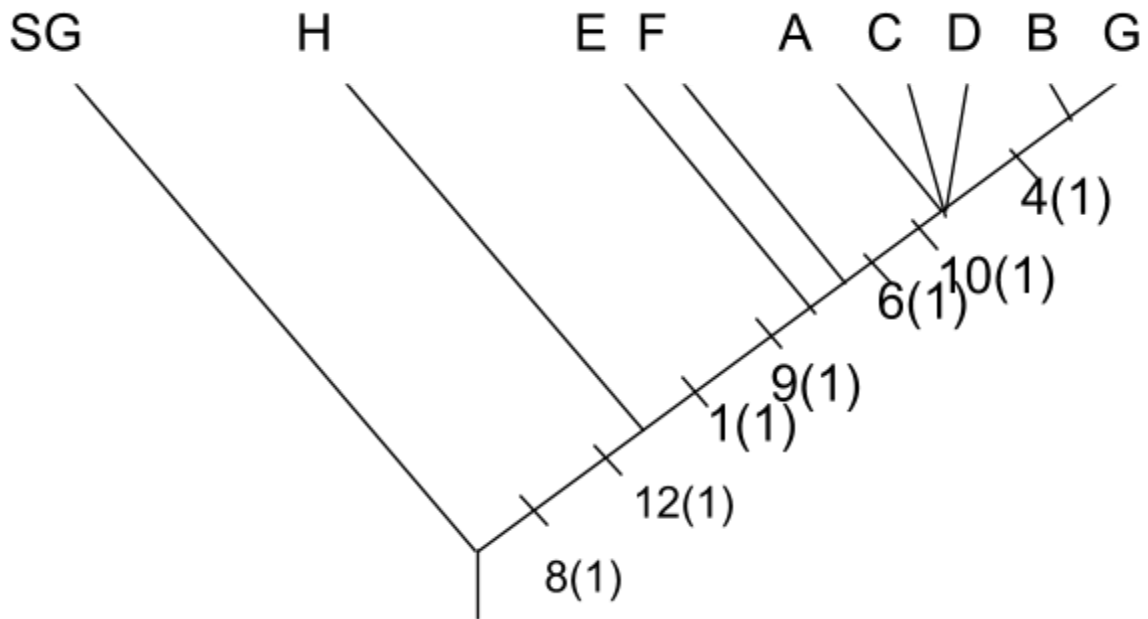
Cladogram 4: Lungs and similar derivatives evolve in species A-G



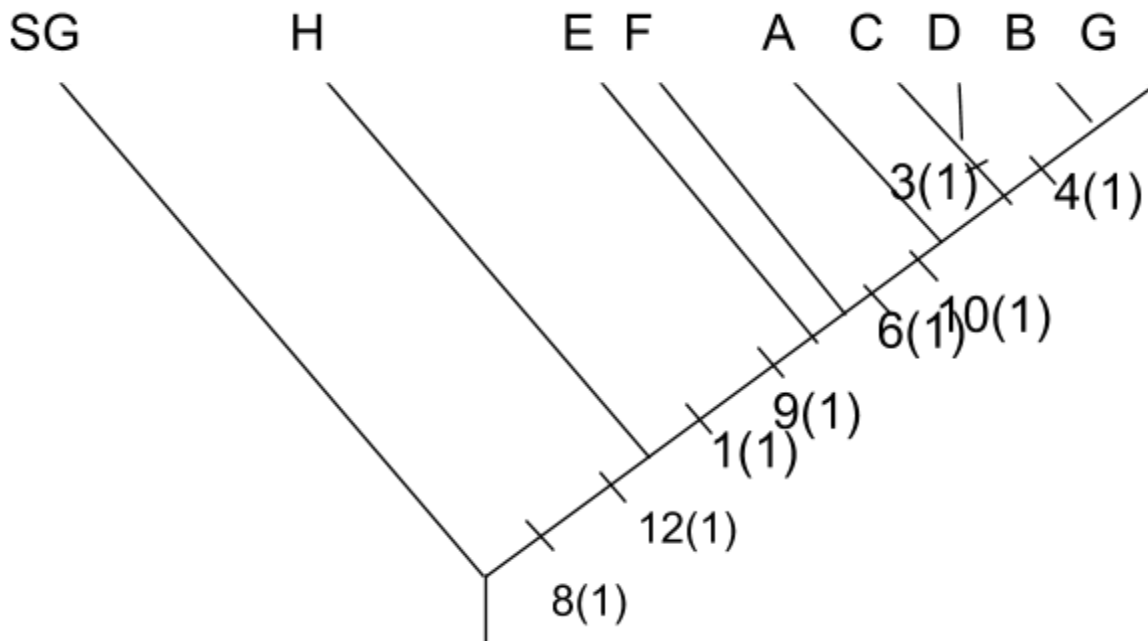
Cladogram 5: Amnions can be found in species A-D and G



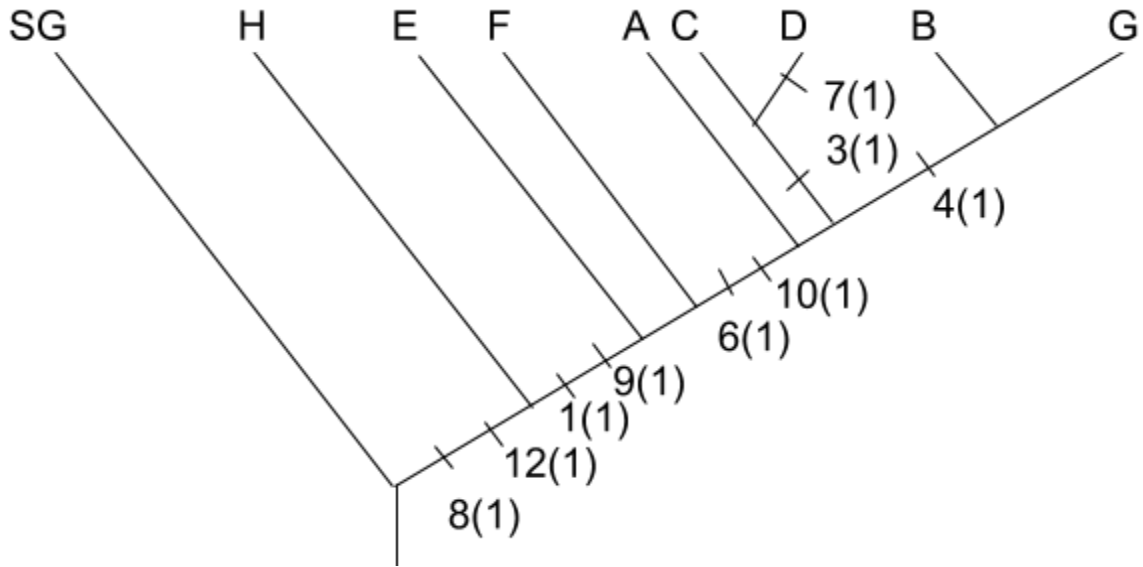
Cladogram 6: In species A-D and G, an adult nephridial system has evolved



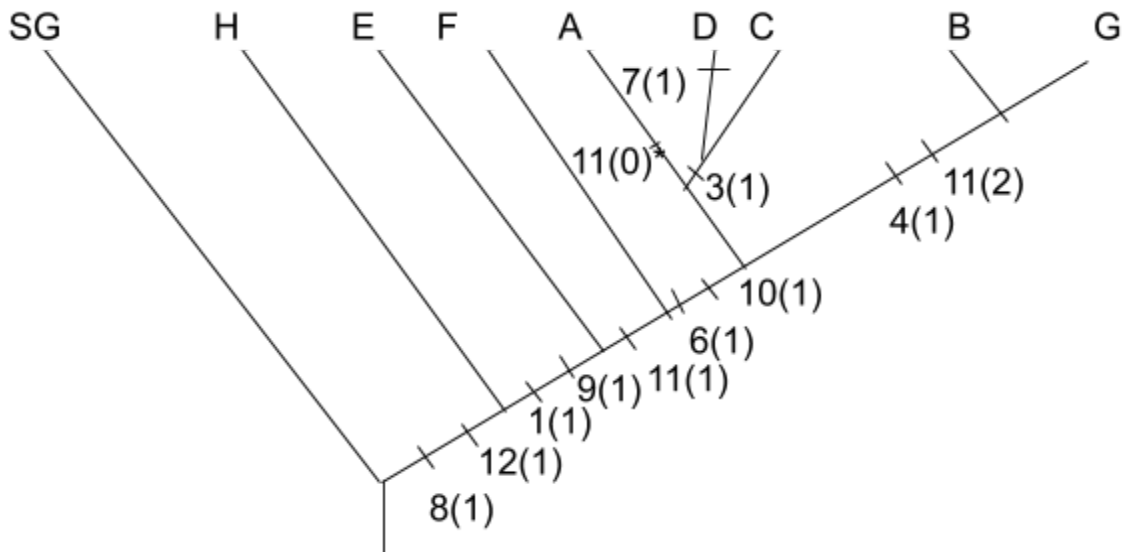
Cladogram 7: Hair/fur is now found on species B and G



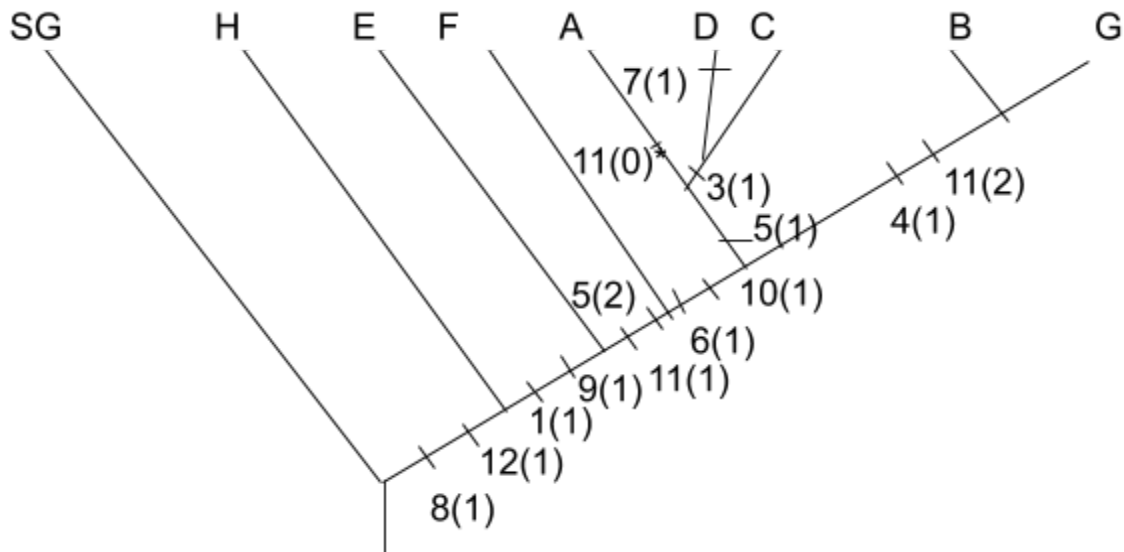
Cladogram 8: Gizzards are formed in species C and D



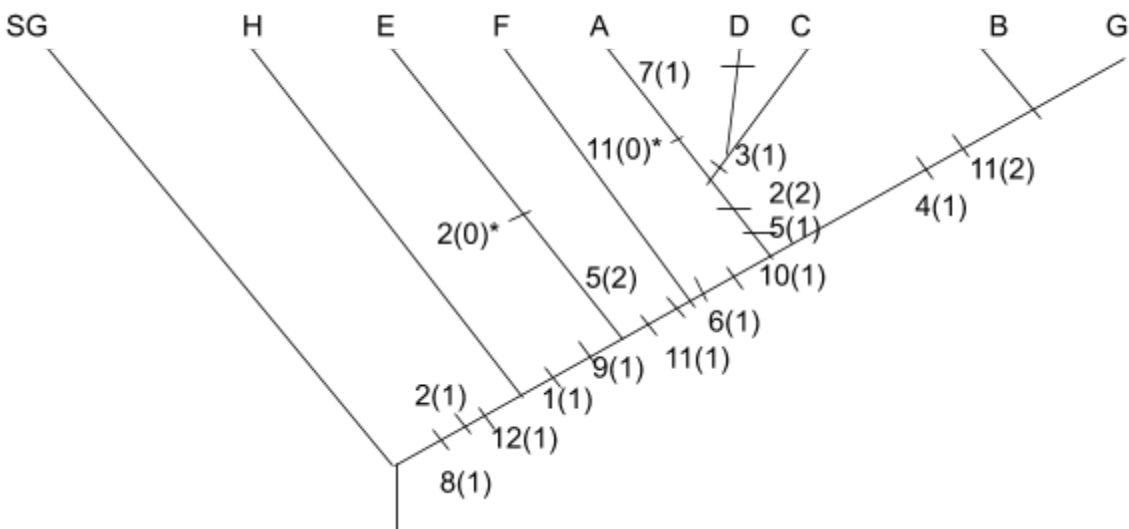
Cladogram 9: Forelimbs evolved for flight are observed on a single species



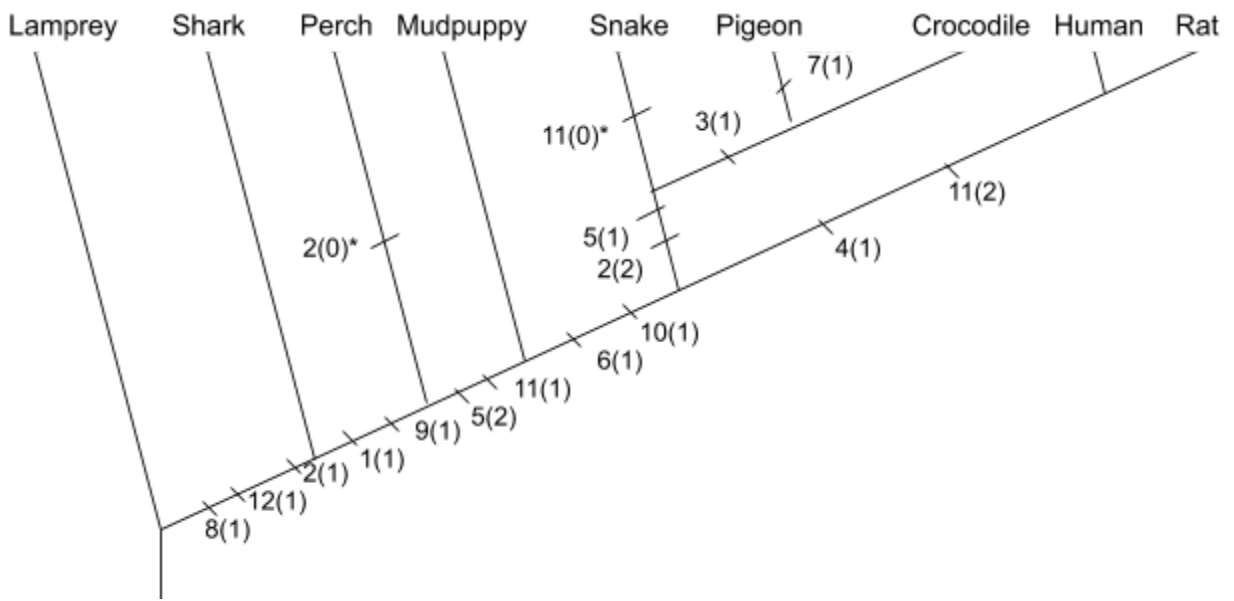
Cladogram 10: A reversal event occurs for species A, with the lost of digits on the hind leg



Cladogram 11: 2 occipital condyles evolve in species F, B and G. A single occipital condyle is found in species A, D and C



Cladogram 12: Urea - a form of nitrogenous waste - evolves in all species A-H. However, species A, D and C evolve again in order to produce uric and a reversal event occurs so that species E produces ammonia.



Cladogram 14 (Final): A reversal event occurs for character trait 2(0), as well as 11(0)

Conclusion

An endothermic organism is any individual defined by being able to generate its own heat in order to maintain its temperature. Warm-blooded species such as mammals and birds are considered to be endothermic organisms, whereas cold blooded species like reptiles and amphibians are defined as ectothermic organisms - where external sources maintain body temperature. Of the nine species presented in the above cladograms, only three - the pigeon, human, and rat - are endothermic organisms. The remaining six are all ectothermic.

Considering the placement of the pigeon, the human, and the rat species, endothermy represents a convergence homoplasy event. This is the result of the pigeon not being apart of a monophyletic group with the human and rat, due to this, the endothermy trait had to have occurred independently for the different species.