1. *JD* The rapid evolution of flowering plants likely influenced primate evolution in many ways. Which of the possible influences below is the *most* likely?

    A. Increasing the number of mutations that occurred
    B. **Making new adaptive opportunities available**
    C. Increasing gene flow
    D. Reducing gene flow
    E. Increasing competition

2. *JD* Male orangutans (a kind of great ape) are typically much larger than females, and often develop very prominent facial features (called cheek flanges) that females do not have. Based on this, it is likely that male orangutans have:

    A. large testicles
    B. small testicles
    C. **high variation in sexual success**
    D. low variation in sexual success

3. *JD* Many scientists in the past believed that hominins were a sister taxon to great apes. Which of the following is *not* a likely reason for that belief?

    A. **Cladistic analysis**
    B. Phenetic analysis
    C. Observer bias
    D. Effects of culture

4. *JD* A phylogenetic tree _____ how a group of species branched out from a common ancestor, and _____ which species have evolved the furthest from that ancestor.

    A. describes; also describes
    B. **describes; does not describe**
    C. does not describe; does describe
    D. does not describes; also does not describe

5. *JD* The "Five Kingdoms" are a good description of:

    A. How organisms evolved
    B. The roles that organisms play in the biosphere
    C. How organisms interact
    D. **How organisms look to humans**

6. *JD* Scientist should prefer a phenetic approach (as opposed to a cladistic approach) to phylogeny when:

    A. relying on morphological rather than genetic data
    B. studying a wide range of taxa at once
    C. **available data describe distances, rather than traits**
    D. All of the above
    E. None of the above

7. *JD* In phylogenetic analysis, the *biggest* advantage of genetic data compared to morphological data is that:

    A. Traits can be measured more precisely
    B. **More traits can be measured**
    C. It is easier to tell which traits are derived
    D. It is easier to tell which traits are homologies
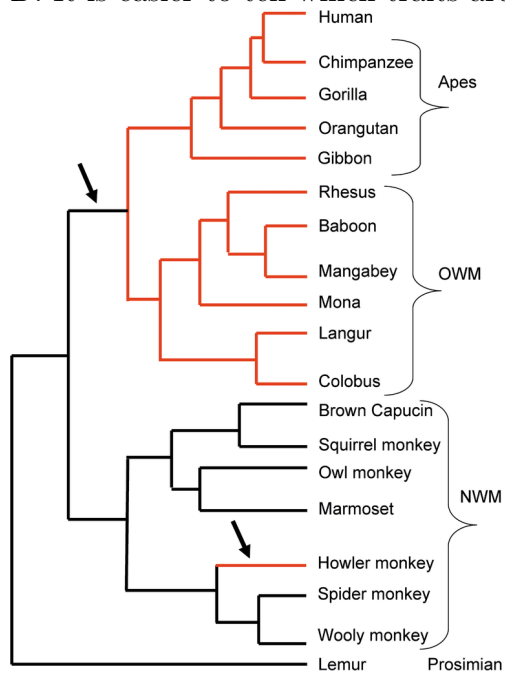
Use the figure above for the next three questions

8. *JD* Which of the following groupings is *not* a clade according to the model shown in the tree?

    A. Rhesus
    B. **Rhesus + Baboon**
    C. Rhesus + Baboon + Mangabey
    D. Rhesus + Baboon + Mangabey + Mona
    E. None; these are all clades

9. *JD* According to the tree, and following the labels on the tree, the sister taxon for the Old-World monkeys (OWM) is:

    A. New-World monkeys (NWM)
    B. New-World monkeys plus prosimians
    C. Apes
    D. **Apes plus humans**

10. *JD* The arrows and red branches on the tree likely indicate

    A. A proposed new taxon, recognizing the fact that "monkeys" are not a taxon
    B. An older taxonomic theory
    C. The evolution of more advanced traits
    D. **A trait that is hypothesized to have evolved twice**
    E. A trait that is hypothesized to have evolved and then been lost

11. *JD* A limitation of the tree above is that:

    A. The complete evolutionary history of these taxa cannot be described by a tree
    B. It's very hard to ever be sure that we have the best tree for a group of taxa
    C. **Both**
    D. Neither

12. *JD* Dolphins, like humans, have brains that are unusually large for their body size. Of the following explanations, which one is most likely?

    A. **Brain size being driven largely by sociality**
    B. Dolphin brains being a vestigial trait
    C. Dolphins evolving in the direction of more complex culture than they have now
    D. Largeness of dolphin brains being homologous to largeness of human brains

13. *JD* Which of the following is *not* a possible advantage of large, widely spaced eyes?

    A. Better night vision
    B. Predator avoidance
    C. **Stereoscopic vision**
    D. Wider range of view

14. *JD* Cows have pulley-shaped ankles. Hippos have pulley-shaped ankles, thick bones and blubber-like fat. Whales have thick bones, blubber-like fat, blowholes and split sleeping.

a) (2 points) Use these traits to draw a *phenetic* tree showing inferred relationships between these three species. Explain how you chose which two species to pair first.

b) (3 points) Use these traits to draw a *cladistic* tree showing inferred relationships between these three species. Explain how you chose which two species to pair first. What key assumption do you need to use these traits as the basis for a cladistic tree?