From case study:

1. Do you think that in a phylogenetic tree the parasites that use similar hosts will group together?
    a. Some parasites are highly specialized to particular host species or groups of hosts. Parasites with narrow host ranges may form distinct clades in a phylogenetic tree if their evolution is shaped by interactions with their specific hosts.
2. You will probably still have some scaffolds that derive from the bird. These should be short. Why?
    a. Incompleteness of the sequencing and assembly process
3. Insert the missing data in the table. Use bash, not internet!

| Species | Genome size | Genes | GC content |
|---|---|---|---|
| Pb | 17954629 | 7235 | 23.71% |
| Pv | 27007701 | 5682 | 42.19% |
| Py | 22222369 | 4889 | 20.77% |
| Pf | 23270305 | 5207 | 19.36% |
| Pk | 23462187 | 4952 | 37.54% |
| Pc | 26181343 | 5787 | 39.07% |
| Tg | 128105889 | 0 | 52.19% |
| Ht | 6265874 | 1437 | 23.55% |

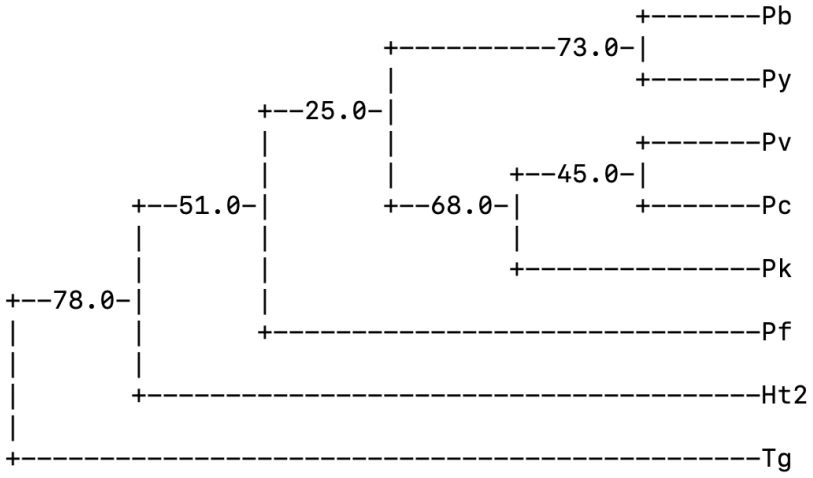
4. Compare the genome sizes with other eukaryotes and bacteria. Discuss with your partner (that is student partner) the reason for the observed genome sizes.
    a. Parasites often undergo gene duplication and expansion to adapt to diverse host environments and evade host immune responses, which leads to larger genome sizes
5. What may cause the biased GC-contents in some of the species?
    a. Horizontal gene transfer events between host and parasite
6. What does the curly braces notation stand for?
    a. generates a list of items or expands a pattern
7. Compare how many BUSCOs (orthologous proteins) that are found in each proteome. Do the investigated parasites have close to complete numbers of BUSCOs?
    a.

| Species | Complete |
|---|---|
| Pb | 361 |

| | |
|---|---|
| Pv | 437 |
| Py | 435 |
| Pf | 436 |
| Pk | 433 |
| Pc | 429 |
| Tg | 380 |
| Ht | 101 |

   b. The plasmodium species aside from Pb have close to complete numbers of BUSCOs.

8. Do you think that the assembly of the Haemoproteus tartakowskyi genome is a reasonable approximation of the true genome?
   a.
9. How many of the BUSCOs are found in all eight organisms?
   a. 78
10. If Toxoplasma is removed, how many BUSCOs are shared among the remaining seven species. Interpret!
   a. 87
   b. Makes sense that there are more since we know Tg is an outgroup and is not as similar as the plasmodium species
11. Do all protein trees reflect the “true’ ’ species tree?
   a. No
12. What is the phylogenetic position of Plasmodium falciparum?




   a.
13. Do you think that the GC contents have an impact on the tree topology?
   a. It does appear that species with similar GC contents group together on the tree
14. Do you think that the host range has an impact on the tree topology?

a. Yes, strains that have the same host range or very similar host ranges tend to branch together on the tree