

**Assignment #1**

1.

**Table 1:**

Gryphon Character States

Characters	States
Tail	0 = elongated
Hallux	1 = reduced or absent
Claws	0 = non-retractable
External Ear (penna)	0 = present

The Gryphon would be placed where the Walrus is located on the 21-step phylogeny. Gryphon's can only be classified through 4 character traits, so the other phylogenies (12-steps and 20-steps) can't be used to identify the Gryphon's location.

2.

**Table 2:**

Characters and character states for an analysis of Timbits

Characters	States
1. White/plain interior	0 = Absent 1 = Present
2. Jelly filling	0 = Absent 1 = Present
3. Fruit	0 = Absent 1 = Present
4. Glazed	0 = Absent 1 = Present
5. Sprinkles	0 = Absent 1 = Present

**Table 2:**

Morphological data matrix for Timbits

Taxa	Character State Scoring					
	#	1	2	3	4	5
Oldfashioned plain (outgroup)		0	0	0	0	0
Honey dip		1	0	0	0	0
Jelly strawberry		0	1	1	0	0
Apple fritter		1	0	1	0	0
Oldfashioned glazed		1	0	0	1	0
Chocolate glazed		0	0	0	1	0
Birthday cake		0	0	0	0	1
Salted caramel		1	0	0	1	0

**Discussion:**

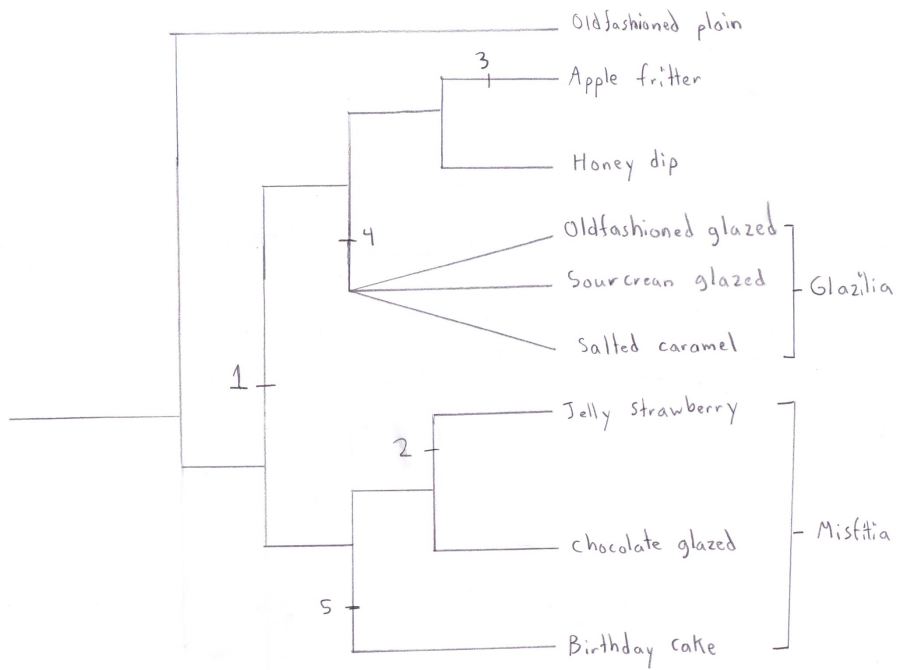
*Misfitia* is a clade that includes the lower branch of the phylogeny, which includes jelly strawberry, Birthday cake, and chocolate glazed. This is an important clade to distinguish as the species have quite different physical features than the upper branch that includes all timbit species that had a white and plain interior.

The clade, *Glazilia*, includes the species grouped in the polytomy. These timbit species are Salted caramel, Oldfashioned glazed, and Sourcream glazed. These species were unresolved in distinguishing themselves from one another. These species were very closely similar, and grouped under the clade, *Glazilia*.

The choices of characters were fairly successful as most species were distinguished within the phylogeny. The characters used were very clear and split up the more sophisticated species with the timbits that had simple white and plain physical features (first character). This created two separate and distinct lineages from the root. The jelly strawberry, birthday cake, and chocolate glazed followed the same

branch (shared descent) and were able to be distinguished as we moved through the derived states.

Unfortunately, the *Glazilia* clade was unresolved. With another character, we could have used salted or dipped as another character that could be included that would distinguish one of the three species left in the polytomy. The most non-informative character would be glazed, as it doesn't so much as distinguish a single species, it merely splits the timbits into two different branches that will eventually need additional characters to distinguish species of timbits apart. It was useful only as a means to group some of the timbits through this ancestral trait, but would be non-informative if it were used as a derived character. So, if the glazed character were used later within the phylogeny, it would be non-informative.



Characters	1. White/plain interior	2. Jelly filling	3. Fruit	4. Glazed	5. Sprinkles