Bioinformatics Assignment Worksheet

Exercise 1

**Question 1**

Consider the two objects in **Figure 1**. Are these objects similar? In what way(s) would you consider them to be similar?

**Question 2**

How could the similarity between the two passages above be quantified? What must be done prior to determining the similarity of these passages?

**Question 3**

Considering amino acid residue chemical properties, explain why an alanine substituted with a Serine is assigned a score of 1, while an Alanine substituted with a Tryptophan is assigned a score of -3 in the BLOSUM-62 substitution matrix.

**Question 4**

What is the total similarity score for these two aligned sequences?

Query: MGDVEKGKKIFIMKC

Subject 1: MGEVERGKKLFIMKC

**Question 5**

If the query sequence is aligned to a different subject sequence (given below), what is the similarity score?

Query: MGDVEKGKKIFIMKC

Subject 2: MCDVWKGKSIFIMKC

**Question 6**

Explain why the similarity scores calculated above are different. Consider and refer to information provided in Table 1 as part of your explanation.

**Question 7**

When the query sequence is compared to itself, a similarity score of 80 is obtained. Considering this, why are the two scores you calculated above different despite having the same number of identical amino acids? Which of the two subject sequences most likely diverged evolutionarily longer ago from the query sequence?

**Question 8**

Report the similarity scores from the computational scoring. Did the computationally calculated similarity scores match those that you manually calculated?