**CS5483 – HW2**

**Student: Ibrahim Baho**

Q1)-

(A). The 4 scoring matrices:

A C G T

\_\_\_\_\_\_\_ \_\_\_\_\_\_\_ \_\_\_\_\_\_\_ \_\_\_\_\_\_\_

A 0.87547 -0.62861 -0.62861 -0.62861

C -0.62861 0.87547 -0.62861 -0.62861

G -0.62861 -0.62861 0.87547 -0.62861

T -0.62861 -0.62861 -0.62861 0.87547

A C G T

\_\_\_\_\_\_\_ \_\_\_\_\_\_\_ \_\_\_\_\_\_\_ \_\_\_\_\_\_\_

A 1.0296 -0.91629 -0.91629 -0.91629

C -0.91629 1.0296 -0.91629 -0.91629

G -0.91629 -0.91629 1.0296 -0.91629

T -0.91629 -0.91629 -0.91629 1.0296

A C G T

\_\_\_\_\_\_ \_\_\_\_\_\_ \_\_\_\_\_\_ \_\_\_\_\_\_

A 1.1632 -1.3218 -1.3218 -1.3218

C -1.3218 1.1632 -1.3218 -1.3218

G -1.3218 -1.3218 1.1632 -1.3218

T -1.3218 -1.3218 -1.3218 1.1632

A C G T

\_\_\_\_\_\_ \_\_\_\_\_\_ \_\_\_\_\_\_ \_\_\_\_\_\_

A 1.2809 -2.0149 -2.0149 -2.0149

C -2.0149 1.2809 -2.0149 -2.0149

G -2.0149 -2.0149 1.2809 -2.0149

T -2.0149 -2.0149 -2.0149 1.2809

(B).

for score = 20 the E-value: 2.0612 e-06 -> the alignment is significant

(C).

for score = 5 the E-value: 6.7379 -> alignment is NOT significant

(D).

for score = 20 against a DB of size 1 million, E-value: 2.0612

(E).

The Score Matrix:

60% 70% 80% 90%

\_\_\_\_\_\_ \_\_\_\_\_\_ \_\_\_\_\_\_ \_\_\_\_\_\_

18.54 16.672 12.9 10.794

23.839 25.381 24.373 19.56

32.1 35.451 36.798 34.931

36.5 41.865 45.733 47.568

* From the scoring matrix we notice that the highest scoring alignment for each pair is the corresponding substitution matrix, for ident\_60\_seq\_1 and ident\_60\_seq\_2 the best score from the 60% substitution matrix, for ident\_70\_seq\_1 and ident\_70\_seq\_2 the best score from the 70% matrix, same thing for 80\_seq and 90\_seq.
* From figure-2 (on the next page), we notice that all E-values are very low for all sequences which means the alignments are significant, except the E-value for 60% matrix on ident\_60\_seqences where the score is high (around 0.4) which means that the alignment is not significant.

A close up of a map

Description automatically generated

figure(1):

A close up of a map

Description automatically generatedfigure(2):