

**CENG 465  
Fall 2013-2014**

**Assignment #1**

**Research assignment on Scoring Matrices**

The goal of this assignment is to show that scoring matrices such as BLOSUM62 lead to biologically more accurate alignments compared to simple scoring schemes such as the one used in the definition of the “edit distance”. Your objective is to find two protein sequences which are homologs from databases such as NCBI Protein database or EBI UniProt and globally align them using the Needleman-Wunsch algorithm with two different scoring measures:

1. Biologically more accurate measure
  - Scoring matrix BLOSUM62
  - Gap open -11
  - Gap extend -1
2. Biologically not so accurate measure
  - Match score +1
  - Mismatch score -1
  - Gap penalty (open and extend) -1

You will compare the results of two alignments and your goal is to show that the biologically more accurate measure aligns conserved (i.e., biologically matching) regions correctly; whereas the not so accurate measure misaligns certain amino acids (i.e., is not able to match some conserved amino acids).

Show both of the alignments and identify the incorrect matches in the alignment of the simple scoring scheme.

You may use any alignment tool available on the web, such as NW-Align, which is available at: <http://zhanglab.ccmb.med.umich.edu/NW-align/>

**Note:** Some tools may not allow you to change the scoring matrix. For example, you may need to modify the source code of NW-align to use the second scoring measure described above. Or, you may also find another tool which will allow you to change the scoring matrix. In your report indicate which tool you used.

**Submission:**

Submit your report via COW at [cow.ceng.metu.edu.tr](http://cow.ceng.metu.edu.tr) (if you do not have a COW account, you may submit your assignment via e-mail to [tcan@ceng.metu.edu.tr](mailto:tcan@ceng.metu.edu.tr) with a subject header of “CENG 465 Assignment #1”)

**Late Submission Policy:**

Your final assignment grade will be penalized 20 points per late day.

**CHECK THE NEWSGROUP REGULARLY FOR POSSIBLE UPDATES ON THE ASSIGNMENT.**