Bioinformatics 1 Assignment 1

1. Write a report of approximately **2000 words**, not inclusive of any perl code, to answer the following:
2. Describe the functionality of the proteins of the *lac operon*. **(3 marks)**
3. Explain how the “transcription” of the lac operon genes will regulated in the presence of finite source of lactose and a finite source of glucose. **(7 marks)[[1]](#footnote-1)**
4. Describe, using examples, how you attempt to find, using amino acid sequences, all “potential” *realistic* *Open Reading Frames* (ORF) in a prokaryotic DNA sequence such as the lac operon use the amino acid sequence) **(6 marks)**
5. The amino sequence of a prokaryotic gene can be translated manually by utilising the “DNA <-> AA” translation table. Discuss, using suitable example, if would consider that this is *an efficient*  technique in determining the amino acid sequence for eukaryotic gene coding sequences (CDS) **(8 marks)**
6. Using a suitable example such as the the e. coli pal gene sequence. Write **perl script(s)** that:
   1. Show all the start and stop codons in a “translated” prokaryotic DNA sequence input via a fasta file **(4 marks)**
   2. Show the frame number and position of the start and stop amino acid and the DNA/AA sequence for all potential ORF. **(6 marks)**
   3. Eliminate possible false ORF from the listed generate in part 5b and give a list of all remain potentially “true” ORF; *the frame number and the amino acid sequence* of each of them. Clearly explain your reasoning – via comments- for the removal of some of the ORF in part c **(6 marks)**

*Clearly comment the code (especially if using regular expressions )and ensure your applications has a user friendly interface.*

You must submit the assessment via webcourses by Thursday the **1 November**

1. A report *answering parts 1 to 4*; you can call it :

***“An analysis of the lac operon and how to find true , prokaryotic, open reading frames.”*** *.*

1. *The Perl script for part 5*

**This assignment will form 40% of the overall assignment mark**

**Late Submissions**

Any assignments that are submitted after the due date but within one working week will be **Marked out of 50%.** Assignments submitted more than one week late will receive a mark of zero. **There will be no extensions granted** unless a person has been out for the period of the assignment and can furnish proof of their absence.

1. You can use the notes primary source of the lecture notes Klug, W.S. “essential of genetics” Chapter 15 7th edition [↑](#footnote-ref-1)