Problem Set 1

DUE: September 4, 11:59 PM

Using the following sequence:

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CCGTCGTAGCACCGAGCCTCAGCACCACGAAAGAGATTGAAGTAGTTCCTCGGAAAGTTCTTCGACTCTT
CCTTGAAACATGTCTTCCTGGAGCAACCAACCTGCCATGGATGATTATGGCCTGCCATCCTCCAACCCTT
ATGGGAACTTCACAGTTGTGGACATGGCCCCTAAAGACATCCTTCACATGATTCATCCTCACTGGTACCA
ATATCCCCCCATGAACCCAATGATGTATCCATTACTTTTAATATTCATGCTCTTCACCGGCATACTCTGC
CTGGCAGGTAACTTTGTTACCATCTGGGTGTTCATGAACACCAAATCTCTCCGCACTCCTGCCAATCTCC
TTGTTGTTAACTTGGCCATGTCCGACTTCCTCATGATGTTCACTATGTTCCCTCCCATGATGGTCACATG
CTACTATCACACATGGACACTTGGCCCCACATTCTGTCAAGTTTATGCCTTCCTCGGAAACTTGTGCGGC
TGTGCATCCATCTGGACGATGGTGTTCATCACCTTTGACCGCTATAATGTCATTGTTAAGGGAGTGGCTG
GTGAGCCTCTTAGTACAAAGAAAGCATCTTTGTGGATATTAACAATATGGGTATTATCTATTACCTGGTG
TATAGCACCATTCTTCGGCTGGAACCGCTACGTTCCCGAGGGCAACCTTACTGGCTGTGGTACTGATTAT
CTGTCTGAGGACATTTTATCCCGCAGCTACCTATACGACTACTCCACATGGGTCTATTACCTCCCTCTAT
TACCAATCTATTGCTACGTTTCCATCATCAAGGCTGTTGCTGCCCACGAGAAAGGTATGCGTGATCAGGC
CAAGAAGATGGGAATAAAGTCCCTGAGGAACGAAGAAGCACAGAAGACTTCTGCCGAGTGCCGCCTGGCC
AAGATTGCTATGACGACAGTGGCTCTGTGGTTCATTGCTTGGACTCCCTATCTCCTCATCAACTGGGTCG
GCATGTTCGCCAGGTCCTACCTGTCTCCTGTCTATACCATCTGGGGCTACGTGTTCGCCAAGGCCAACGC
TGTCTACAACCCTATTGTGTATGCCATCAGCCACCCCAAGTACCGCGCTGCCATGGAGAAGAAGCTGCCA
TGTCTCTCTTGCAAAACTGAAAGTGATGACGTTAGCGAAAGTGCCTCAACTACCACCAGCTCAGCGGAAG
AAAAGGCAGAAAGTGCTTAGACTTTTGTGGGGAACTCCGTACTTCAACTGATCAACGACTGTATGCATAT
TATATATCATACAATGTAATTTAAAGTAATTCCCTAAATGGTAGCAATTTTCTAGATTCTAATAAACCCA
GCATCAT
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Please conduct the following:

1. Translate this nucleotide sequence to amino acids and provide the amino acid sequence in FASTA format for each of 6 possible reading frames. Which do you think is most likely to be the "true" reading frame? Why?

2. What is the frequency of A's, C's, G's and T's in this nucleotide sequence? What is your (naively) expected frequency of these nucleotides and does your data meet your expectations?

3. Design a pair of PCR primers to amplify these gene region based on the provided sequence. What are your primer sequences? How did you decide on these primers? What factors did you take into account in designing this primer pair?

4. Check to ensure that you answered *all* of the questions and requests posed in the previous three items, showing work where possible. You may use any computational tools (online or otherwise) as needed, but you must explain how you did it and which tools you used.