HW 1

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1 Question 5

For the following mRNA sequence, can you extract its 5' UTR, 3' UTR and the protein sequence?
ACTTGTCATGGTAACTCCGTCGTACCAGTAGGTCATG

ATG is the start codon. **TAA, TAG, TGA** are the stop codons. Notice the start codon:
ACTTGTC**ATG**GTAACTCCGTCGTACCAGTAGGTCATG

Notice the stop codon **TAG**:
ACTTGTCATGGTAACTCCGTCGTACCAG**TAG**GTCATG

We now have the 5' untranslated region occurring before the start codon, the protein sequence occurring between and including the start and stop codons, and the 3' untranslated region occurring after the stop codon.

The 5' Untranslated Region:
ACTTGTC

The coding region:
ATGGTAACTCCGTCGTACCAGTAG

The 3' Untranslated Region:
GTCATG

2 Z-algorithm Results

Here is the Z-Algorithm result for a random string S.

S=ABSBAJSLABSKDFBAABASBABSBAJSLABKABSBAK
Results from the algorithm are:

- Counter = 0, Z = 0
- Counter = 1, Z = 0
- Counter = 2, Z = 0
- Counter = 3, Z = 1
- Counter = 4, Z = 0
- Counter = 5, Z = 0
- Counter = 6, Z = 0
- Counter = 7, Z = 0
- Counter = 8, Z = 0
- Counter = 9, Z = 2
- Counter = 10, Z = 0
- Counter = 11, Z = 0
- Counter = 12, Z = 0
- Counter = 13, Z = 0
- Counter = 14, Z = 1
- Counter = 15, Z = 0
- Counter = 16, Z = 0
- Counter = 17, Z = 1
- Counter = 18, Z = 0
- Counter = 19, Z = 0
- Counter = 20, Z = 1
- Counter = 21, Z = 0
- Counter = 22, Z = 9
- Counter = 23, Z = 0
- Counter = 24, Z = 0
- Counter = 25, Z = 1

- Counter = 26, Z = 0
- Counter = 27, Z = 0
- Counter = 28, Z = 0
- Counter = 29, Z = 0
- Counter = 30, Z = 0
- Counter = 31, Z = 0
- Counter = 32, Z = 0
- Counter = 33, Z = 4
- Counter = 34, Z = 0
- Counter = 35, Z = 0
- Counter = 36, Z = 1
- Counter = 37, Z = 0

We also coded up the Exact pattern matching implementation. It's Results are located here:
String S= TEST$ASTEALGHSLTE TESTEST

- Counter = 0, Z = 0
- Counter = 1, Z = 0
- Counter = 2, Z = 0
- Counter = 3, Z = 1
- Counter = 4, Z = 0
- Counter = 5, Z = 0
- Counter = 6, Z = 0
- Counter = 7, Z = 2
- Counter = 8, Z = 0
- Counter = 9, Z = 0
- Counter = 10, Z = 0
- Counter = 11, Z = 0
- Counter = 12, Z = 0

- Counter = 13, Z = 0
- Counter = 14, Z = 0
- Counter = 15, Z = 2
- Counter = 16, Z = 0
- Counter = 17, Z = 0
- Counter = 18, Z = 4
- Counter = 19, Z = 0
- Counter = 20, Z = 0
- Counter = 21, Z = 4
- Counter = 22, Z = 0
- Counter = 23, Z = 0
- Counter = 24, Z = 0