



PROG 2700 - Tech Check 3

Value: 5% of overall course mark

Bioinformatics 101

Step 1 - Convert DNA Sequence to corresponding Codon Sequence

DNA code is comprised of four letters: G, T, A, and C. In a strand of DNA, each triplet of these letters is called a *codon*. Each codon represents an amino acid. Your first task in this tech check is to convert a DNA sequence – stored as a string – into the corresponding sequence of codons.

So, for example, the following DNA sequence string: GCTCGTAATGATTGT should be converted into the following codon sequence: **["GCT","CGT","AAT","GAT","TGT"]**.

Step 2 - Convert your codon sequence into an amino acid sequence

Once you've translated the DNA sequence into a codon sequence, your next job is to translate that codon sequence into an amino acid sequence. Imagine doing that by hand using the table below.

There are 21 amino acids. The DNA codons that represent them and their abbreviations are specified in the table below.

Your job is to programmatically perform the conversion using JSON data from an API representing the table below. You will use the JSON data to lookup the correct amino acid that corresponds to each codon. This JSON data is available at <https://prog2700.netlify.app/json/dnaMap.json>

Abbr.	DNA Codons	Amino Acid
Ala	GCT, GCC, GCA, GCG	Alanine
Arg	CGT, CGC, CGA, CGG, AGA, AGG	Arginine
Asn	AAT, AAC	Asparagine
Asp	GAT, GAC	Aspartic Acid
Cys	TGT, TGC	Cysteine
Gln	CAA, CAG	Glutamine
Glu	GAA, GAG	Glutamic acid
Gly	GGT, GGC, GGA, GGG	Glycine
His	CAT, CAC	Histidine

Abbr.	DNA Codons	Amino Acid
Ile	ATT, ATC, ATA	Isoleucine
Leu	CTT, CTC, CTA, CTG, TTA, TTG	Leucine
Lys	AAA, AAG	Lysine
Met	ATG	Methionine
Phe	TTT, TTC	Phenylalanine
Pro	CCT, CCC, CCA, CCG	Proline
Pyl	UAG	Pyrrolysine
Ser	TCT, TCC, TCA, TCG, AGT, AGC	Serine
Sec	UGA	Selenocysteine
Thr	ACT, ACC, ACA, ACG	Threonine
Trp	TGG	Tryptophan
Tyr	TAT, TAC	Tyrosine
Val	GTT, GTC, GTA, GTG	Valine

Submission Instructions

When your program is complete, please zip up the entire folder that contains your code and submit it to the TechCheck 3 Brightspace folder.

Marking Scheme

Final Grade	Requirement
10/10	Tech check is correct (passes all tests) and is completed during class time.
8/10	Tech check is correct (passes all tests) and is completed on the same day as the Tech check.
6/10	Tech check is correct (passes all tests) and is completed within a week of the start of the Tech check.
0/10	Tech check is not submitted or does not pass all tests within a week of the start of the Tech check.