Intro to Programming: Final Project Proposal
Team:

Interactive creation of primary structure of a protein:

We propose to create an interactive program where the user can input x number of codons, and visualize a simple linear model of their protein's primary structure in the graphics interface. The program will run on two screens, the code screen prompting the user to input codons and the graphics screen where the user can visualize their creation. Each amino acid will be a simple shape (either an oval or rectangle) with a unique color, which will be displayed when the code is complete. If feasible, the color-coded amino acids will also have their three-letter code written on them (i.e. Alu, Pro, etc.), otherwise, we will provide a key in the graphics output. In order to keep the program more biologically accurate, we will use a conditional statement to ensure the user inputs the start codon before adding any other codons. In addition, we will use a while loop that terminates the adding process when either the user inputs a stop codon, or the protein sequence reaches a certain length, where we will then prompt the user to enter a stop codon. See below for a basic skeleton of the steps we will take to create this code.

Steps:

- create a list of codons
- ask user for codon, prompt them to enter the start codon
    - use if/else statement: if the user inputs the start codon, accept the codon and append to the list
    - else: prompt the user to try again
- ask user for up to 5 codons (ex. 'Input three-letter codon consisting of 'A' 'U' 'G' or 'C)
- use if/else statement to ensure user inputs a codon from the list
    - if the codon is in the list continue with code
    - else: tell the user that this codon is not correct
- create a different colored block for each amino acid
    - using the graphics module
- add amino acids to strand as user inputs codons
- for the case in which the user enters less than 5 codons: create a while loop to terminate sequence when user inputs a stop codon
    - while not UAA, UGA, UAG (stop codons): append codon to list, and add protein block to graphic interface
- terminate code when the user enters the maximum 5 codons, add the stop codon

Graphics Module: http://mcsp.wartburg.edu/zelle/python/graphics.py