Practice Exam based on Spring 2020 Exam 2 (Sequencing)

Problem #1: Description

The Joyce-Jackson (JJ) sequence is an integer sequence calculated with the three previous values of the sequence, using the equation below (Equation 1):

$$JJ_n = ((JJ_{n-2} - JJ_{n-3}) * n) + JJ_{n-1} \quad (1)$$

where JJ_n is the nth value in the sequence **JJ** and **n** is the position of the integer.

The JJ sequence requires the user to input the first 3 values before it can calculate the rest of the sequence. The code should accept a vector for the first 3 values and then calculate the JJ sequence to some number of integers, determined by the user input.

Sample JJ sequence for an integer sequence to 6:

JJ_1 (User Input)	JJ_2 (User Input)	JJ_3 (User Input)	JJ_4	JJ_5	JJ_6
0	1	2	6	11	35

Function

Create a function named **JJ_cougarnet** (replace with your courgarnet username) that, using the 1 x 3 starting row vector creates a sequence based on the Eq. 1 with the total number of elements defined by **n**.

Function Inputs:

1. Starting [1 x 3] row vector
2. Number of values for sequence (n)

Function Outputs:

1. Final JJ sequence

The function header should be formatted similarly to the following:

```
function [out1] = JJ_cougarnet(in1,in2)
```

Remember you are free to use whatever variable names you want, but they must be listed in the same order as given in the input/output lists provided above.

Main Script

User inputs and validation:

- Ask the user to enter the total number of values to be created for the sequence and store this value in a variable named **NUM**. It is assumed that the user will enter a positive number greater than three. No data validation is required in this step.
- Ask the user to enter a 1 x 3 row vector and store the vector in a variable named **START**. Check if the user input is a 1 x 3 vector. If not, ask the user to enter a new 1 x 3 row vector and keep asking until the correct size vector is entered.

Sequence Creation:

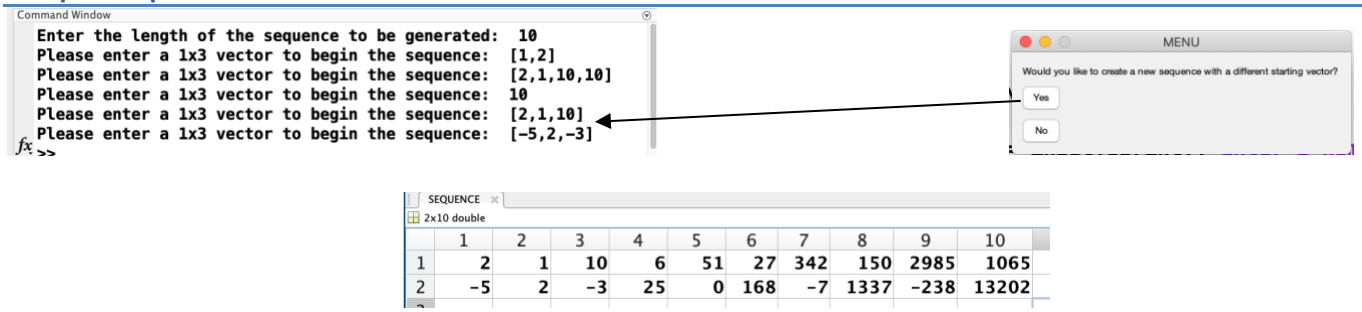
- Using the function **JJ_cougarnet**, determine the final JJ sequence and save the SEQUENCE as a .mat file named **Exam2_Sequence.mat**.

Repeat and Store

Using a menu, ask the user if they would like to create a new sequence with the same number of elements as entered in Task 1 (**NUM)** but with a different 1 x 3 starting vector (**START).**

- If yes, ask the user for a new 1 x 3 row vector and create a new sequence with the same **NUM**.
- Store the new sequence in the next row of the variable named **SEQUENCE**.
- Keep repeating until the user selects no.
- NOTE: The number of rows in **SEQUENCE** will equal the number of times the user enters a 1 x 3 row vector.

Sample Output:



SEQUENCE
2x10 double

	1	2	3	4	5	6	7	8	9	10
1	2	1	10	6	51	27	342	150	2985	1065
2	-5	2	-3	25	0	168	-7	1337	-238	13202