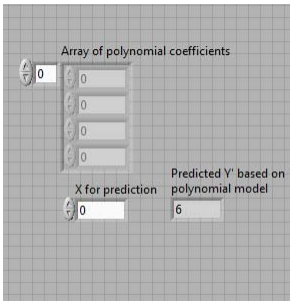
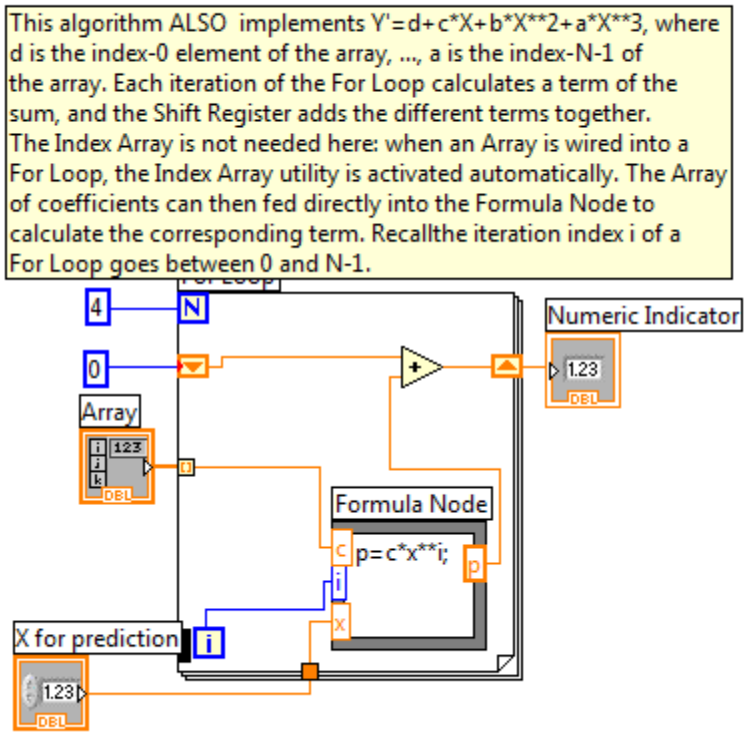
Engin 103 April 29, 2010 back to e-syllabus	Topics: LabVIEW topics: Shift register; spectrum detection Project 3 Topic Assignment Logbook questions

Shift register –To obtain a prediction Y' using a polynomial model of any order





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Project 3

Section 1

Team	*Team leader*	*Assignment*
1	Waqas	E
2	Rachel	G
3	Scott	D
4	Ben	A
6	Harpreet	F
7	Penelope	H
8	James	B
9	Julie	I
10	Erikton	C

Section 2

Team	*Team leader*	*Assignment*
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Project	Description
A	Predict the max. temp. for the next day using previous thirty days' temperatures, using polynomial and other models
B	Predict the oil price for next week using previous thirty weeks' prices, using polynomial and other models

C	Detect the frequency spectrum of a given signal (in wav format) using Fourier Transforms, output the number of frequency components of the signal
D	Say the decimal number for any four-digit binary number
E	Make a 16 keys piano
F	Solve the quadratic equation with distinction of the three cases for the discriminant. Provide solutions including: double roots, different roots, and complex conjugate roots.
G	A VI that inputs sound via a microphone, when the sound amplitude is above certain limit it will display the waveform, replay the sound, save it into a file, and present results of a tone measurement including amplitude, frequency and phase of the signal
H	A VI that will produce and display an html file containing the front panel (with a description of problem solved, inputs and outputs), block diagram, and notes. The html file will be saved as p2p2a.html
I	A VI that produces two or more chirp sounds, that is, a sound whose frequency is changing with time
J	Make a "sound recording utility" that can record voice from a microphone, display it and its FFT, then save it into a file. When a 'playback button' is pressed it will play the recorded sound.

	Front Panel (suggested)	Block Diagram (suggested)
Project A Predict Max Temp for next day: polynomial and other models	Numeric Arrays Numeric Control for Polynomial Order Number XY Graph Boolean Switches Get data from the web (e.g. accuweather.com)	Case Structure Curve fitting/Data Modeling sub-VI's Bundle for graphing Build Array Use For Loop with Shift Register to produce prediction for the next day (see example above) For an exponential model the prediction can be obtained using A*exp(-d*X) (A & d are outputs from the Exponential Fit, X is 31 if you use previous 30 days data)
Project B Predict gas prices:	Similar to Project A Get data from the web	Similar to Project A

polynomial and other models		
Project C: Predict the Spectrum of a given Signal using FFT.vi. Output number of peaks detected	-Path to File containing given signal in wav format -Waveform Graph for the Spectrum	FFT.vi Absolute Value Peak Detection
Project D: Say the decimal number for a four-digit binary number	-Numeric Control to enter the binary number -Explanation on how to enter data	-Case Structures -Play correct wav file containing speech of decimal number according to the binary input
Project E: 16 keys piano	-Push buttons -Record your singing or obtain synthetized WAV files	-See notes for Project D
Project F: Solve quadratic equation	-Ways to enter the equation -Ways to output the two solutions; and text to classify the discriminant	-Case Structure -Arithmetic operations -String constants
Project G & J Acquiring sound	-Graph -Numeric indicators	-Case structure -Sound Input and Output Sub-VI's -Use '0' for Device ID
Project H: Html reports	-File path -Others	-reporting sub-VI's
Project I: Chirp sound	-Ways to enter frequencies or periods -String Control for formulas -Waveform graphs	-For Loop -Eval Single-Var. Array -Bundle; Build Array -Sound utilities

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LOGBOOK: example of a logbook page

-Use a quadrille notebook; number all pages; date all entries
-Write your notes for all activities, thoughts, problems and solutions, and learning conclusions related to Engin 103. You should write down progress, outcomes, and conclusions on projects and teamwork; conclusions from class work (including LabVIEW) and homework.
-In addition you should answer in the logbook all questions listed in these notes in blue, as shown below:

51) In the Block Diagram shown above which produces the prediction Y' for an input X using a polynomial model, what are the roles of the Formula Node and the For Loop. And what order is being used here for the polynomial model, how can you tell? Is it possible to make this order a variable to be specified by the user?

52) In the same Block Diagram, explain how you obtain the coefficients 'c' via the 'Array' if you were doing Topic A or B in Project 3.

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