Engin 103	Topics:
April 28, 2011	LabVIEW topics: Shift register;
	spectrum detection
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	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
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Section 2

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

С	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
Е	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
Н	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
Ι	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	Block Diagram
	(suggested)	(suggested)
Project A	Numeric Arrays	Case Structure
Predict Max Temp	Numeric Control for Polynomial Order Number	Curve fitting/Data Modeling sub-VI's
for next day:	XY Graph	Bundle for graphing
polynomial and other	Boolean Switches	Build Array
models	Get data from the web (e.g. accuweather.com)	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	Similar to Project A	Similar to Project A
Predict gas prices:	Get data from the web	

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