cs:
d with LabVIEW
ect 3 Topic Assignment
book questions

## Sound





## Modifications:

- a) Use amplitude of 128 for the cos(t) signal
- b) Use frequencies instead of periods at the Numeric Controls
- c) Replace  $2\pi/T$  by  $2\pi f$  in the Block Diagram (for both  $f_1$  and  $f_2$ )
- d) Add 127 to the sum of the two signals
- e) Use "To Unsigned Byte Integer" to convert to an 8-bit binary signal
- f) Use Sound Output Configure to assigned Task ID for Sound Output Write
- g) Connect binary signal into Sound Output Write

h) Adjust Numeric Constants N and delta: for frequencies of about 1000 Hz, a period has 0.001s, so delta has to be sufficiently small to allow at least 10 points per period, i.e., delta should be 0.0001 or smaller. Use N to control the length of the signal.

# Playing WAV files



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## **Project 3**

Project	Description	Team
А	Predict the max. temp. for the next day	5
	using previous days' temperatures, using	
	polynomial and other models	
В	Predict the oil price for next week using	6
	previous weeks' prices, using polynomial	
	and other models	
С	Detect the frequency spectrum of a given	7
	signal using Fourier Transforms	
D	Say the decimal number for a four-digit	3
	binary number	
Е	Make a 8 keys piano	2
F	Solve the quadratic equation with	10
	distinction of cases for the discriminant	
G	A VI that can calculate the areas and	1
	volumes of 5 different 3D geometrical	
	shapes	
Н	A VI that produces interesting sounds from	8
	the combination of 2 or more sine waves	
	with different frequencies	
Ι	A VI that produces a chirp sound, that is a	4
	sound whose frequency is changing with	
	time	

	Front Panel	Block Diagram
	(suggested)	(suggested)
Project A	Numeric Arrays	Case Structure
Predict Max Temp	XY Graph	Curve fitting/Data Modeling sub-VI's
for next day:	Boolean Switches	Bundle for graphing
polynomial and other		Build Array
models		
Project B	Similar to Project A	Similar to Project A
Predict gas prices:		
polynomial and other		
models		
Project C:	-Path to File containing given signal in wav	FFT.vi
Predict the Spectrum	format	Absolute Value
of a given Signal	-Waveform Graph for the Spectrum	
using FFT.vi		
Project D:	-Numeric Control to enter the binary number	-Case Structure
Say the decimal	-Guide for entering correct data	-Play correct wav file according to the binary
number for a four-		input
digit binary number		
Project E:	-Push buttons	-Related to Project D
8 keys piano		
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:	-Boolean switches	-Case structure
Calculate 4 different	-Graphics to explain the geometries, dimensions,	-Sub-VI
geometrical shapes	etc.	
	-Numeric controls for sizes	
Project H:	-Ways to enter frequencies or periods	-For Loop
Sound from two or	-Waveform graphs	-Eval Single-Var. Array
more sinusoids and		-Bundle; Build Array
their sum		-Sound utilities
Project I:	Related to H	
Chirp sound		

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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:

45) Use your own words to describe the important steps in developing a Virtual Instrument or any computer code that can performs some assigned tasks

46) Is your team using a Case Structure in Project 3? If yes, describe what it does in the true and false cases, and what operation determines the case.

47) Insert a snapshot of the Front Panel of your team's VI for Project 3, describe each element shown and explain why they are there

48) Insert a snapshot of the Block Diagram of your team's VI for Project 3, describe each operation shown and explain why they are there

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