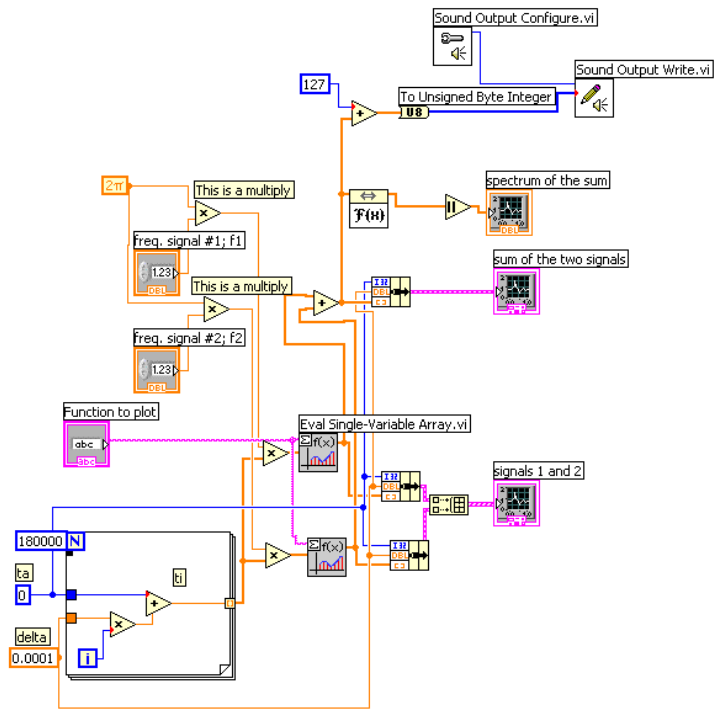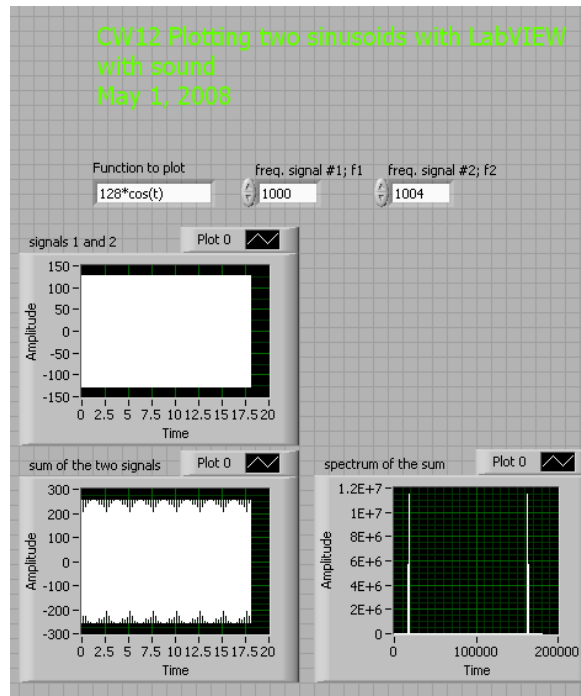# Sound



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

Path Constant
🔒 G:\e103\Sp08\labVIEW\bs.wav

Play Sound File.vi

2
Length of sound file in seconds
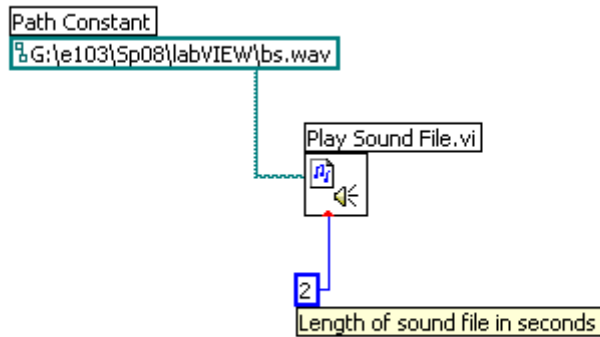
# Project 3

| Project | Description | Team |
|---------|-------------|------|
| A | Predict the max. temp. for the next day using previous days' temperatures, using polynomial and other models | 6 |
| B | Predict the oil price for next week using previous weeks' prices, using polynomial and other models | 10 |
| C | Detect the frequency spectrum of a given signal using Fourier Transforms | 4 |
| D | Say the decimal number for a four-digit binary number | 5 |
| E | Make a 8 keys piano | 2 |
| F | Solve the quadratic equation with distinction of cases for the discriminant | 8 |
| G | A VI that can calculate the areas and volumes of 5 different 3D geometrical shapes | 3 |
| H | A VI that produces interesting sounds from the combination of 2 or more sine waves with different frequencies | 9 |
| I | A VI that produces a chirp sound, that is a sound whose frequency is changing with time | 7 |
| 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 | 1 |

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

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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**

back