# BM 627-Virtual Instrumentation

## Assignment 3 : v1.0

## Function Generator, Signal Processor and Data Acquisition

**September 21st, 2011**

**Submission Deadline: 10th October (Monday) 2011 @ 12:00 Noon**

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**Important:** Assignment 3 is your biggest CVI assignment! It will help you with your final CVI project as you would be learning many concepts which would be useful for your course project. But please start working on it immediately as it is really huge, lots of new stuff and will take time. You are certain to be short of time at the end if you don't start right away!

Following is the functionality to be implemented:

1. The main panel will be the parent panel and it should have all the graphs and following command button controls
    1.1. Function generator

    1.2. Signal Processor

    1.3. Data Acquisition

2. When any of the above mentioned controls are pressed, a new panel should open which should contain all the necessary controls for that application. The child panel should have a 'Done' button which should deactivate the child panel and reactivate the parent panel and update the parent panel appropriately.

3. Following are the user inputs on child panels:

    3.1. Function generator panel: take following inputs from user

        3.1.1. Different signal: Sine wave, Saw tooth wave, Square wave, Triangular wave, Ramp wave.

        3.1.2. Amplitude, Frequency, Phase, DC shift, Duty cycle (wherever applicable)

3.2. Signal Processor panel

3.2.1. Peak detector: take following inputs from user

- All peaks
- Positive peaks
- Negative peaks
- Peaks in the amplitude range

3.2.2. Filters: take following inputs from user

- Filter Method (like Butterworth, Chebyshev)
- Filter Order
- Filter Type (Low pass, High pass, Band pass or Notch filter)
- Frequency range of pass or stop band according to type of filter

3.3. Data Acquisition

3.3.1. File Mode: where user can load a data file from the system. Address of the file should be specified by the user. File format includes all relevant types like".txt", ".dat" or excel format

3.3.2. DAQ card Mode: Real time input from DAQ (data acquisition) card

3.4. Other than these parent panel should have save option with which user can save the generated- processed signal on the hard drive of the system. Again the address should be specified by the user.

3.5. Graphs should have zooming, panning and expand capabilities. They should all also have cursors. In expand option there should be scroll buttons and a go to option where user can specify which area should be focused.

**Note:** The sampling frequency should be mentioned in the UI. You can decide a fixed sampling frequency ($f_s$) yourself, or get the value from the user dynamically. Remember that the maximum limit of the frequency of the generated signal depends on $f_s$ ($f_{max} < f_s / 2$ ). Use $f_s$ to convert the graph axis to time axis. The same value of $f_s$ should be used while acquiring data from DAQ card.

All the Best ☺