**SDLC**

**Submission A**

**Software development of INL and DNL for DAC and ADC**

**Understanding**

Parameters for measuring ADC:

1. DNL

2. INL

**DNL**

* Differential Non-Linearity (DNL) is the difference between two successive voltage levels that the DAC produces.
* Difference between the actual step width occurred and ideal step width for the corresponding voltage.
* The ideal difference between two successive voltages is 1 LSB.
* To generate DNL, take the difference of Vout value from one transition to the next transition and ideal value.

**INL**

* Integral Non-Linearity (INL) is the maximum deviation of actual input-output characteristics from the ideal transfer characteristics.
* It is measured by using the Endpoint method.
* If the INL of a DAC is less than ±0.5 LSb, the input-output characteristic is monotonic.

**Funtionality**

**Home:**

**Assumption:**

* It is a page which gives detailed explanation about DNL and INL concepts to the user.
* It is just like a help tab for an application.

**Questions:**

* Whether the definitions can be set as constant in the program, or should it be read from the file to display it?
  + Can be constant for the INL DNL test
* What are the additional concepts that need to be displayed on the home page other than DNL and INL?
  + For each test, the corresponding details can be shown
* Whether the steps to take the test need to be displayed on this page to the user like user manual?
  + Not necessary

**Mode Selection:**

**Assumption:**

* This tab will have the available modes of operation to perform the test. I.e., ADC and DAC.
* Based on the user selected mode, the test executes its function and displays the result.

**Questions:**

* What needs to be done when the new mode changes, while executing another mode?
  + All tests can be instantaneous, meaning you will not be able to switch the modes during the test
* What needs to be set after selecting the operation?
  + Please elaborate. I couldn’t get your question

**Configuration:**

**Assumption:**

* It is the place where the parameters are given to the application that are needed to proceed with the test.
* It provides the settings for the application.

**Question:**

* What are the parameters that need to be in the configuration tab?
  + We need to specify the instrument configs and measurement configs for the particular test.
  + In this case, instrument config can be empty, and measurement config can contain the interpolation method.

**Status and graph:**

**Assumption:**

* It displays the DNL and INL results in this tab – for any selected code, it shall display the DNL and INL values
* It also plots the DNL and INL graph with respect to the codes.

**Questions:**

* From where or how do the input codes need to be generated, to calculate the result?
  + Currently, it can be a simulated INL DNL test. The analog/digital values can be generated in software layer itself
* How much data needs to be displayed in the graph? E.g. Last 100 values.
  + It has to display the complete graph for all values
* Whether the graph needs to be plotted even if user switches another button?
  + Yes
* What do the “codes” in this tab refer to? Is it digital code like 101?
  + Code refers to the digital code for the corresponding DNL or INL value
* Whether the graph needs to be reset after selecting new mode of operation?
  + Yes

**UI/UX**

1. **Page/Tab selector:**

**Assumption:**

* It has a set of switches which is used to start and perform different functions.
* Based on the user selections, corresponding operation should be performed and display that function.

**Questions:**

1. Whether the buttons can be placed as individual controls, or it could be combined in a cluster?
   1. It is your call. Please give a good experience to the user
2. How to handle the case, when the same button is pressed twice by the user?
   1. It is again your call
3. Whether the previous button should go to OFF state, when a new button is pressed?
   1. The buttons should behave more like Page Selectors
4. **Icons for pages:**

**Assumption:**

* The icon for the button needs to be stored in a folder.
* The icons need to be loaded to its corresponding button dynamically from the folder when the program runs.

**Questions:**

* What could be the size of the image for the button?
  + Please come up with a decent size

1. **Work Area:**

**Assumption:**

* It is a tab control which displays the corresponding operations according to user selection.
* It has multiple pages, in which each page displays individual functions.

1. **Status Bar:**

**Assumption:**

* It displays and logs the message when a new state occurs in the program when debug mode is “True” in INI file.
* When an error occurs in the program, it should log the error message in red color.

**Questions:**

* In what format does the “status string” need to be displayed in the status bar?
  + It can be 1-line status messages
* Whether the status can be displayed in string box or in a list box?
  + Can be a string box

**Common Question**

* How to produce/load analog data to calculate DNL and INL values?
  + You can simulate with an error of 0.1\*stepsize
* When/How to stop the result calculation or stop the execution of application?
  + Upon panel close
* What are the things that need to be set to calculate the result?
  + Whatever configs that are required for the test

**Additional features:(may be tried out and included)**

* DNL and INL values can be generated as a report after calculation if required.
  + Exporting the data to a report is really a good feature, Looking forward to it
* Maximum and minimum DNL and INL values can be displayed in the status and graph page.
  + Might not be necessary for now

I would like to have the main feature of selecting the tests from a tree.

Simulated INL DNL can be one of them. I should be able to code and add new tests to the framework in future.