Procedure to Create an Experiment

Following are the stepwise instructions to add two numbers using Sandhi.

Step 1:- Download and Install Sandhi from the following link.

http://sandhi.fossee.in/installation

Step 2:- Go to the **Terminal** and type *sandhi* then press **Enter** as shown in Fig 1.



Fig 1

Step 3:- After the Sandhi interface opens, goto File -> New as shown in Fig 2

grc - /home/harshal/	Desktop/Expt-	Testing -	GNU Ra	idio Co	mpanior								×		3:26 PM 👤 Harshal
File Edit View E	Ctrl+N	e e	0	6	a 6		90	0 6	>	4 4	10				
Open	Ctrl+O		9	00 0		•	16.eth							- 1	Blocks
Save															▶ [Sources]
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Close	Ctrl+W														Type Conversions
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ID: samp_rate															[Synchronizers]
Value: 32k															[Level Controls]
															[Filters]
															[Modulators]
															▶ [Error Correction]
															▶ [Line Coding]
															[Probes]
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Fig 2

Step 4:- Then goto *File -> Save As* as shown in Fig 3.



Fig 3

Save the file with the name as "addition" in your desired folder and click on **Save** button as shown in Fig 4.

😕 🗐 🗊 Save a	Flow Graph to a File		
Name:	addition		
Save in folder:	home harshal Desktop MAGLEV		Create Folder
Places	Name 👻	Size	Modified
 Search Recently User root Desktop File System Documents Music Pictures Videos Downloads 	 ktras 1-Plant Modelling.grc 2-Transient Response.grc 3-ON-OFF Controller.grc 4-P Control.grc 5-Frequency Response(bode).grc 6-PD Control for Desired Pole Placement .grc 7-PD Control for Desired Transient Response .grc 8-PID Control for Desired Transient Response .grc 9-PD Control for Desired Pole Placement -unstable.grc 10-PID Control for Desired Transient Response .grc BODE.grc 	24.6 KB 49.6 KB 39.7 KB 84.6 KB 42.2 KB 87.4 KB 91.0 KB 87.4 KB 91.1 KB 31.9 KB	Monday 06 April 2015 Tuesday 21 April 2015 Tuesday 21 April 2015 Thursday 23 April 2015 Wednesday 22 April 2015 Monday 13 April 2015
4 -			Flow Graph Files 🛟

Step 5:- Block Placement and Configuration.

• On the right hand side panel, locate and click on the arrow corresponding to **Calculation.** Under **Calculation,** double click on the **Calculator**. A Calculator block will be placed on the workspace as shown in Fig 5.

File Edit View Build Help	
[] 🚰 🖉 🗶 🖳 X 🖻 🛍 🛇 (♠ ↗) 🖨 🍄 🎭 🎯 (♠ →) ⊴ ⊴ C 🍾	
Addition X Sandhi X Addition X Options ID: top, block Thte: Addition Author: HARSHAL Generate Options: WX GUI	 [Stream Conversions] [Misc Conversions] [Synchronizers] [Level Controls] [Filters] [Modulators] [Error Correction] [Line Coding] [Probes]
Value: 32k	 [Variables] [Misc] [Sources (New)] [Sinks (New)] [Math Operations (Nev) [Boolean Operations (Nev) [Stream Type Conversisis] [Stream Operations (Nev)] [Misc (New)] [FFT] [GREX] [Custom] [Python_Blocks] [Pots] [Calculation] Calculator Roots Comparator Manual (Nev)
	Add

Fig 5

• Double click on the Calculator block to set the **Expression** and **Num Inputs** parameters in the properties window that pops up. For Expression, type 'a0+a1' and for **Num inputs,** type '2' as shown in Fig 6.

😣 🗖 🔲 Properties	Calculator
Parameters:	
ID	Calculation_Calculator_0
Expression	a0+a1
Num inputs	2
Error Messages:	
Source - out(0):	ed.
Port is not connect	ed.
Documentation:	l l l l l l l l l l l l l l l l l l l
Variable names must b	be a0,a1,a2 and so on.
You can use maximum	10 variables per block.
Example to add 5 varia	ibles:
"a0+a1+a2+a3+a4"	
	Cancel OK

Fig 6

• Similarly, add two **Constant Source** blocks from the **Sources** category and add two **WX GUI Slider** blocks from the **WX GUI Widgets** category onto your workspace as shown in Fig 7.

File Edit View Build Help	
C S X S X S S C S A A S S C S A A C S	
Sandhi X addition X Detions (b) Dis top bock The: Addition Author: HARSHAL Generate Options: WX GUI Detault Value: 30 Waite: 32k WX GUI Slider Dot unt for any rate WX GUI Slider Dot unt Value: 30 WX GUI Slider Dot unt Value: 30 WX GUI Slider Dot unt Value: 30 Madmum: 100 Constant: 0 Madmum: 10 Constant:	 [Probes] [Variables] [Misc] [Sources (New)] [Shack (New)] [Math Operations (New) [Boolean Operations (New)] [Stream Type Conversions (New)] [Stream Operations (New)] [Stream Operations (New)] [GREX] [Custom] [Python_Blocks] [Potton] [Canculation] [Transfer function] [Cantrols] [exponent] [WX GUI Notebook WX GUI Check Box WX GUI Check Box WX GUI Static Text WX GUI Static Text WX GUI Static Text WX GUI Static Text WX GUI Fert Sink
	Add

• Now, double click on the **WX GUI Slider** and set the parameters: **ID**, **Label**, **Default Value**, **Minimum**, **Maximum**, **Num steps** etc, as per your requirements as shown in Fig 8. Press OK and configure the other slider similarly.

😣 🖻 🔳 Properties	WX GUI Slider
Parameters:	
ID	Slider_0
Label	Input A
Default Value	1
Minimum	0
Maximum	100
Num Steps	100
Style	Horizontal 💲
Converter	Float 🗘
Grid Position	
Notebook	
Documentation:	
This block creates a va variable id as the label	riable with a slider. Leave the label blank to use the . The value must be a real number. The value must
	Cancel OK

Fig 8

• From the properties window of one of the **WX GUI Slider** blocks, copy the ID. In the properties window of one of the **Constant Source** blocks, paste it in the **Constant** parameter as shown in Fig 9. For the **Constant Source** block select the property of the **Output Type** as **Float** in the property window.

• Similarly, configure the other **WX GUI Slider** block and **Constant Source** block.

😣 🚍 🗊 Properties: WX GUI Slider		🛛 🙁 🗐 🔍 Propertie	s: Constant Source
Parameters:		Parameters:	
<u>ID</u>	Slider_0	ID	const_source_x_1
Label	Input A	Output Type	Float ‡
Default Value	1	Constant	Slider_0
Minimum	0		
Maximum	100		
Num Steps	100		
Style	Horizontal 🛟		
Converter	Float 💲		
Grid Position			
Notebook			
Documentation: This block creates a v variable id as the lab	ariable with a slider. Leave the label blank to use the el. The value must be a real number. The value must		
	Cancel OK		Cancel OK

Fig 9

• As explained earlier, place a **WX GUI Number Sink** block under **Sink** category on your workspace as shown in the Fig 10.

File Edit View Build Help	
Sachi X addition X Drions Troughow Troughow The rest addition Arthor: HASHAL Encode the rest addition Draine it Default Value: 1 Drise ang rate Default Value: 1 Minimum: 100 Constant Source Containt: 0 Variable Value: 12 Minimum: 100 Drive Tools Maximum: 100 Onvertier: Float Constant Source Containt: 0 Maximum: 100 Constant Source Containt: 0 Maximum: 100 Constant Source Containt: 0 Maximum: 100 Convertier: Float	 [Boolean Operations (h) [Stream Type Conversion [Stream Operations (N) [Misc (New)] [FFT] [GREX] [Custom] [Python_Blocks] [Pots] [Calculation] [Controls] [controls] [controls] [controls] [Custom Illight of the second se
	Add

• Set the parameters like **Type** as **Float**, **Title** as **Output** and **Decimal Place** as **3** and then press **OK**. See Fig 11.

😣 🗐 🗊 Properties	:: WX GUI Number Sink
Parameters:	
ID	wxgui_numbersink2_0
Туре	Float ‡
Title	Output
Units	Units
Sample Rate	samp_rate
Min Value	-100
Max Value	100
Factor	1.0
Decimal Places	3
Reference Level	0
Number Rate	15
Peak Hold	Off ‡
Average	Off 💲
Show Gauge	Show ‡
	Cancel OK

Fig 11

Step 6:- To connect two blocks, click on the **Out** of one block and then click on the **In** of another block or vice-versa. Finally, complete the connections to create the experiment as shown in Fig 12.



Fig 12

Step 7:- Now, press **F6** function key on the keyboard or click on the **Execute the Flow graph** button in the standard toolbar as shown in Fig 13. This will run the experiment and produces the output in a new window.

là 🗋 🖄 🗶 lá		Blocks
Uptions ID: top_block Title: Addition Author: HARSHAL Generate Options: WX GUI	Execute the now graph	 ▷ [Sources] ▷ [Sinks] ▷ [Message Tools ▷ [Operators]

Fig 13

Results are obtained as shown in Fig 14. One can vary the inputs by moving the slider pointer. You may observe the changes in the output based on the changes in the input parameters.

😣 🖻 🗈 Addition	
nput B: 3	
nput A: 2	
Output	Options Peak Hold
5.000 Units	Average Avg Alpha: 0.1333
	Stop

Fig 14

Procedure to execute an existing Sandhi experiment

Step 1:- Go to the **Terminal** and type *sandhi* then press **Enter**.



Fig 1

Step 2:- After the Sandhi interface opens, goto *File -> Open* as given in Fig 2.



Fig 2

Step 3:- As shown in Fig 3, browse to the folder where the **.grc** files of the experiments (MAGLEV) are saved. Then click on the experiment which you wish to execute, click on **Open** button.

Search Recently Used	xtras a 1-Plant Modelling.grc		Monday 06 April 201
 Recently Used root 	2 T-Plant Modelling.grc		
root	2 Transient Bernanse are	24.6 KB	Tuesday
E Darahbara	2-Halistelic Response.grc	49.6 KB	Tuesday
Desktop	3-ON-OFF Controller.grc	39.7 KB	Thursday
File System	4-P Control .grc	84.6 KB	Wednesday
Documents	5-Frequency Response(bode).grc	42.2 KB	Tuesday
Music	6-PD Control for Desired Pole Placement .grc	87.4 KB	Wednesday
Pictures	7-PD Control for Desired Transient Response .grc	82.7 KB	Wednesday
	8-PID Control for Desired Transient Response .grc	91.0 KB	Wednesday
Downloads	9-PD Control for Desired Pole Placement -unstable.grc	87.4 KB	Wednesday
, boundad	10-PID Control for Desired Transient Response .grc	91.1 KB	Wednesday
	BODE.grc	31.9 KB	Monday 13 April 20

Step 4:- After the experiment is opened, press **F6** function key on the keyboard or click on the **Execute the Flow graph** button in the standard toolbar as shown in Fig 4. This will run the experiment and produce the output in a new window.



Fig 4