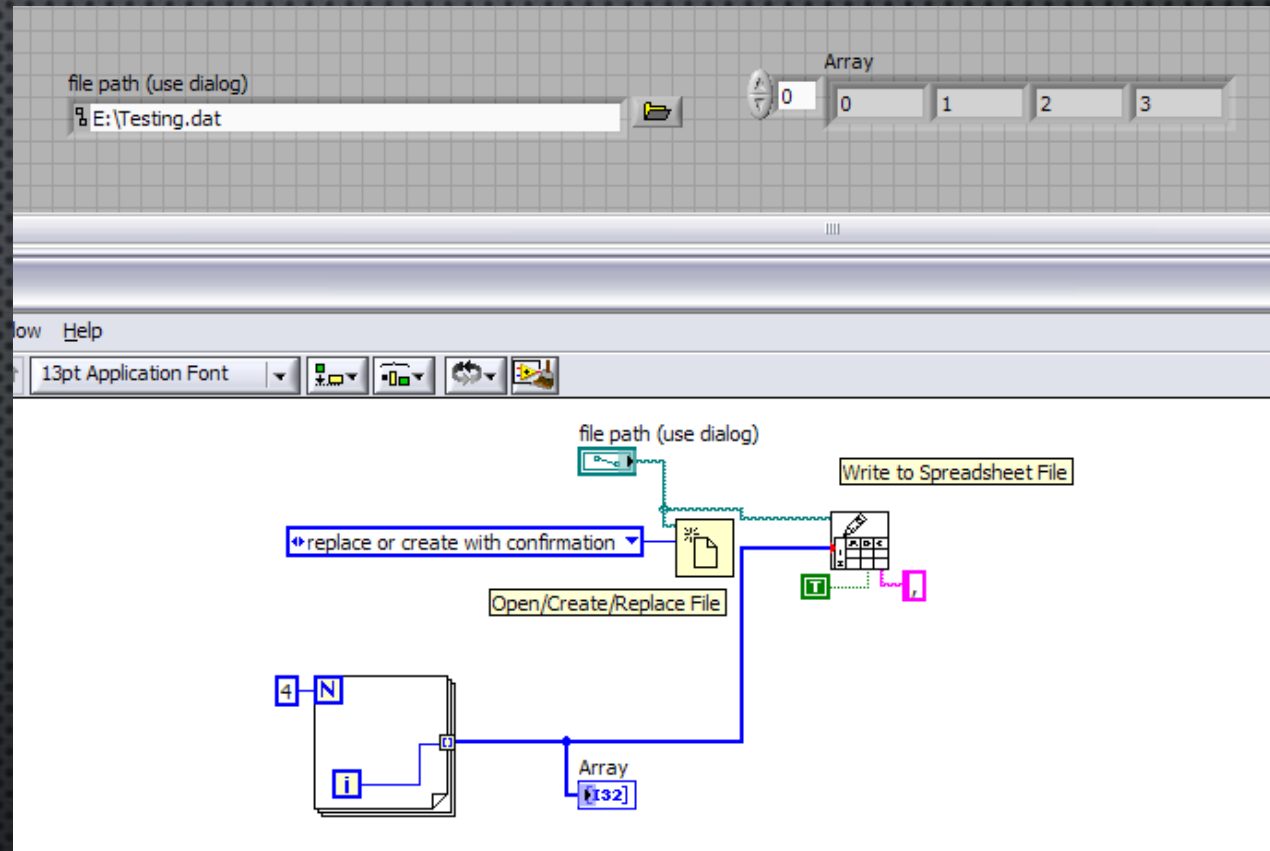


FILE INPUT/OUTPUT AND CREATING SUBVIS

FILE INPUT/OUTPUT

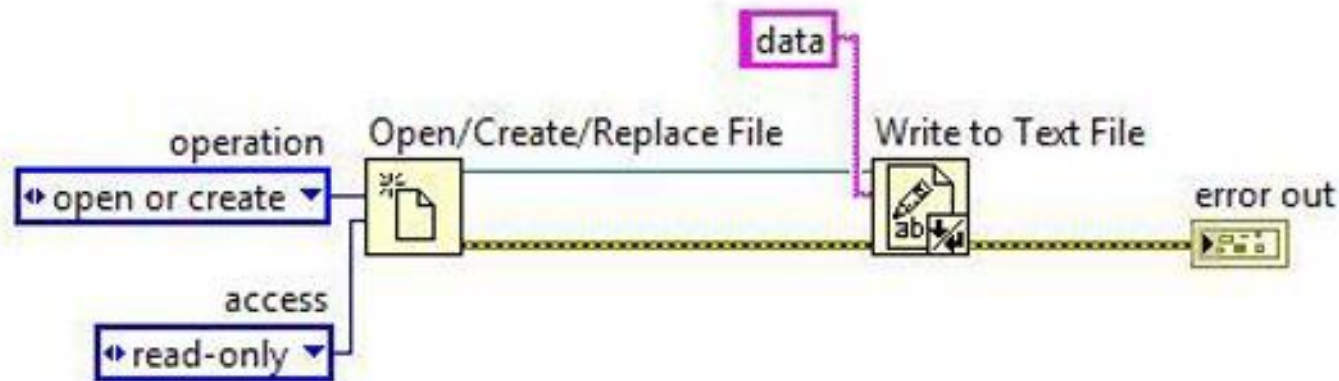
THIS PROGRAM WRITES
0123 TO THE
SPREADSHEET FILE
CALLED TESTING.DAT.
YOU HAVE TO
OPEN/CREATE/ REPLACE
THE FILE BEFORE YOU
CAN WRITE TO THE
SPREADSHEET FILE.



You can have it append the data to the file. You can also have it transpose the data like I did in this program so that it writes vertically instead of horizontally. Although not needed here, I delimited the data with commas.

CLAD QUESTION

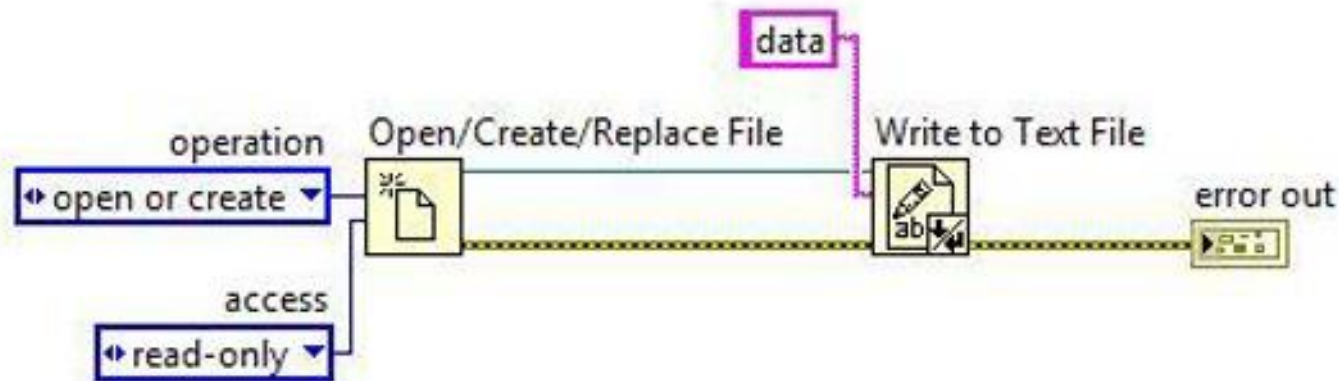
Q13: Why does an error occur when the code executes?



- A** File path not wired to the input of the Open/Create/Replace File function
- B** File opened with the incorrect access
- C** File reference not closed
- D** File data type is incorrect

CLAD QUESTION

Q13: Why does an error occur when the code executes?



- A** File path not wired to the input of the Open/Create/Replace File function
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FILE INPUT/OUTPUT WITH EXCEL

EXCEL SAVES FILES AS .XLS OR .XLSX. THIS FORMAT IS IN BINARY FORMAT. THE REASON EXCEL USES THIS FORMAT IS THAT IT TAKES LESS STORAGE SPACE. LABVIEW CANNOT READ THIS TYPE OF FILE WITH READ FROM SPREADSHEET FILE VI. THEREFORE, IT IS BEST TO SAVE YOUR DATA IN EXCEL AS EITHER A .CSV (COMMA SEPARATED FORMAT) OR TEXT FORMAT.

I SHOULD NOTE THAT YOU CAN DOWNLOAD A MICROSOFT OFFICE PACKAGE. WITH OUR PROFESSIONAL LABVIEW LICENSE IT IS FREE, BUT OTHER MORE BASIC EDITIONS WILL REQUIRE AN EXTRA PURCHASE FOR THE PACKAGE.

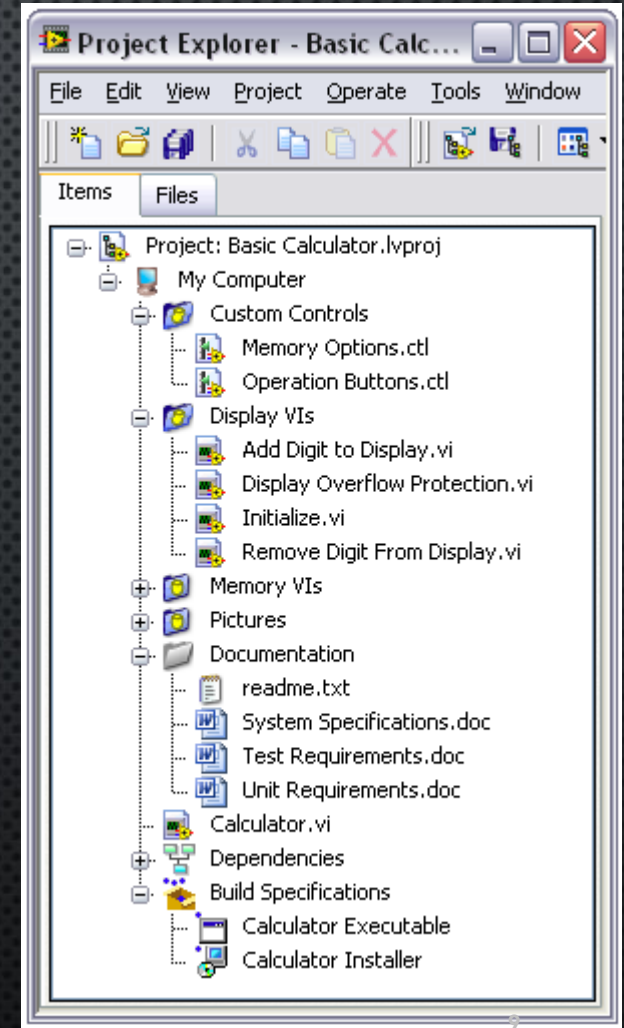
WRITING/READING FROM A TEXT FILE

WRITING AND READING FROM A TEXT FILE IS VERY SIMILAR TO A SPREADSHEET FILE. SPREADSHEET FILES ARE TYPICALLY MORE DIFFICULT TO WRITE/READ TO/FROM.

LABVIEW PROJECT FILES (.LVPROJ)

OFTEN TIMES WHEN YOU HAVE A PROGRAM THAT CONTAINS SEVERAL SUBVIS AS WELL AS OTHER FILES, IT'S GOOD TO CREATE A LABVIEW PROJECT FILE TO HAVE EVERYTHING ORGANIZED (SEE EXAMPLE).

IF YOU ONLY PLAN TO HAVE ONE FILE, THEN I WOULDN'T SUGGEST USING A PROJECT FILE.



CLAD QUESTION

Which statement best describes a LabVIEW Project (.lvproj) file?

- a. A specialized folder that contains all files pertaining to an application
- b. A file containing a front panel and block diagram where programming steps can be implemented
- c. A compiled version of code mostly used for final deployment of an application
- d. A file that contains references to, and provides organization for all files pertaining to an application

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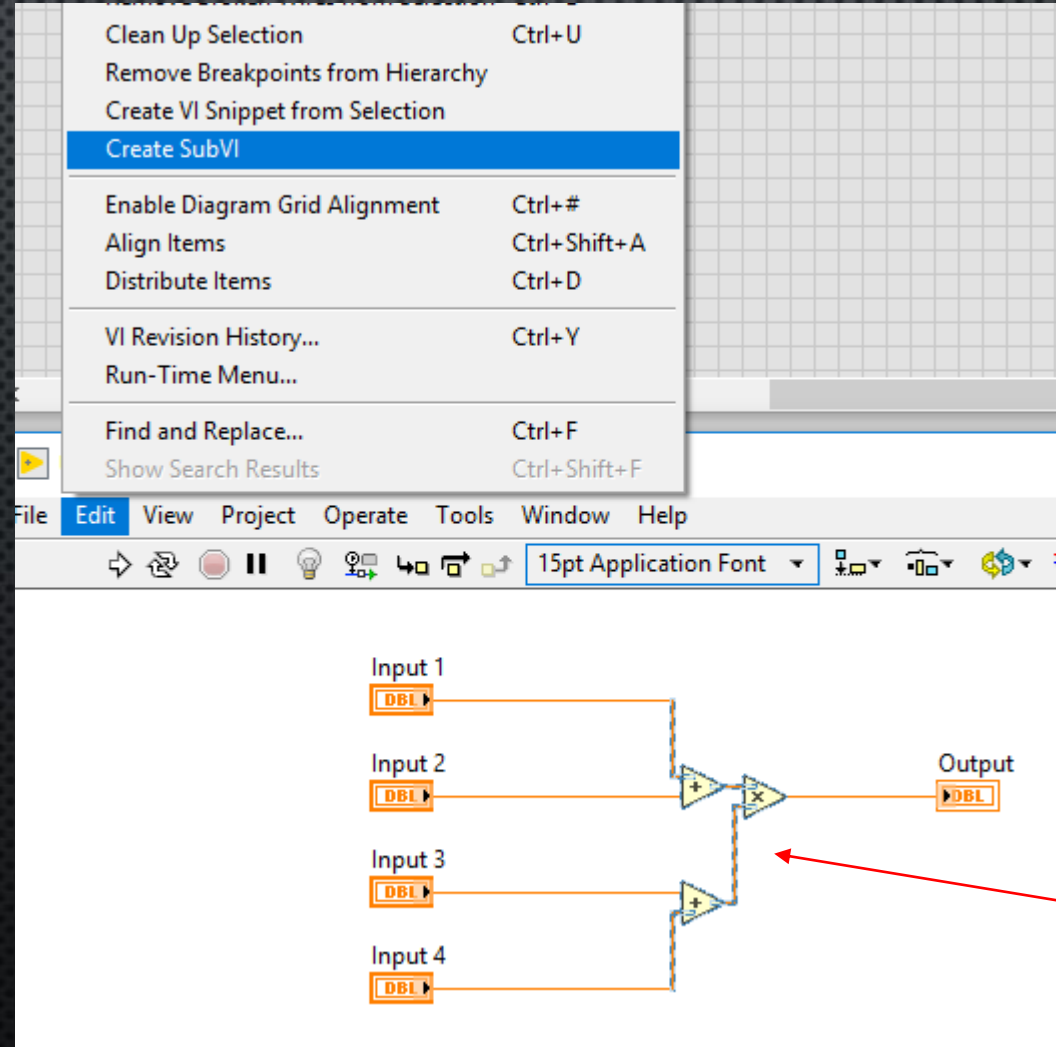
SUBVIS

A SUBVI IS A SEPARATE VI THAT PERFORMS SOME ACTION. ADVANTAGES TO USING SUBVIS INCLUDE . . .

1. ADDS MODULARITY: IF YOU NEED YOUR CODE TO PERFORM THE SAME ACTION IN MULTIPLE PLACES WITHIN YOUR CODE, THEN USING A SUBVI IS A GOOD STRATEGY. SUBVIS ACT SIMILARLY TO USING FUNCTIONS OR SUBROUTINES IN OTHER HIGH LEVEL PROGRAMMING LANGUAGES.
2. USES LESS BLOCK DIAGRAM REAL ESTATE: A SUBVI GETS SQUISHED INTO A SINGLE ICON SO IT'S MUCH SMALLER. I TYPICALLY PREFER NOT TO DO THIS BECAUSE IT PUTS YOUR CODE IS SORT OF BEHIND THE SCENES UNLESS I AM RUNNING OUT OF SPACE ON THE BLOCK DIAGRAM (REMEMBER THAT THE RULE OF THUMB IS TO TRY TO FIT YOUR ENTIRE BLOCK DIAGRAM CODE WITHIN ONE SCREEN WIDTH)

MAKING A SUBVI BY HIGHLIGHTING EXISTING CODE

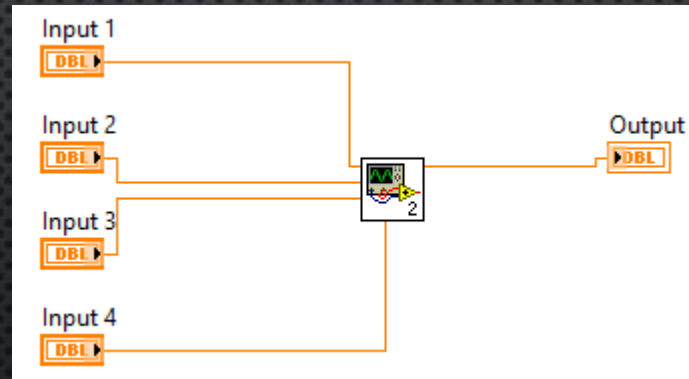
ONE WAY TO MAKE
A SUBVI IS TO
HIGHLIGHT CODE
ON YOUR BLOCK
DIAGRAM > EDIT >
“CREATE SUBVI”



Highlighted

MAKING A SUBVI BY HIGHLIGHTING EXISTING CODE

ONCE YOU CLICK CREATE SUBVI, A SINGLE ICON APPEARS

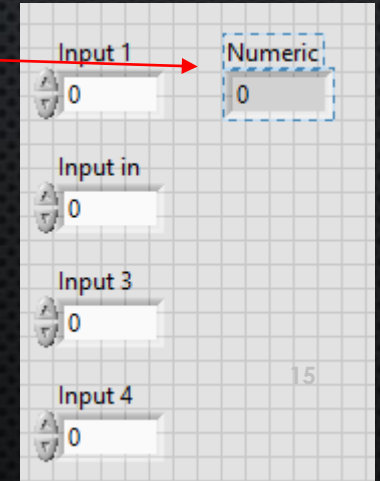
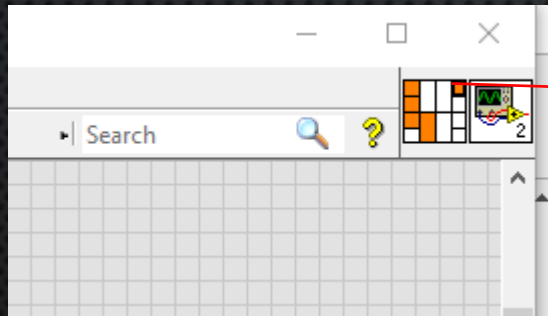


You can double-click on the icon to open the subVI.

EDITING WHERE THE SUBVI WIRES GET CONNECTED

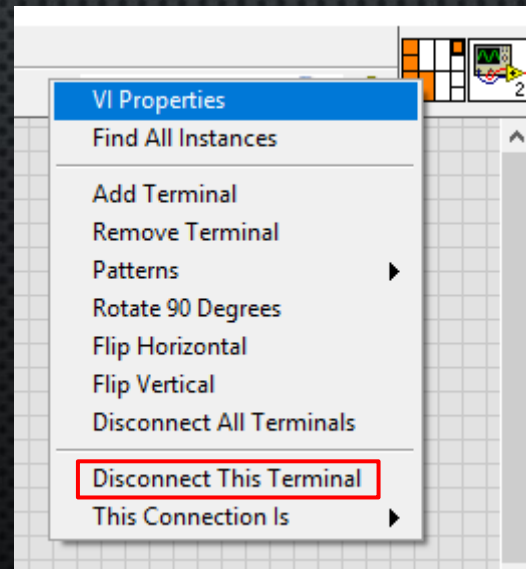
ONCE THE SUBVI IS OPENED, YOU CAN VIEW THE CONNECTOR PANE ON THE TOP RIGHT CORNER OF THE FRONT PANEL. THE CONNECTIONS THAT WERE AUTOMATICALLY CREATED IN THIS EXAMPLE ARE SHOWN AS . . .

When you click on one of the connections, it will highlight the item that the connection corresponds to on the front panel.



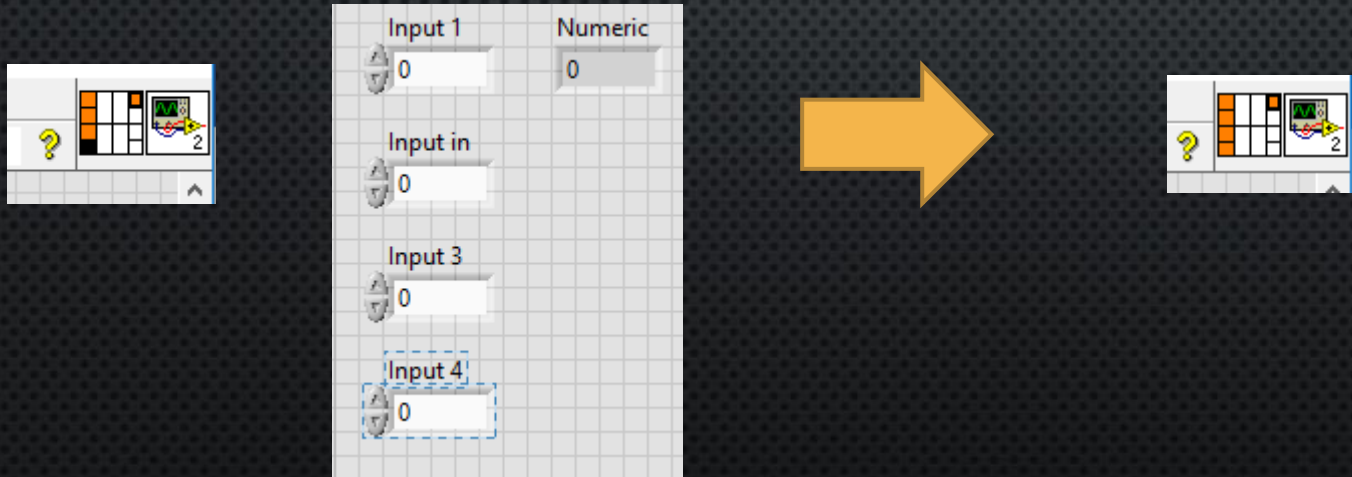
EDITING WHERE THE SUBVI WIRES GET CONNECTED

WE CAN MOVE A CONNECTION BY RIGHT-CLICKING ON THE CONNECTION AND CHOOSING “DISCONNECT THIS TERMINAL”



EDITING WHERE THE SUBVI WIRES GET CONNECTED

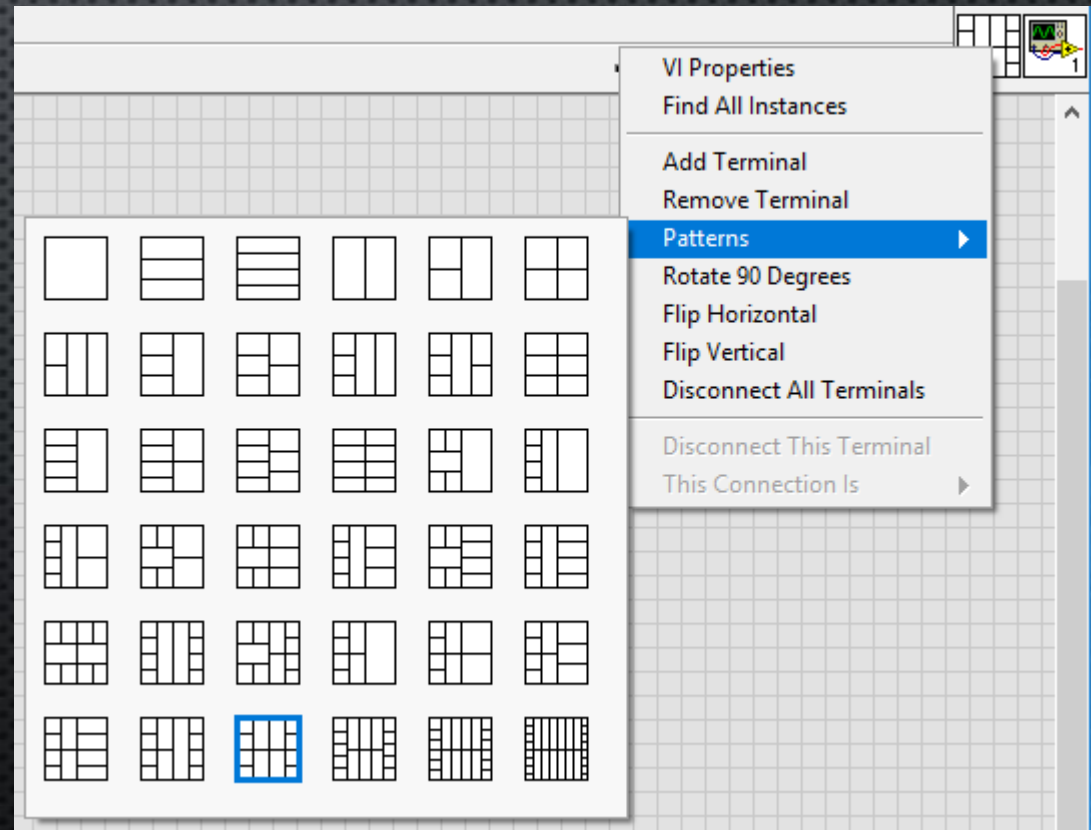
NOW SELECT ONE OF THE BOXES THAT YOU WANT THE TERMINAL TO GO TO (IN THIS CASE, I CHOSE THE BOTTOM LEFT BOX), THEN SELECT THE CONTROL THAT YOU WANT THE CONNECTION TO LINK TO AND THE TWO WILL BE LINKED.



The white boxes represent where a connection could be, but currently there is not a connection there.

EDITING WHERE THE SUBVI WIRES GET CONNECTED

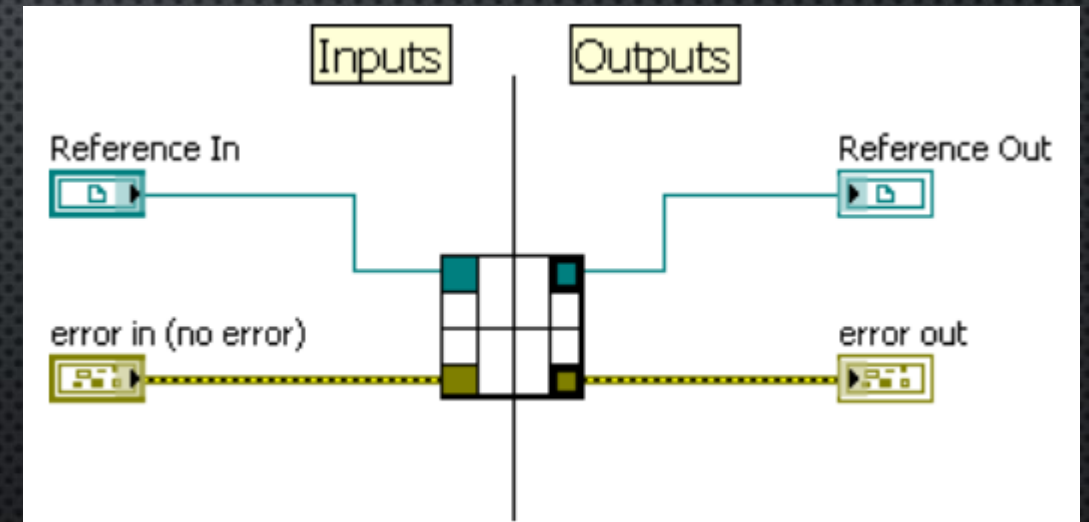
THERE ARE DIFFERENT OPTIONS FOR THE CONNECTOR PANE. YOU CAN SEE THESE OPTIONS IF YOU RIGHT-CLICK ON THE CONNECTOR PANE > PATTERNS. THIS WAY YOU CAN HAVE UP TO 28 CONNECTIONS TO ONE SUBVI.



STANDARD PRACTICE FOR CONNECTOR PANE

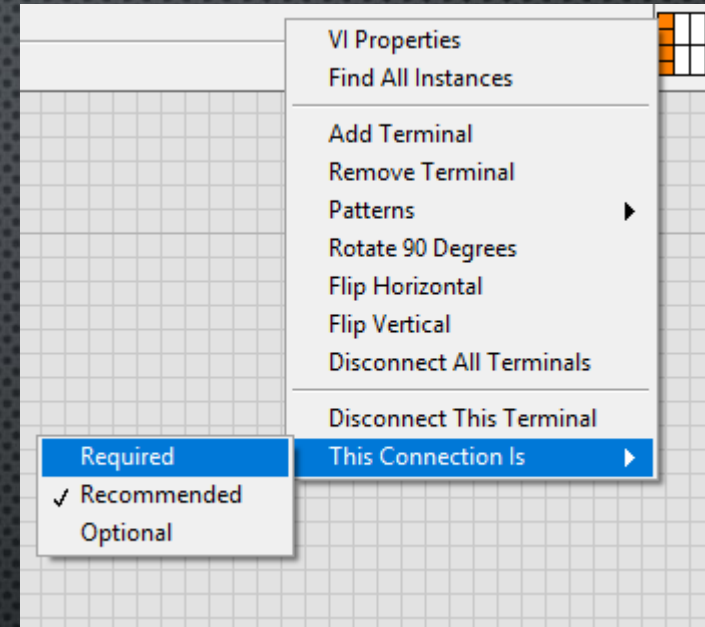
TYPICALLY, THE TOP INPUT/OUTPUT CONNECTIONS ARE RESERVED FOR PASSING REFERENCES AND THE BOTTOM INPUT/OUTPUT ARE RESERVED FOR ERROR HANDLING

ALSO, TYPICALLY INPUTS ARE INPUTTED ON THE LEFT-HAND SIDE OF THE CONNECTOR PANE AND OUTPUTS ARE ON THE RIGHT-HAND SIDE.

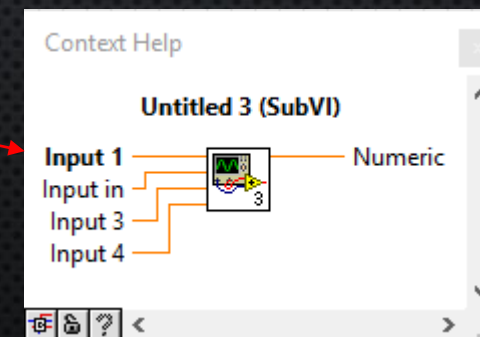


MAKING INPUTS REQUIRED

SOMETIMES IT'S IMPORTANT TO MAKE INPUTS REQUIRED. TO DO THIS, YOU RIGHT-CLICK ON THE CONNECTION PANE > "THIS CONNECTION IS" > REQUIRED.



REQUIRED INPUTS ON SUBVIS SHOW UP IN THE CONTEXT HELP WITH BOLD LETTERS AND THE PROGRAM WILL NOT COMPILE WHILE THE INPUT IS UNWIRED.



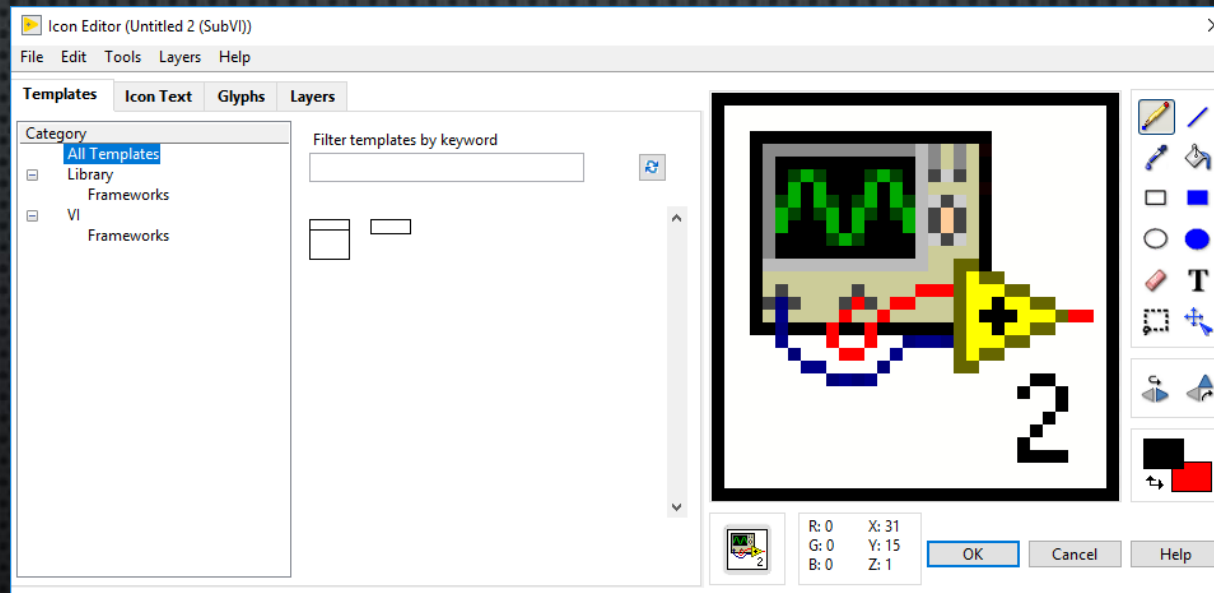
MAKING A SUBVI FROM A REGULAR VI

LAST TIME WE MADE A SUBVI FROM HIGHLIGHTING A SECTION OF CODE.

YOU CAN ALSO MAKE A SUBVI FROM TAKING A REGULAR VI AND SETTING UP THE CONNECTIONS FROM THE CONNECTOR PANE. SO ANY PROGRAM YOU MAKE CAN BE TURNED INTO A SUBVI.

CREATING A CUSTOM ICON

EVERY TIME YOU MAKE A SUBVI, YOU SHOULD CREATE A CUSTOM ICON. YOU DO THIS BY DOUBLE-CLICKING ON THE ICON AND THE ICON EDITOR COMES UP.

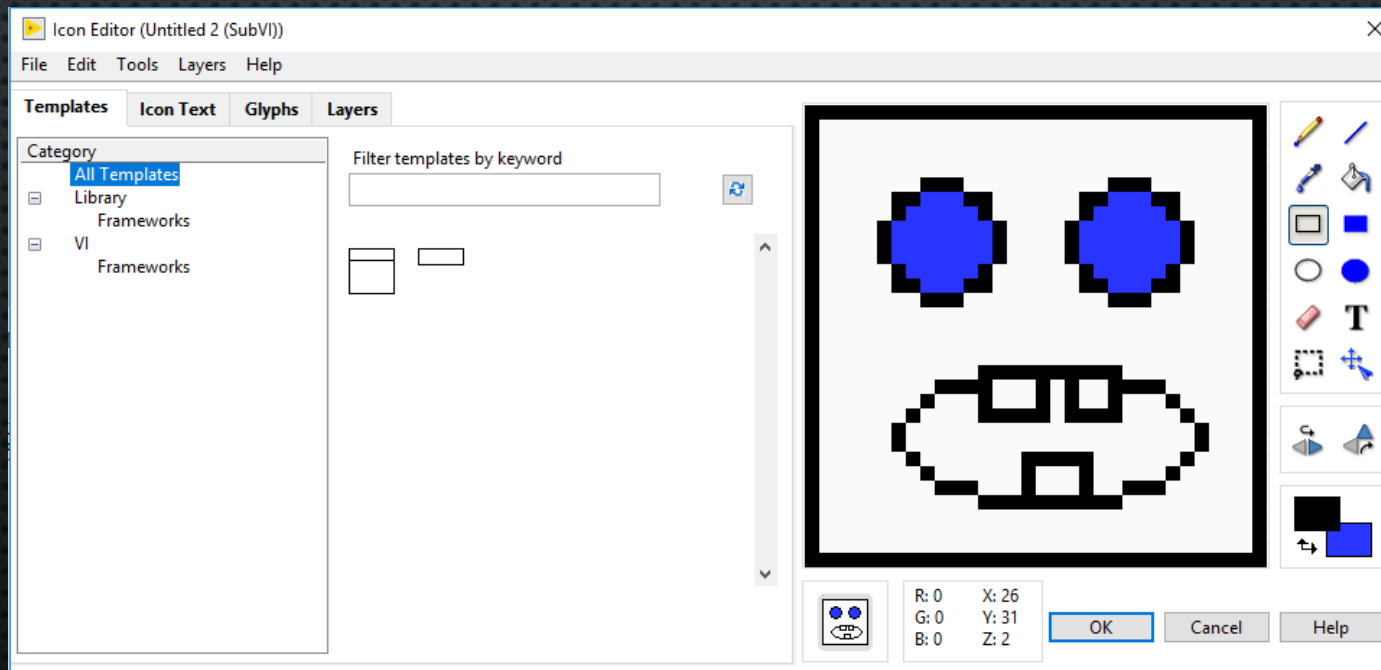


Let's draw a smiley face!

CREATING A CUSTOM ICON

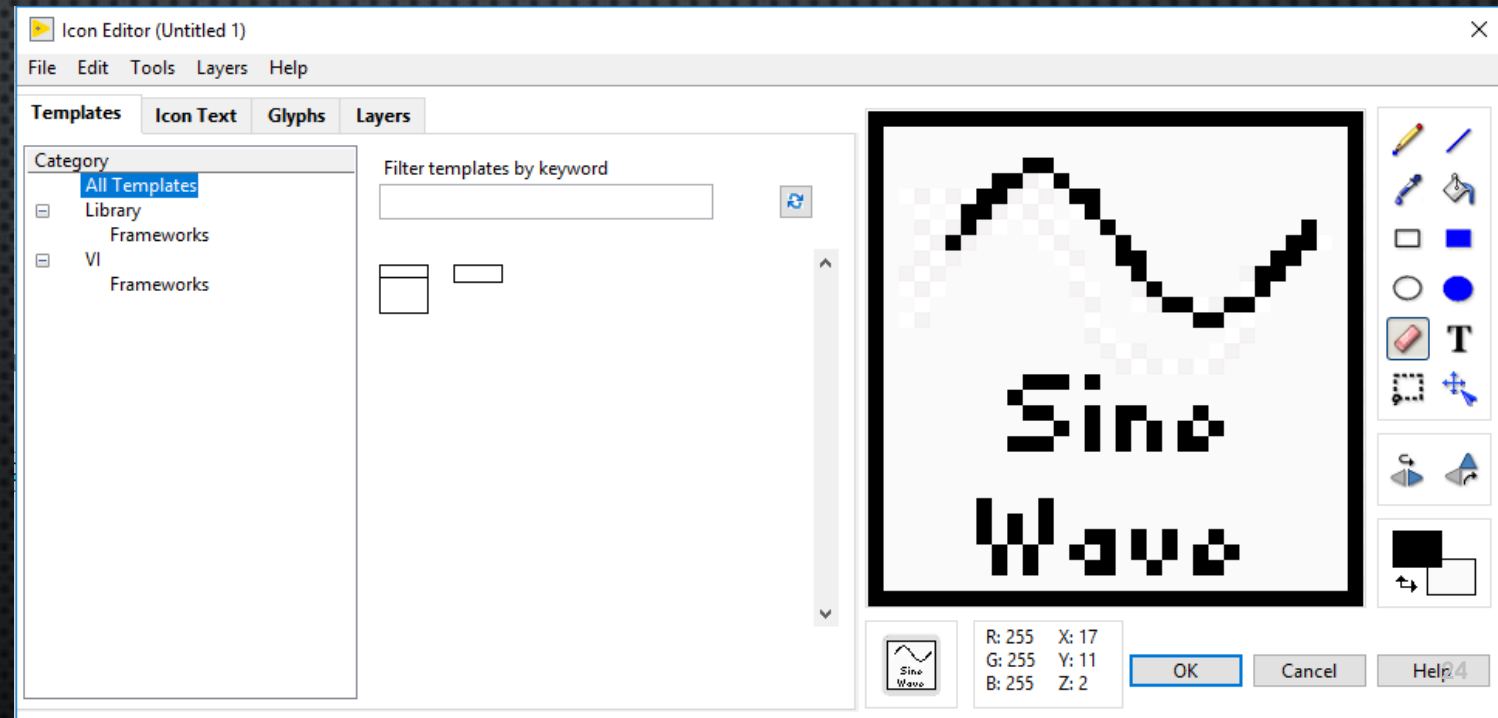
I'M GUESSING THAT YOU THINK THIS IMAGE IS AMAZING, BUT

TYPICALLY, YOU WOULD WANT TO MAKE SOMETHING THAT REPRESENTS WHAT THE SUBVI DOES, SO THIS EXAMPLE OF A SUBVI ICON DESIGN IS NOT IDEAL (UNLESS YOU'RE MAKING A NUMBER CRUNCHERS VIDEO GAME OR SOMETHING).



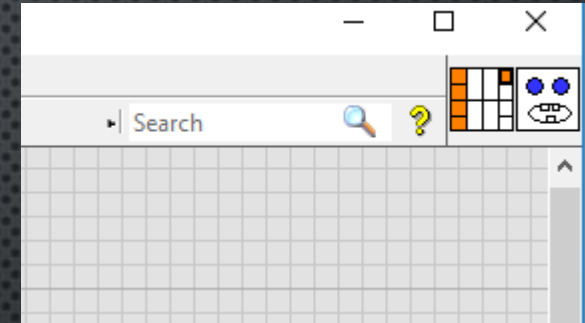
CREATING A CUSTOM ICON

THIS IS A BETTER EXAMPLE OF A MORE INFORMATIVE ICON

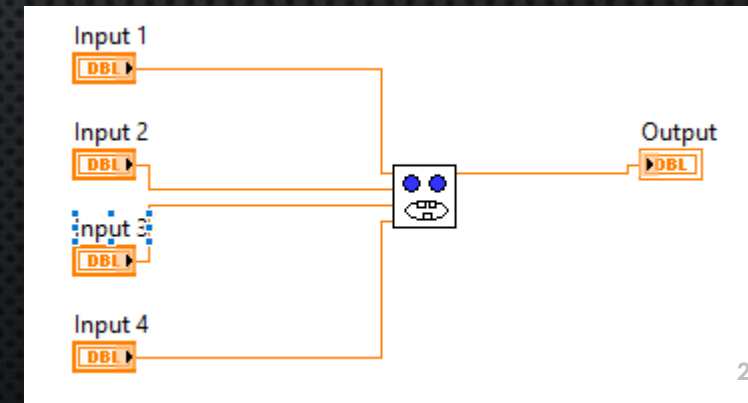


CREATING A CUSTOM ICON

ONCE YOU CLICK OK, YOU CAN SEE YOUR ICON IS DISPLAYED IN THE TOP CORNER OF YOUR VI.

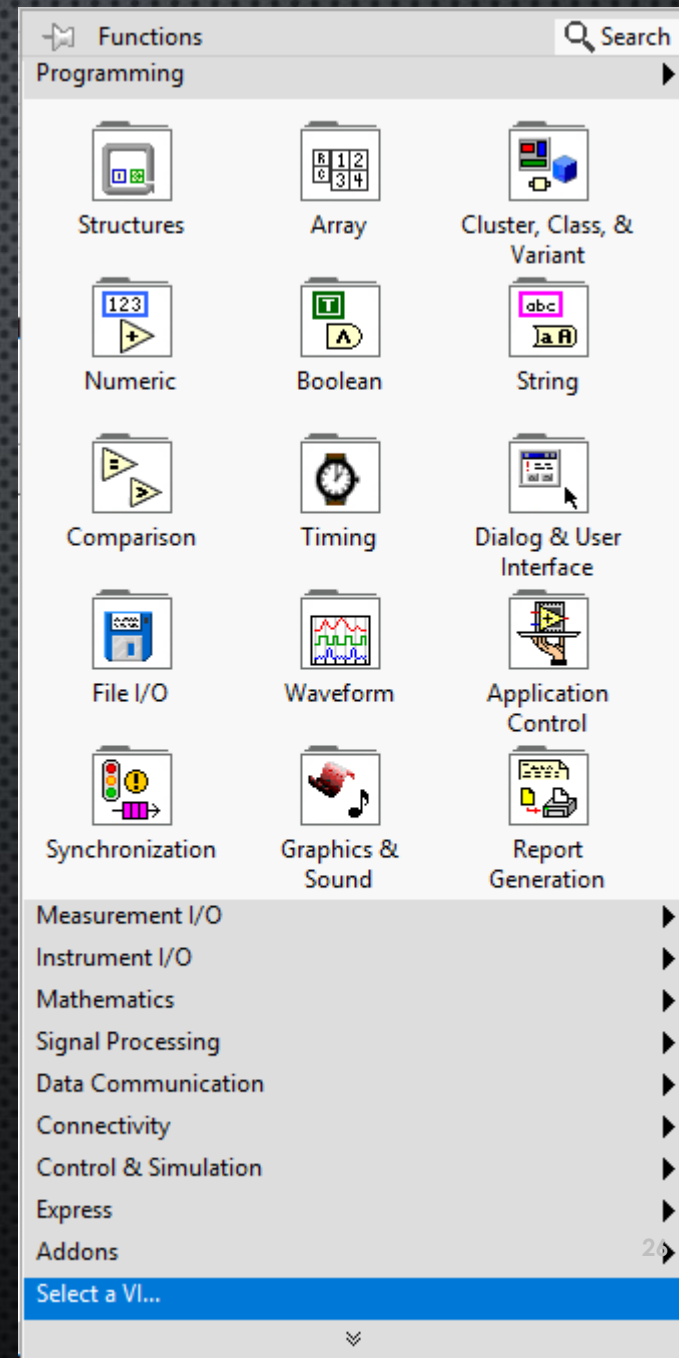


Once you do this, your icon will automatically change in the higher level VI that calls this subVI.



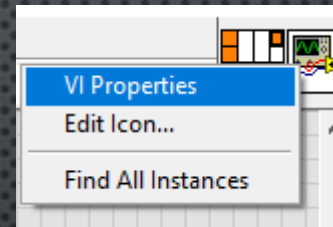
HOW TO USE A SUBVI

TO USE A SUBVI IN A REGULAR VI, YOU SIMPLY CHOOSE “SELECT A VI...” FROM THE FUNCTIONS PALETTE.

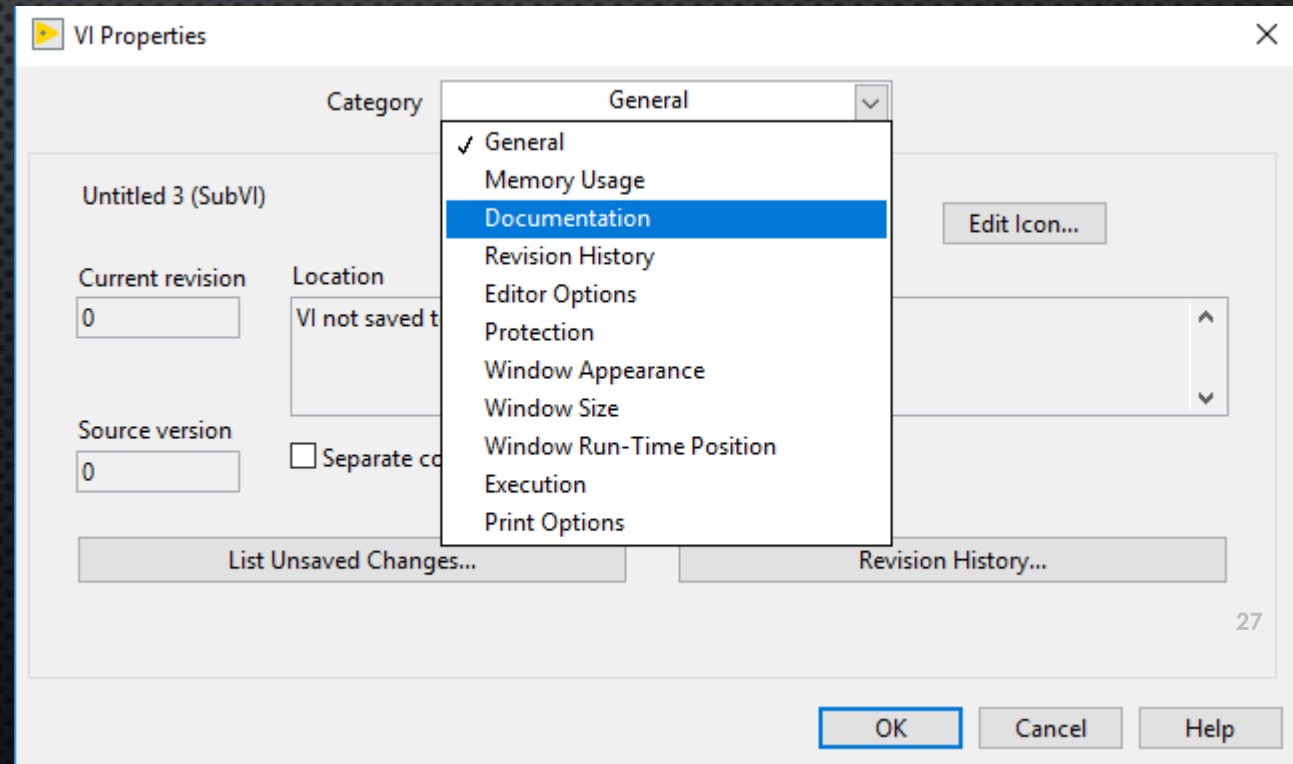


ALL SUBVIS SHOULD BE DOCUMENTED

WHenever you create a subVI, you should also include a description of what the subVI does. To do this, you need to right-click on the icon and select "VI Properties"



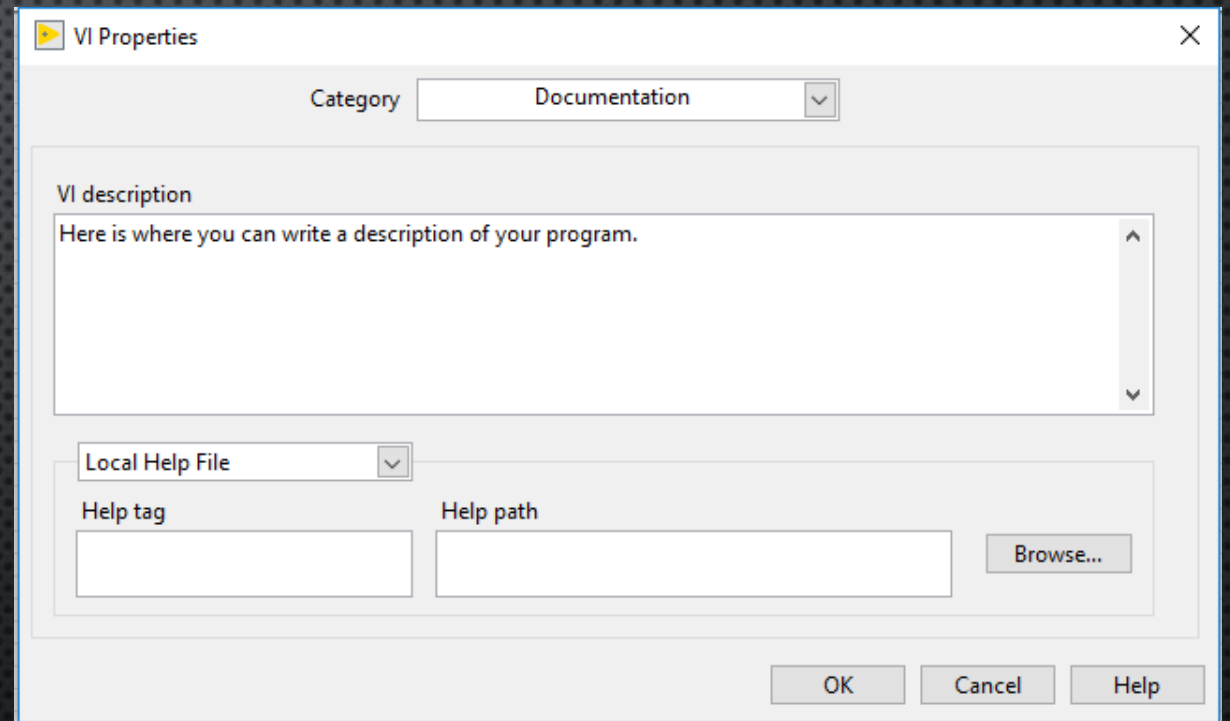
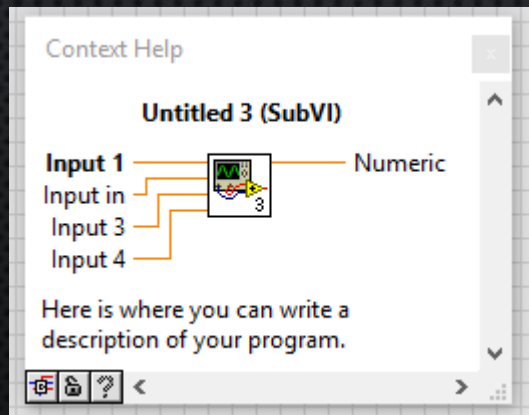
In the VI Properties, select the drop down to show the Documentation option.



ALL SUBVIS SHOULD BE DOCUMENTED

IN DOCUMENTATION, YOU CAN WRITE A DESCRIPTION OF WHAT YOUR VI DOES.

Notice that the description shows up on the context help. 😊



ERROR HANDLING WITH SUBVIS

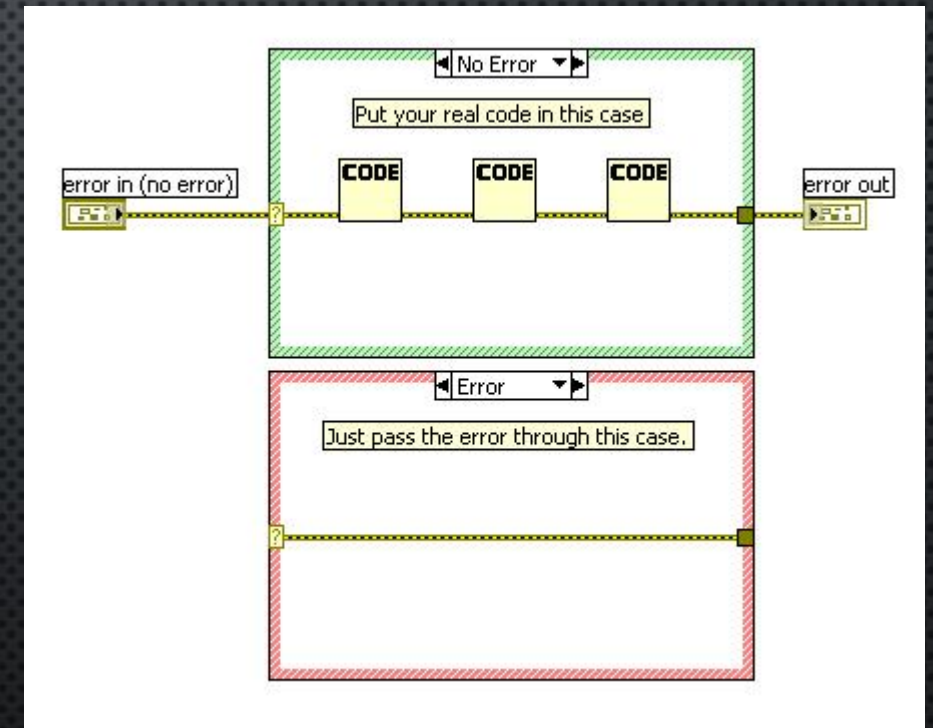
WITH SUBVIS, IT'S TYPICALLY A GOOD IDEA TO INCLUDE ERROR HANDLING WITHIN THE SUBVI.

NI RECOMMENDS THAT YOU DRAW A CASE STRUCTURE AROUND YOUR ENTIRE SUBVI WITH AN ERROR FEEDING THE CASE STRUCTURE TERMINAL.

ERROR HANDLING WITH SUBVIS

IF AN ERROR DOES NOT EXIST, THEN YOU SIMPLY IMPLEMENT THE SUBVI AS NORMAL.

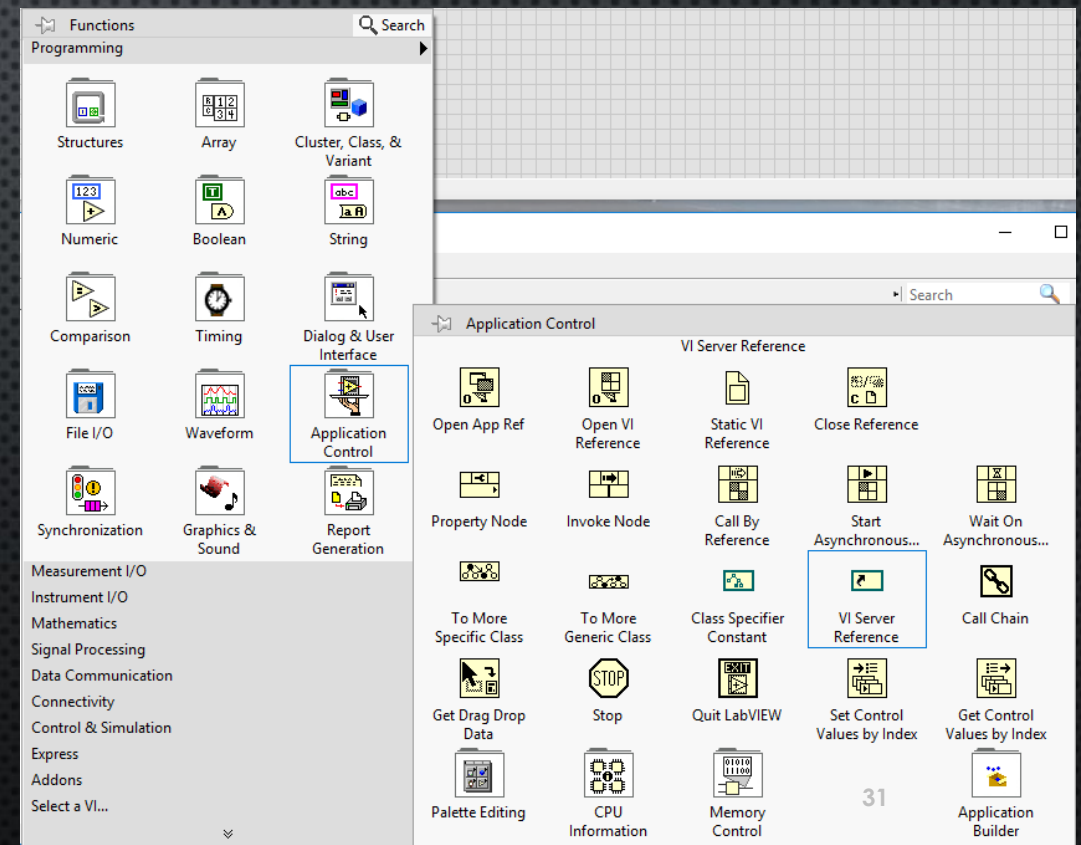
IF AN ERROR DOES EXIST, THEN YOU DON'T IMPLEMENT ANY CODE IN THE SUBVI AND YOU JUST PASS THE ERROR THROUGH.



<http://labviewinsights.blogspot.com/2008/09/put-error-handling-in-every-subvi.html>

MANIPULATING OBJECTS CONTAINED IN A HIGHER LEVEL VI FROM A SUBVI

SOMETIMES YOU NEED TO CALL A SUBVI FROM A HIGHER LEVEL PROGRAM AND SOMETIMES YOU NEED THAT SUBVI TO CHANGE PROPERTIES OF AN ITEM IN THE HIGHER LEVEL PROGRAM. TO DO THIS, YOU NEED TO PASS THE CONTROL REFERENCE OF THE ITEM THAT IS GOING TO BE CHANGED TO THE SUBVI. THE REFERENCE IS OBTAINED BY USING THE “VI SERVER REFERENCE” FUNCTION.

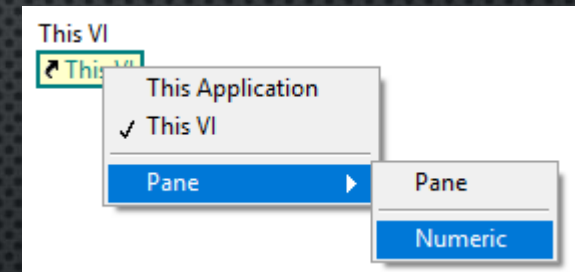
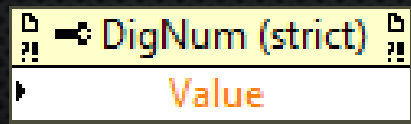


MANIPULATING OBJECTS CONTAINED IN A HIGHER LEVEL VI FROM A SUBVI

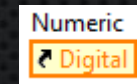
ONCE YOU GET THE VI SERVER REFERENCE FOR THE HIGHER LEVEL VI ON THE BLOCK DIAGRAM, SELECT THE FRONT PANEL OBJECT THAT YOU WANT TO REFERENCE TO (IN THIS CASE WE CHOSE NUMERIC).

NOW YOU NEED TO GET THE PROPERTY NODE OF THE HIGHER LEVEL FRONT PANEL OBJECT INTO THE SUBVI. THIS CAN EASILY BE DONE BY SIMPLY CREATING THE PROPERTY NODE IN THE HIGHER LEVEL PROGRAM AND PLACING IT ON THE BLOCK DIAGRAM, THEN DRAG IT INTO THE SUBVI'S BLOCK DIAGRAM. AFTER THIS ACTION, THE PROPERTY NODE LOOKS LIKE .

..

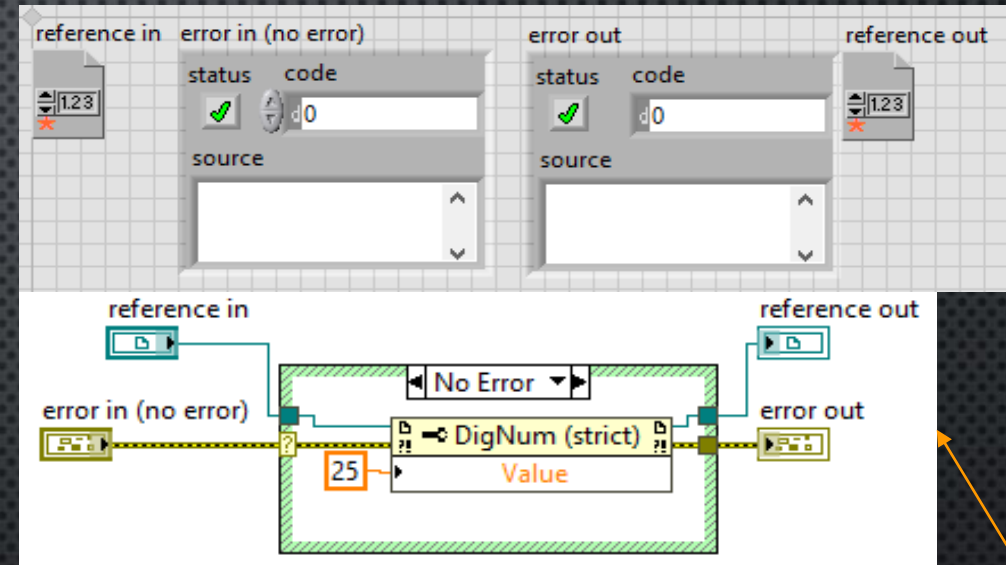


After selecting "Numeric", the Reference looks like . . .



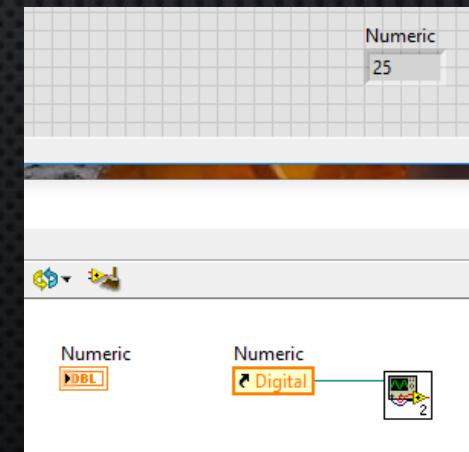
MANIPULATING OBJECTS CONTAINED IN A HIGHER LEVEL VI FROM A SUBVI

IN THE SUBVI, RIGHT CLICK ON THE INPUT REFERENCE DOT OF THE SUBVI AND CHOOSE "CREATE CONTROL". PERFORM THIS SAME ACTION FOR THE REFERENCE OUT AND THE ERROR IN AND ERROR OUT. THE SUBVI BLOCK DIAGRAM AND FRONT PANEL SHOULD LOOK SOMETHING LIKE . . .



And the Front Panel of the higher level VI will look like □

Notice that it works! ☺ The subVI changed the higher level Numeric to 25.



Higher Level VI

SubVI

CLAD QUESTION

Which combination of words correctly completes the following statement? Unlike _____ Property Nodes, _____ Property Nodes require _____ as inputs in order to function correctly.

- a. Explicit; Implicit; Data Value References
- b. Implicit; Explicit; Data Value References
- c. Explicit; Implicit; Control References
- d. Implicit; Explicit; Control References

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CLAD QUESTION

You have a control on the front panel of a VI and you need to modify one of its properties at run time. Which of the following is the best approach you would take?

- a. Create an implicit property node and select the property to modify
- b. Create a control reference, pass the reference to a property node and select the property to modify
- c. Create a linked shared variable and select the property to modify the property
- d. Create a local variable and select the property to modify

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