Section 2 Guide

Background

In every arcade game there is always a top score, and every player wants to beat it in order to become the number one, and so on.

In Section 1 we established one way of calculating the score: by counting the letters of the player's name. Despite of not being the final scoring system that we are going to use for the game, it's a good way to get started. But now is time to create the Top Score system.

Task

Building on the VI from the previous section, we want to create an array of scores to show the Top 3 scores of the game. Each new player will need to have a cluster containing his or her name and the score that they have achieved.

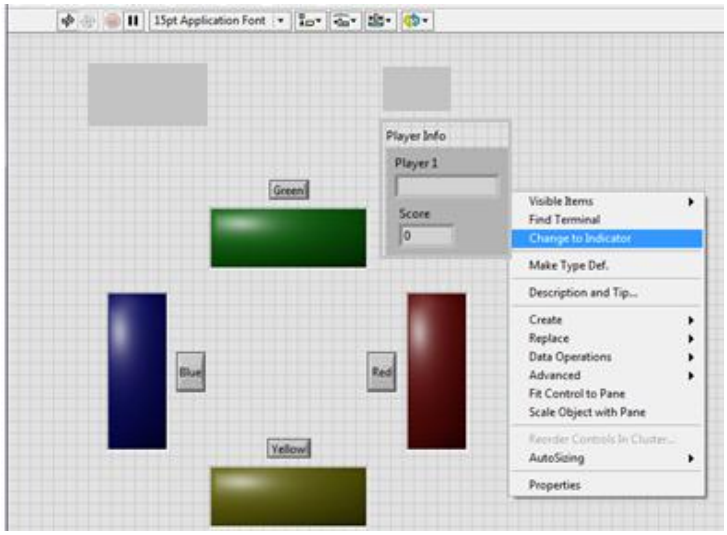
However, since we haven't covered Loops or Files, we need to use some way to store the players and their score on each execution of the VI. In order to do that, we are going to use a black box that will take care of that for us:

This VI receives a cluster with the Name of the Player and the Score and will give back an array with all the previous plus the current Player Information, sorted from lowest score to highest score. Feeling adventurous? Open up BlackBox.vi and see if you can decipher how it works.

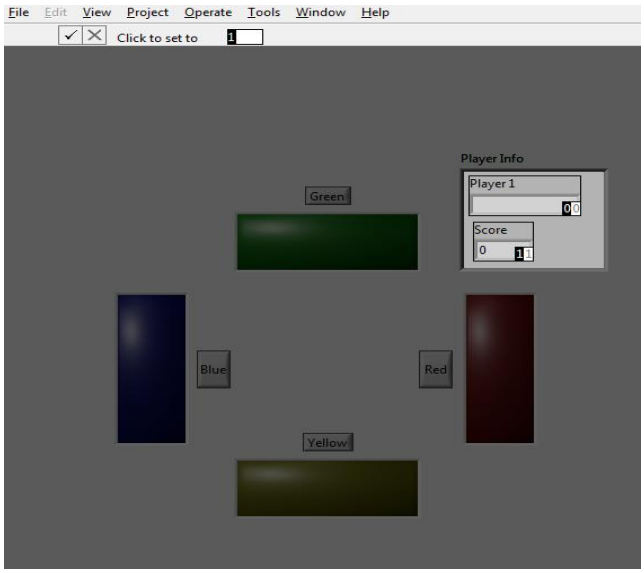
Steps

This part of the Guide provides you step-by-step instructions of how to obtain the expected results of this section. Feel free to follow all steps, skip some, or do even it by yourself and compare your solution at the end with the steps, filling in any pieces you may have missed. To maximize your learning experience, we suggest choosing the latter method. From now on, the sections won't be as explicit as Section 1. The first step is to modify the Front Panel.

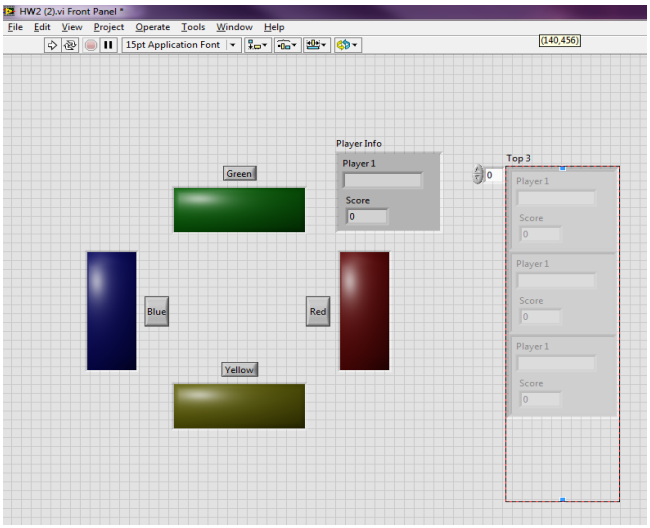
1. Open Section1.vi, save it as Section2.vi. Add the Cluster Shell from *Right Click > Controls Palette > Modern > Array, Matrix & Cluster > Cluster.* Drag the Player 1 and score controls to the shell we just added. Make sure that the cluster is an indicator (If not, *Right Click on the Cluster > Change To Indicator*). Also, make sure your cluster is named Player Info. This cluster is where the user will see their information.



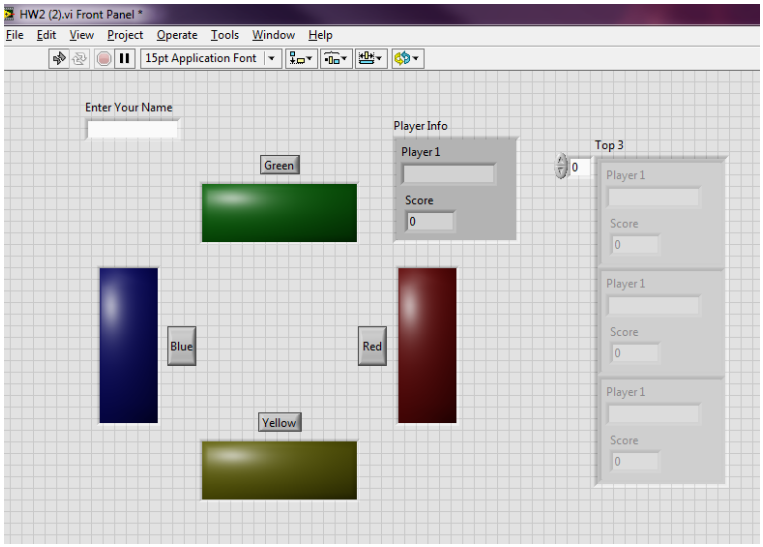
2. Verify that the elements in your cluster are arranged in the appropriate order. If you added your elements in a different way than advised your order might be incorrect. To verify the order of elements in your cluster *Right Click on the Outer Edge of the Cluster > Reorder Controls in Cluster…* Make sure that your elements are ordered such that the string labeled Player 1 is element zero and the numeric labeled Score is element 1. If this is not the order of your elements use your mouse to click on the elements can change the order. Click on the check mark on the toolbar when you are done editing the order.



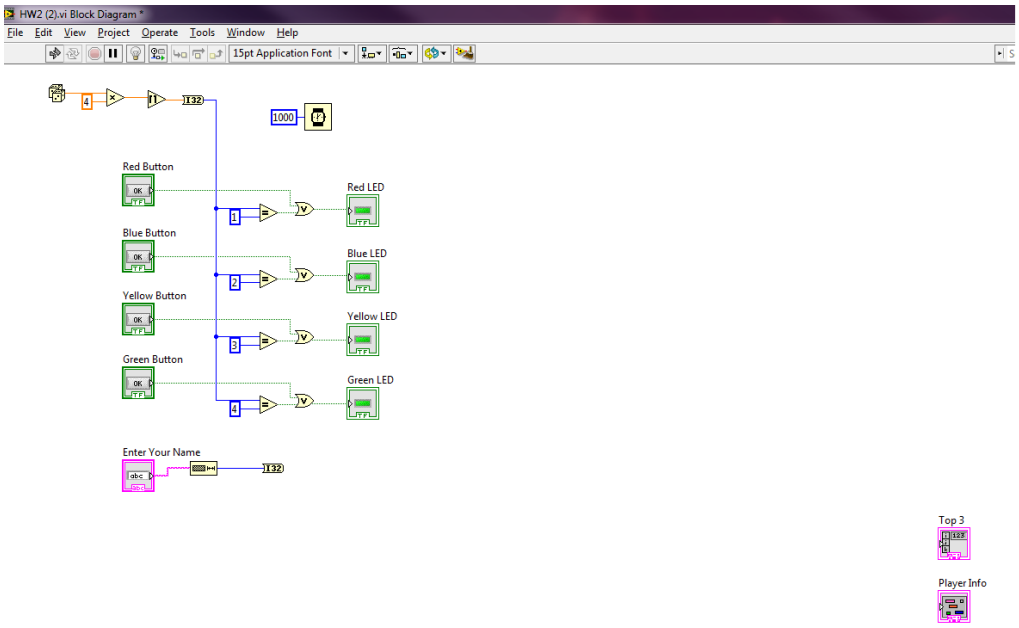
3. Create an array that holds the top three scores by adding an array shell (*Right Click > Controls > Modern > Array, Matrix & Cluster > Array*). Copy the Player Info Cluster into the array (Drag the Player Info cluster into the array while pressing the Ctrl key or you can use other methods of copy and pasting). Finally drag the lower corner of the array to show three different clusters. Name this array Top 3. The picture below shows what the array should look like while expanding the number of elements. Make sure to only include three elements.



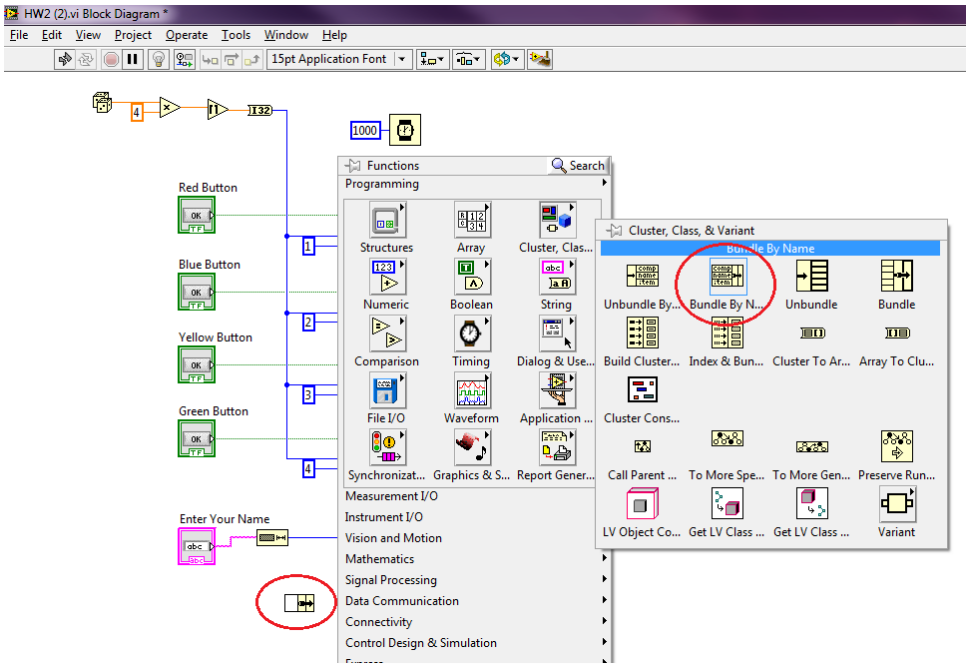
4. Add a new string control for the player to enter their name. Make the label read: Enter Your Name. Make sure your front panel looks like the one pictured below.



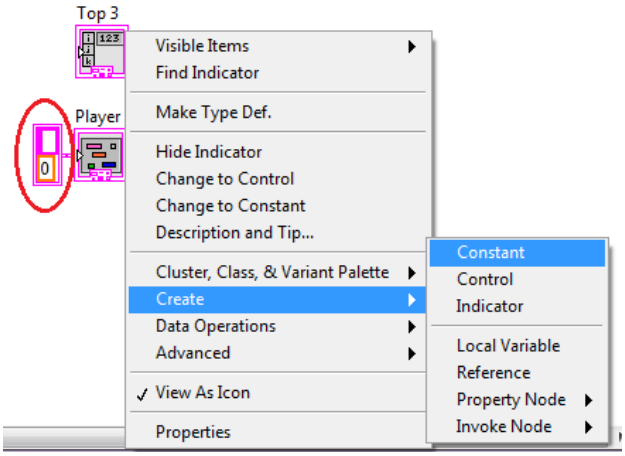
5. Now is time to make the Block Diagram. We will keep using number of letters in the player name as the score; however, you are free to change it if you come up with another score system (i.e. a random number generator). For this step lets re-arrange the Controls and Indicators. Make your block diagram look similar to the one seen below.



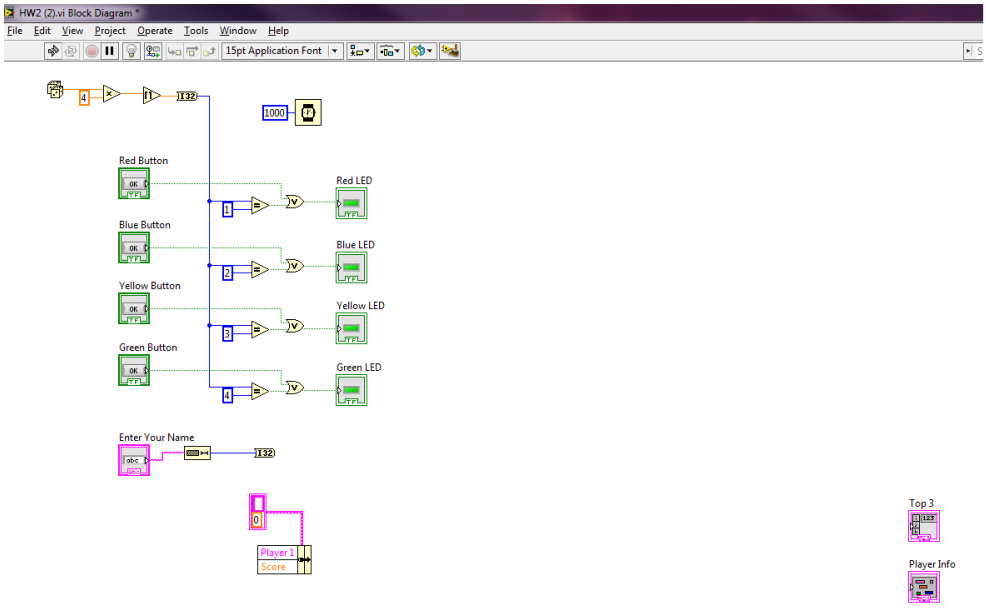
6. Here is where we need to add the Black Box VI that we are going to be using. Remember that it needs a cluster with the Player and score in order to work so first of all, let's create the Cluster by adding the Bundle By Name Function (*Right Click > Functions > Programming > Cluster, Class & Variant > Bundle By Name*).



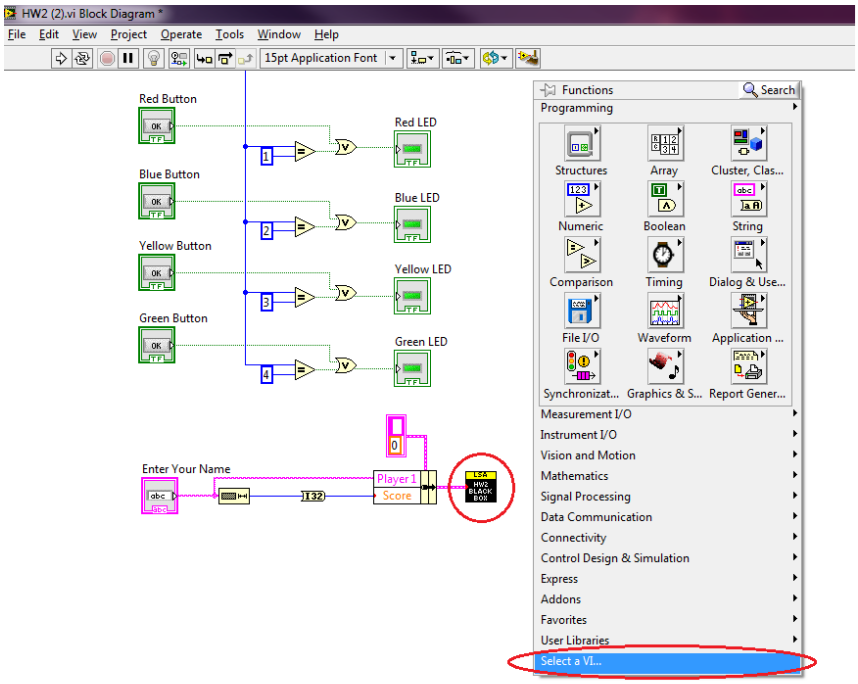
7. The previously added function requires a base cluster to know how it should name the elements of the cluster, so create a constant of the Player Info Cluster (*Right Click on the Indicator > Create > Constant*).



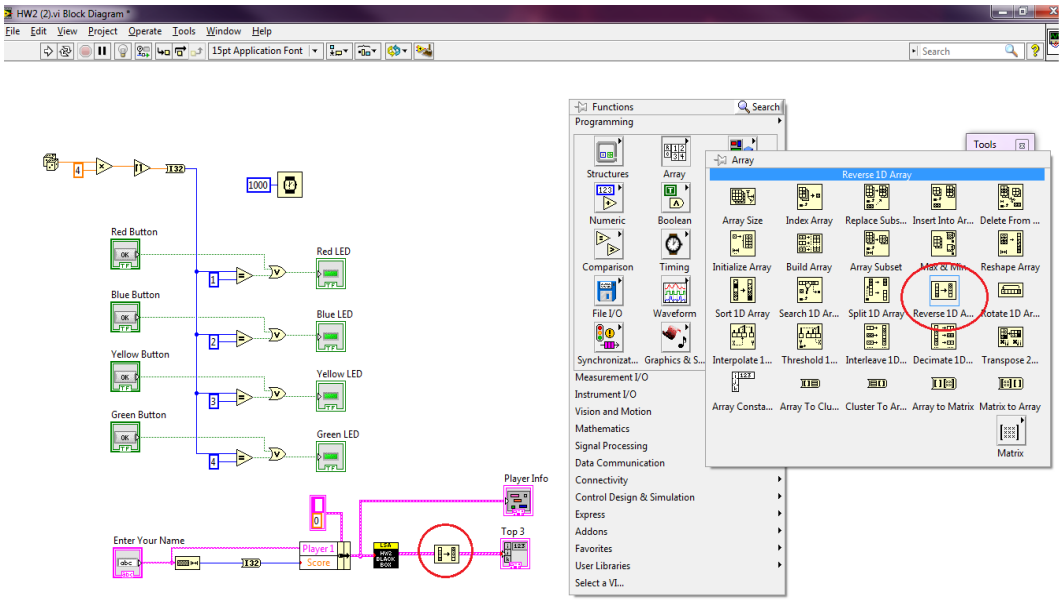
8. Attach the previously created constant to the top of the Bundle By Name Function. Grow the Function in order to have the Player and the Score Fields (Left Click at the bottom of the function and Drag).



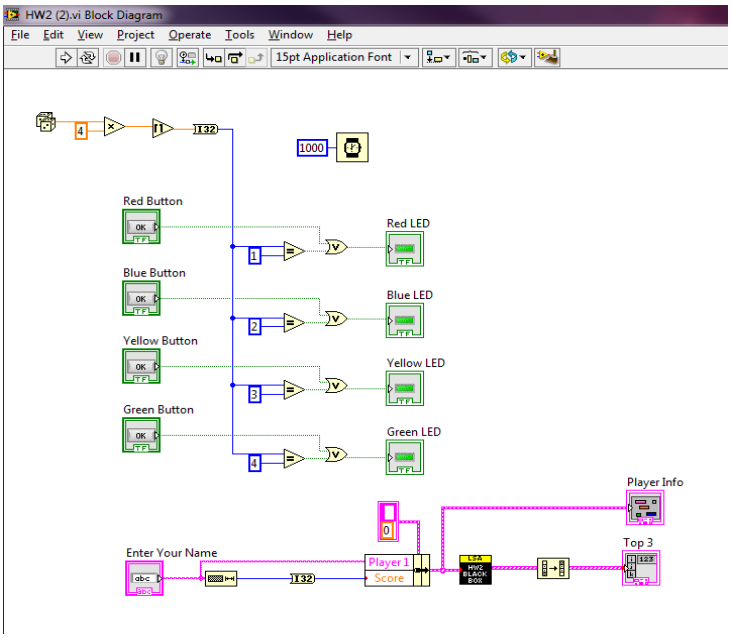
9. Finally connect these elements together. To add the Black Box, *Right Click > Select a VI… > Go to the Directory of BlackBox.vi*. (Note: Another way to add the Black Box is to just drag the file from the directory where it was downloaded into the Block Diagram)
** Optional: Open up BlackBox.vi and examine the code. What is it doing? **

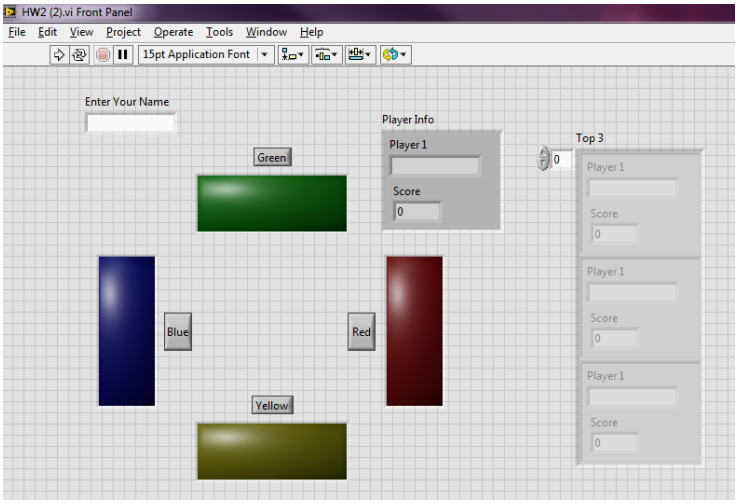


10. The Black Box gives us the array of Player Info sorted from Lowest to Highest, in order to obtain the Top 3 we need to flip the array, in order to do that we can use the function Reverse 1D Array (*Right Click > Functions Palette > Programming > Array > Reverse 1D Array*) and connect it to the Top 3 Indicator. Connect the Player Info Indicator to the output of the Bundle By Name Function.

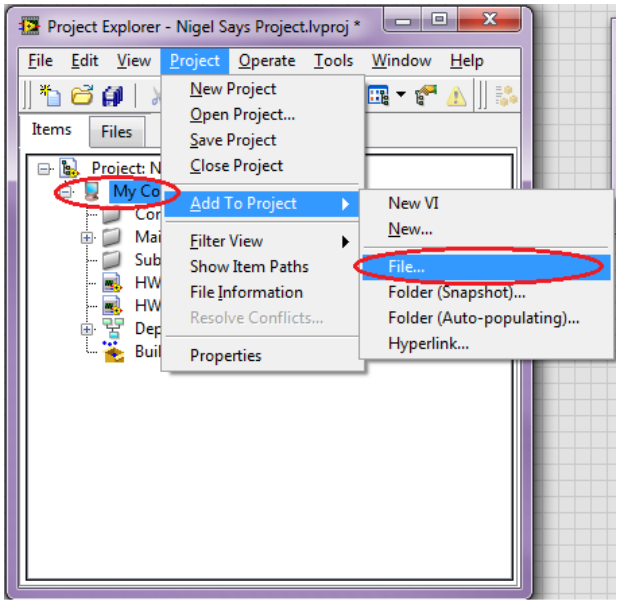


11. This VI will work by running it just once or by running it continuously. In order to reset the values of the Top 3 you can recompile the VI by closing it and opening it again. All the VI will do at this time is flash LEDs randomly while calculating the player's score based on the player's number of letters in his or her name while saving the top three highest scores. We will add more functionality to this later on in the project. Here is what your block diagram and front panel should look like:



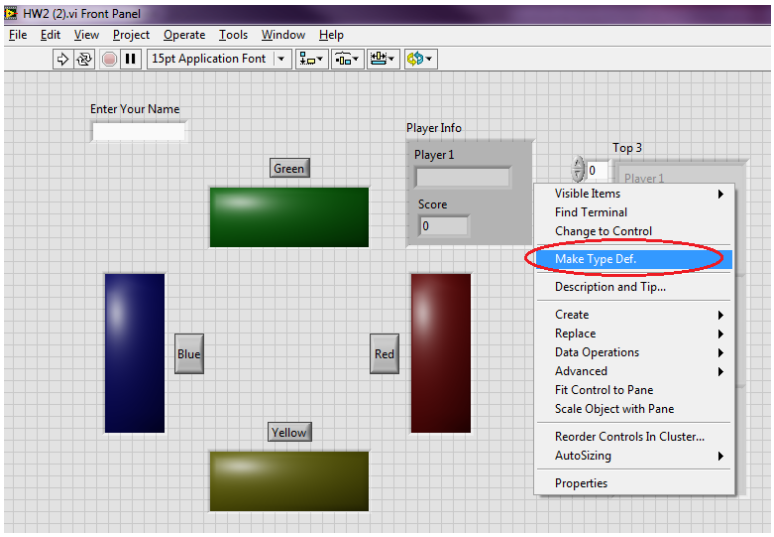


12. Place Section2.vi and BlackBox.vi in the project you previously created in the last sectiun by opening the project and then *Project > Add to Project > File* and then navigating to the directory of Section2.vi and BlackBox.vi. Make sure you have My Computer selected before trying to add the files because the options will change for the 'add to project' tab depending on what was originally selected.

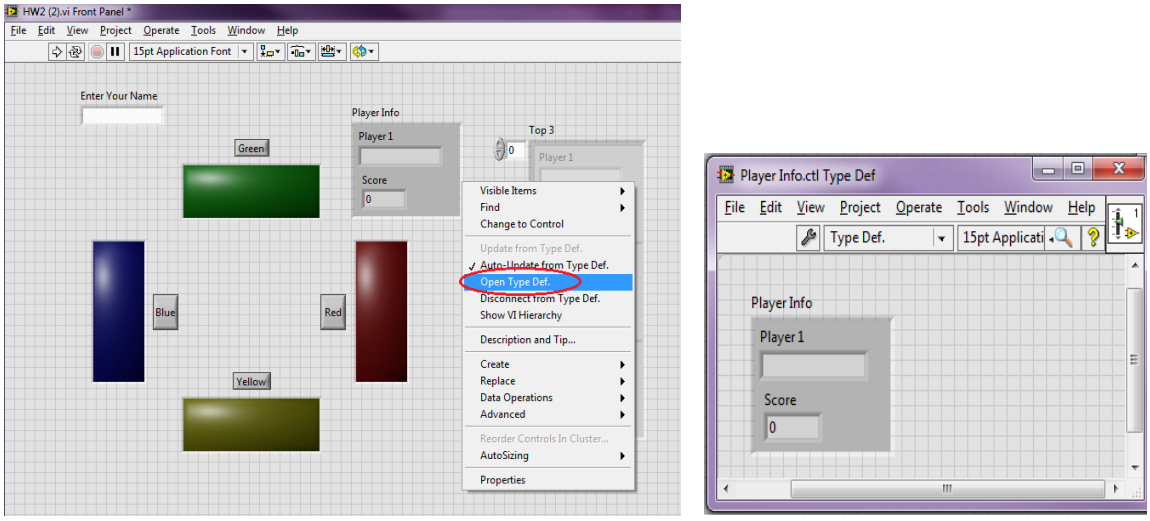


13. Place Section2.vi in the Main VI virtual folder and place BlackBox.vi in the SubVI virtual folder.

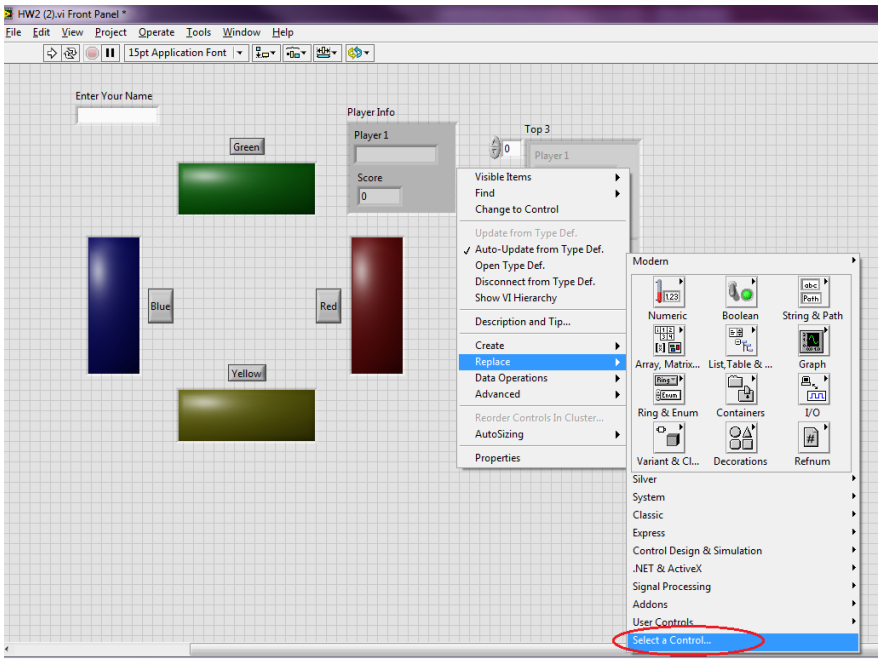
14. Now, we are going to make the Player Info cluster a control type def. Go back to your Section2.vi and right click on the outer edge of the Player Info cluster and select Make Type Def. as pictured below.



15. Right click on the Player Info cluster again and select Open Type Def. This will open up another window as pictured below. Save this as **"Player Info.ctl."** Following this, add this file to the project and move it into the Controls virtual folder. For reference on how to do this please look at step 13 and 14.

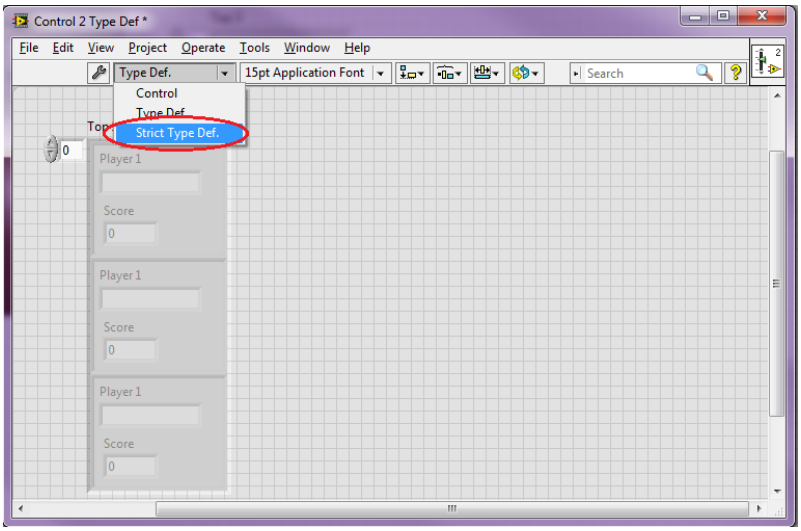


16. In the block diagram, replace any Player Info cluster with the Player Info cluster type def. You can easily do this by *Right Clicking on the Existing Player Info cluster > Replace > Select a Control.. > Navigate to Player Info.ctl*.



17. We will now make the Top 3 array into a strict type def. We will do this by following a similar set of steps like we did with the Player Info type def. Right click on the Top 3 Array and then select Make Type Def. Right click on the indicator once more after this and select Open Type Def. Replace the Player Info cluster inside the array with the type def control you just created (Player Info.ctl). For visuals on these steps please refer to steps 15 and 16. Once the type def window has popped up you then need to specify that we want the Top 3 array to be a Strict Type Def because we want to conserve the length shown. On the toolbar there should be a pull down

menu labeled Type Def. Pull down this menu and then select Strict Type Def. Please refer to the image below on how to make the Top 3 array into a strict type def.



18. Save this Strict Type Def as **"Top 3.ctl,"** add it to the project and then move it into the Controls virtual folder.

19. Next, replace the Top 3 array seen in the front panel of Section2.vi with the Strict Type Def previously created. Do this the same way you did in step 17.

20. Also replace the input cluster of the BlackBox.vi with the Player Info cluster type def and replace the cluster in the output the Player Info cluster type def.

21. (Optional) Create custom controls for each of the LEDs to make them look more like the LED shapes of the original Simon Says game

Useful image editing tool: Paint .NET http://www.getpaint.net/