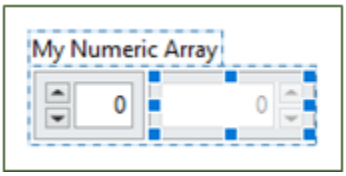
Exercise 8-1: Creating and Viewing an Array

Goal

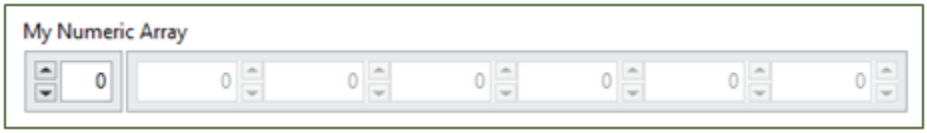
- Create and view a numeric array.

Instructions

1. Create a new project. Save the project as `Create Array.lvproj` in the `C:\Exercises\LabVIEW Core 1\Create Array` directory.
2. Create and open a new VI. Rename the VI as `Create Array.vi`.
3. Create an array of numeric controls.
   - Add an **Array** shell to the front panel. Rename it as My Numeric Array.
   - Add a numeric control inside the un-configured array.
4. Resize the array to show the 6 elements.
   - Select the **entire array control** so that a blue line outlines the array, as shown below.

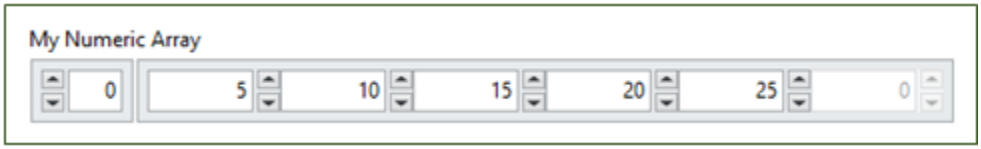


   - To resize the array horizontally, drag the dot on the far right until 6 elements appear on the front panel.



   Notice that the six elements appear greyed out. This is because these elements are uninitialized and contain no actual data.

5. Enter data into the array control. Enter `5, 10, 15, 20, 25` into the array, as shown below. Notice that in this example, the last element is still greyed out and uninitialized.

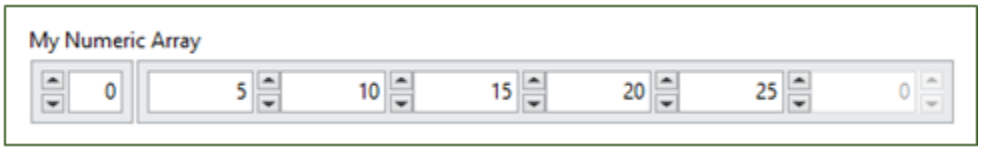


   Question 1 - Check your understanding of the array index.

   - What is the value of the array element at index 2? _____
   - What is the value of the array element at index 4? _____
   - What is the value of the array element at index 0? _____

   Remember, arrays are zero-indexed, which means the very first element of the array is at index 0.

6. Examine the array index display.



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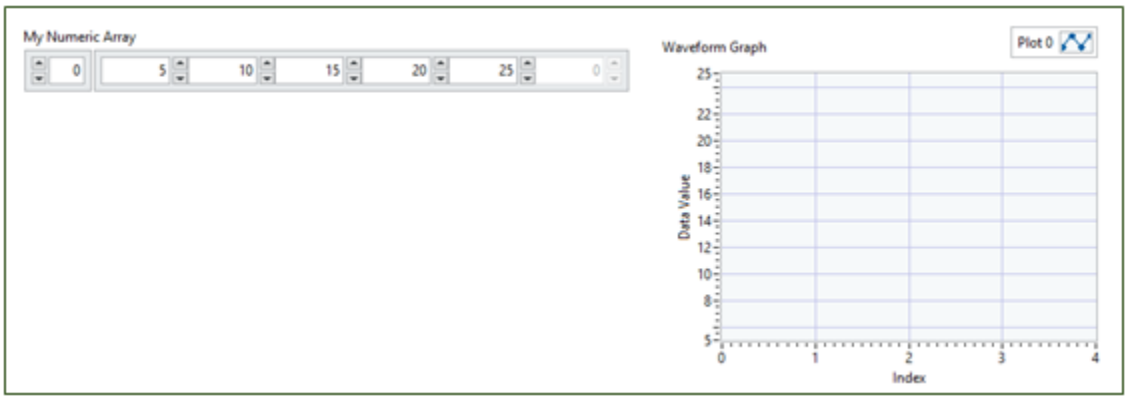
1. **Index Display** – Controls which array element is shown at the leftmost element. Use the increment and decrement buttons to change the value in the index display.

If you set the index display to 2, then the leftmost element in the array will show the element at index 2, and the element to its right will show the element at index 3.

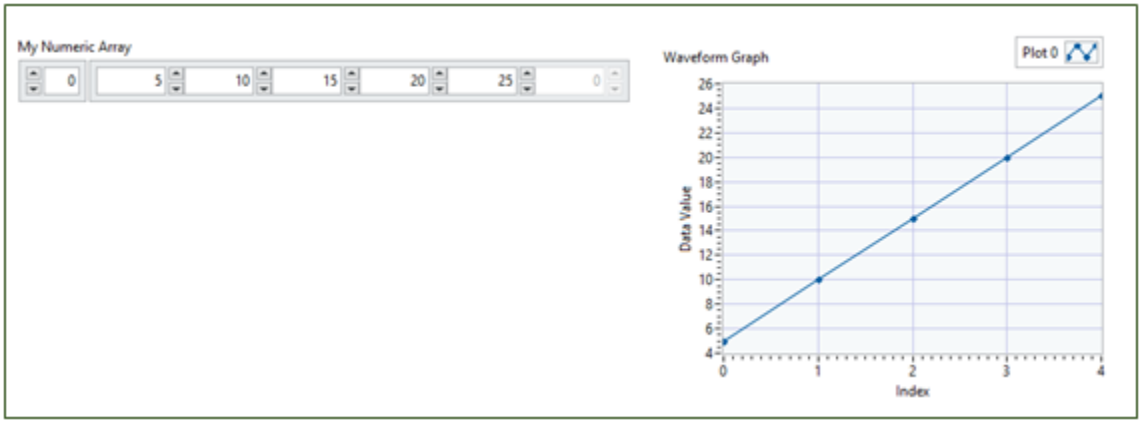
- Increase and decrease the index display to examine how it affects which elements are shown in the array control.

7. View how the array data appears on a graph indicator.
   - Place a waveform graph indicator on the front panel.

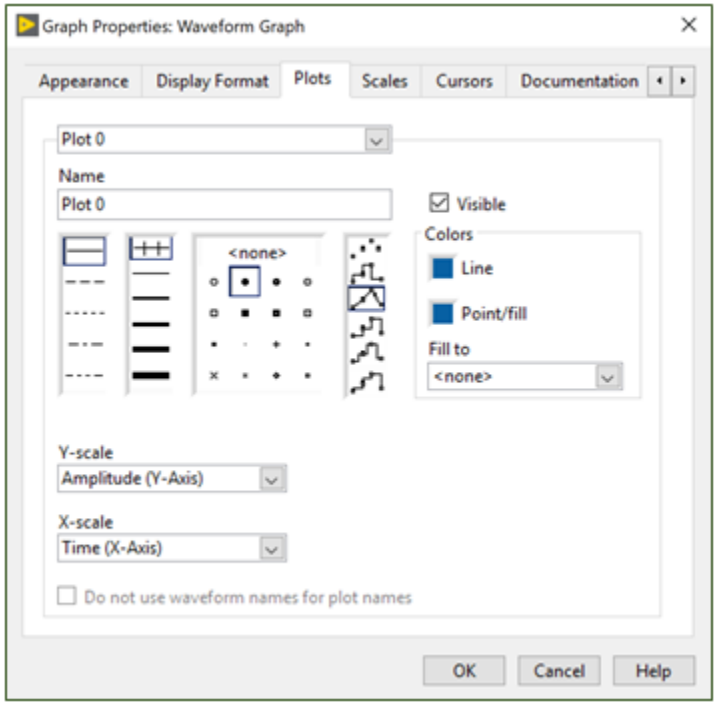


   - Create the block diagram, as shown in the following figure, to pass the array data to the graph.

   - Switch to the front panel and run the VI. Notice how the 1D array data is visualized in the waveform graph indicator.

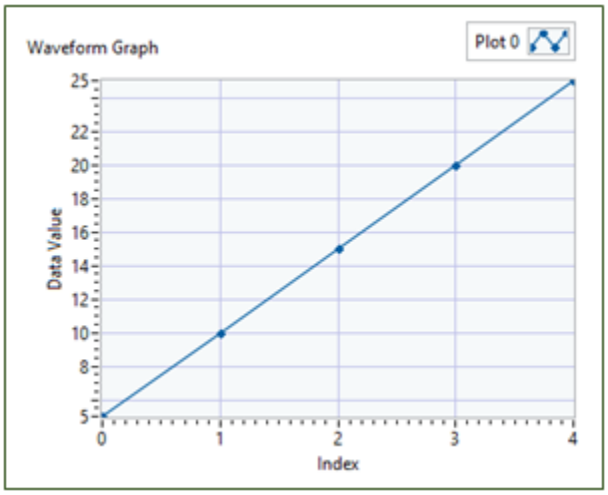


- Right-click the **waveform graph indicator** and select **Properties** to open the **Graph Properties** dialog box. In the **Plots** tab you can configure the visual representation of the plot. For now, configure plot as shown in the picture below for the indicator to display sequentially connected points, which represent the data values in the array control.



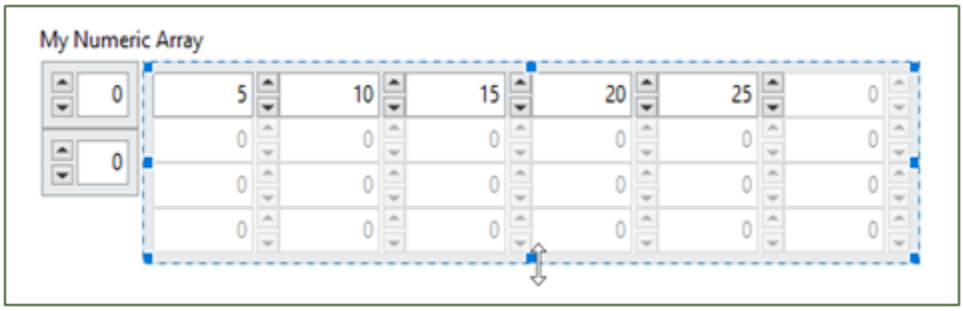
- On the y-axis of the waveform graph, double-click **Amplitude** and rename it as `Data Value`.
- On the x-axis of the waveform graph, double-click **Time** and rename it as `Index`.

Notice that the **My Numeric Array** control contains data values, but does not contain any timing information. Therefore, the x-axis only represents the array index number for each array data value. This is why you see points at x-axis values of 0, 1, 2, 3, and 4.

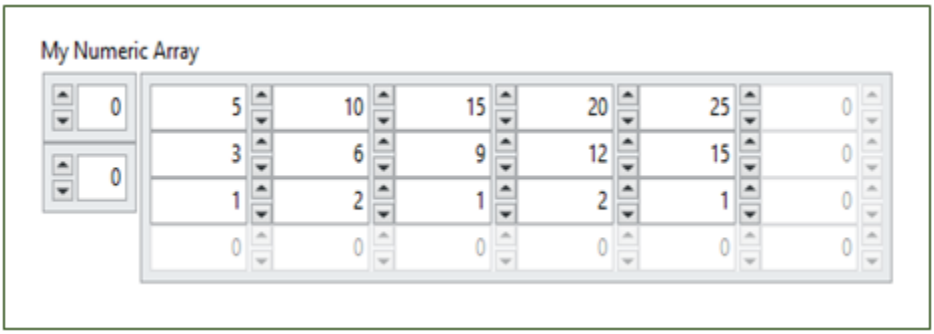


Creating a Two-Dimensional (2D) Array

1. Change the number of dimensions from 1 to 2
   - Right-click **index display** of My Numeric Array and select **Add Dimension**.
2. View two dimensions (rows and columns) of data.
   - Select the **entire array control** so that a blue line outlines the array.
   - Drag the middle-bottom dot downwards until 4 rows are displayed on the front panel.



3. Enter data into the 2D array, as shown in the following figure.

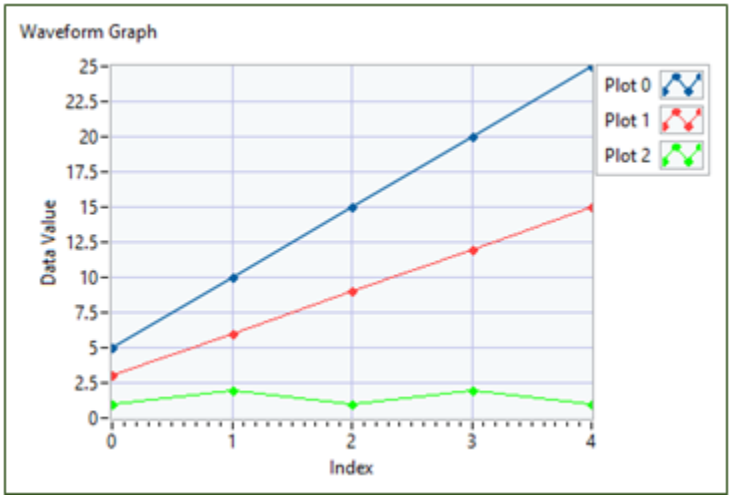


4. Examine the index display.
   - Notice that there are now two numeric controls in the index display.
   - The top numeric control refers to the row index. The bottom numeric control refers to the column index.
   - Increase and decrease the index display controls to examine how it affects which elements are shown in the array control.

   Question 2 - What is the row index and column index of the element containing 12?

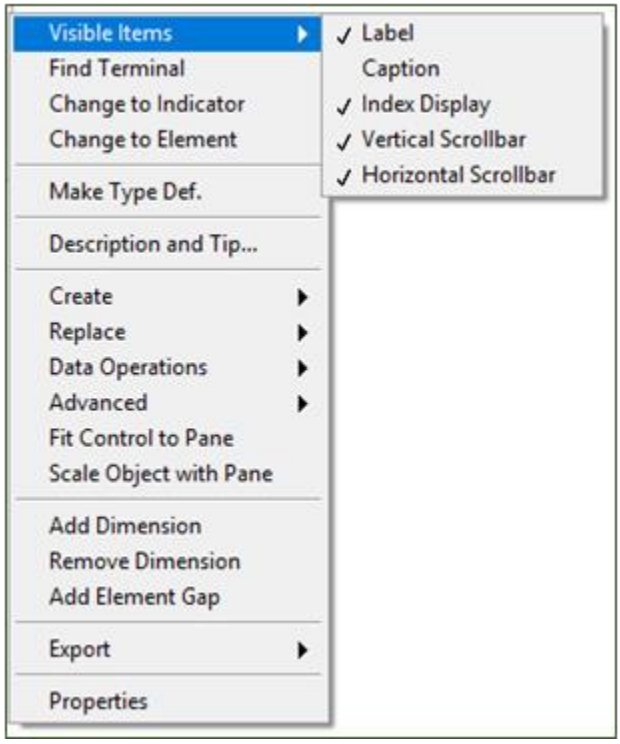
Row Index	
Column Index	

5. View how the 2D array data appears on a graph indicator.
    - Switch to the front panel and run the VI. Observe how the 2D array data are visualized in the waveform graph indicator.
    - Hover your cursor over the plot legend, and resize it to show three plots.
    - Right-click the **Waveform Graph** indicator and select **Properties**. Configure each plot as the first one in the **Plots** tab of the **Properties** dialog box. The Waveform Graph indicator now displays points that represent the data values in the array control. The lines connect the points sequentially.



Configure the Appearance of an Array Control

1. Right-click the body of **My Numeric Array** control.
2. In the **Visible Items** section of the drop-down menu, you can configure whether to show the label, caption, index display, horizontal scrollbar, and vertical scrollbar.



- Check and uncheck these items to observe their effect on the appearance of the **My Numeric Array** control.

Answers

Question 1 - Answers: 15, 25, 5

Question 2 - Answer: row index is 1; column index is 3

End of Exercise 8-1