LabVIEW Intro

**Pasco-Ray Programming Guide**

**Team RUSH 27 LabVIEW**

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**LabVIEW Intro**

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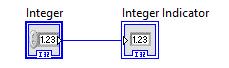
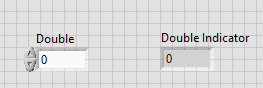
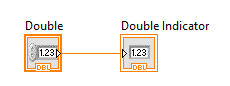
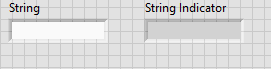
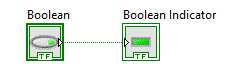
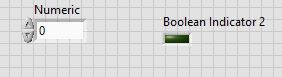
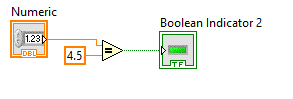
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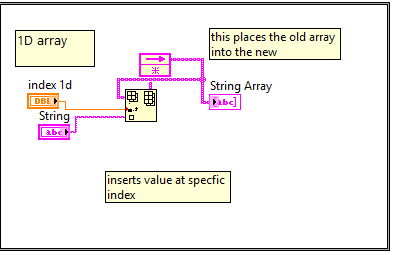
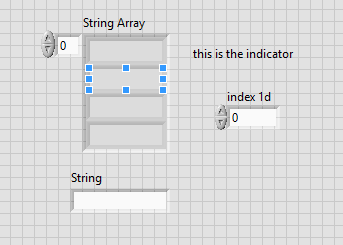
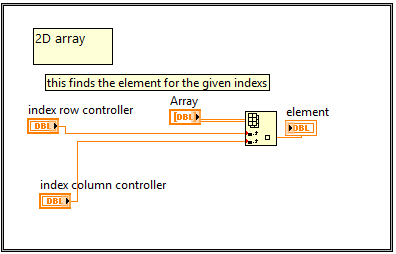
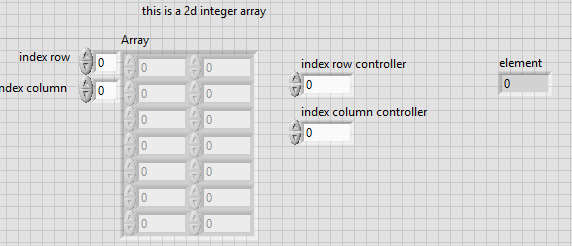
**Intro to Variables, Types, and Loops**

* **Data Types**
  + Data types are the main Variable types you will be using in LabVIEW. They are color coded and easy to see. They consist of
  + Integer
  + Numeric/Double
  + String
  + Boolean
  + Comparison Tablets
* **Loops**
  + Loops are specific amounts of code that you want to run for the specified amounts of times for certain parameters until something is completed. They Consist of
  + For Loops
  + While Loops
  + Case Structures
  + Timed Structures
  + Disabled Diagrams
  + Flat Sequenced

**Data Types**

* **Integers**
  + **Color Code: Blue**
  + Integers are any **whole** number from -∞ to +∞
  + Example
    - A counter used to count Number of Balls in Robot
* 
* **Numeric/Double**
  + **Color Code: Orange/Yellow**
  + Any number (can include Decimals) from -∞ to +∞
  + Example
    - Counting Encoder Rotations (has decimals to represent half turns
* 
* **String**
  + **Color Code: Pink**
  + Letters/Words
  + Example
    - Read the name of a text file that is place on the cRIO
* 
* **Booleans** 
  + **Color Code: Green**
  + True or False/ ON or OFF
    - When a button on a gamepad is hit it becomes True
* 
* **Comparison**
  + **Color Code: Green can be changed**
  + Used to compare two variables of the same data type
  + Example
    - Check to see if the encoder rotations are greater than
* 

**Arrays**

* **Index**
  + think of it as a coordinate point or as a cell in excel
  + **ALWAYS STARTS AT 0**
  + **1D array**
    - It will only have a single index (x coordinate)
  + 
  + 
  + **2D array**
    - It will have two (x coordinate and one for y coordinate)
  + 
  + 
* **Data**
  + **YOU CAN ONLY HAVE ONE DATA TYPE**
  + ex
    - You can have an array of only booleans, you **cannot** have an array of booleans and strings
* **Example**
  + We use arrays for auton storing motor values, direction and case selector values (see page 6) as integers and index 0 be case selector, 1 heading, 2 power, ect...
  + here is an array called string\_array
    - string\_array(0)= “hello”
    - string\_array(1)= “bye”
    - string\_array(2) = “robots”
  + So if we send an index value of 1 it will send back “bye”

**Loops**

* **For Loops**
  + A loop that runs for a set amount of times
  + **NOTE:** The number of times includes 0 so if you set it for 4 it will repeat 5 times for 0,1,2,3,4.
  + **Example**
    - I want the counter to update x times
* **While**
  + A loop that repeats until a set condition is met
  + **NOTE:** The loop must be able to repeat
  + **Example**
    - I want to drive the motors while my distance is less than 3ft.
* **Case Structure**
  + A loop that can do different things depending on what is inputted into the case
  + Any variable can be put into it (see page 3 “Data Types”)
  + **Example**
    - If Boolean is true I want my counter to add 1 but if it is false subtract 1.
* **Timed Structures**
  + A loop that iterates every x amount of time
  + **Example**
    - I want to add 1 to the time every 1000ms
* **Disable Diagram** 
  + Used for disabling code
  + **Example**
    - Disabling code that is not complete to test other parts
* **Flat Sequence**
  + Chooses what will run from left to right
  + **Example**
    - I want to turn *then* I will drive *then* I will shoot

