## SOLUTIONS MANUAL



# Solutions Manual LabVIEW for Engineers

R. W. Larsen

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## **1** Introduction

There are no Problems in Chapter 1.

### 2 LabVIEW Basics

 Use LabVIEW's Square and Square Root functions to create a VI (similar to the VI shown in Error! Reference source not found.) that will accept a value, compute the square of the value and the square root of the value, and display the results. What happens when X = 0 and X < 0?</li>

#### **SOLUTION**

Front Panel



**Block Diagram** 



Answers to question: What happens when X = 0 and X < 0?



 Use LabVIEW's Natural Log and Base-10Log functions to create a VI (similar to the VI shown in Error! Reference source not found.) that will accept a value, compute the logarithms, and display the results. What happens when X = 0 and X < 0?</li>

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#### **Block Diagram**



Answers to question: What happens when X = 0 and X < 0?



- 3. Create a VI that has four numeric controls and displays the sum of the four values.
  - a. Use several Add functions to compute the sum.
  - b. Use LabVIEW's Compound Arithmetic function to compute the sum.

#### **SOLUTION**

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4. Write a quadratic equation solver that will accept values for A, B, and C, defined by

$$Ax^2 + Bx + C = 0$$

and then compute both quadratic solutions (one solution using the plus symbol, the other using the minus symbol in the following equation.)

$$x = \frac{-B \pm \sqrt{B^2 - 4AC}}{2A}$$

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A 1	Plus Root
B	4
<del>)</del> -7 С	Minus Root
<u>*</u> ]12	,

Figure 2.1. Solving quadratic equations

Test your VI with the coefficients shown in Figure 2.1. When it is working, solve the following quadratic equations:

- a.  $2x^2 2x 4 = 0$
- b.  $x^2 1.7x 4.8 = 0$
- c. When  $4AC > B^2$ , there is a negative number inside the square root operator. This is the case for equations such as

 $2 + x + 2x^2 = 0$ 

What does LabVIEW show as the solutions to this equation?

#### **SOLUTION**

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- 5. LabVIEW provides a function that converts a Boolean (True, False) value into a 1 or 0. Create a VI and use it to determine the decimal value equivalent to the following binary numbers:
  - a. 001 (C is off, B is off, A is on)
  - b. 010
  - c. 101

#### **SOLUTION**

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b. Modify your VI to handle four-bit binary numbers by adding another switch.

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