# Certified LabVIEW Associate Developer Sample Exam 2

## Test Booklet

**Note: The use of the computer or any reference materials is NOT allowed during the exam.**

**Instructions:**

- **Please do not detach the binding staple of any section. If any part of the exam paper is missing or detached when returned to National Instruments, you will be deemed to have failed the exam.**
- Please follow the instructions on the Answer Sheet. If you fill in your Candidate ID incorrectly, **your test will be invalidated**.
- Indicate **ALL** answers on the Answer Sheet. Answers recorded in this test booklet will **NOT** be evaluated.
- Please do not ask the proctor for help answering questions.
- This examination may not be taken from the examination area or reproduced in any way. You may not keep any portion of this exam after you have completed it.

**Exam Details:**

- Time allocated: 1 hour
- Type of exam items: Multiple choice
- Number of exam items: 40 questions
- Passing Grade: 70%

**IMPORTANT: When you have completed this exam, place it in the provided envelope with you answer sheet and SEAL the envelope. Give the sealed envelope to your proctor.**

**Answer Sheet:**

To quickly check your answers against the solutions in the Solutions Section, record your answers on this Answers Sheet. Detach this page and record your answers as you go along. This page is not included in the actual CLAD exam; it is included here for practice purposes only. The Solutions Section is at the end of the Sample Exam.

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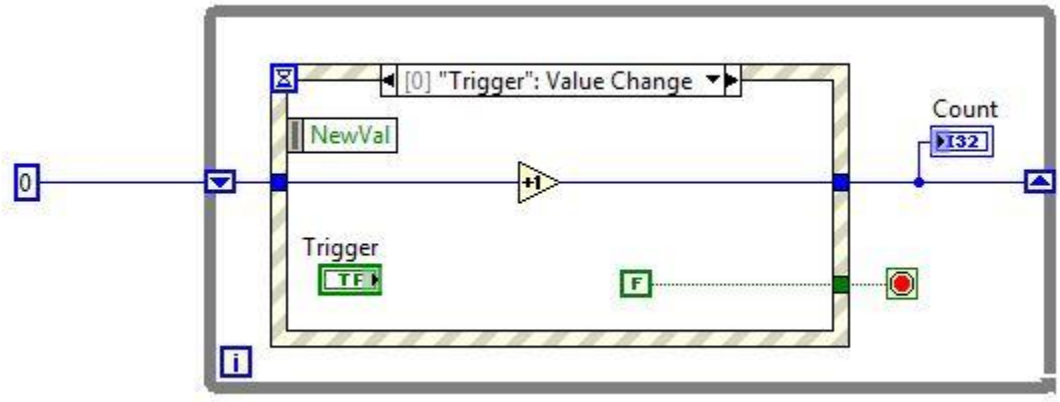
**Q1:** Which of the following user interface events will allow your code to respond before LabVIEW performs the default action associated with that event?

**A** Mouse Down
**B** Panel Resize
**C** Panel Close?
**D** Value Change

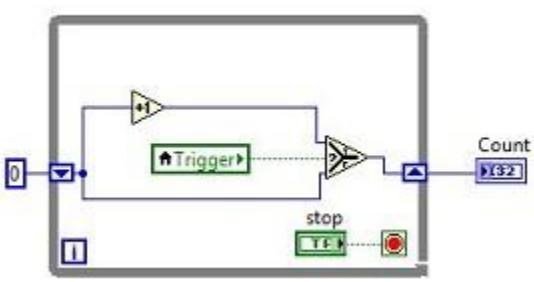
**Q2:** The **Trigger** control is configured with a switching mechanical action. The VI's requirement is to display a **Count** value that tracks the number of "value change" events, for changes to TRUE, that occur for the **Trigger**.

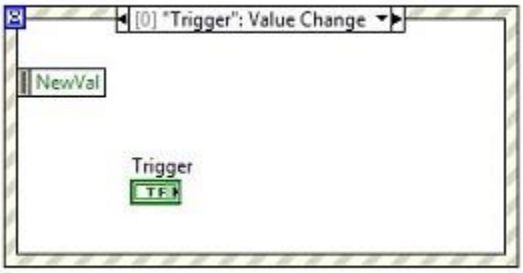
Which of the code snippets meets that requirement when the VI is run?

**A**

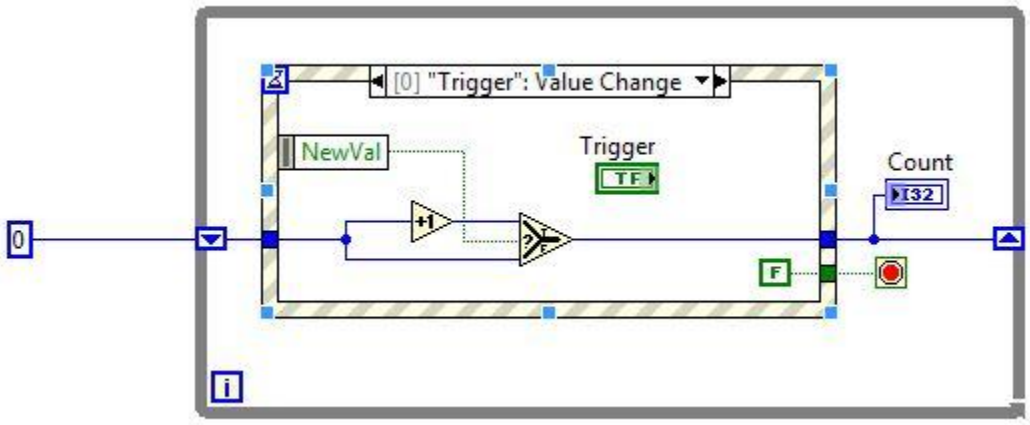



**B**

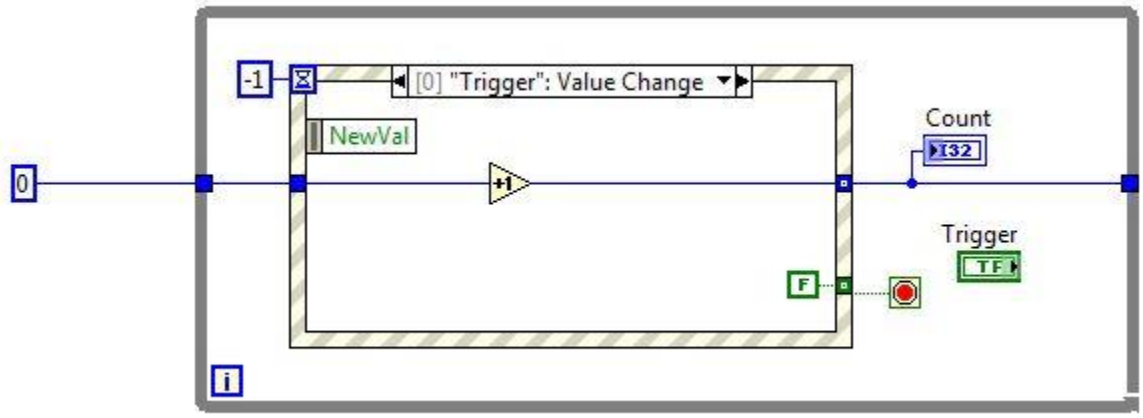


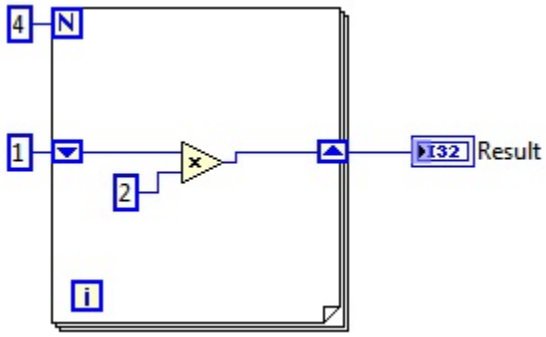
**C**




**D**




**Q3:** What is the value in the **Result** indicator after the VI completes execution?




**A** 16
**B** 24
**C** 32
**D** 10

**Q4:** Which of the following terminals cannot control how many times a For loop executes?

**A**

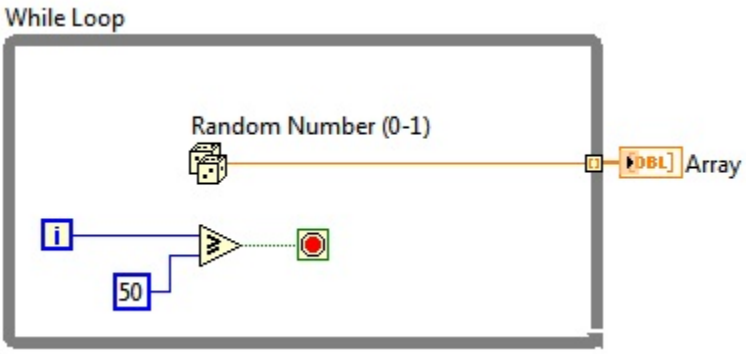
**B**

**C**

**D**

**Q5:** Which of the following statements is TRUE regarding the execution of the following code?

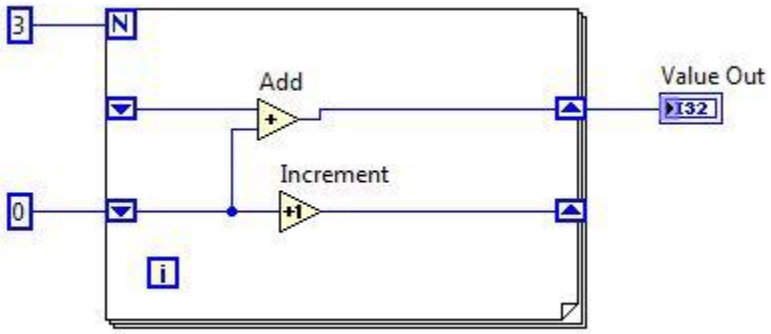
The loop will iterate:




**A** 51 times
**B** 50 times
**C** 49 times
**D** a random number of times

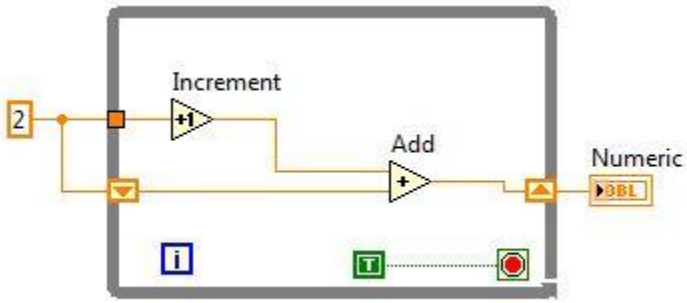
**Q6:** The VI is open and run twice without being closed or modified.

What value is displayed in the **Value Out** indicator after the second execution of the VI?



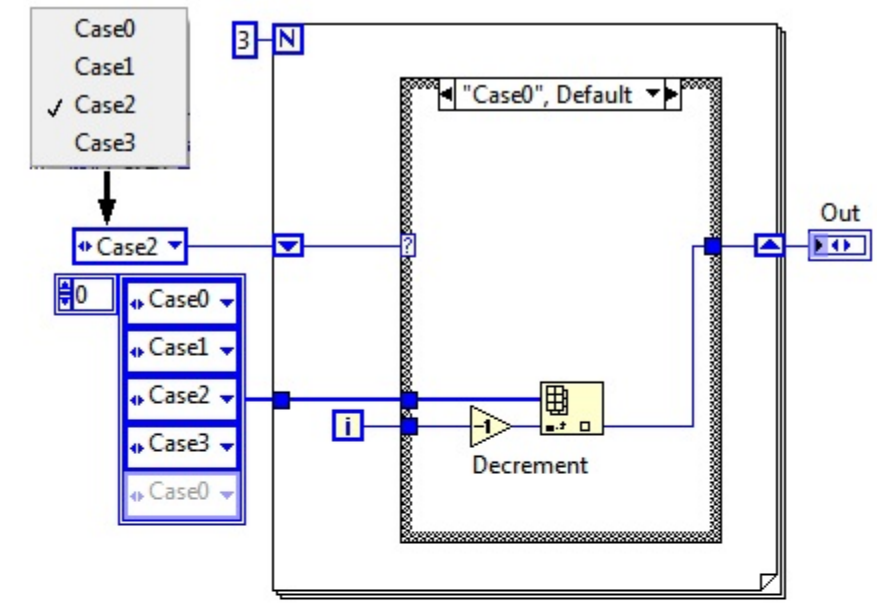

**A** 3
**B** 4
**C** 5
**D** 6

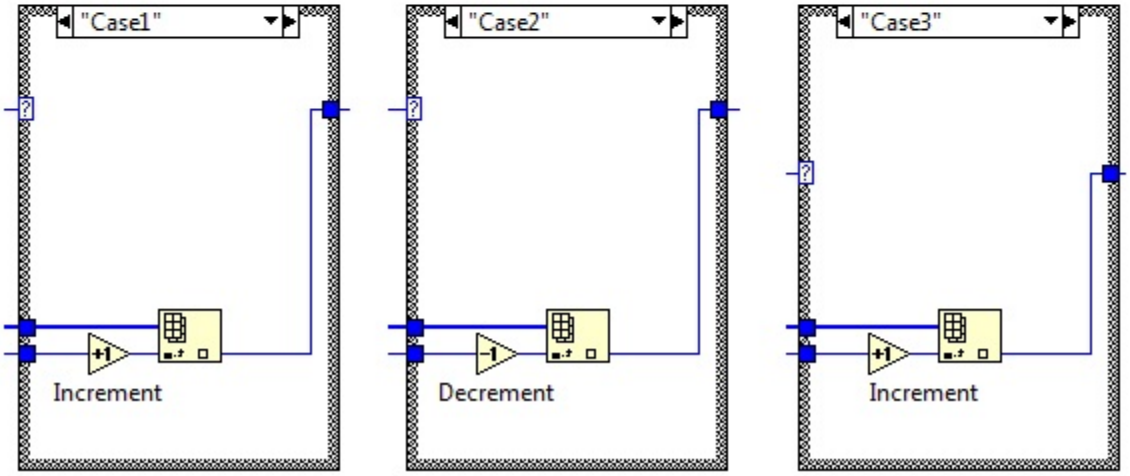
**Q7:** What value is displayed in the **Numeric** indicator after the VI executes?




**A** 0
**B** 4
**C** 5
**D** The While Loop iterates indefinitely

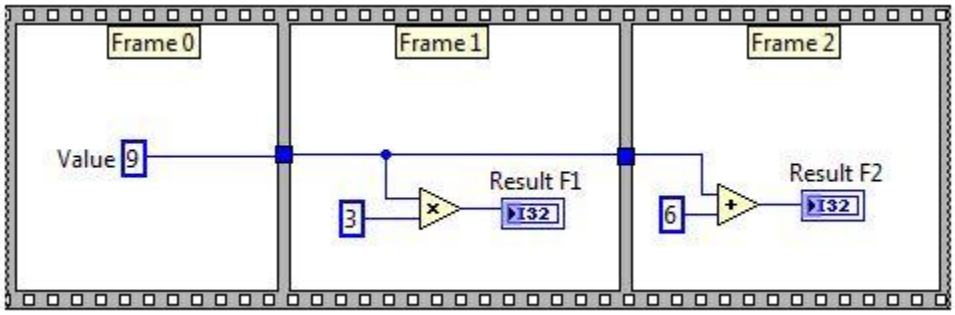
**Q8:** What value will be displayed in the Out indicator when this VI completes execution?



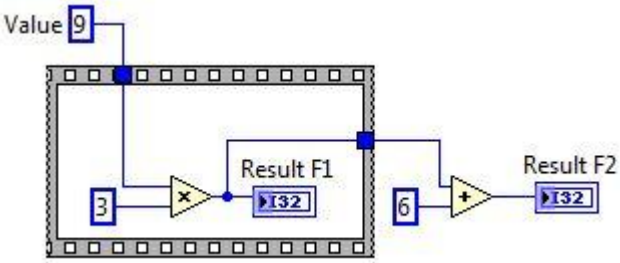

**A** Case0
**B** Case1
**C** Case2
**D** Case3

**Q9:** Which code snippet is functionally equivalent to this sequence structure?

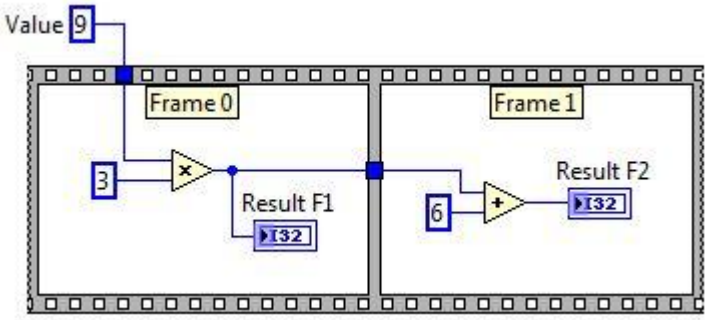




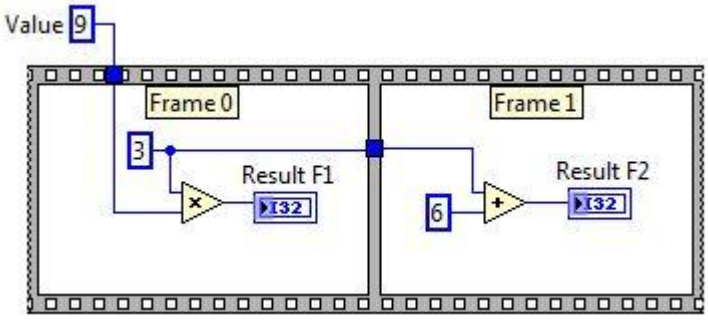
**A**




**B**




**C**



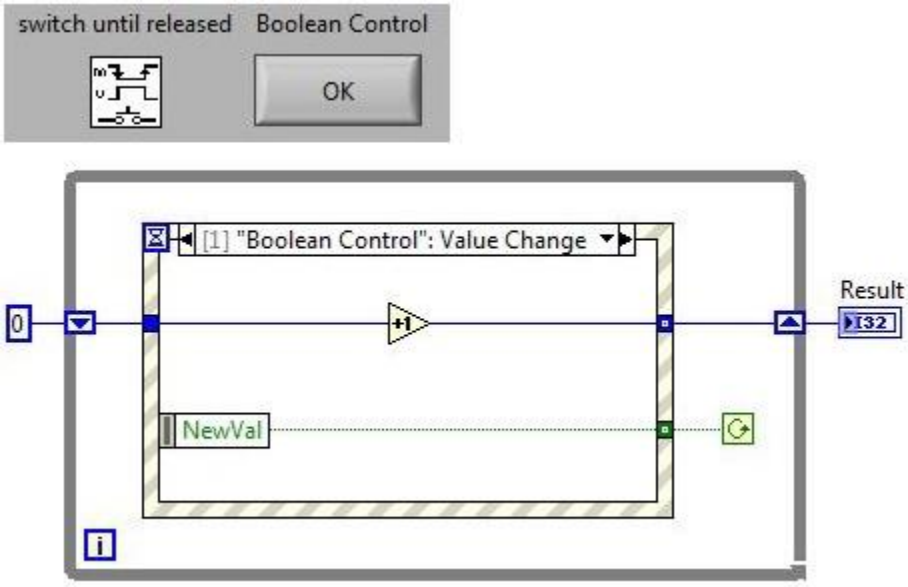

**D**

**Q10:** The Wait function can be added to While Loops:

**A** To free up available memory
**B** To allocate memory used by the CPU
**C** To allow the processor time to complete other tasks
**D** To reserve which processor the code is running on

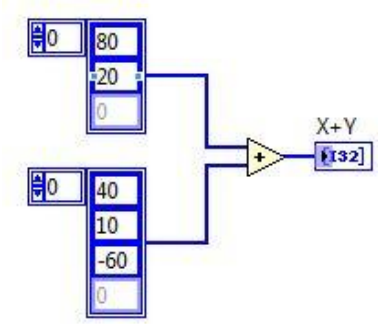
**Q11:** While the VI executes, the user presses and then releases **Boolean Control** with Switch Until Released mechanical action. The starting value of **Boolean Control** is FALSE,

What value is displayed in the **Result** indicator after execution?

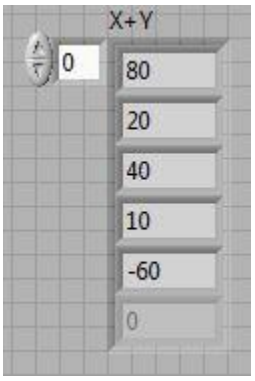



**A** 0
**B** 1
**C** 2
**D** 3

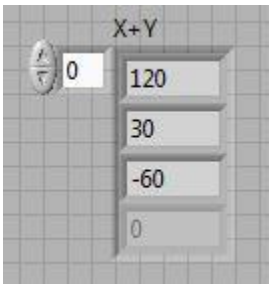
**Q12:** What value is displayed in the X+Y indicator after the code completes execution?



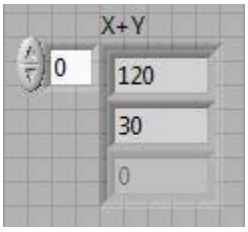

**A**



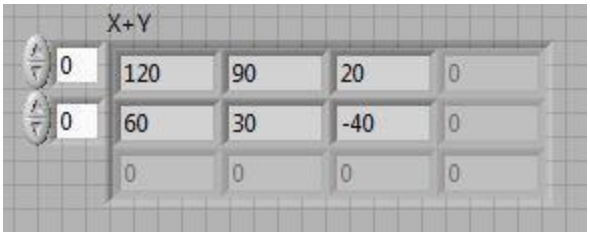

**B**



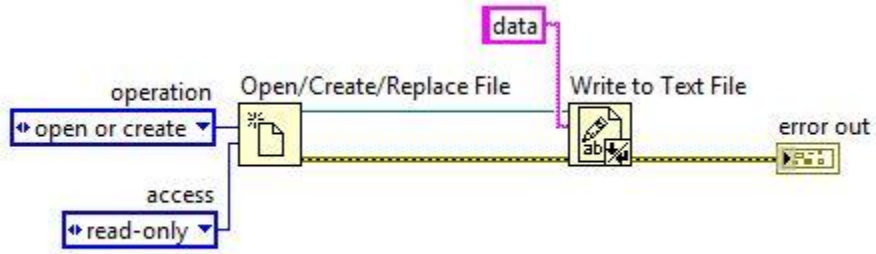

**C**




**D**

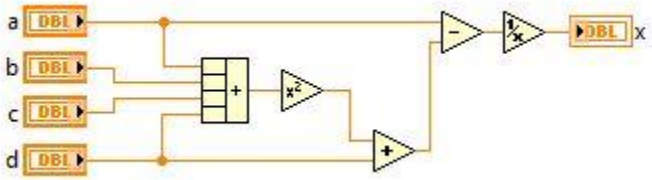


**Q13:** Why does an error occur when the code executes?




**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

**Q14:** Which equation is equivalent to the code?




**A**

$$x = \frac{1}{((a+b+c+d)^2+d)-a}$$

**B**

$$x = \frac{1}{d-(a+b+c+d)^2+a}$$

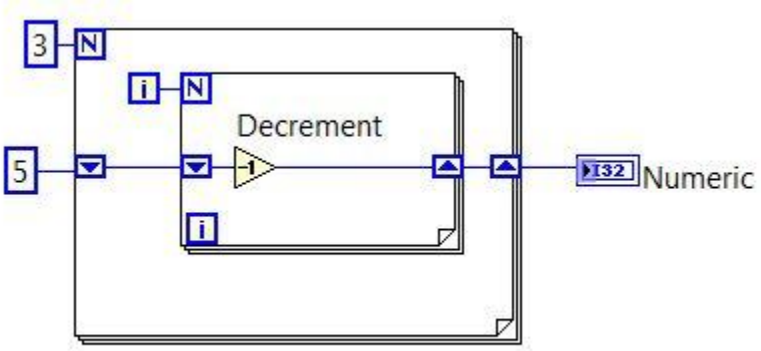
**C**

$$x = \frac{1}{a-((a+b+c+d)^2+d)}$$

**D**

$$x = \frac{1}{a-((a^2+b^2+c^2+d^2)+d)}$$

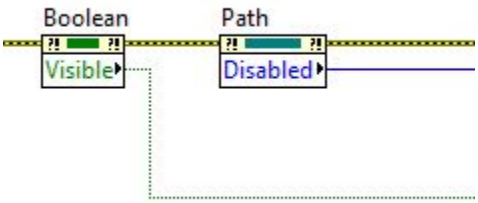
**Q15:** What value will be displayed in the **Numeric** indicator when the VI completes execution?




**A** 0
**B** 1
**C** 2
**D** 4

**Q16:** You are creating a SubVI by selecting a portion of code from an existing VI. The selection contains an implicitly linked property node and an implicitly linked invoke node for two different front panel controls.

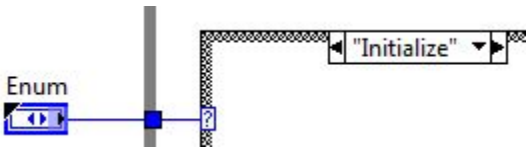
What new items are placed on the block diagram of the existing VI when the SubVI is created?



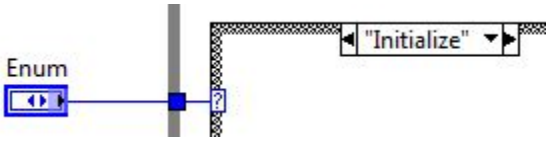

**A** Local variables are added for property and invoke nodes
**B** Global variables are added for the property and invoke nodes
**C** Control references are added for the property and invoke nodes
**D** Control Terminals are added for the property and invoke nodes

**Q17:** What is the best choice for the case selector input for a Functional Global Variable design pattern?

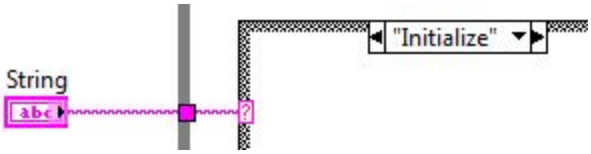
**A**



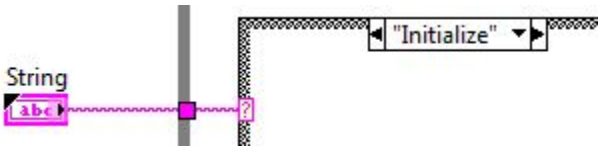

**B**




**C**



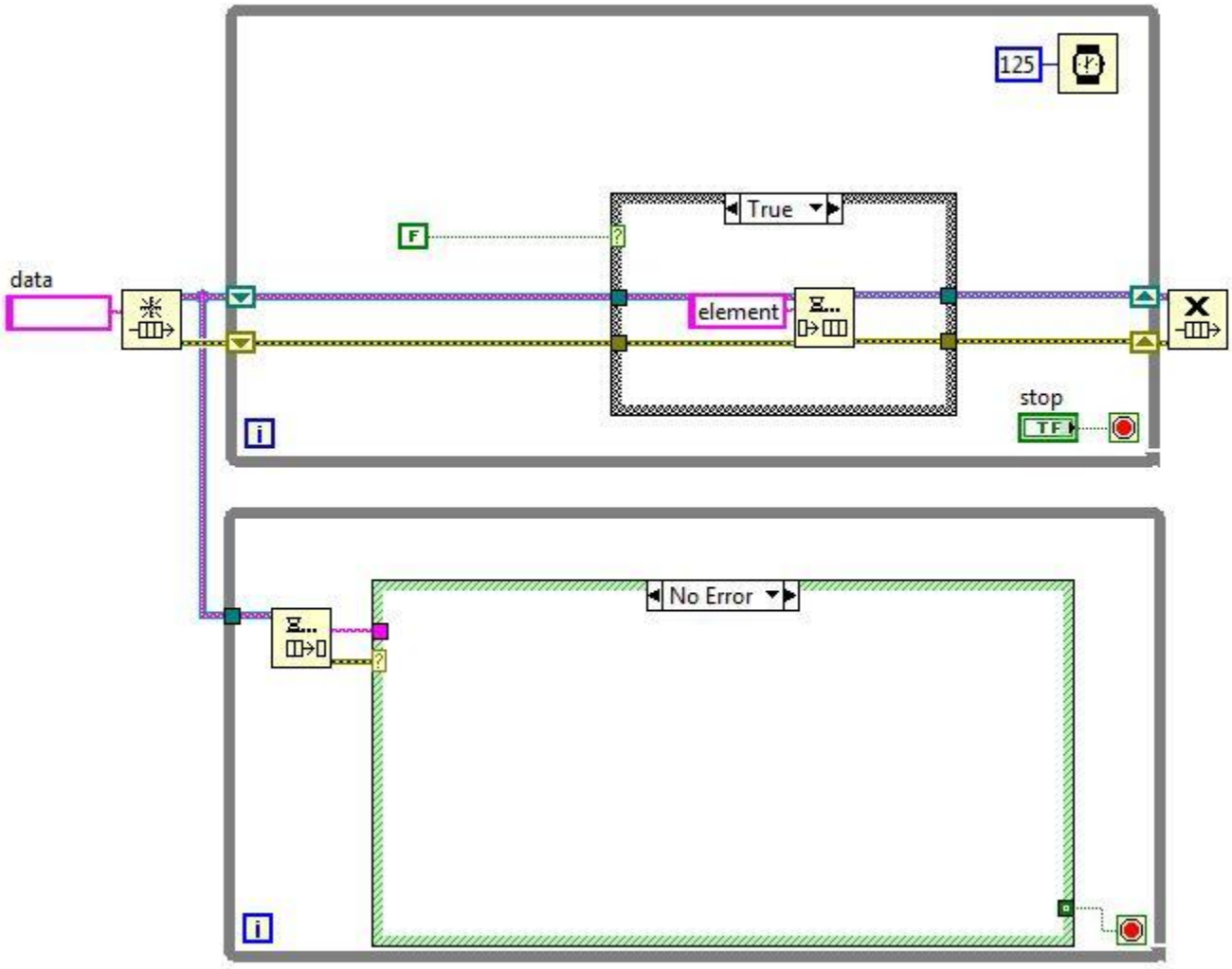

**D**




**Q18:** Which component is not required for a state machine?

**A** Case Structure
**B** While Loop
**C** Enum
**D** Shift Register

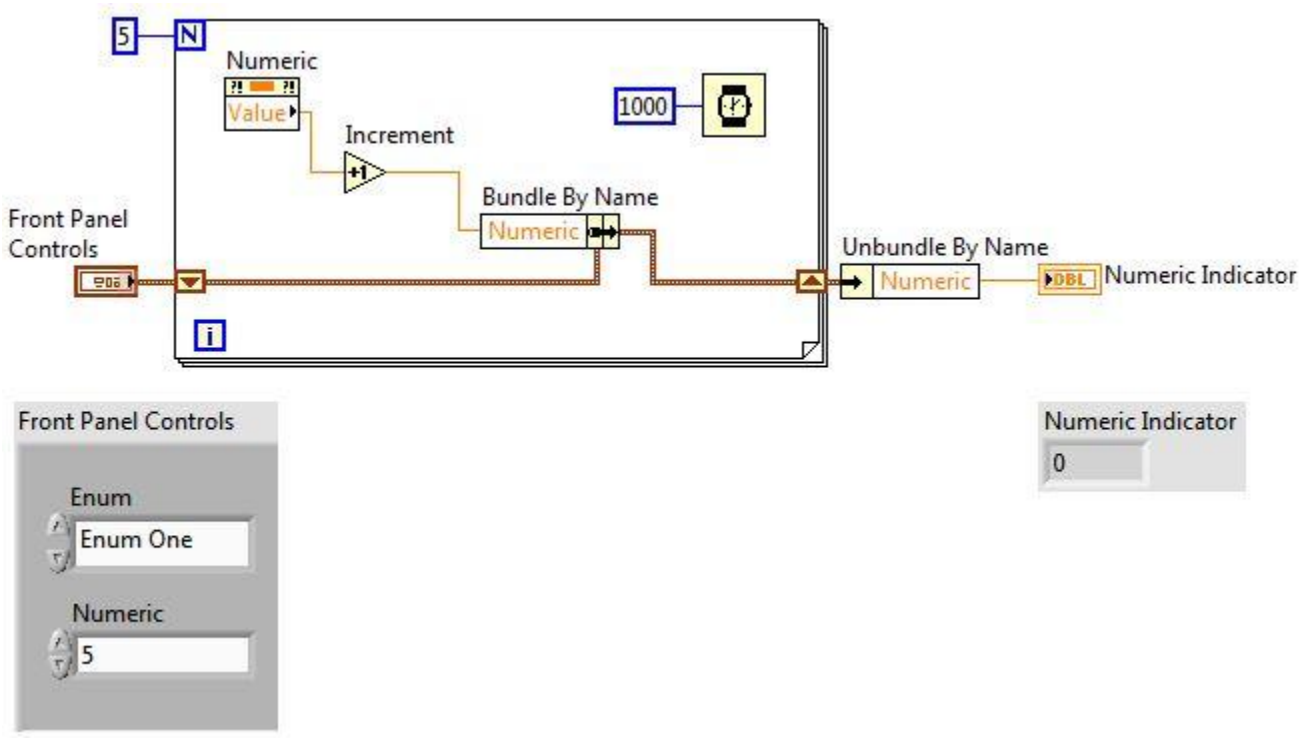
**Q19:** What is the name of this common design pattern?




**A** State Machine
**B** Producer Consumer (data)
**C** Producer Consumer (events)
**D** Queued Message Handler

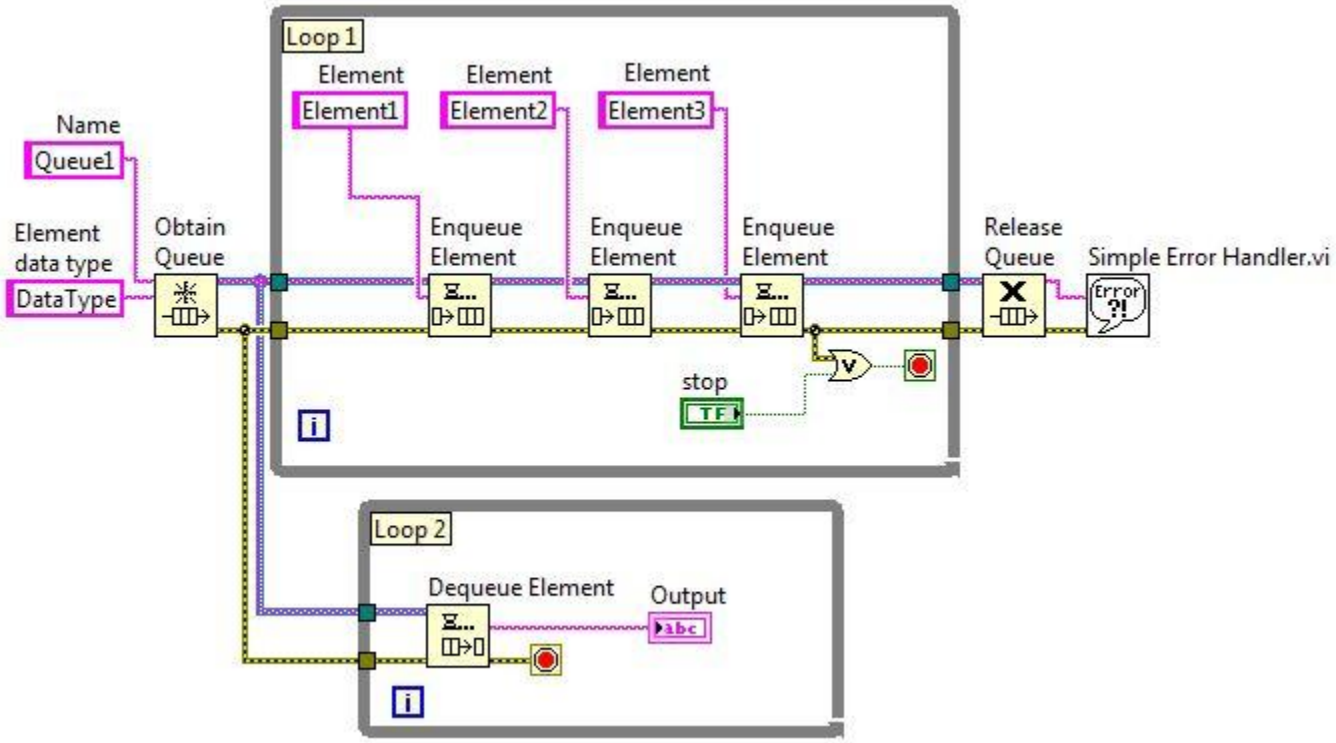
**Q20:** The VI begins execution with the value of **Numeric** as 1. At the end of the 3th loop iteration (i=2), the user changes the front panel control **Numeric** to value 4.

What will be the final value of the front panel **Numeric Indicator** after the VI completes execution?



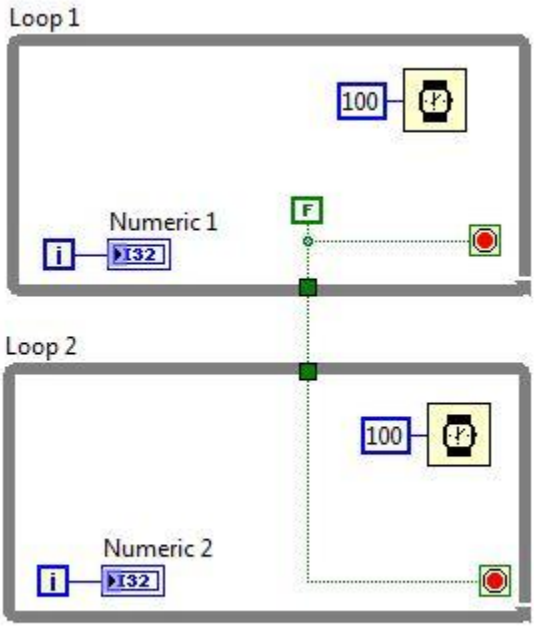

**A** 2
**B** 4
**C** 5
**D** 6

**Q21:** What value is displayed in the **Output** indicator when the fifth iteration (i=4) of Loop 2 completes?



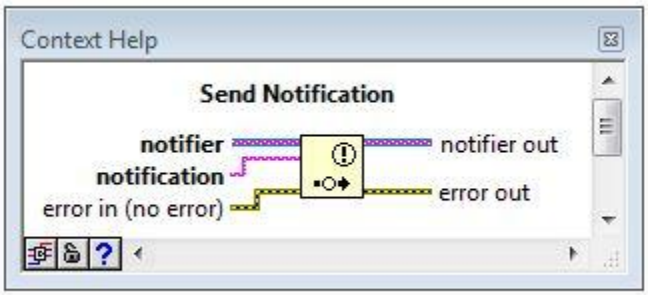

**A** Element1
**B** Element2
**C** Element3
**D** Element1Element2Element3

**Q22:** What is the behavior when the code executes?




**A** Loop 1 and Loop 2 run simultaneously
**B** Both loops run one time and stop
**C** Loop 2 runs after Loop 1 stops
**D** Loop 1 runs forever and Loop 2 never runs

**Q23:** What does this function do?


**A** Buffers multiple notifications to be read by a Wait on Notification function
**B** Sends a notification to be read by Wait on Notification functions
**C** Enqueues notifications in the Notifier Queue
**D** Sends a pause execution notification to a Wait on Notification function

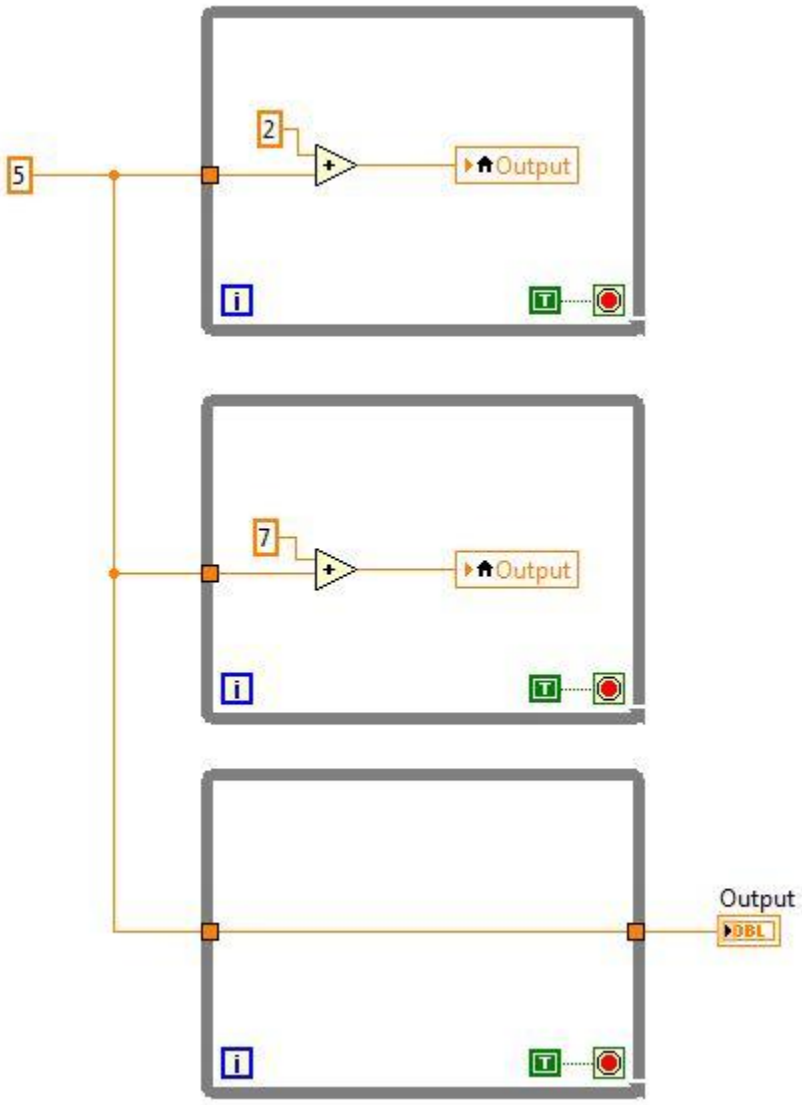
**Q24:** What is the purpose of these block diagram toolbar buttons?

**A** To display the data flowing through wires as the VI runs
**B** To step through the block diagram when execution is paused
**C** To start or skip SubVIs
**D** To run the VI in continuous or single run mode.

**Q25:** When using single step debugging with a SubVI which of the following is not possible?

**A** Step Into (  ) while the execution flow is paused on the SubVI icon
**B** Step Out (  ) while the execution flow is paused on a node inside the block diagram of the SubVI.
**C** Finish VI (  ) while the execution flow is paused on the block diagram of the SubVI
**D** Finish Block Diagram (  ) while the execution flow is paused on a node inside the SubVI

**Q26:** What value will be displayed in the **Output** indicator when the VI completes execution?

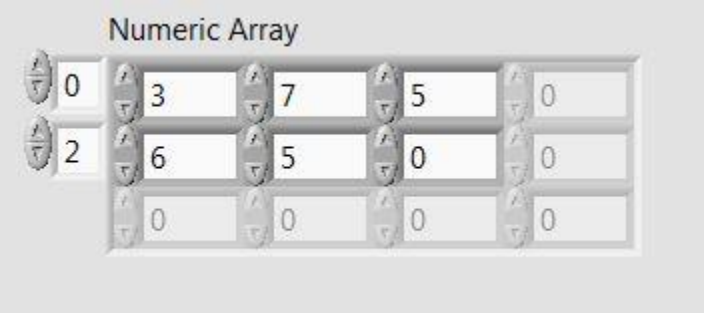



**A** 5
**B** 7
**C** 12
**D** Indeterminant

**Q27:** Which Mechanical Action changes a Boolean when the button is pressed and returns it to its default value after LabVIEW reads the value?

**A** Latch when pressed
**B** Switch when released
**C** Switch until released
**D** Latch when released

**Q28:** Which of the following statements is TRUE about **Numeric Array**?




**A** It is an indicator
**B** It contains exactly 10 elements
**C** It contains exactly 12 elements
**D** It contains exactly 8 elements

**Q29:** Which of the following statements is true?

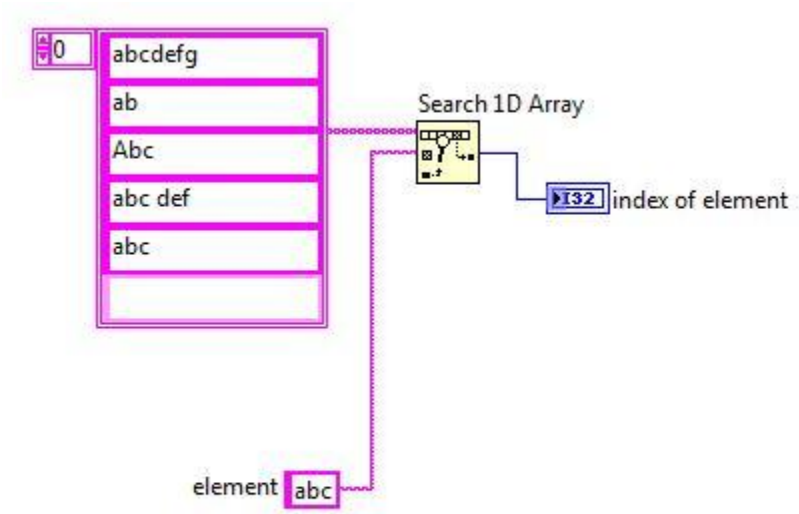

**A** The output of the divide function will be a U64
**B** The output of the divide function will be a U32
**C** The output of the divide function will be a SGL
**D** A VI containing this diagram will have a broken run arrow

**Q30:** What are the datatype and value at the output terminal of the Round Toward +Infinity function after the VI completes execution?


**A** I32 with value -4
**B** I32 with value -3
**C** DBL with value -4
**D** DBL with value -3

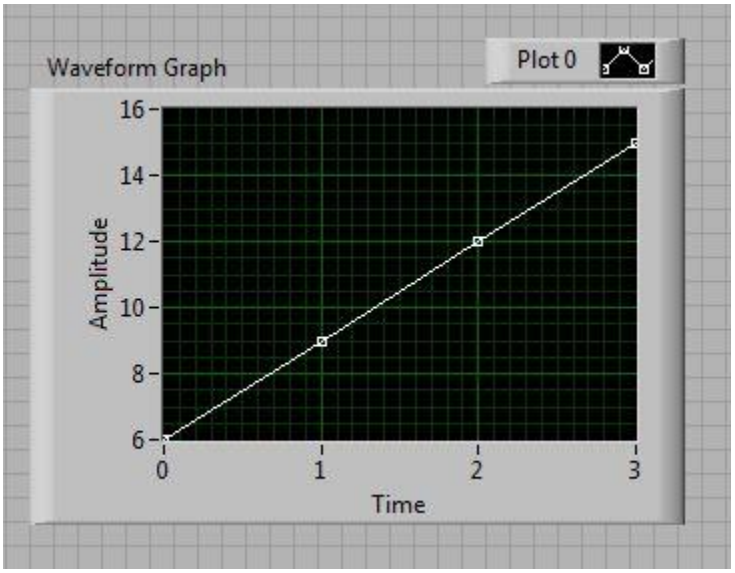
**Q31:** The "start index (0)" input terminal of Search 1D Array is unwired.

What value is displayed in the **index of element** indicator after this code runs?

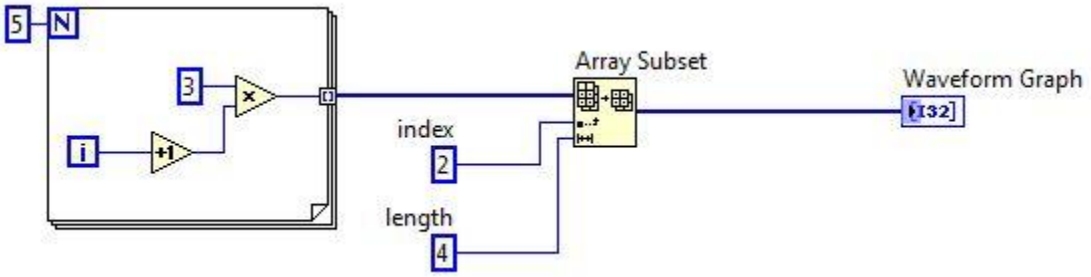



**A** 0
**B** 2
**C** 3
**D** 4

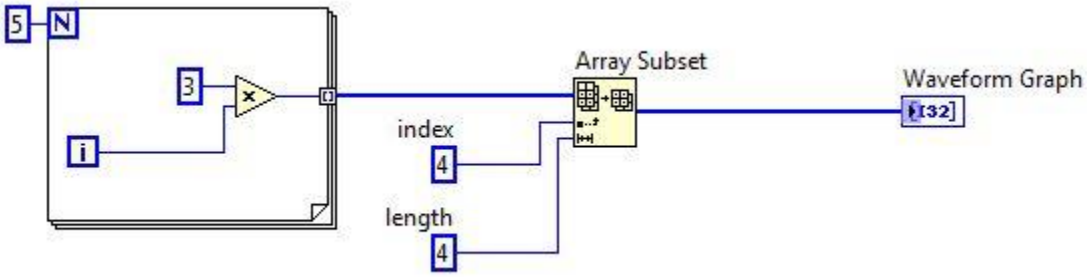
**Q32:** Which block diagram produces the result in the **Waveform Graph**?



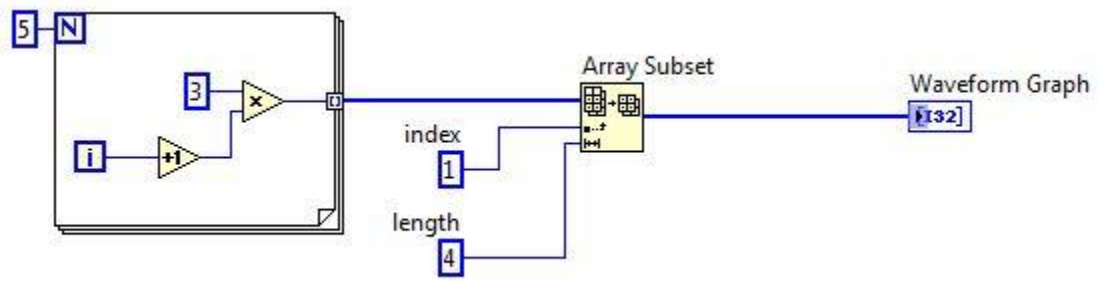

**A**



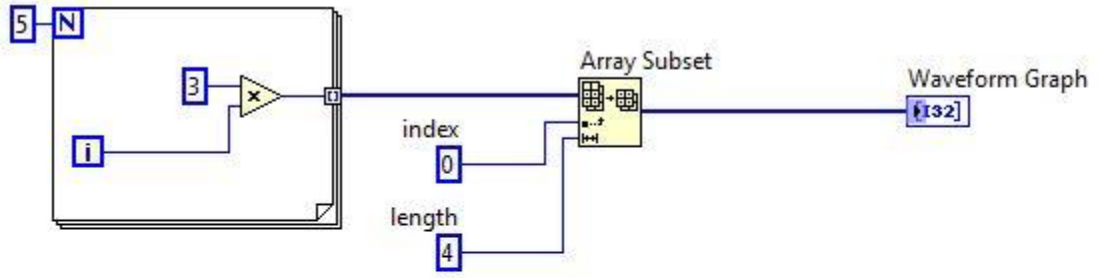

**B**



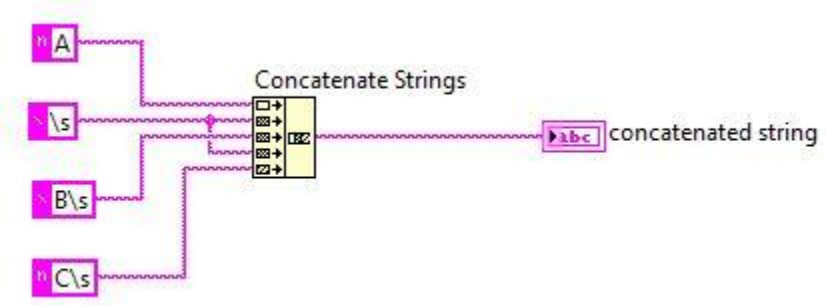
**C**


5
N
3
×
i
+1
Array Subset
index
1
length
4
Waveform Graph
I32

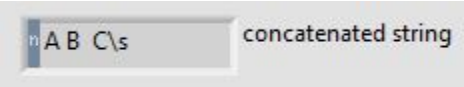
**D**


5
N
3
×
i
Array Subset
index
0
length
4
Waveform Graph
I32

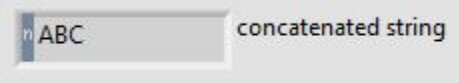
**Q33:** What will be the value of the **concatenated string** indicator after the VI completes execution?




**A**




**B**

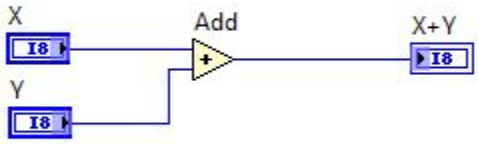



**C**


**D**

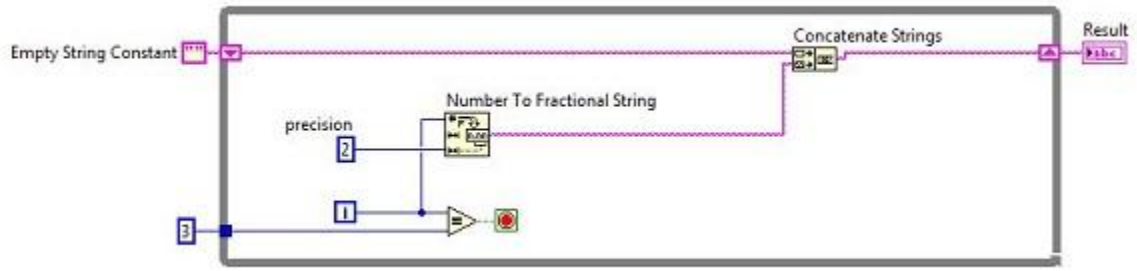

**Q34:** The VI begins execution with the values of **X** = 127 and **Y** = 1.

What value will be displayed in the **X**+**Y** indicator after the VI completes execution?




**A** 0
**B** 128
**C** -128
**D** -127

**Q35:** What string is displayed in the **Result** indicator after the VI completes execution?




**A** 123
**B** 0123
**C** 1.00 2.00 3.00
**D** 0.001.002.003.00

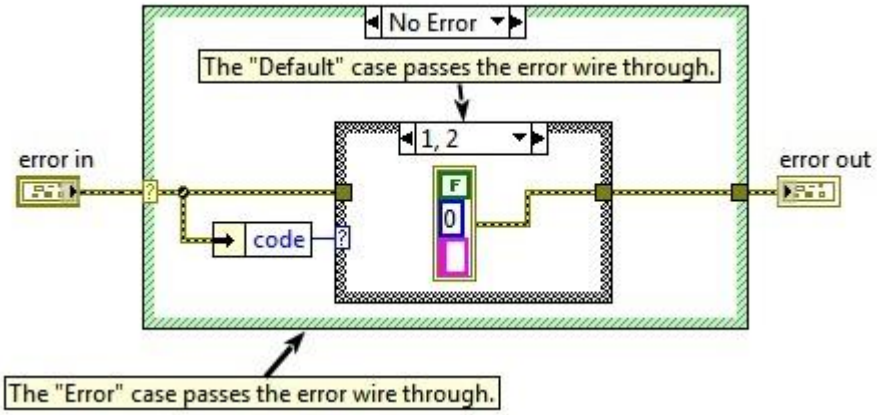
**Q36:** What VI or function is typically used to display an error dialogue?

**A** Merge Errors function
**B** One Button Dialog function
**C** Generate Front Panel Activity function
**D** Simple Error Handler.vi

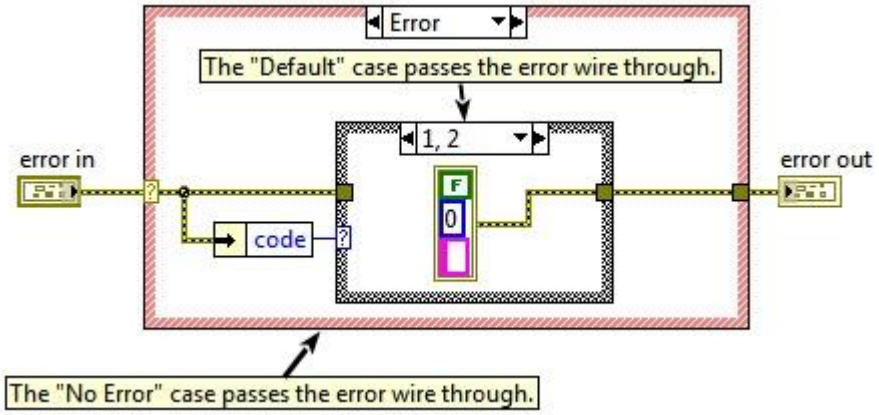
**Q37:** A VI takes an input error cluster. If the cluster contains an error or a warning with code = 1 or code = 2, the VI should clear the error or warning.

Which diagram implements this functionality?

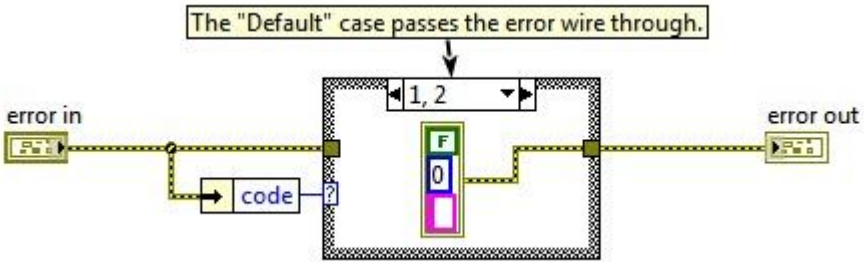
**A**



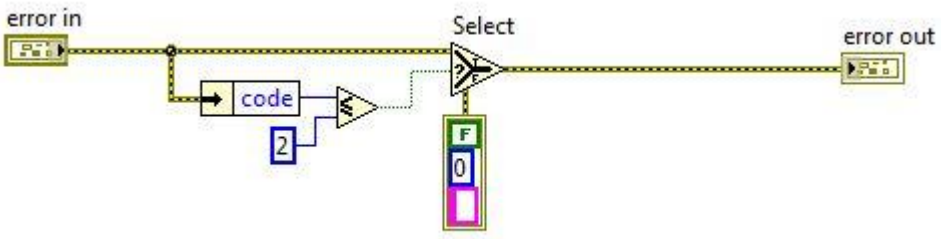

**B**




**C**

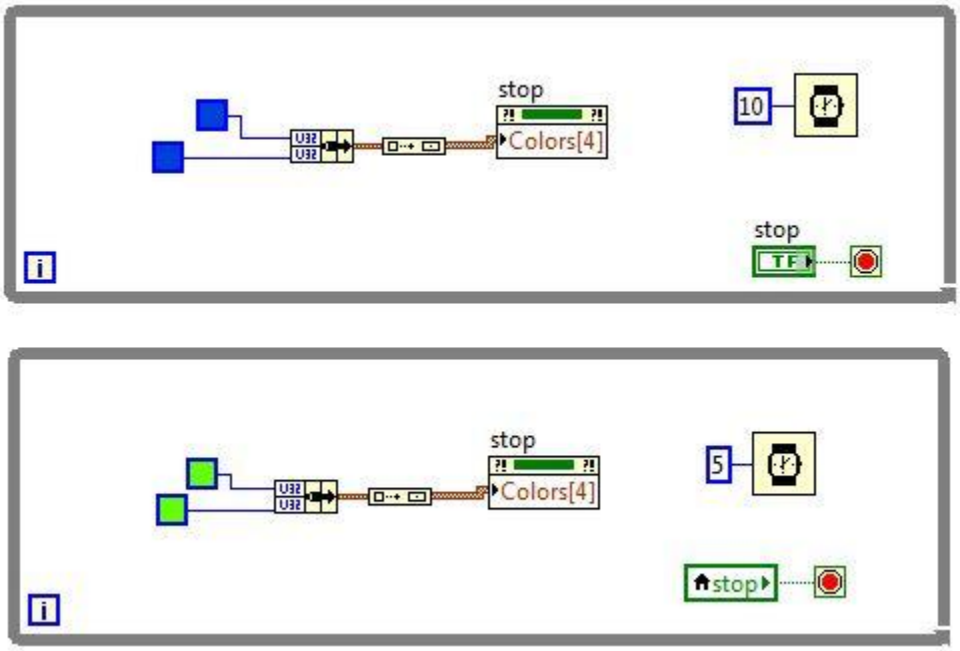



**D**



**Q38:** The following VI has two parallel While Loops, and runs for 11 ms.

What color is the **Stop** Boolean when the VI completes execution?

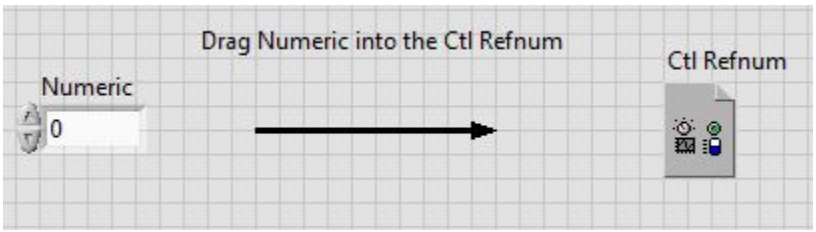



**A** Blue
**B** Green
**C** Both colors will be present
**D** Indeterminate

**Q39:** Which do you use to initialize all front panel objects to their default values?

**A** Application Reference
**B** Invoke Node
**C** User interface event
**D** User event

**Q40:** What results from dragging a Numeric Control into a Control Refnum on the front panel?




**A** An error is returned if the control is not initialized
**B** The Control takes on only generic properties
**C** The Control Refnum changes into that control
**D** The Control Refnum becomes strictly typed

Solutions Page:

Below are the answers and explanations for the CLAD Sample Exam. To quickly check your answers, record them on the Answer Sheet, detach the Answer Sheet, and compare it, side-by side, with the Solutions Page. This Solutions Page is not included in the actual CLAD exam; it is included here for practice purposes only.

1. Correct Answer: C
Topic: Event Structures
Justification: LabVIEW help Filter events allow you to validate or change the event data before LabVIEW performs the default action associated with that event.

2. Correct Answer: C
Topic: Event Structures
Justification: The initialized register increments by one for each Trigger "value change" event when the Trigger new value is True and displays the new Count value after the event occurs. A counts every value change, not just true. B polls resulting in constant increments when the switch changes value to TRUE. D would count every value change if it had a shift register.

3. Correct Answer: A
Topic: Loops
Justification: The For Loop executes 4 times. Starting with the value of 1, the result of the previous iteration is multiplied by 2. Thus, the value in the indicator after 4 iterations is equivalent to 2x2x2x2, or 16.

4. Correct Answer: A
Topic: Loops
Justification: The iteration terminal is only a count of the iteration number and can not control how many loops occur.

5. Correct Answer: A
Topic: Loops
Justification: The iteration terminal in While Loops and For Loops always starts counting at zero. It returns 0 on the first iteration, 1 on the second iteration, etc. Since the While Loop is configured to stop when the output of the iteration terminal is greater than or equal to 50, we know that the iteration terminal must output a value of at least 50. The first time this happens is after 51 iterations.

6. Correct Answer: D
Topic: Loops
Justification: Uninitialized shift register retains value.

7. Correct Answer: C
Topic: Loops
Justification: Loop runs 1 time, use data flow to calculate the values.

8. Correct Answer: B
Topic: Case Structures
Justification: Dataflow and correct steps, track shift register and index to get answer.

9. Correct Answer: A
Topic: Sequence Structures
Justification: Dataflow and correct steps.

10. Correct Answer: C
Topic: General Programming Functions
Justification: The Wait (ms) function does nothing to release or allocate memory or specify processor core. All it does is cause the execution of a VI to pause for a short time to allow the processor time to complete other tasks.

11. Correct Answer: C
Topic: General Programming Functions
Justification: Since the mechanical action is set to Switch Until Released, two events are generated when a user clicks and releases. The first event is the FALSE to TRUE transition, and the second is the TRUE to FALSE transition. In addition, the conditional for the loop is set to Continue if True, so the VI will complete execution after the Boolean is released and turns back to False.

12. Correct Answer: C
Topic: General Programming Functions
Justification: Polymorphic response, the addition only occurs if there are elements in each location, based on the index number. The extra elements in on array are ignored.

13. Correct Answer: B
Topic: General Programming Functions
Justification: "access" input terminal on the Open/Create/Replace File function is set to "read-only", so file cannot be written to.

14. Correct Answer: C
Topic: General Programming Functions
Justification: Data Flow

15. Correct Answer: C
Topic: General Programming Functions
Justification: Use the index number of the outer loop to set the number of iterations of the inner loop, including zero. For a zero number of iterations the inner shift register passes its value.

16. Correct Answer: C
Topic: SubVI Creation
Justification: By definition, control references are placed on the block diagram of the "calling" or existing VI.

17. Correct Answer: A
Topic: Design Patterns
Justification: A is an Enum and a Type Def, which are the requirements for the case selector inputs of a FGV.

18. Correct Answer: C
Topic: Design Patterns
Justification: An enum is not required to be the case selector of a state machine (but it is best practice).

19. Correct Answer: B
Topic: Design Patterns
Justification: This producer loop does not have an Events Structure, this producer consumer design pattern would be used for data handling.

20. Correct Answer: C
Topic: Data communication and synchronization
Justification: The front panel control is read by the property node, so changes to the control take effect in the For Loop. The value to be displayed in the Numeric Indicator only depends on the final iteration, when the value of the numeric is read and incremented.

21. Correct Answer: B
Topic: Data Communication and Synchronization
Justification: Due to FIFO, and since i=4 is the fifth iteration of the loop, the fifth element in the queue will be read. The queue is filled in order with element 1 and then element 2, then 3, repeatedly.

22. Correct Answer: D
Topic: Data communication and synchronization
Justification: The first loop never stops because False is wired to the conditional terminal. Since the first loop never stops, the second loop can't start as it does not have all its inputs.

23. Correct Answer: B
Topic: Data communication and synchronization
Justification: The Send Notification function sends a message to all functions waiting on a notifier. The notifiers are not buffered.

24. Correct Answer: B
Topic: Debugging tools
Justification: The single step debugging tools are used when execution is paused.

25. Correct Answer: B
Topic: Debugging practices
Justification: Step Out is not a single step command. Finish VI or Finish Block Diagram are both available in the SubVI depending on where the VI execution is paused.

26. Correct Answer: D
Topic: Debugging tools
Justification: Since the order of execution of the write to Output actions cannot be verified, it is not clear what value will result in Output.

27. Correct Answer: A
Topic: LabVIEW Environment
Justification: Definition of Latched in LabVIEW. Can not be Latch when released, the question only describes the action of the button being pressed, not released.

28. Correct Answer: B
Topic: LabVIEW Environment
Justification: Since the display index value for columns is '2', that means there are two columns not show (4 elements), along with the 6 visible elements, this array has exactly 10 elements.

29. Correct Answer: C
Topic: Data Types
Justification: Data is coerced to the widest data type input to minimize loss of information.

30. Correct Answer: D
Topic: Data Types
Justification: Rounds towards positive value without changing the datatype.

31. Correct Answer: D
Topic: Data Types
Justification: String comparisons and searches in LabVIEW are case-sensitive and exact.

32. Correct Answer: C
Topic: Data Types
Justification: Graph 4 points , starting with index 1 (Drop the 0 index element). Values of points in order are: 3,6,9,12,15.

33. Correct Answer: A
Topic: Data Types
Justification: When constant is set to "\" codes display, "\s" is a space character, otherwise in normal display "\s" is literally \s.

34. Correct Answer: C
Topic: Data Types
Justification: The maximum positive number that a I8 can represent is 127. When the sum of two I8 number is greater than 127, the answer wraps around to -128 .

35. Correct Answer: D
Topic: Data types
Justification: Because we are starting with an empty string, the output of the "Concatenate Strings" function is purely the concatenation of the iterations, displayed with two digit precision with no spaces and converted into text. The loop runs 4 times (until i=3), so first time is 0.00, second time 1.00, etc.

36. Correct Answer: D
Topic: Error Handling
Justification: The Merge Errors VI does not display any dialog. The One Button Dialog function has no error input, and would therefore require additional coding. The Generate Front Panel Activity function does not generate a dialog. Therefore the Simple Error Handler is the best choice because it accepts an error cluster as an input and displays a dialog to the user in the event of an error.

37. Correct Answer: c
Topic: Error Handling
Justification: A has the logic in the wrong case. B will only clear errors, will not clear warnings. D will clear any error or warning with a code value of 2 or less (which includes negative codes). C is the only one that fulfills all the stated requirements.

38. Correct Answer: D
Topic: VI server
Justification: Race conditions exist because there is no coordination between the loops.

39. Correct Answer: B
Topic: VI server
Justification: An Application Reference allows the program to identify an application for an action, but by itself does not change anything. Both the "user interface events" and "User events" require input from the user and additional code. An invoke node has a native "renitialize all to default values" action, thus may be used to fulfill the requirements.

40. Correct Answer: D
Topic: VI Server
Justification: Drag a control into the front panel control refnum control to remove the original control and create a strictly typed control refnum. Strictly typed control refnums accept only control refnums of exactly the same data type.