

Lab 6: Control Flow

Lab Solutions

Lab solution(s) are present in `Solution\Lab06` folder.

The Delay Activity

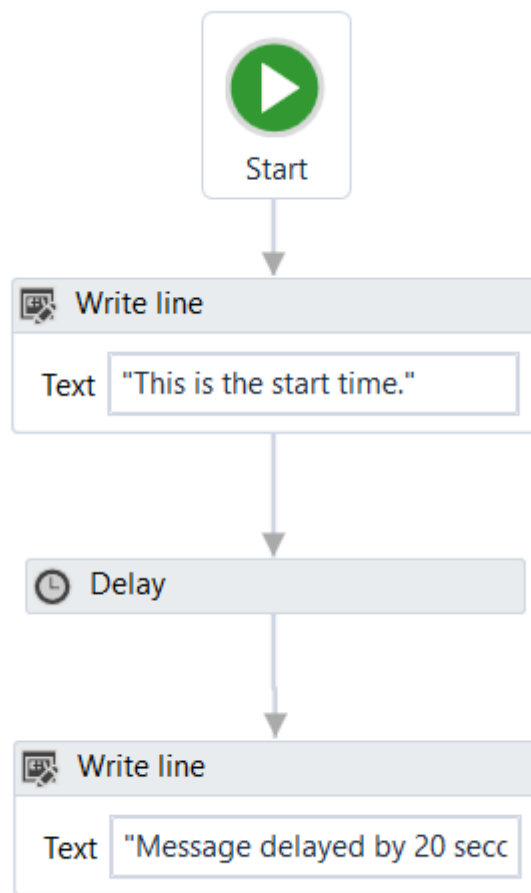
The **[Delay]** activity enables you to pause the automation for a custom period of time (in the hh:mm:ss format). This activity proves itself quite useful in projects that require good timing, such as waiting for a specific application to start or waiting for some information to be processed so that you can use it in another activity.

Example of Using the Delay Activity

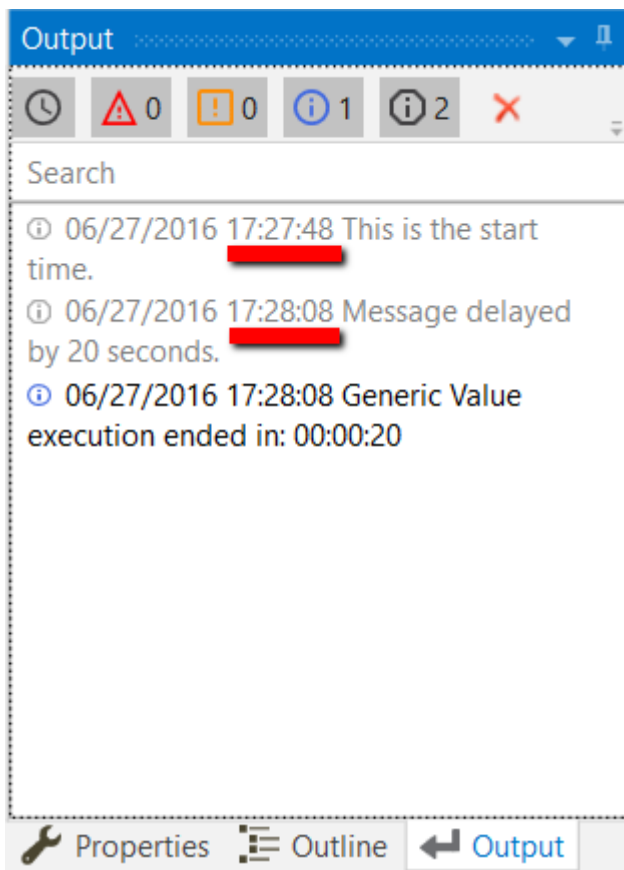
To exemplify how you can best use the **Delay** activity, let's create an automation that writes two messages to the **Output** panel, with a delay of 20 seconds between them.

1. Create a new flowchart.
2. Add a **[Write Line]** activity and connect it to the **Start** node.
3. Select the activity, and in the **Text** field, type "This is the start time."
4. Add a **Delay** activity and connect it to the previously added activity.
5. Select the activity, and in the **Properties** panel, in the **Duration** field, type 00:00:20. This is the 20 seconds delay that is going to be between the two logged messages.
6. Add another **Write Line** activity and connect it to the previously added activity.
7. In the **Text** field, type "Message delayed by 20 seconds."

The final project should look as in the following screenshot.



8. Press F5. The automation is executed. Note that, in the **Output** panel, the two messages added in the **Write Line** activities are written twenty seconds apart.



The Do While Activity

The **[Do While]** activity enables you to execute a specified part of your automation while a condition is met. When the specified condition is no longer met, the project exits the loop.

This type of activity can be useful to step through all the elements of an array, or execute a particular activity multiple times. You can increment counters to browse through array indices or step through a list of items.

Note:

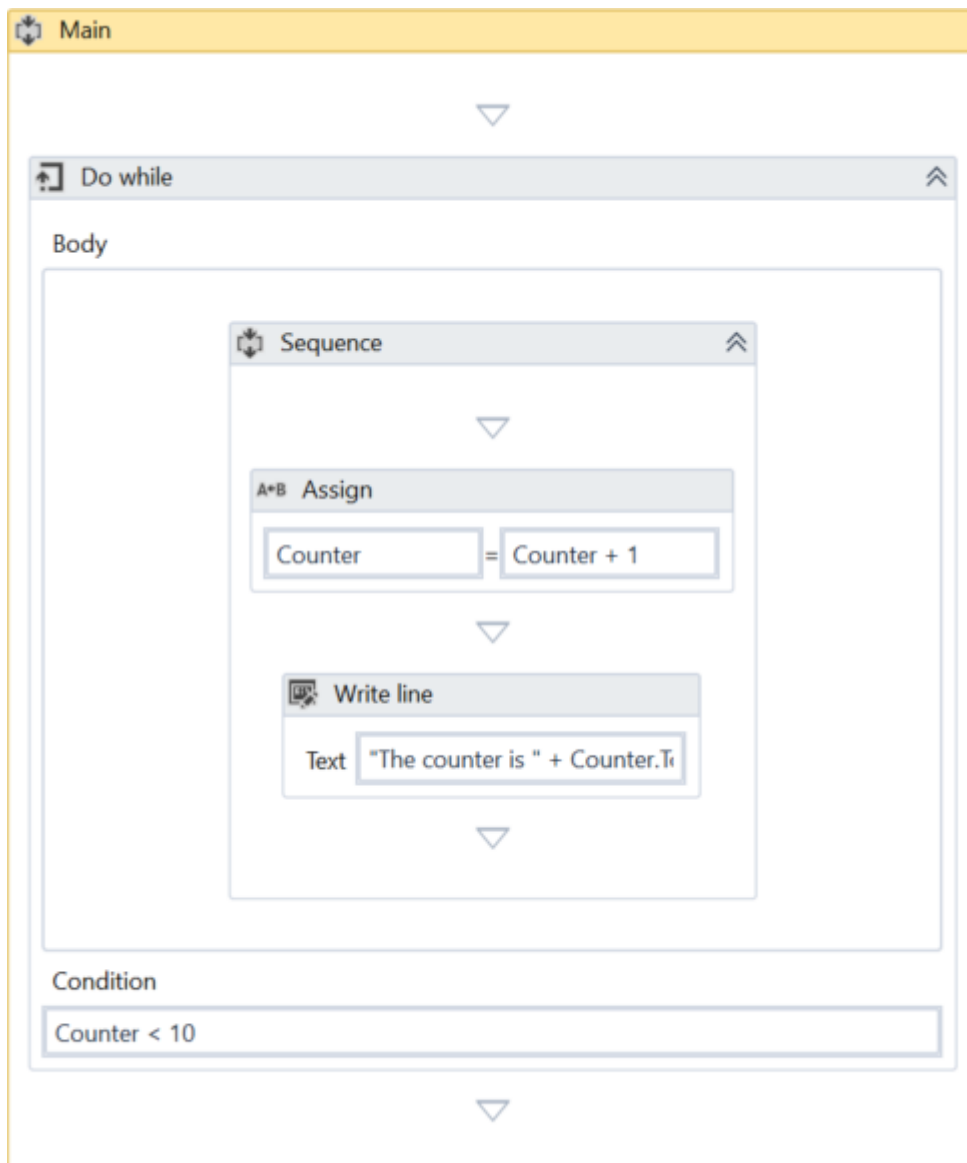
Do While activities are evaluated only after the body has been executed once.

Example of Using a Do While Activity

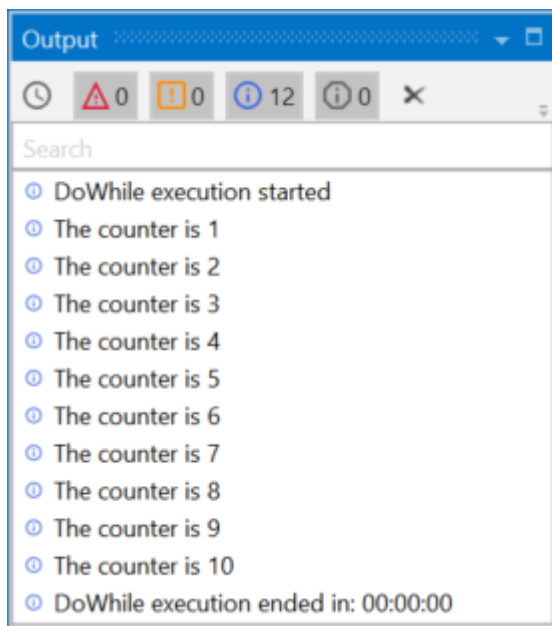
To exemplify how to use a **Do While** activity, let's create an automation that increments an integer variable from 0 to 10, and displays a message every time it is incremented.

1. Create a new sequence.
2. Create an integer variable, Counter, with a default value of 0.
3. Add a **Do While** activity to the **Designer** panel.
4. In the **Body** section, add an **[Assign]** activity.
5. Select the **Assign** activity, and in the **Properties** panel, in the **To** field, add the Counter variable.
6. In the **Value** field, type Counter + 1. This helps you increment the value of the variable with one.
7. Add a **[Write Line]** activity, under the **Assign** one.
8. In the **Text** field, type "The counter is " + Counter.ToString. This writes the value of the counter in the **Output** panel each time it is incremented.

9. In the **Condition** section of the **Do While** activity, type `Counter < 10`. The body of the **Do While** activity is repeated until the value of the Counter variable is bigger than 10. The project should look as in the following screenshot.



10. Press F5. The automation is executed. Note that the **Output** panel displays the message indicated in the **Write Line** activity.



The If Activity

The **[If]** activity contains a statement and two conditions. The first condition (the activity in the **Then** section) is executed if the statement is true, while the second one (the activity in the optional **Else** section) is executed if the statement is false.

If activities can be useful to make decisions based on the value of variables.

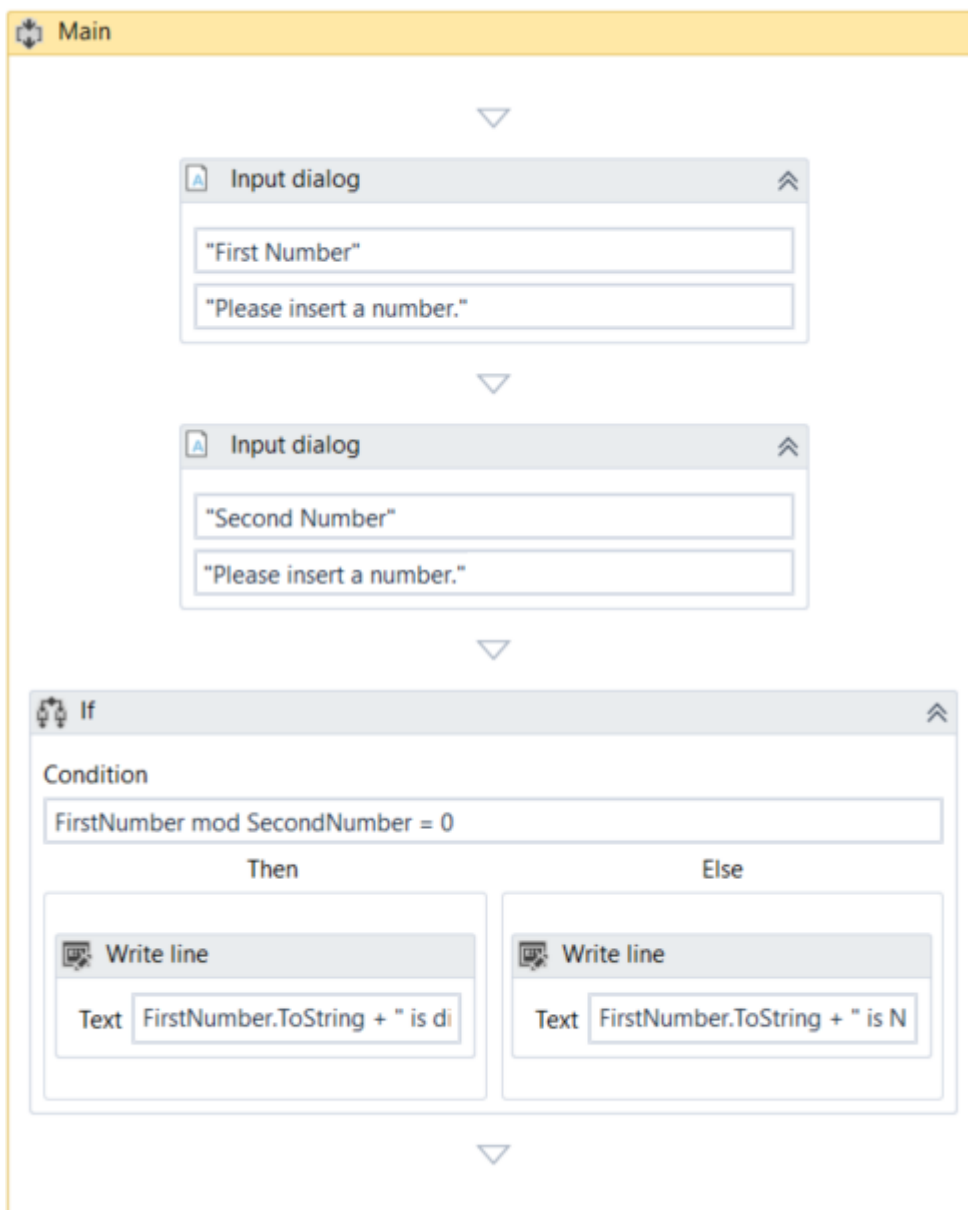
Note:

*The **If** activity is almost identical to the **[Flow Decision]** one. However, the latter can only be used in flowcharts.*

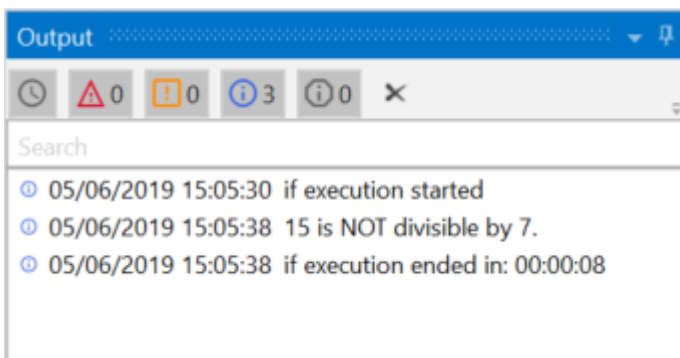
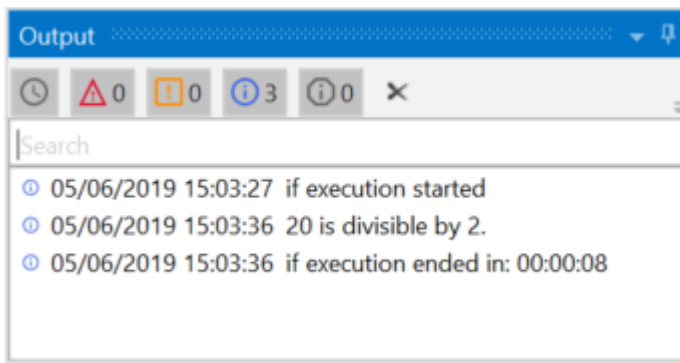
Example of Using an If Activity

To exemplify how you can use the **If** activity, let's create an automation that asks the user for two numbers, checks to see if one is divisible by the other, and depending on the result, displays a different message in the **Output** panel.

1. Create a new sequence.
2. Create two integer variables, FirstNumber and SecondNumber for example.
3. Add two **[Input Dialog]** activities to the **Designer** panel.
4. In the **Properties** panel, type labels and titles for both activities and, in the **Result** fields, add the FirstNumber and SecondNumber variables.
5. Add an **If** activity to the **Designer** panel, under the previously added **Input Dialog** ones.
6. In the **Condition** section, type `FirstNumber mod SecondNumber = 0`. This expression checks if the first number is divisible to the second one, using the [mod](#) operator.
7. In the **Then** section, add a **[Write Line]** activity.
8. In the **Text** field, type `FirstNumber.ToString + " is divisible by " + SecondNumber.ToString + "."`. This is the message that is displayed if the first number is divisible by the second one.
9. Click **Show Else** to display the Else section, and then add another **Write Line** activity in the **Else** section.
10. In the **Text** field, type `FirstNumber.ToString + " is NOT divisible by " + SecondNumber.ToString + "."`. This is the message that is displayed if the first number is not divisible with the second one.



11. Press F5. The automation is executed.
12. Add numbers when prompted. Note that the **Output** panel displays the result, depending on the values added in the **Input Dialog** windows.



The Switch Activity

The **[Switch]** activity enables you to select one choice out of multiple, based on the value of a specified expression.

By default, the **Switch** activity uses the integer argument, but you can change it from the **Properties** panel, from the **TypeArgument** list.

The **Switch** activity can be useful to categorize data according to a custom number of cases. For example, you can use it to store data into multiple spreadsheets or sort through names of employees.

Example of Using a Switch Activity

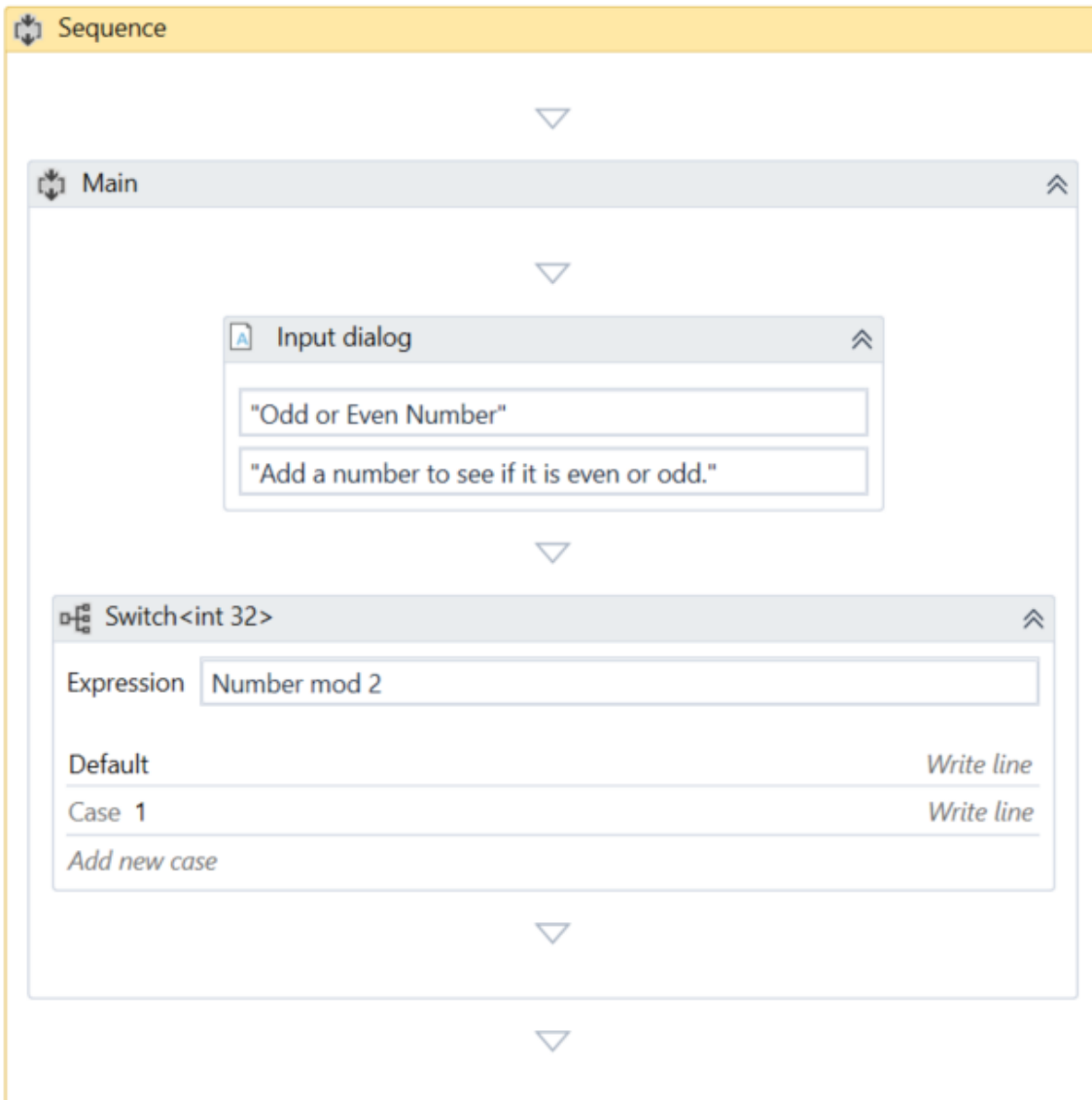
To exemplify how to use the **Switch** activity, we are going to create an automation that asks the user for a number, checks if is odd or even, and depending on that, a different message is written to the **Output** panel.

Since all odd numbers divided by two have a remainder equal to 1, this project needs only two cases (0 and 1) , yet keep in mind that this activity supports multiple cases.

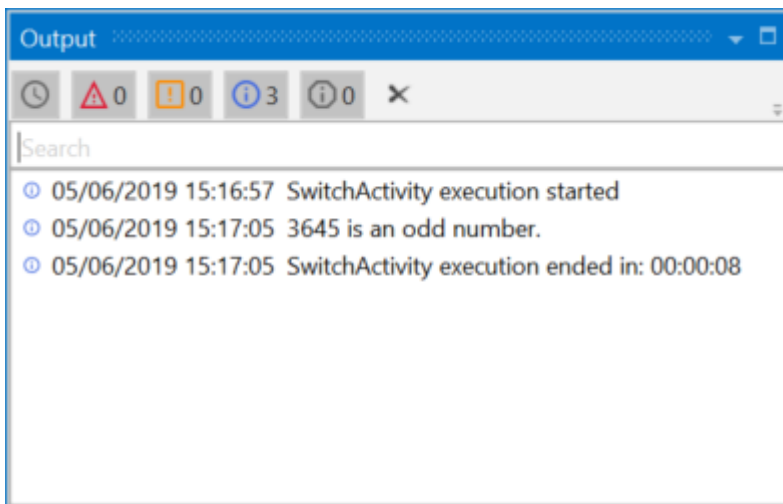
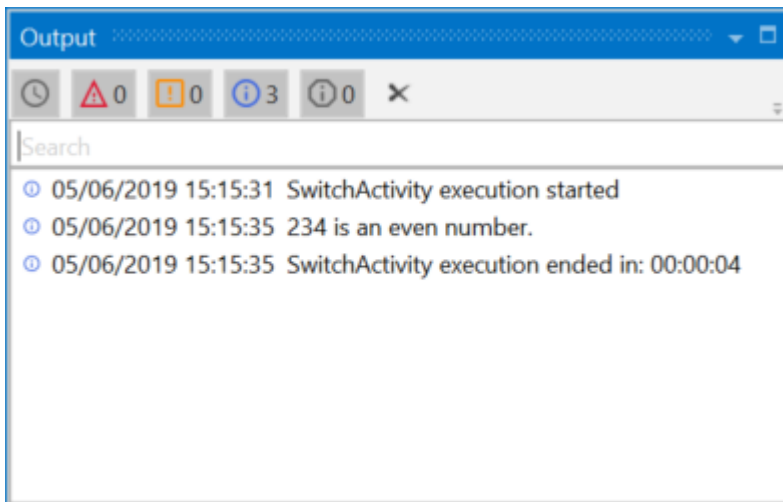
1. Create a new sequence.
2. Create an integer variable, Number.
3. Add an **[Input Dialog]** activity to the **Designer** panel.
4. Add a **Title** and **Label** to prompt the user for a number.
5. In the **Result** field, add the Number variable.
6. Add a **Switch** activity, under the **Input Dialog**.
7. In the **Expression** field, type Number mod 2. This verifies if the user's number is divisible by 2.
8. In the **Default** section, add a **[Write Line]** activity.
9. In the **Text** field, type Number.ToString + " is an even number."
10. Click the **Add new case** line, and in the **Case Value** field, type 1.
11. Add a **Write Line** activity to this case.

12. In the **Text** activity, type `Number.ToString + " is an odd number."`.

The final project should look as in the following screenshot.



13. Press F5. The automation is executed. Note that the **Output** panel displays the data correctly.



The While Activity

The **[While]** activity enables you to execute a specific process repeatedly, while a specific condition is met. The main difference between this and the **[Do While]** activity is that, in the first one, the condition is evaluated before the body of the loop is executed.

This type of activity can be useful to step through all the elements of an array, or execute a particular activity multiple times. You can increment counters to browse through array indices or step through a list of items.

Example of Using a While Activity

To exemplify how to use a **While** activity, let's create an automation that increments an integer variable from 10 to 100, and writes all the numbers to a Microsoft Word document.

1. Create a new sequence.
2. Create an integer variable, Counter, with the default value of 10.
3. Add a **While** activity to **Designer** panel.
4. In the **Condition** field, type Counter < 100. This means that the body of the loop is going to be repeated until the value of the Counter variable is going to be bigger than 100.
5. In the **Body** section of the **While** activity, add an **[Assign]** activity.

6. In the **Properties** panel, in the **To** field add the Counter.
7. In the **Value** field, type Counter + 1. This increments the value of the Counter with one.
8. Add an **[Append Text]** activity under the **Assign** one.

Note:

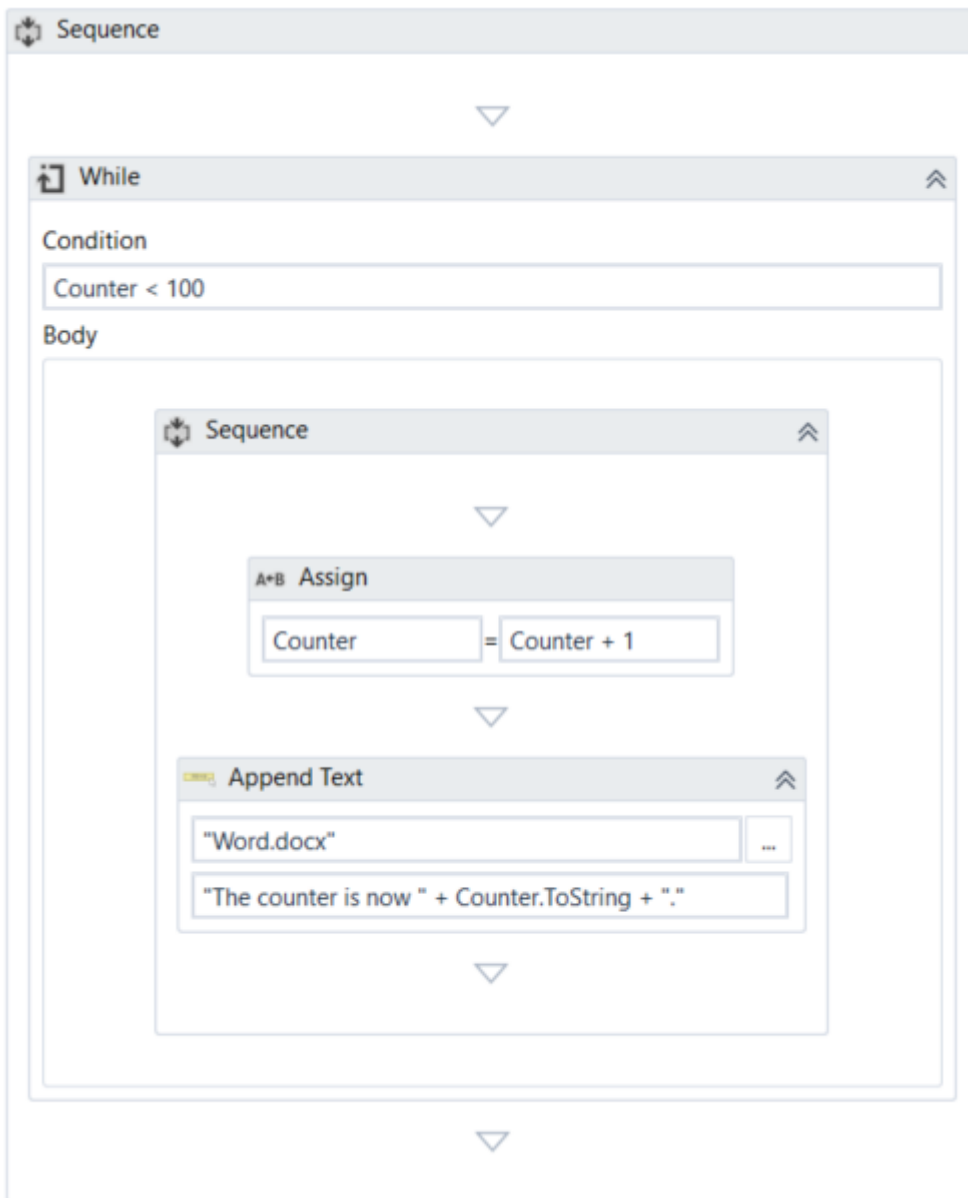
This activity is part of the Word activities package. If you do not have it, use the [package manager functionality](#) to install it.

9. In the **FilePath** field, type the path of a Word document in between quotation marks.

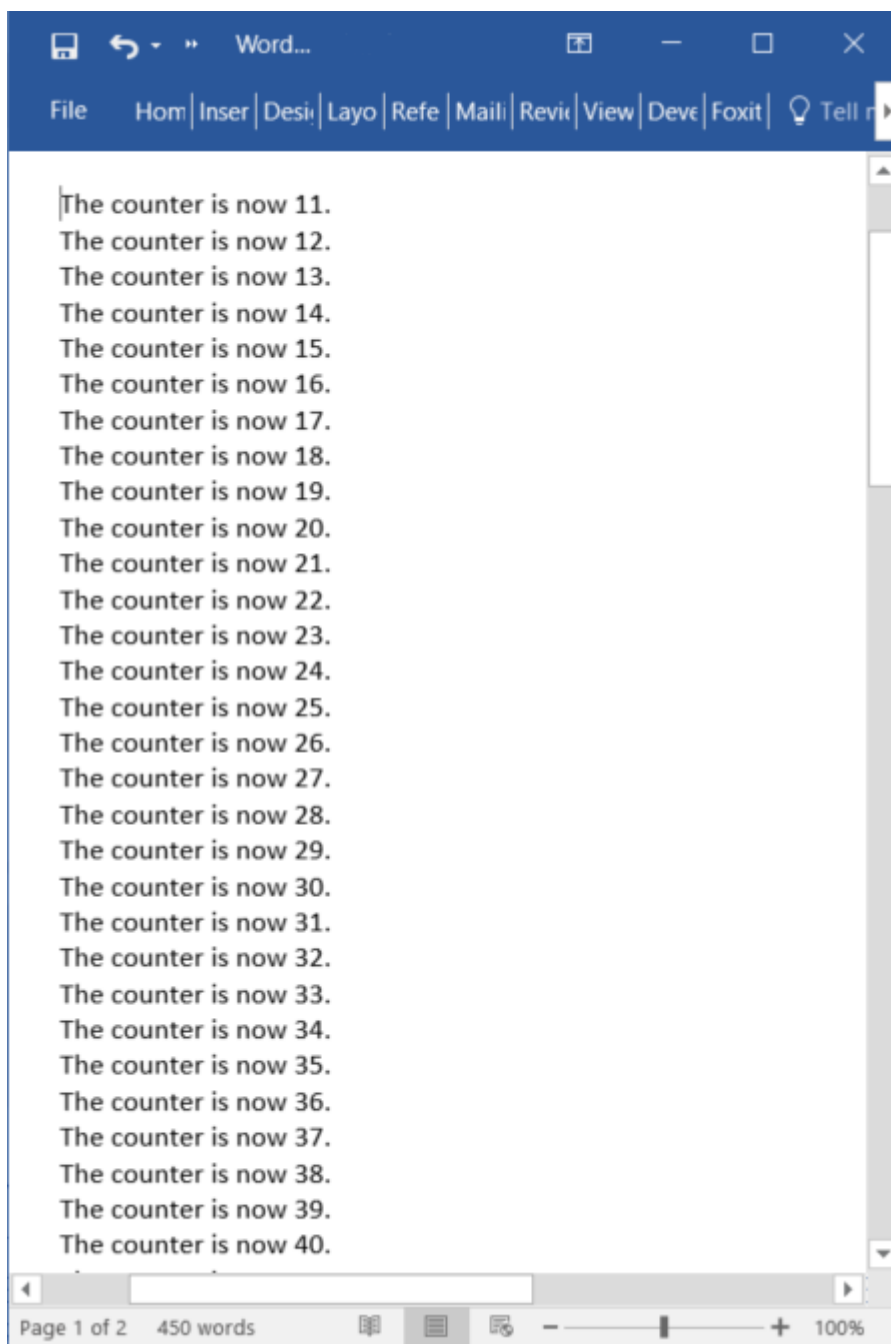
Note:

Make sure that the Word document is not used when running the automation, otherwise a message error is displayed and the execution is stopped.

10. In the **Text** field, type "The counter is now " + Counter.ToString + ".".
- The final project should look as in the following screenshot.



11. Press F5. The automation is executed.
12. Double-click the Word document specified at step 9. Note that all the numbers between 10 and 100 are written, as expected.



The For Each Activity

The **[For Each]** activity enables you to step through arrays, lists, data tables or other types of collections, so that you can iterate through the data and process each piece of information individually.

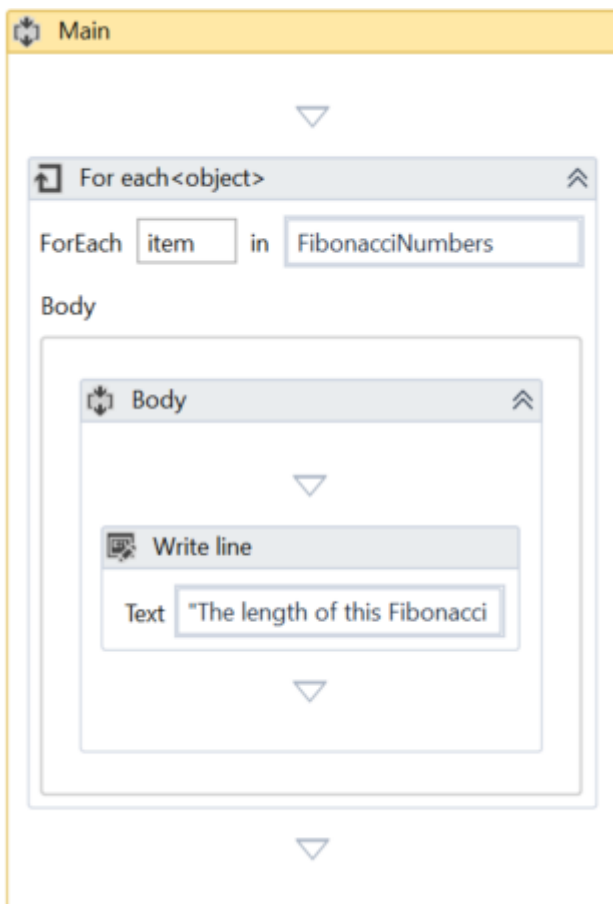
Example of Using a For Each Activity

To exemplify how to use a **For Each** activity, let's create an automation that goes through each element of an array of integers and writes the length of the array and each element to the **Output** panel.

1. Create a new sequence.

2. Create an array of integer variables, FibonacciNumbers.
3. In the **Default** field, type the Fibonacci sequence up to a desired value, such as {1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89}.
4. Add a **For Each** activity in the **Designer** panel.
5. Do not make any changes to the **ForEach** field.
6. In the **In** field, add the FibonacciNumbers variable. This activity looks at each individual item in the provided variable.
7. In the **Body** section of the **For Each** activity, add a **[Write Line]** activity.
8. In the **Text** field, type "The length of this Fibonacci sequence is " + FibonacciNumbers.Length.ToString + " and contains the " + item.ToString + " element.". This expression enables you to write the total number of array elements and each element of the array in the **Output** panel.

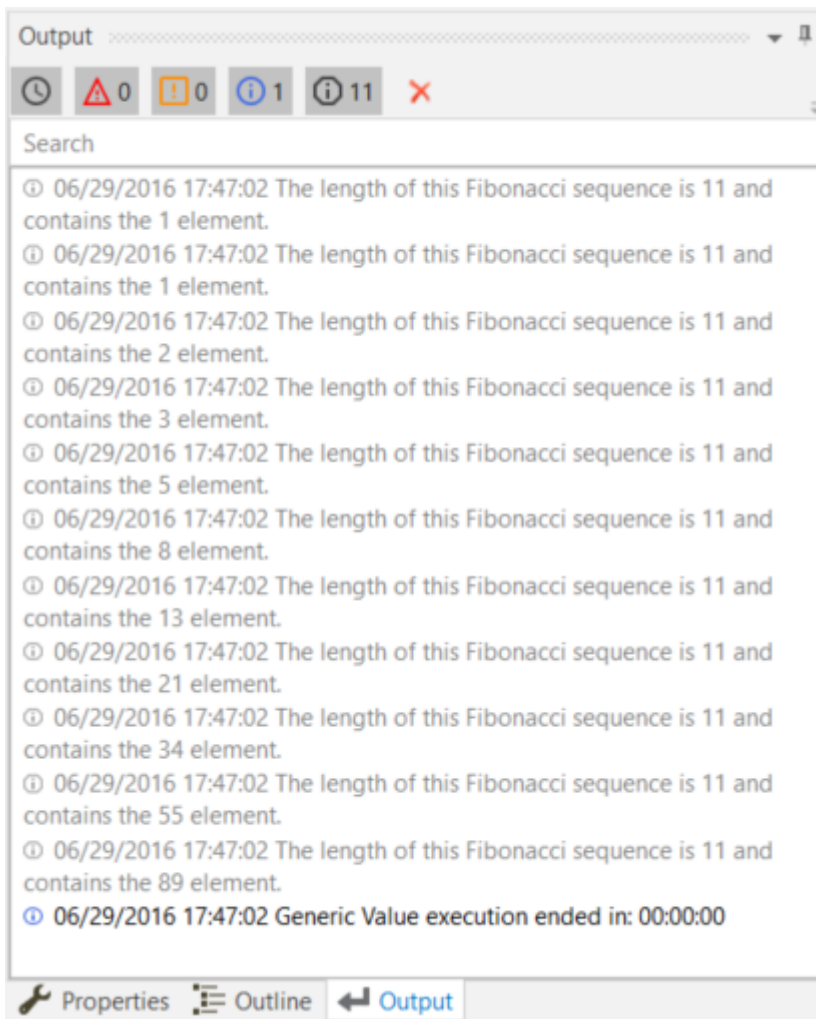
The final project should look as in the following screenshot.



9. Press F5. The automation is executed. Note that the **Output** panel displays the correct message for each element of the array.

Note:

The **Length** property enables you to find out the total number of array elements.



The Break Activity

The **[Break]** activity enables you to stop the loop at a chosen point, and then continues with the next activity.

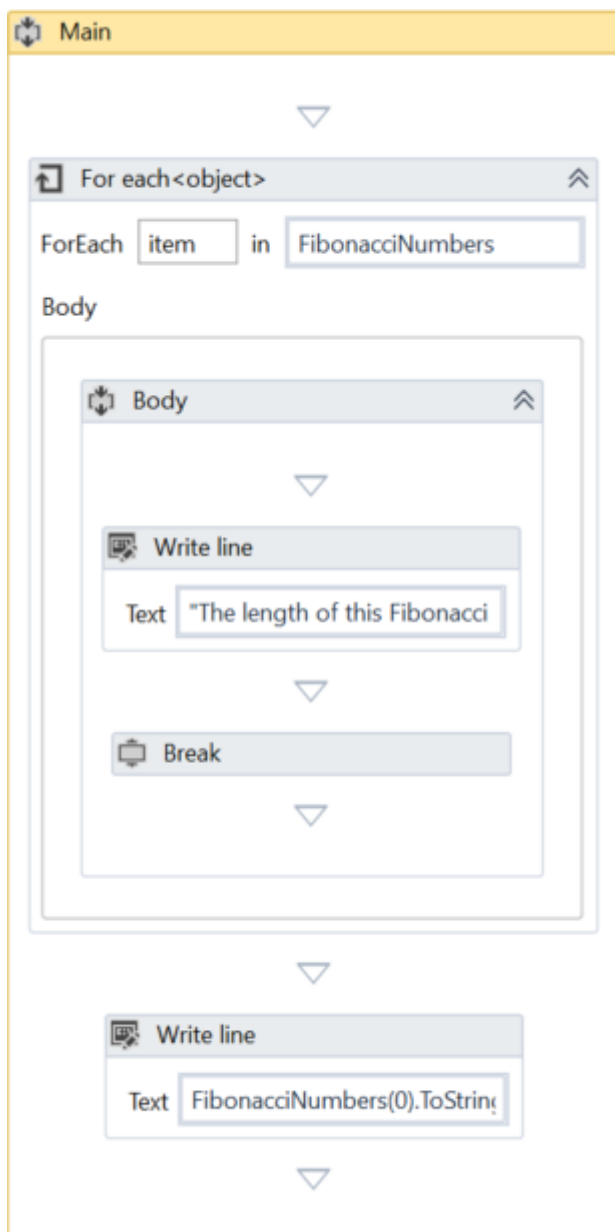
Note:

The **Break** activity can only be used within one of the following activities: For Each, While or Do While.

Example of Using a Break Activity

To exemplify how to use the **Break** activity we are going to build upon the project created for **[The For Each Activity]**. This new project writes only the first iteration of the loop and a few elements of the array to the **Output** panel.

1. In the **Body** of the **For Each** activity, under the **[Write Line]**, add a **Break** activity.
2. Under the **For Each**, add a new **Write Line** activity.
3. In the **Text** field, type `FibonacciNumbers(0).ToString + " " + FibonacciNumbers(2).ToString + " " + FibonacciNumbers(4).ToString + " " + FibonacciNumbers(6).ToString + " " + FibonacciNumbers(8).ToString + " " + FibonacciNumbers(10).ToString + " "`. This means that only the indicated elements of the array are going to be written to the Output panel. The final project should look as in the following screenshot.



4. Press F5. The automation is executed. Note that the **Output** panel only displays the first iteration of the loop and the specified array elements from the **Write Line** activity.

Output

0

0

4

0

Search

05/06/2019 14:49:59 ForEachActivityWithBreak execution started

05/06/2019 14:50:00 The length of this Fibonacci sequence is 11 and contains the 1 element.

05/06/2019 14:50:00 1 2 5 13 34 89

05/06/2019 14:50:00 ForEachActivityWithBreak execution ended in: 00:00:00