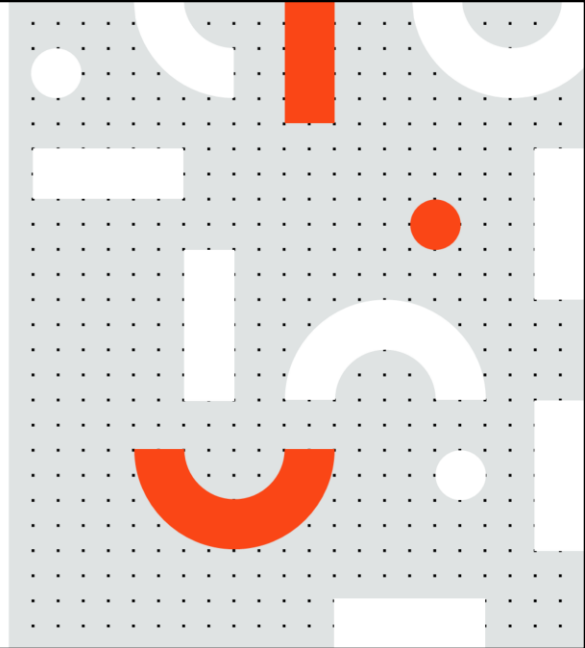


# RPA Design & Development v1.1


## Lesson 12 Excel Data Table and PDF







### Module Objectives:

Students should be able to understand these methodologies in this chapter:

- Excel Data Table Automation in Studio
- Understand and apply automation to understand the Excel Data Table & PDF



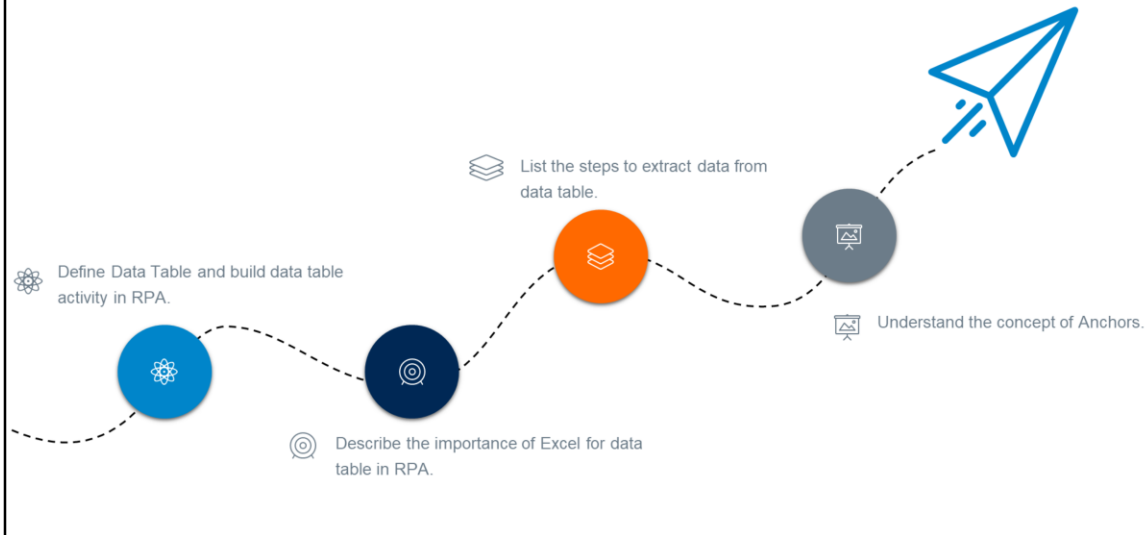
## Agenda

-  **Data Tables in RPA**
-  **Excel and Data Table**
-  **Extracting Data from Data table**
-  **Anchors**

We will learn and cover these points in this lesson Data Tables in RPA

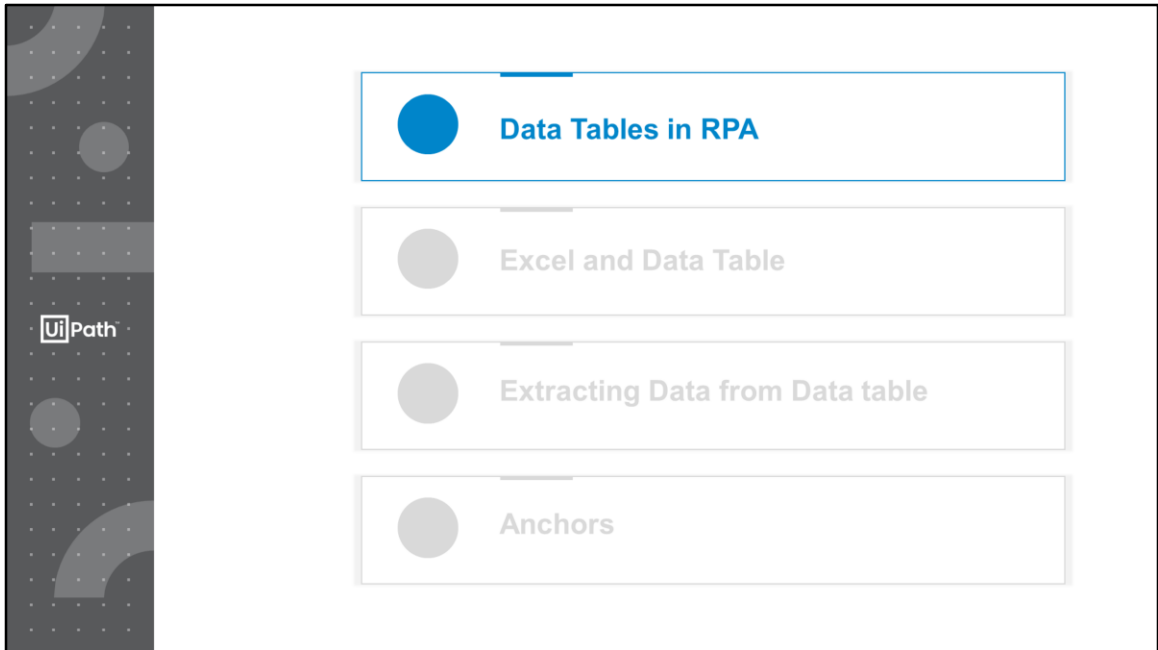
- Basics of Excel and Data Table
- Extracting Data from Data table
- Anchors

## Learning Objectives



At the end of this chapter, people will be able to understand the Excel Data Table and PDF implementation in RPA.

- Describe the importance of Excel for data table in RPA
- List the steps to extract data from data table
- Understand the concept of Anchors



In this topic, we will learn about Data Tables in RPA.

## Data Table

A **Data Table** is a tabular format for displaying any information.

The **Data Table** shows information displayed in:

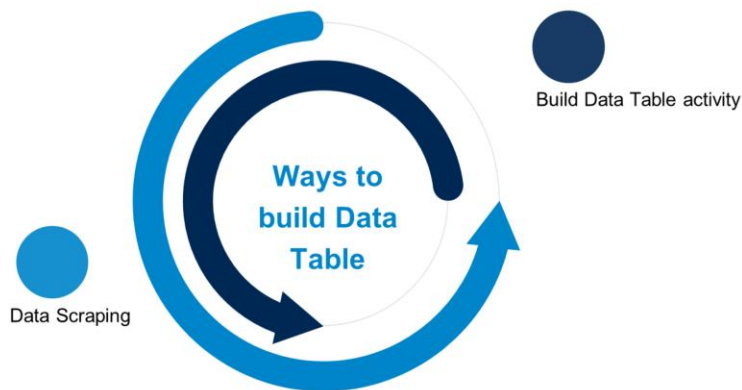
- columns
- rows

Name	Roll No	Marks
John	1	75
Paul	2	82
David	3	70
kerry	4	95
Simson	5	45

It is a collection of data, resources or information where you can insert or set any information that is displayed in the tabular form. It contains the data in rows and columns form. For example Excel, CSV, etc.

## Data Table in RPA

The **Data table** is a type of variable in RPA that is used to store and write the data in the form of rows and columns.



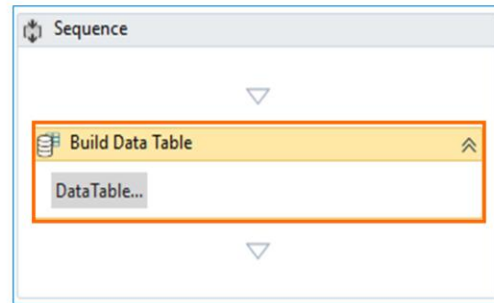
The Data table is a type of variable in RPA that is used to store and write the data in the form of rows and columns. It represents the information of data as a database in a spreadsheet. The variables enable us to migrate data from one database to another. After that, we can easily extract the information by data store or website. In UiPath, you can create or build a Data Table in one of the two ways:

- Build Data Table activity
- Data Scraping

## Build Data Table Activity

**Build Data Table Activity** is used when a user has to store the data manually inside the data table. The steps to be followed are:

1. Drag and drop Data Table in the Build Data Table activity inside the sequence.



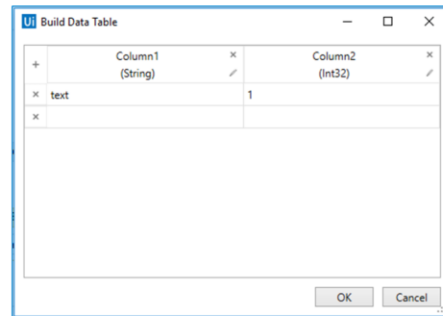
It is used when a user has to store the data manually inside the data table. The steps to be followed are:

1. You can drag and drop sequence. After that, you can insert or drag the build Data Table activity inside the sequence to create a process of a data table.

## Build Data Table Activity (Contd.)

The steps to be followed are:

2. Click on the Data Table; A pop up will appear on the UiPath project screen.



The steps to be followed are:

2. When we click on the data table, we will get a pop up on the UiPath project screen.



## Build Data Table Activity (Contd.)

The steps to be followed are:

3. Click on the Add Column button.  
Set the name and data type of the column.

Column Name

Data Type

Allow Null ☒

Auto Increment ☐

Default Value

Unique ☐

Max Length

OK Cancel

The steps to be followed are:

3. We can add a new column by clicking on the add column button and setting the name & data type in the column.

## Build Data Table Activity (Contd.)

The steps to be followed are:

4. If Allow Null is checked, it is not compulsory to have additional data in the column.

Column Name:

Data Type:

Allow Null: ☒

Auto Increment: ☐

Default Value:

Unique: ☐

Max Length:

OK Cancel

4. In the ordinary case, the Allow Null is checked or ticked then it is not compulsory for additional data to be inside the column, but if it is unchecked then we again add data into the same.

## Build Data Table Activity (Contd.)

The steps to be followed are:

5. If the Default Value column is blank, it will automatically take default value .

Column Name:

Data Type:

Allow Null: ☒

Auto Increment: ☐

Default Value:

Unique: ☐

Max Length:

OK Cancel

5. The Default value means if that column is blank, then it will automatically take default value inside it.

- **Max Length:** The number of characters allows the columns, and if you do not want to apply the length of maximum data, then you can set the default value -1 which is also a set of the default values.
- **Unique:** If the dataset is selected for a specific value then you can create or develop unique data in the data table.
- **Auto Increment:** When you set the Data Type in the form of int32 then the checkbox display on the screen after this the data automatically increase every time by new row activity with 1 new row.

## Build Data Table Activity (Contd.)

The steps to be followed are:

6. Add data inside the data table.

	Name (String)	Roll No (Int32)	Marks (String)
x	"John"	1	75
x	"Paul"	2	82
x	"David"	3	70
x	"Kerry"	4	95
x	"Simson"	5	45
x			

OK Cancel

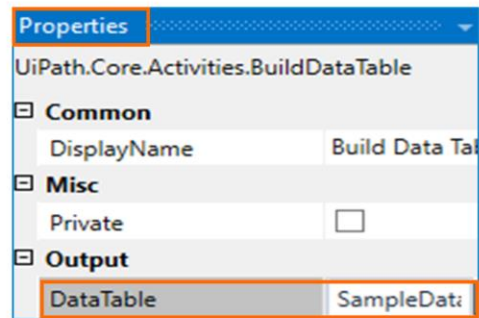
The steps to be followed are:

6. We can add several data inside the data table.

## Build Data Table Activity (Contd.)

The steps to be followed are:

7. Click on the Properties tab of the build Data Table. Create the variable in the output column with the name "Sample Data."



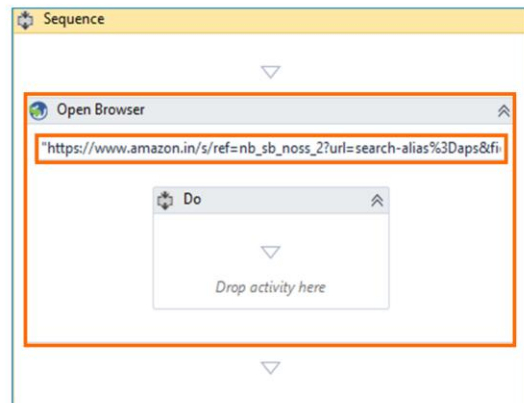
The steps to be followed are:

7. Click on the properties tab of the build Data Table and create the variable in the output column with the name "Sample Data."

## Data Scraping

**Data Scraping** is used to create a data table at run time.  
The steps to be followed are:

- Drag and drop the Open Browser activity inside the sequence.
- Type the URL inside the open browser text box.



It is used to create a data table at run time. It can extract all the pattern-based data and store it into the form of the data table automatically. When you build a project, it enables you to extract data from a browser, document, Excel file, .CSV file and an application to a database.

With the help of these Steps, let us create a data table and store data inside it, using Data Scraping activity.

Let us consider extracting Data from Amazon website.

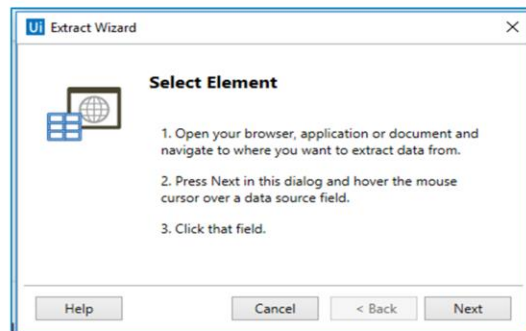
- I. Drag and drop the open browser activity inside the sequence.
- II. Type the URL inside the open browser text box.
- III. URI:  
`https://www.amazon.in/s/ref=nb_sb_noss_2?url=search-alias%3Daps&field keywords=iPhone`

## Data Scraping (Contd.)

The steps to be followed are:



- An activity window will pop up. Click on the Next button.
- Click on the Data Scraping icon.

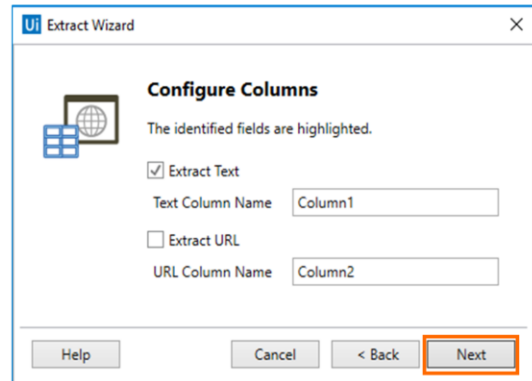


IV. Click on the Data Scraping icon on the top left corner of UiPath Studio. Then an activity window will pop up which showing as a next button. You can click on it and START the next activity data scraping.

## Data Scraping (Contd.)

The steps to be followed are:

- Select the name of the mobile .
  - Modify the data or variable name.
- Click on the next button.



The image shows a screenshot of the 'UiPath Extract Wizard' dialog box, specifically the 'Configure Columns' step. The dialog has a title bar with the UiPath logo and the text 'Extract Wizard'. Inside, there's a section titled 'Configure Columns' with a subtitle 'The identified fields are highlighted.' Below this, there are two options: 'Extract Text' (which is checked) and 'Extract URL' (which is unchecked). Each option has a corresponding text input field for the column name. For 'Extract Text', the input field contains 'Column1'. For 'Extract URL', the input field contains 'Column2'. At the bottom of the dialog, there are four buttons: 'Help', 'Cancel', '< Back', and 'Next'. The 'Next' button is highlighted with an orange border.

V. Now there is a pointer that indicates on the screen. So, you can choose the name of the mobile with that pointer; then it will ask to show the second similar element from the screen.

VI. You can also modify the data or a variable name of the columns and then click next.



## Data Scraping (Contd.)

The steps to be followed are:

- Data is displayed in one column table.
- Click on Extract Correlated Data to extract the second field, price.

The screenshot shows the 'Preview Data' window in UiPath. It displays a single column of data representing mobile phones. The data is as follows:

Column1
Apple iPhone X (64GB) - Silver
Apple iPhone 6 (Gold, 1GB RAM, 32GB Storage)
Apple iPhone 6s (32GB) - Space Gray
Apple iPhone XR (128GB) - Black
Apple iPhone 7 (32GB) - Black
Apple iPhone XR (64GB) - White
Apple iPhone 6s (32GB) - Rose Gold
Apple iPhone X (64GB) - Space Grey
Apple iPhone XR (64GB) - Black
Apple iPhone 8 (64GB) - Space Grey
Apple iPhone X (256GB) - Silver
(Refurbished) Apple iPhone 8 MQ6L2HN/A (Silver, 64GB)
(Sponsored) Apple iPhone Xs Max (512GB) - Space Grey
(Sponsored) Apple iPhone 8 (Red, 256GB)
(Sponsored) Apple iPhone 6s (32GB) - Silver
(Sponsored) Apple iPhone Xs (64GB) - Silver

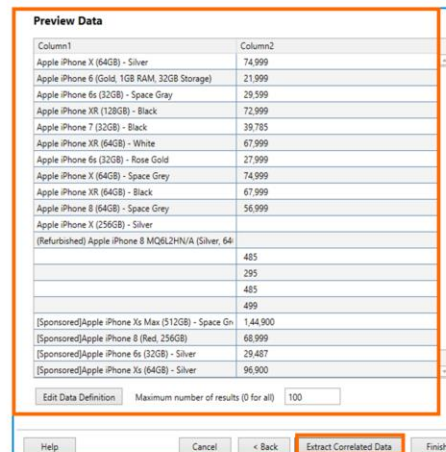
Below the table, there is a text input field for 'Maximum number of results (0 for all)' with the value '100'. At the bottom, there are buttons for 'Help', 'Cancel', '< Back', 'Extract Correlated Data' (which is highlighted with an orange box), and 'Finish'.

VII. The data is represented in a tabular form which shows only one column because we extract only one field. To add more fields then you click on the "Extract Correlated Data" and extract the price in the same way as we have extracted the name of the mobile, laptop or datatbale.

## Data Scraping (Contd.)

The steps to be followed are:

- The data is displayed in a Data table.
- Click on Extract Correlated Data to extract more fields.



**Preview Data**

Column1	Column2
Apple iPhone X (64GB) - Silver	74,999
Apple iPhone 6 (Gold, 1GB RAM, 32GB Storage)	21,999
Apple iPhone 6s (32GB) - Space Gray	29,599
Apple iPhone XR (128GB) - Black	72,999
Apple iPhone 7 (32GB) - Black	39,785
Apple iPhone XR (64GB) - White	67,999
Apple iPhone 6s (32GB) - Rose Gold	27,999
Apple iPhone X (64GB) - Space Grey	74,999
Apple iPhone XR (64GB) - Black	67,999
Apple iPhone 8 (64GB) - Space Grey	56,999
Apple iPhone X (256GB) - Silver	
(Refurbished) Apple iPhone 8 MQ8L2HN/A (Silver, 64	
	485
	295
	485
	499
(Sponsored) Apple iPhone Xs Max (512GB) - Space Gr	1,44,900
(Sponsored) Apple iPhone 8 (Red, 256GB)	68,999
(Sponsored) Apple iPhone 6s (32GB) - Silver	29,487
(Sponsored) Apple iPhone Xs (64GB) - Silver	96,900

Edit Data Definition Maximum number of results (0 for all) 100

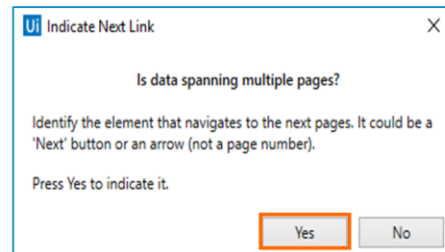
Help Cancel < Back **Extract Correlated Data** Finish

VIII. It is now appearing as a Data table, and in case we want to extract more fields we would click on Extract Correlated Data.

## Data Scraping (Contd.)

The steps to be followed are:

- Click on the Yes button to extract data from multiple pages.

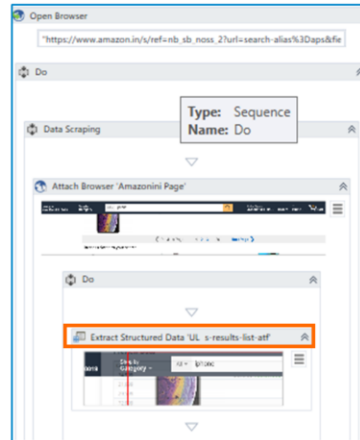


IX. If you require to extract the data by various pages, then you can click on the next section and get the data by click on the next page button.

## Data Scraping (Contd.)

The screenshot displays how the Studio will look:

- Click on the Extract Structured Data to see the properties of the data table.



X. Click on the **Extract Structured Data** inside the Do block and see the properties.

## Data Scraping (Contd.)

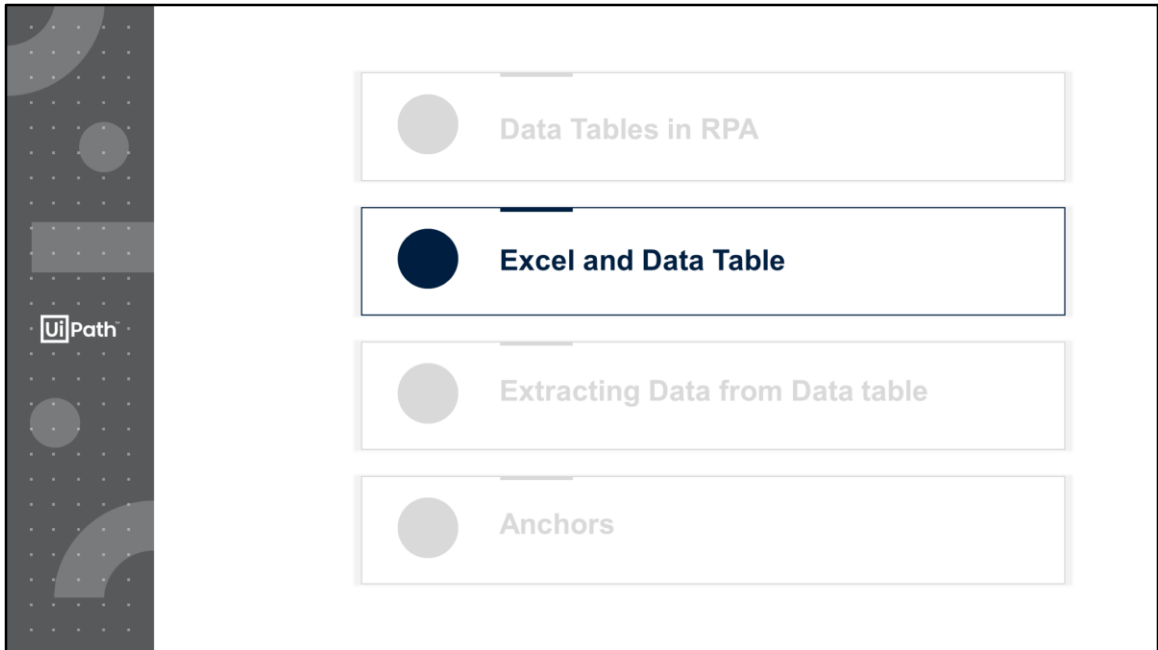
The properties of the data table:

- A variable with the name "ExtractDataTable" is created.

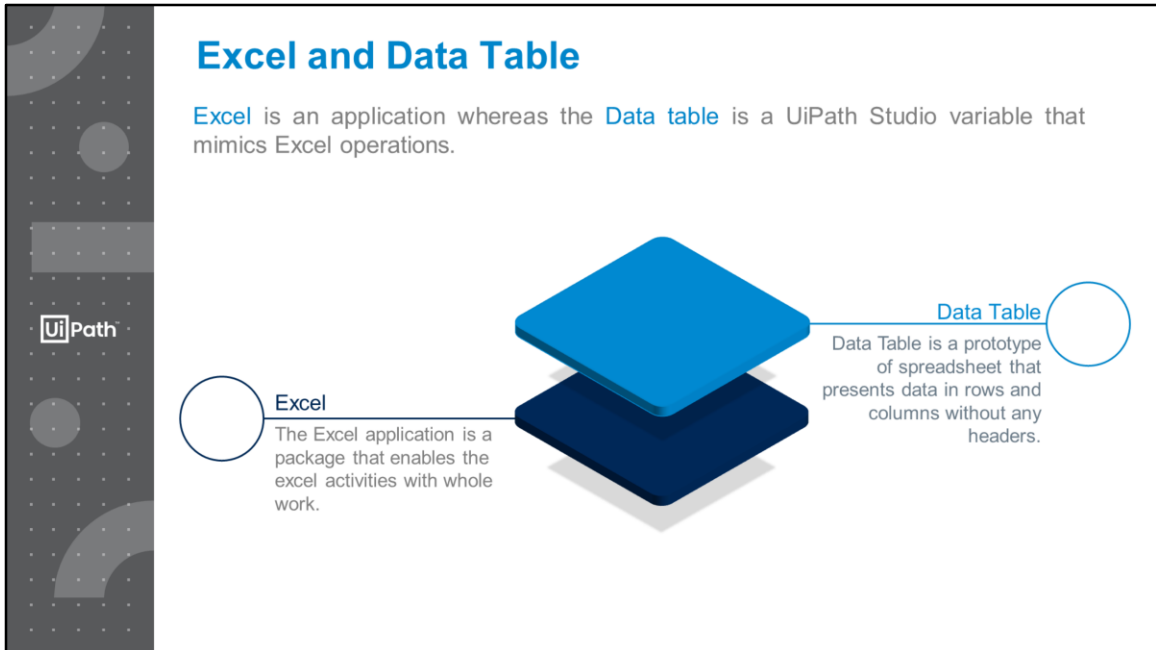
UiPath.Core.Activities.ExtractData

<b>Common</b>	
ContinueOnError	True
Display Name	Extract Structured
<b>Input</b>	
ExtractMetadata	"<extract> <cc
Target	Target
<b>Misc</b>	
Private	<input type="checkbox"/>
<b>Options</b>	
DelayBetweenPagesMS	300
MaxNumberOfResults	100
NextLinkSelector	"<webctrl id=
<b>Output</b>	
DataTable	ExtractDataTal

XI. It has automatically created a variable with the name "ExtractDataTable."



In this topic, we will learn about Excel and Data Table.

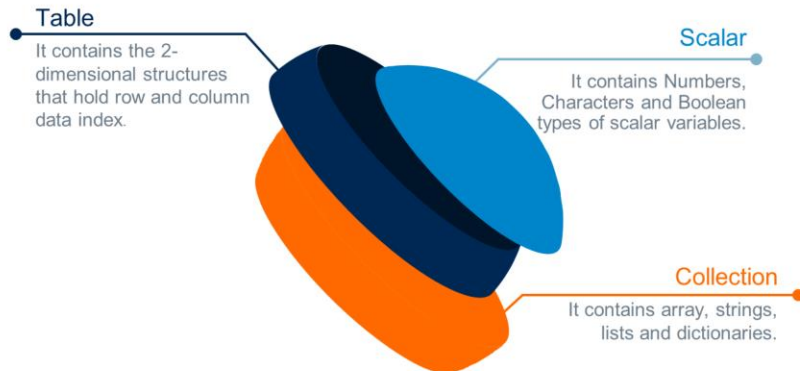


In UiPath Studio, Data Table is a prototype of spreadsheet data that represents the row and column without any headers. The Excel application is a package that enables the excel activities with whole work. Apart from this, it specifies the .xlsx file where you want to work.

You can start with the data table, if you don't have MS office on your laptop, desktop. The Container properties of the data table make Excel application activity for each process such as Read Range, Append Range, Read cell, Write range, Sort Table. Along with these, other types of data table activities that can be done are: Get row item, Build data table, Data Table, For Each Row and Add data row.

## Data Manipulation in Excel

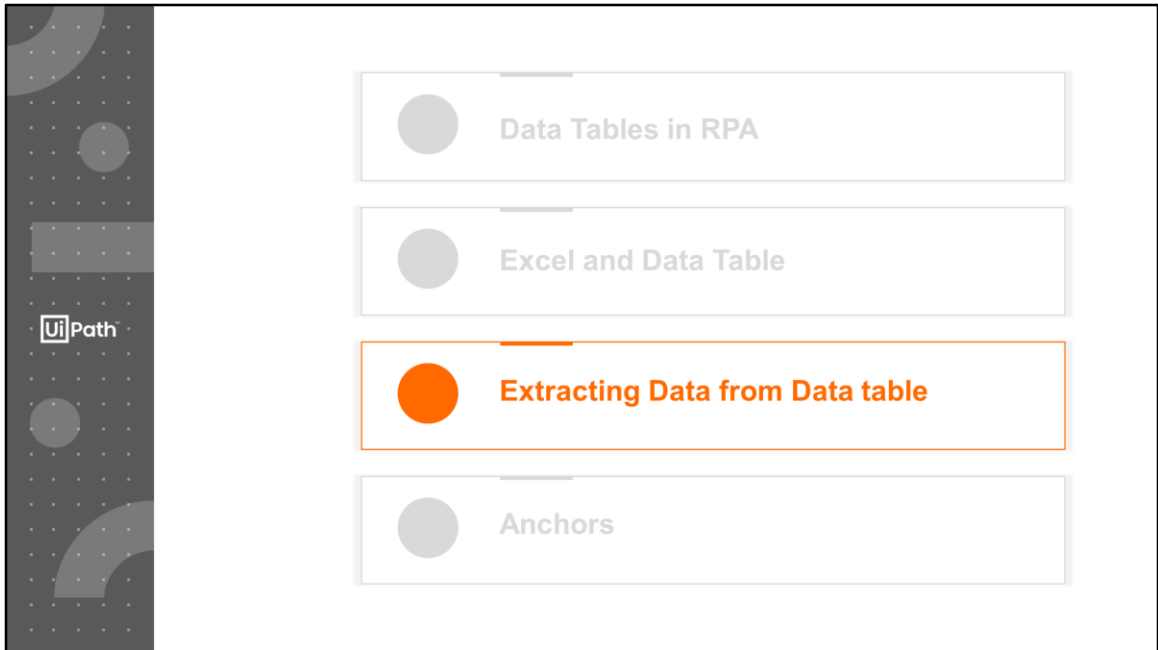
Excel format enables variable storage in three ways:



Data Manipulation is the most straightforward process in UiPath. Excel format enables variable storage in three ways:

- A. Scalar:** It contains Numbers, Characters and Boolean types of scalar variables.
- B. Collections:** The collection is a process which allows array, strings, and lists that is a collection of dictionaries, and character variable. It is useful to extract the data in the Excel spreadsheet and orchestrator queues.
- C. Tables:** It contains the 2-dimensional structures that hold the row and column data index. Additionally, it allows the GenericValue variable which represents the including text, date, times, basic types of data, and numbers.



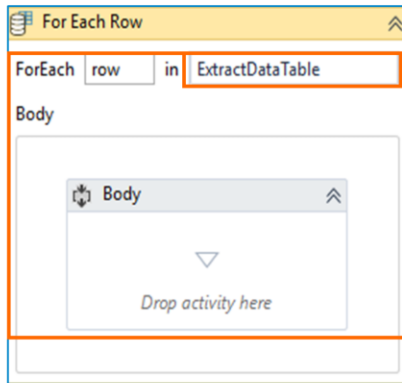


In this topic, we will learn about Extracting Data from Data Table.

## Extracting Data from Data Table

In UiPath, the "For Each Row" activity is used to [extract data from the data table](#). The steps to be followed are:

- Drag the "For Each Row" activity.
- Pass the variable "Extract Data Table" inside it.



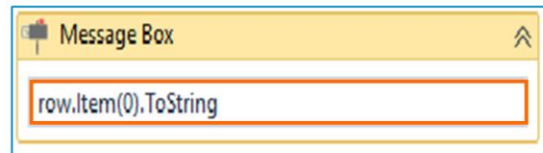
In UiPath, the "For Each Row" activity is used to extract data from the data table. The "For Each Row" activity is a loop that can accept only data table variable. It is mainly used to iterate the data row by row from the data table. These Steps to iterate the Data:

- a) Drag the "For Each Row" activity and pass the variable Extract Data table inside it.

## Extracting Data from Data Table (Contd.)

The steps to be followed are:

- Drag the message box inside the body of the message .
- Write "row.Item(0).ToString", inside it.

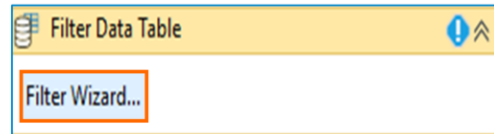


- b) Drag the message box or Write Line inside the body of the message and write the line to see the value of row "row.Item(0).ToString".

## Filtering Data Table

In UiPath, the "Filter Data Table" activity is used to [filter data from the data table](#). The steps to be followed are:

- Drag the "Filter Data Table" activity.
- Click on the Filter Wizard.
- Pass the data table variable inside the input Data table



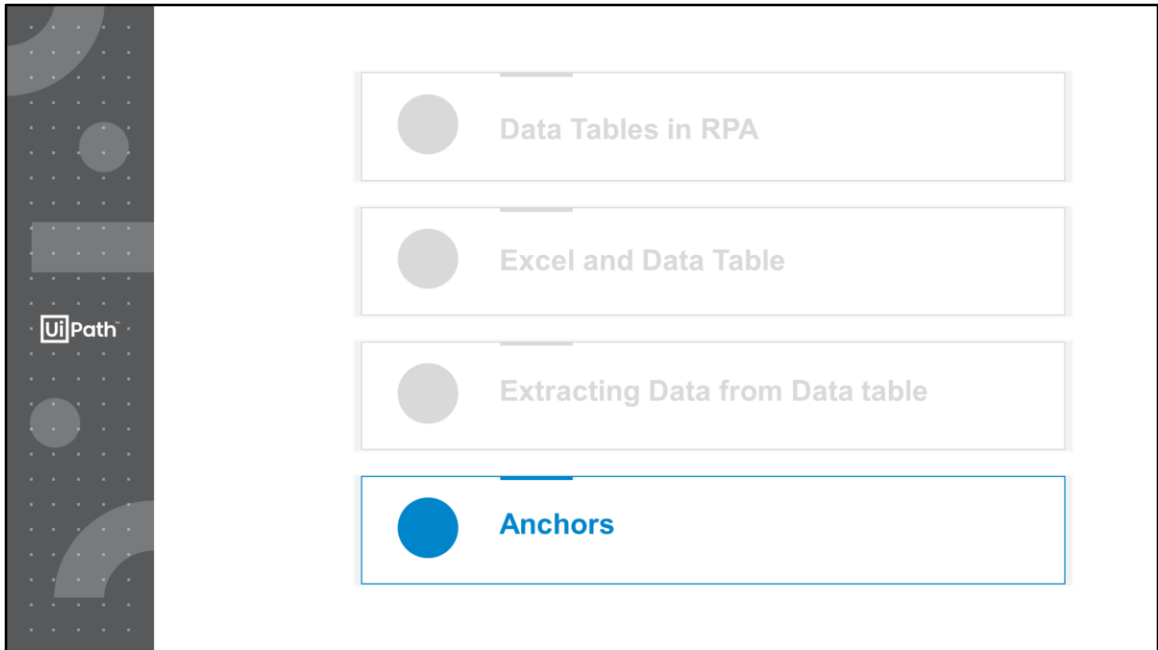
It is the fastest way to filter the data inside the data table based on specific conditions. It can keep or delete rows based on the right conditions. With the help of these steps, you can quickly filter data in the data table

Note: It only supports the data table variable and to use this, we need to ensure that the data table has data.

1. Drag the filter data table activity.
2. Click on the Filter wizard and pass the data table variable inside the input Data table.

Inside the output data table, the user can pass the same variable or different variable in which the user wants to store data according to his requirement.

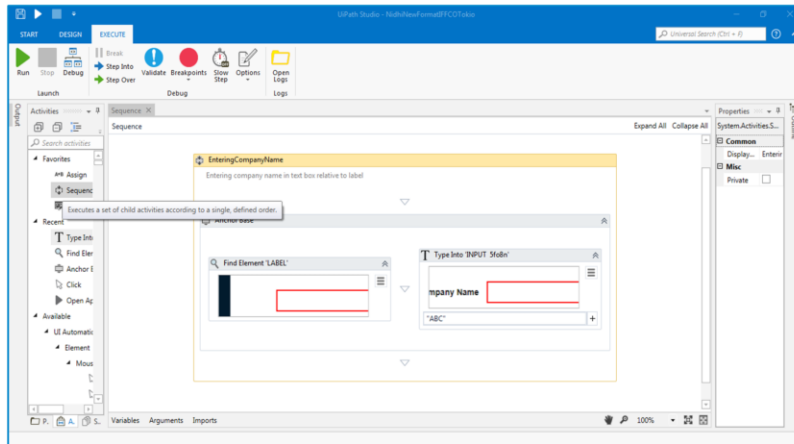
We need to ensure that the output variable must be a data table.



In this topic, we will learn about Anchors.

## Anchor

In UiPath, the term **Anchor** is used to describe a process that enables the user to catch or recognize the relative element of that element.

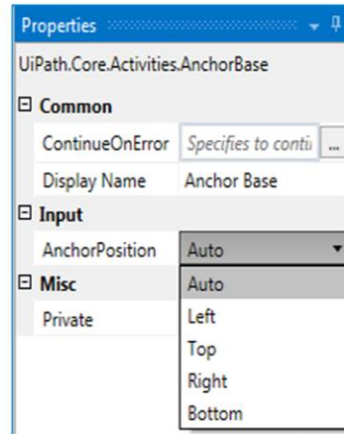


In UiPath, the term Anchor is described as a method that should be used when a constant selector is not available in the data table. The anchor is an efficient process that ensures that we are capable of catching or recognizing the relative element of that element.

## Properties of Anchor

Properties of Anchor can be categorized into three essential parameters:

- Input
- Common properties
- Miscellaneous properties



There are different properties of anchor base which can be categorized into three essential parameters based on Input, Common properties, and Miscellaneous properties.

**A. Input:** It refers to the specific area or place where the UI element is to be referred. The anchor position defines a significant portion of the input.

Anchor Position refers to the edge of the UI element that has been anchored.

**B. Common:** Under the Common section, there are two properties "ContinueOnError" & "Display name."

- ContinueOnError is a common property for many activities, It Accepts Boolean values, so there are only two options which we can enter here – True or False. If we enter a true: The execution of the process will continue whether there's an error or not but if we enter false or leave it blank: The execution of the process stops, an error is thrown.
- Display name as the name suggests it shows the name of the

activity we are using.

**C. Misc:** Misc has a property called "private," if we select private, then it works for logging levels. When we do logging, it gives a detailed description of the work, but when we select private here, the logging values will no more retain at the verbose level. In simple terms the values of arguments or variables will no longer be descriptive, it will show fewer details in log.

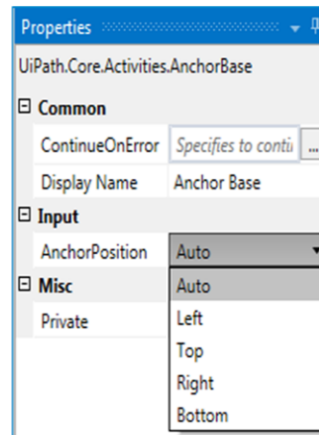


## Properties of Anchor (Contd.)

One of the properties of Anchor is the [Anchor Position](#).

Anchor Position refers to the edge/position where the UI element has been anchored.

- Auto
- Left
- Top
- Right
- Bottom



The anchor position defines a significant portion of the input. Anchor Position refers to the edge of the UI element that has been anchored.

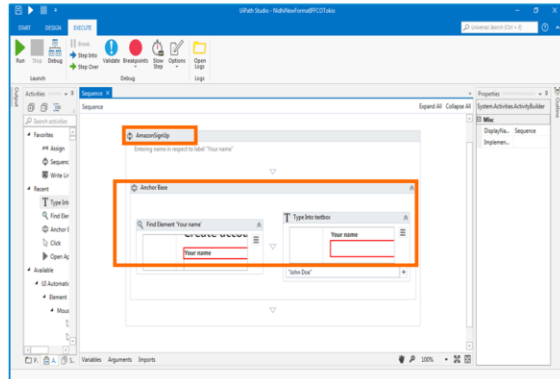
- **Left:** The left portion to the UI Element is used to search.
- **Right:** The right portion of the UI element is used to search.
- **Top:** The top portion of the UI element is used to search
- **Bottom:** The bottom portion of the UI element is used to search.

## Use of Anchors in PDF

The default direction for the anchor position is first left, right and then bottom.

For an example:

- Open Amazon login page.
- Sign in with credentials and details.
- Use the label "Your name" as an anchor.



The auto model plays a crucial role in deciding the anchor position. We ignore the bottom portion. The default direction for the anchor position is first left, right and then bottom. We generally prefer Right, Left and then Bottom direction for an anchor position and select the closest one.

Let us understand the activity through an example using a workflow. Let us consider amazon URL and the login page to sign in with credentials and details. In this workflow, we have considered your name label as an anchor to type into the textbox below it.

## Use of Anchors in PDF (Contd.)

- The anchor "Your name" displays the value of the element in the textbox.

The screenshot shows the Amazon 'Create account' form. The 'Your name' field is highlighted with an orange border and contains the text 'John Doe'. The form includes fields for 'Email', 'Password' (with a note 'At least 6 characters'), and 'Re-enter password'. A yellow button labeled 'Create your Amazon account' is at the bottom. Below the button, there is a link to 'Conditions of Use and Privacy Notice' and a link for 'Already have an account? Sign in'.

The anchor "Your name" displays the value of the element (John Doe) in the login textbox.

## Takeaways



### Data Tables in RPA, Excel and Data Table

The Data table is a type of variable in RPA that is used to store and write the data in the form of rows and columns.

Excel is an application whereas the Data table is a UiPath Studio variable that mimics Excel operations.



The point of the Recap & Summary section is to go through the most important points covered in the lesson, after the students had the chance to see them in practice and obtain a consolidated view.

The teacher should use facilitation questions to help the students map the key points and offer a safe space to get questions and comments from them.

Some examples of facilitation questions:

1. What are the two ways in which Data table can be created?
2. When is the Build Data Table Activity used?
3. In how many ways can variable be stored in Excel format?

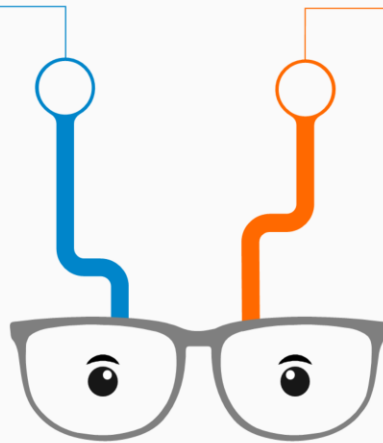
## Takeaways



### Extracting Data from Data table, Anchors

In UiPath, the "For Each Row" activity is used to extract data from the data table.

The term Anchor is used to describe a process that enables the user to catch or recognize the relative element of that element.



The point of the Recap & Summary section is to go through the most important points covered in the lesson, after the students had the chance to see them in practice and obtain a consolidated view.

The teacher should use facilitation questions to help the students map the key points and offer a safe space to get questions and comments from them.

Some examples of facilitation questions:

1. How is data extracted from data table?
2. What are the properties of Anchor?
3. How many Anchor positions are there?

## Questions & Answers



### **Q&A**

Now it's your turn. What's on your mind after learning this lesson?

The slide features a dark vertical sidebar on the left with a light gray dot grid pattern. The UiPath logo is centered in the sidebar. The main content area has a light gray background with a blue question header.

## How can we get column headers in an excel file?

- a) By using add header
- b) By using use filter
- c) By using preserve format

Correct answer: a) We can get column headers in an excel file by using add header.

The slide features a dark vertical bar on the left side containing the UiPath logo and several light gray geometric shapes (circles and rectangles) of varying sizes. The main content area is white.

## Which of the following is a Collection?

- a) array, list, and characters
- b) array, list, and string
- c) string, list, and characters

Correct answer: b) array, list, and string are Collections.



The slide features a dark vertical sidebar on the left with a light gray dot grid pattern. The UiPath logo is centered in the sidebar. The main content area has a light gray background with a thin blue vertical line to the left of the list items.

**Which of these activities can be used as an anchor in the Anchor base activity?**

- a) Find relative elements
- b) Find Children
- c) Find elements

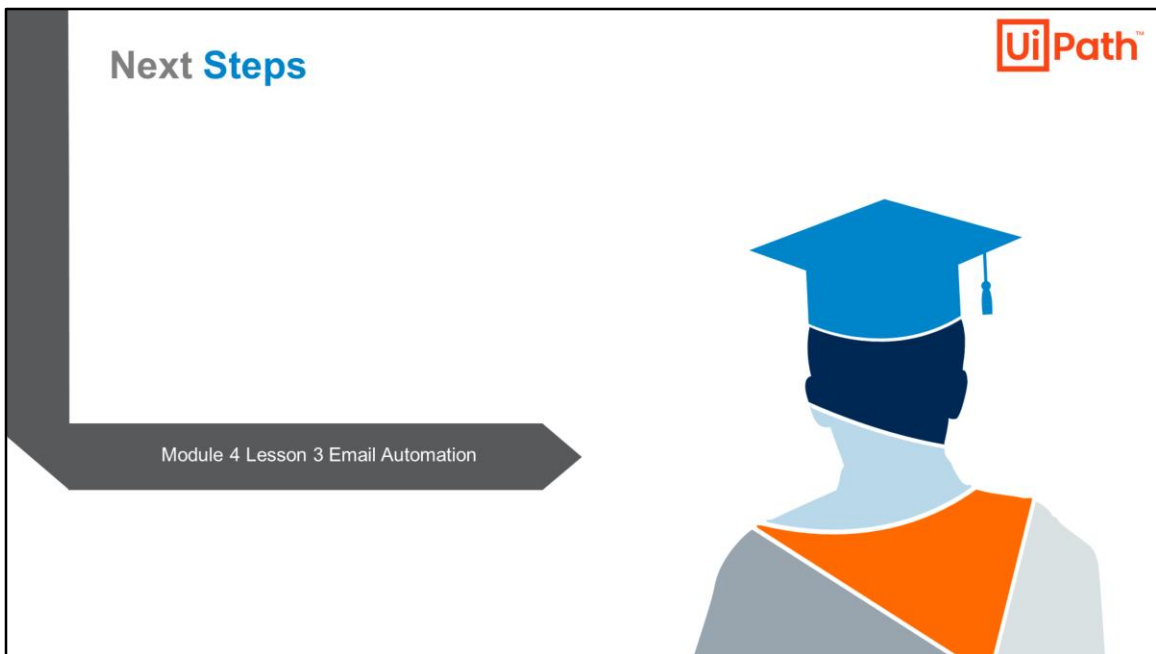
Correct answer: c) Find elements can be used as an anchor in the Anchor base activity.



**Which activity can be used to merge data table?**

- a) Join Data table
- b) Merge Data table
- c) Filter data table

Correct answer: b) Merge Data table activity can be used to merge data table.



In the next lesson, we will be covering Email Automation.