Tutorials Link

#CodeWithSimon

Footsteps towards RPA



Let's step into the journey, where you create robots so that you don't have to be one #RobotsHaveCome

Stephen Simon

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Footsteps towards RPA



Who should read this book?

This book is designed for developers who are starting their journey into Robotics Process Automation. This guide will give you a bird eye view about RPA with respect to UiPath RPA tool.

You'll learn how to get started and what are different process and automations you can perform.

This book can be taken as a first reference guide for RPA (UiPath Studio) and no pre-requisite is required.

Who should NOT read this book?

This book is not a step by step tutorial series and doesn't includes practical approach. If you are an experienced RPA developer or have worked on UiPath studio earlier, then this might not be the right book for you.

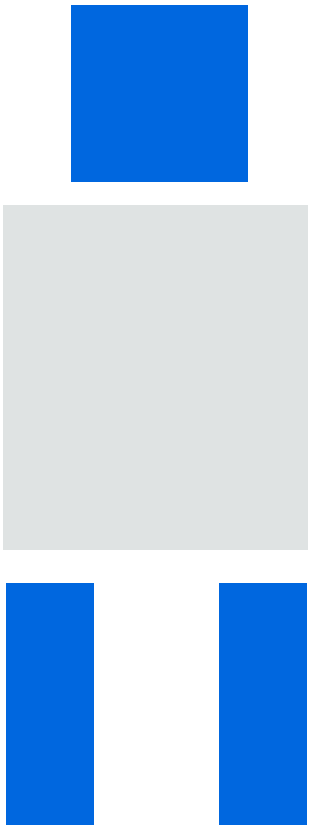
If all the above said satisfies you to read this guide, then lets let's step into the world where we learn the new age digital robots.

01 /

Intro to RPA and UiPath

What is Robotics Process Automation?

RPA that stands for *Robotics Process Automation* to simply put are the tools that are used to create own software robots to automate any business process. With the application of RPA technology one can configure computer software or a *bot* to integrate and emulate the actions of a human interacting within digital systems to execute a business process.



Bots are like Digital Workforce that can interact with any system or application in the same way humans do. The RPA robots can capture the data and manipulate application just like humans do by utilizing the user interface. They can be cloned, communicate with other systems, trigger responses to perform on a vast variety of repetitive tasks.

About UiPath

While you are reading this, Forbes has ranked UiPath as top 3 private cloud companies in the world.

To look into short history, UiPath was co-founded in 2005 in Romania by Daniel Dines as a Desk Over. Today, UiPath is the fastest growing enterprise in the history of software companies with, **5MM+ robots at work, 200,000 – string developers' community, and in over 2,500 global enterprise.**

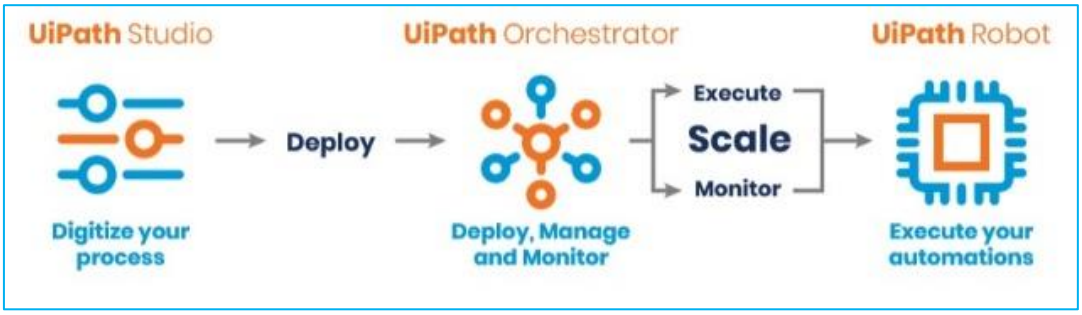
UiPath is a Robotics Process Company that aims to deliver automation across all the industry in the spectrum. As said by Bill Gates, a world with a PC for every desktop, UiPath envisions a world with a robot for every person. A place where every worker has a robot to help with mundane tasks, it frees employees to use time for higher-level work. Workers feel less stressed and become happier and more productive.



Components in UiPath

All the UiPath components works together seamlessly to deliver innovative and end-to-end solutions.

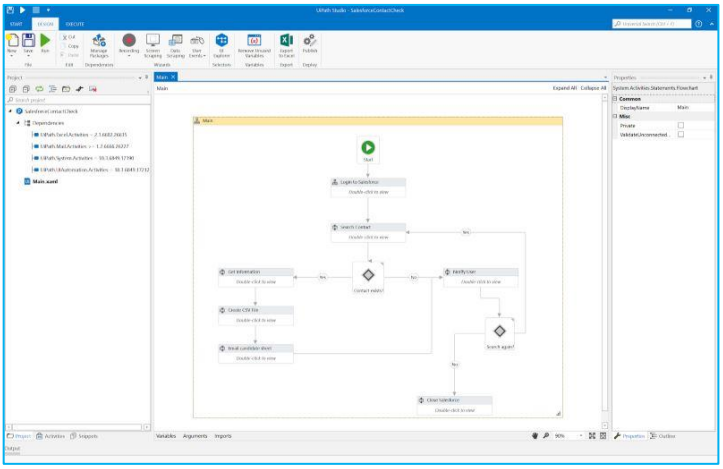
Three major components of UiPath are:



Studio

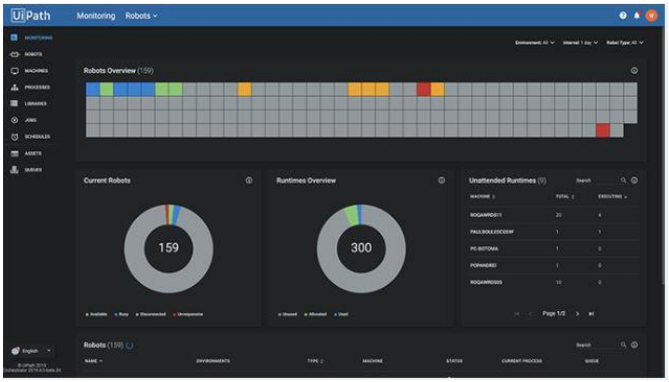
Studio is an IDE where you are going to design the automations for the Robots.

Using the code-free recording tool or drag-and-drop from pre built libraries makes the designing very easy. UiPath Studio also supports programming languages like VB.Net, C#, Python, and Java that can be used in complex scenarios to design powerful workflows.



Orchestrator

Orchestrator is the central dashboard or a web application where you can schedule, manage, and control UiPath Robots in executing repetitive business processes. You can use orchestrator for real time monitoring of the bots deployed globally acting as an integration point with third-party solutions and applications

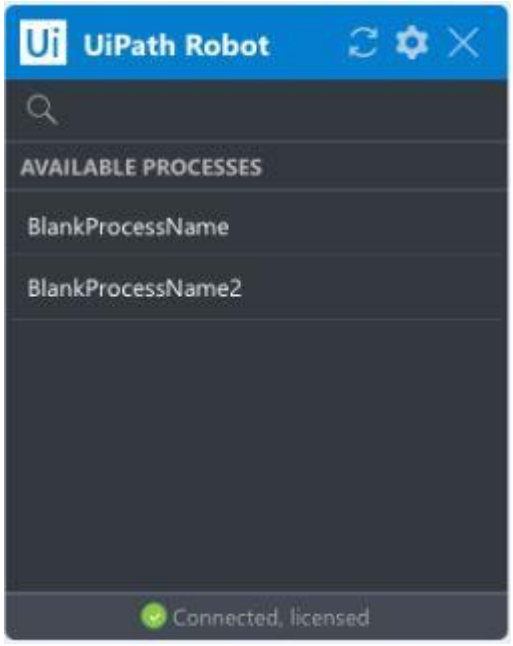


Robot

These are the fundamentals components of UiPath RPA platform. Robots execute the workflow designed in UiPath Studio which can be managed centrally from UiPath Orchestrator. Broadly speaking, UiPath supports two major types of Robot

Attended Bot: Human Intervention is required

Unattended Bot: Operate without human intervention, eventually increasing cost and performance



02 /

Getting Started with UiPath Studio

Installation and Setting up UiPath Studio

Now we know the major components of UiPath Ecosystem, let's set up the same in our local system. To get started, visit https://www.uipath.com/ and click on the *"Start Trial"* orange button on the top right. Here you will find two subscriptions to choose from. First one is Community and the other is Enterprise. We will stick to community edition as it is free and comes with following features:

- 2 Studios for designing automation
- 3 Robots
- Cloud-hosted Orchestrator
- Forum-only support
- UiPath Academy access

Once you select the Community Edition it will prompt you to Sign In/Sign up and send you the download link in the email provided by you.

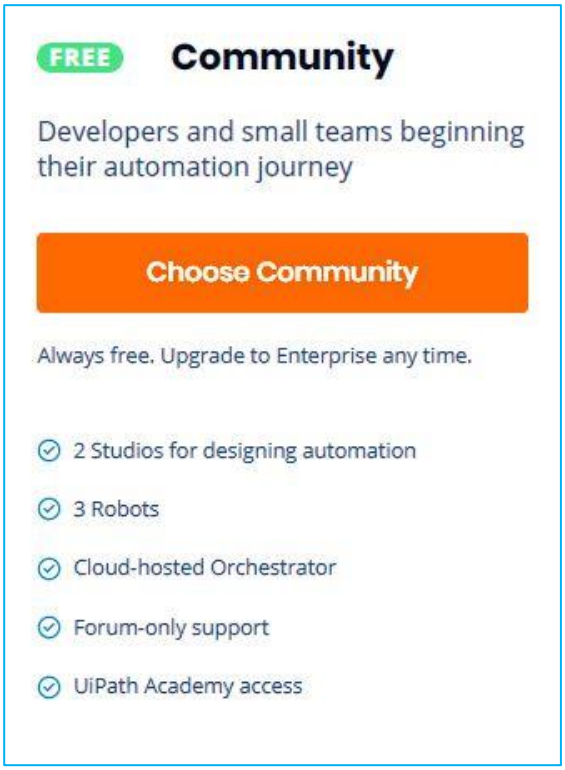
UiPath provided two installers which you can use to install Studio in your system.

- UiPathPlatformInstaller.exe
- UiPathStudio.msi

The one and only difference between these two installers is, *.exe* can help you install Orchestrator too.

If you install Studio with windows installer (.msi) then the location will be *C:\Program Files (x86)\UiPath\Studio* which would allow installation of machine per user with admin permissions.

In the User Mode Installation, the studio is installed at *%localappdata%\UiPath*. It does not require administrative permissions.



Interface of UiPath Studio

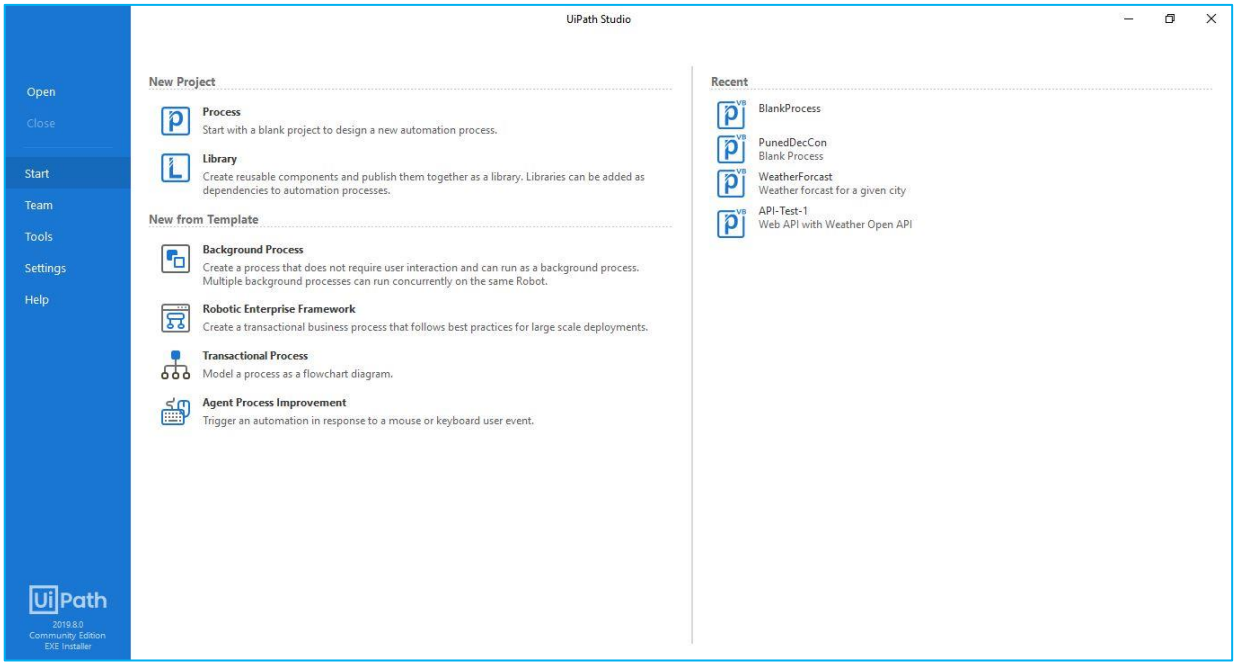
When you start the UiPath Studio, the first screen that prompts on your screen is the Start Page, which is actually a part of the Ribbon, that we will see later.
It gives you two option to work with your project: *1 - New Project; 2 – New from Template*.

New Project

Process - Start with a blank project to design a new automation process
Library – Create reusable component and publish them together as a library. Libraries can be added as dependencies to automation processes.

New from Template

Background Process – Create a process that does not require user interaction ad can run as a background process. Multiple background processes can run concurrently on the same Robot.
Robotics Enterprise Framework – Create a transactional business process that follows best practises for large scale deployments.
Transactional Process – Model a process as a flowchart diagram.
Agent Process Improvement – Triger an automation in response to a mouse or a keyboard user event.



Teams Tab – It allows you to connect your projects to GIT, TFS and SVN! You can also clone your existing project from here.

Tools Tab – You can use this tab to install extension for Firefox, Edge, Java, Silverlight, Citrix, Chrome, and Windows Remote Desktop. You can also use this tab to open apps like Ui Explorer and Project Dependencies Mass Update Tool.

Settings Tab – You can use this tab to change theme, interface language, and managing activities. It has three sub tabs:

1. General, which includes
Language – Use this to change the interface language in Studio and Robot.
Theme - Use this to change the interface theme in Studio.

Telemetry – Use this to enable or disable sending anonymous usage data.
Reset Settings – Reset all the settings to default.

2. Design

Save and Publish – Allows you to manage Auto backup interval, publish project timeout, keep last opened tabs.

Execution – You can control output console size, and minimize on run.

Default Locations – Manage Project path, publish library URL, publish process URL.

3. Manage Resources

In this section you can find locations of Default package Sources and User Defined Package Sources.

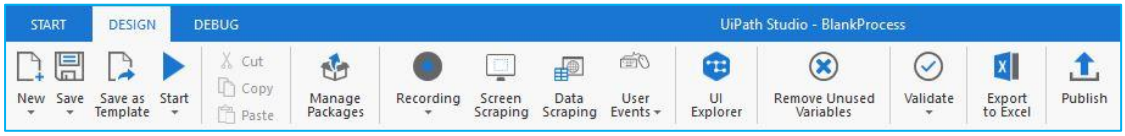
Help Tab – In the help tab you can find, Product documentation, Community Forum, Help Centre, RPA Academy, Release Notes. You can also find details about the licensing of Studio.

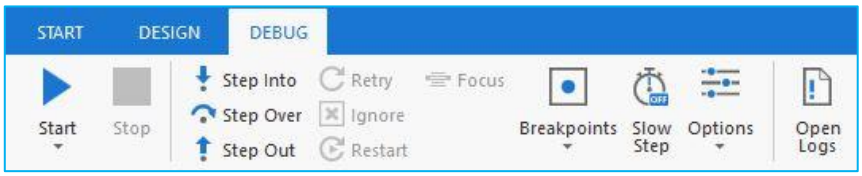
Design Ribbon

In the design ribbon you can create a new file, save an existing one, start the process, manage packages, perform recording, open UI Explorer, remove unused variables, screen and data scrapping. You can also publish your project, export to excel and validate errors.

Debug Ribbon

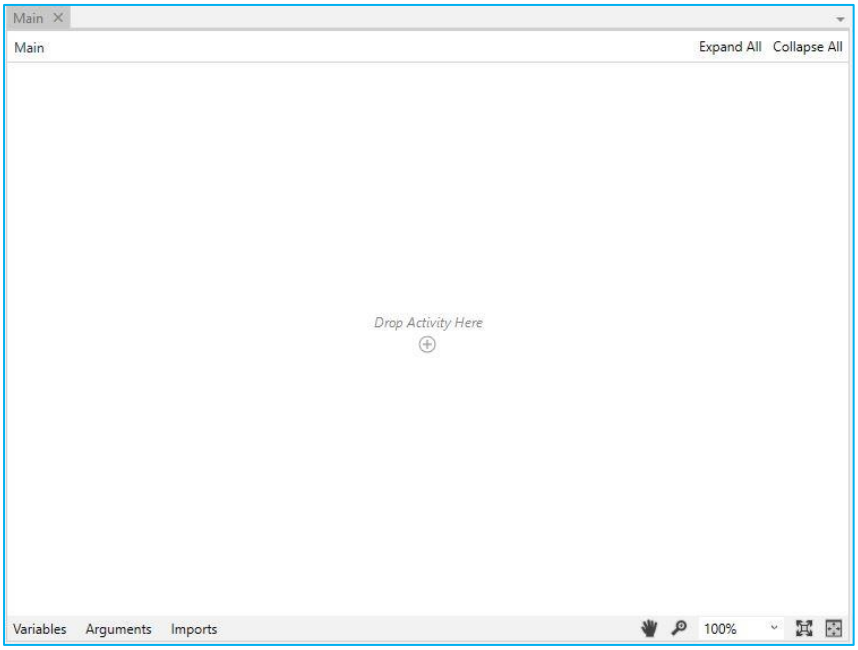
Under the Debug ribbon, you can run and validate the workflows, and use various debugging tools like setting up break points and managing debugging speed. You can also find logs to view details regarding execution or any other changes made in the project.





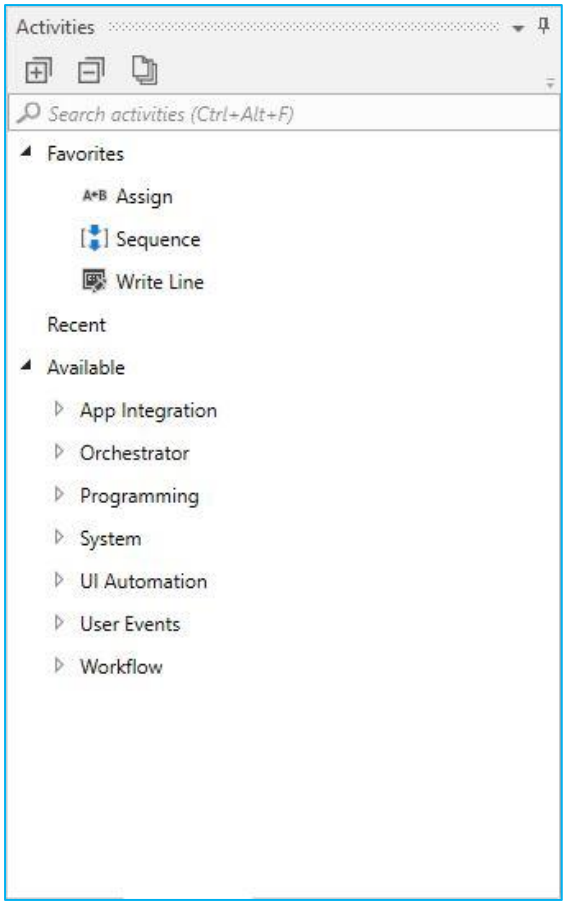
Designer Panel

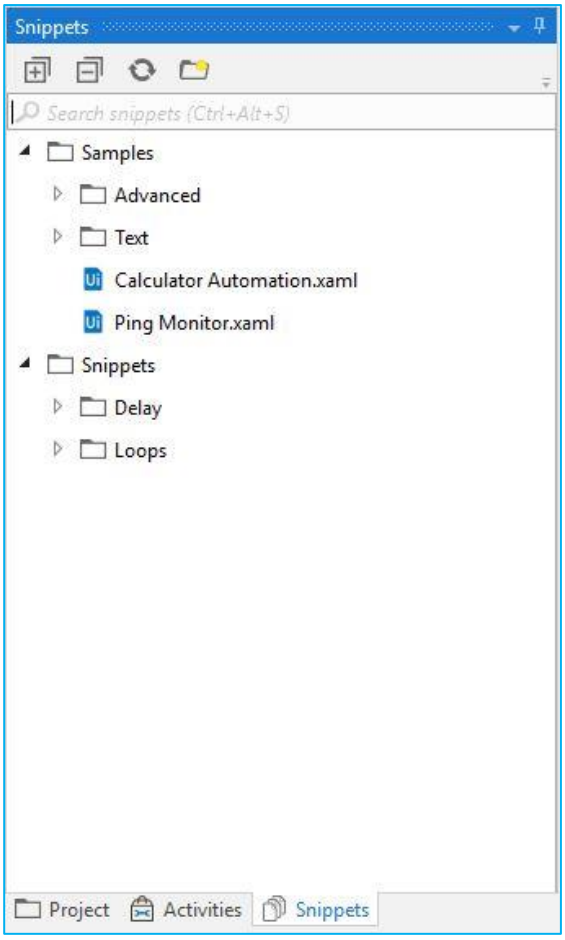
Consider this as a canvas where you will spend most of your time dragging and dropping the activity. Towards the bottom you will find quick access to variables, arguments and imports.



Activities Panel

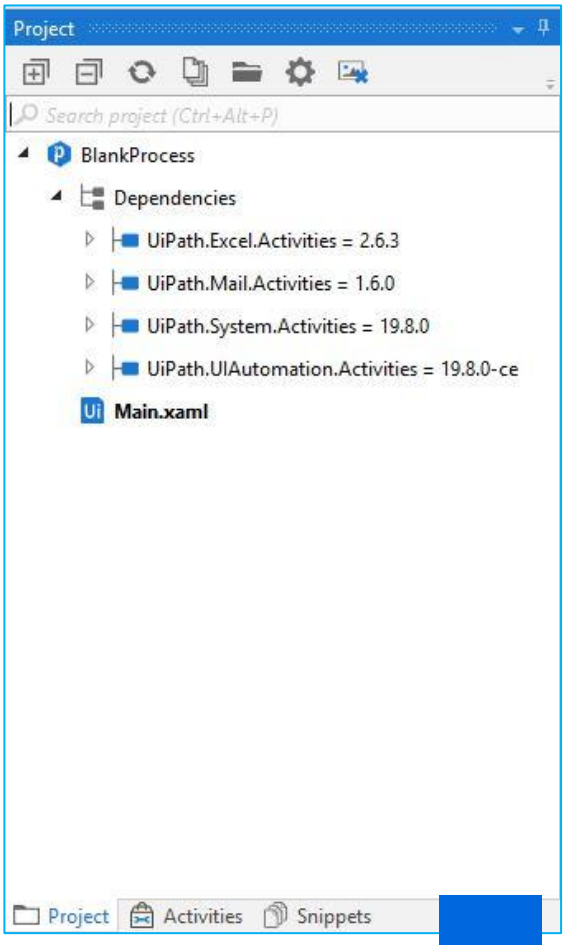
This panel contains more than 400 activities. You can add them in your current project also has a search box at top for quick access.





Snippets Panel

This panel includes multiple samples and snippets. You can also add your own folder and later remove it.

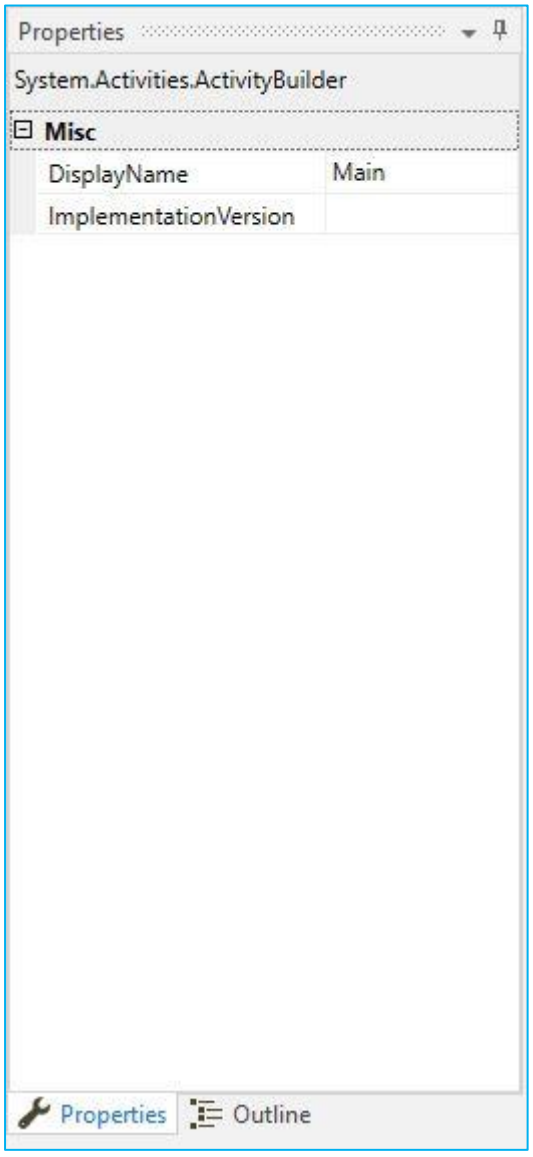


Project Panel

The project panel contains the content of the current project. You can manage the project dependencies, open file location and adjust project settings.

Properties Panel.

In the properties paned and you can change properties of a selected activity. If you select two properties, then the common properties can be modified.

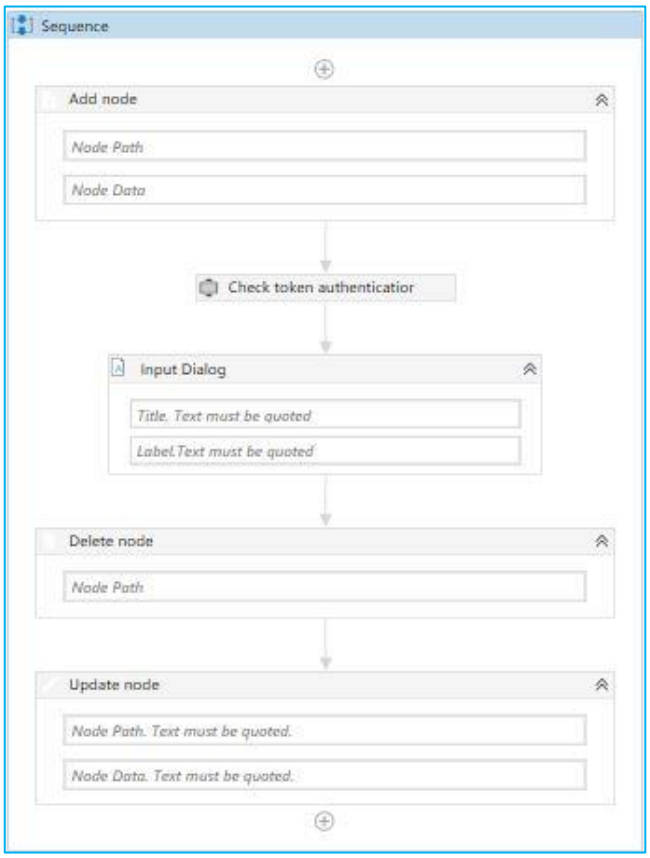


Types of Workflow

The main type of supported workflows are:

Sequences

These are suited for linear process and are the smallest type of project. They help to go form one activity to another seamlessly, and act as a single block activity. Sequences can be reusable, for instance if we create a sequence to take information from a PDF and add it to spreadsheet then we can use it in a different setting by changing some properties.



State Machines

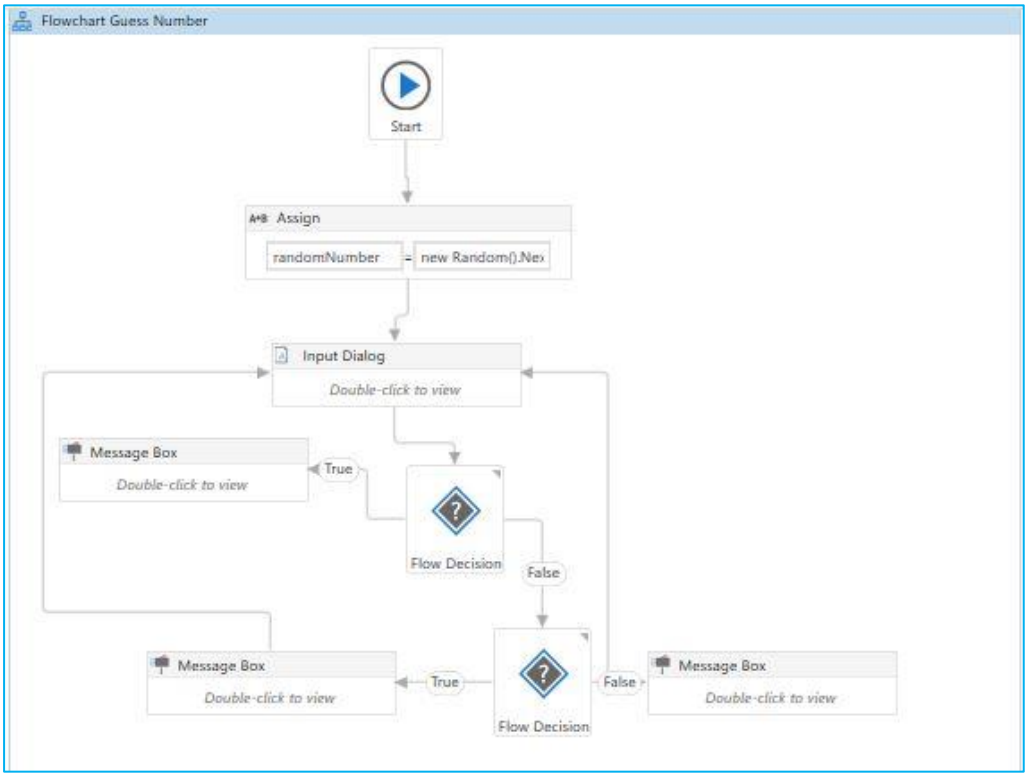
These are suited for very large workflows. It is a type of automation that uses finite number of states for its execution which are triggered by a condition (transition) or activity.

Flowcharts

These are suitable for complex business logics where we can integrate decisions and connect activities in a more diverse manner by using multiple branching logic operators.

Global Exception Handler

It is a type of workflow that is used for debugging processes and to determine the workflow behaviour when encountering an error.



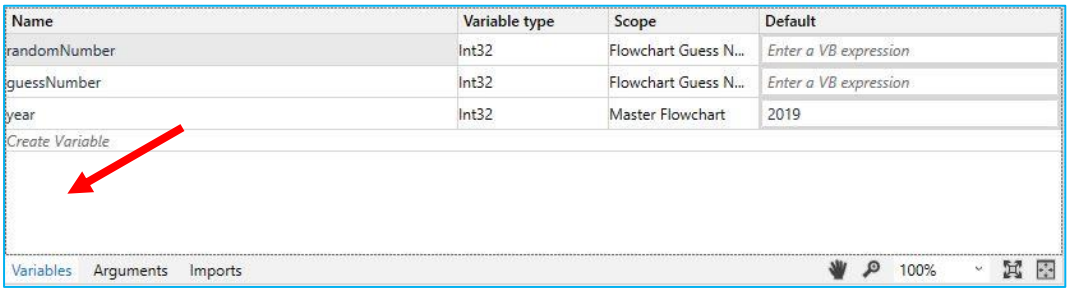
Variables & Data Types in UiPath

Even if you have no experience with programming even then you may have used variables in mathematics to represent unknown values or constants in an equation. In UiPath we can use variables to store various types of data like numbers, text, image, files, colours, and many others.

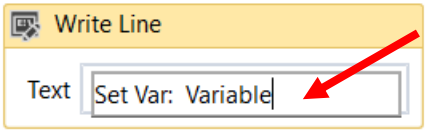
Main types of variables available in UiPath each for specific type of data.

Integer:
Whole Numbers (1, 2, 3, 674, 92415)
String:
Text of any kind "abc123%^$@#"
Boolean:
True or False
Generic:
All of the above + a few others
Arrays:
A list of any type.

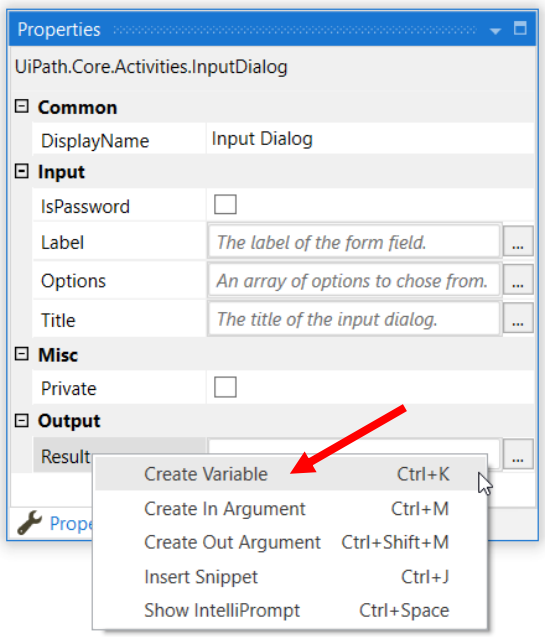
Variables are easy to find in UiPath. They are at the bottom, hidden by default.



From Activity Text Field



From the Property Panel Context Menu

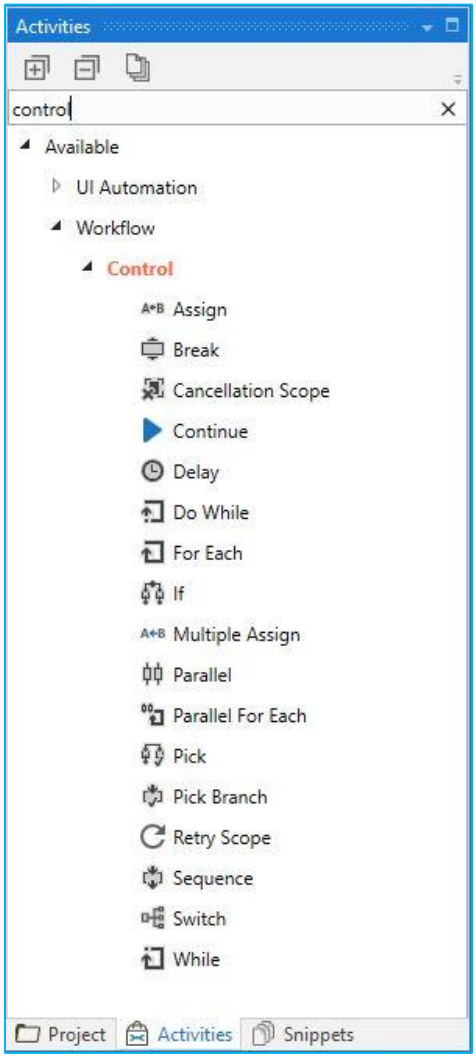


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Control Flow and Loops

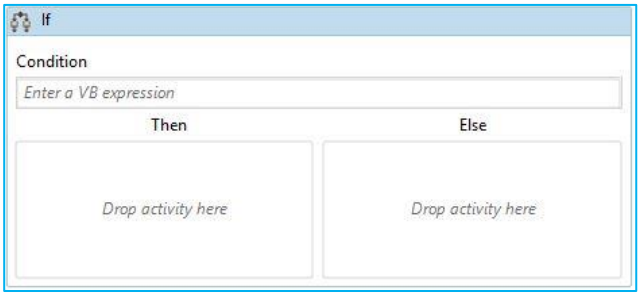
Control Flow in Studio

Control Flow refers to the orders in which the actions are performed.
Like in all programming languages, UiPath studio supports a bunch of Control Flow Activities. All the control flow activities can be found in activities panel under Workflow > Control.



If activity

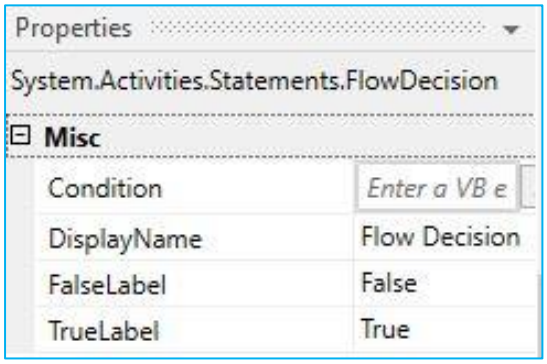
This activity is similar to *if statement* in any other programming language. It first tests the condition, if it's true then activities in "*Then*" block gets executed. If the condition given is false then *"Else"* block is executed.



Flow Decision

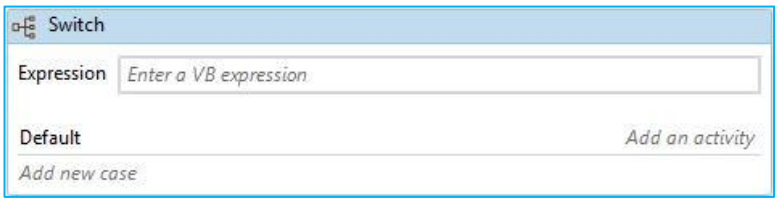
Very similar to If activity, it has two nodes – True and False. The condition is defined in the property section of the activity under Miscellaneous. If the condition is meet, then activity attached to True node is executed else the control flow in False node.





Switch

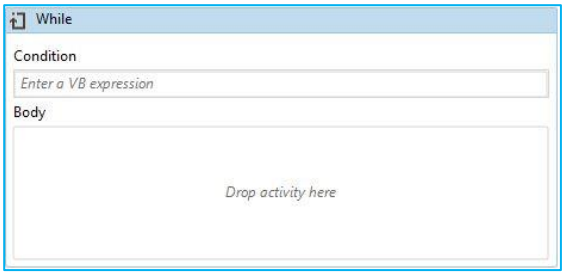
This activity enables you to select one choice from multiple options provided, based on the value of a specified expression. The default argument type is Int32 but can always be changed from the property panel.



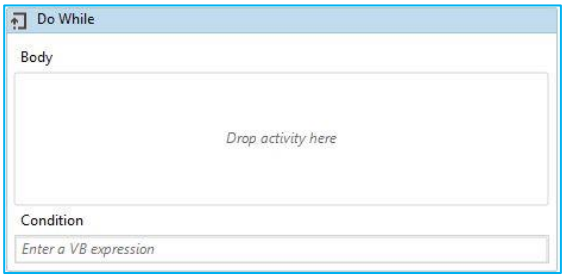
Using Loops in Studio

Loops are used to automate the repetitive tasks in UiPath.
Major loops activities available Studio are:

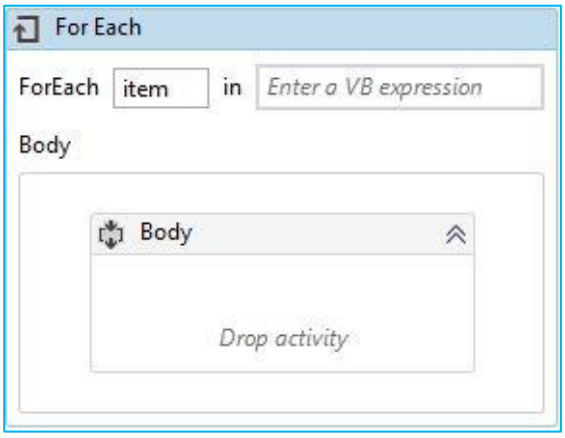
While
If the conditions are true, then the set of actions in the body are executed.



Do While
The action in the body are first executed and then, the condition is checked. If the condition is true then actions are executed again.



For Each
It is used to traverse collection of elements or array. It iterates through the list one at a time and then executes the actions in the body.



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User Interface Recording

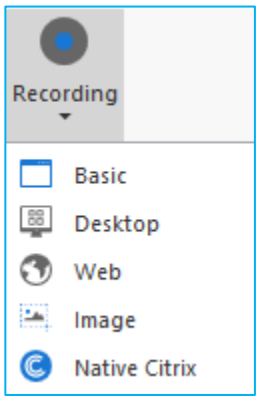
Recording

Recordings are an essential part of UiPath Studio, that can help to save time when automating business process. With recording you can capture users' actions on screens and add it into your workflow as a sequence.

It works similarly to other macro recording apps, but on steroids.

The user interface is highlighted when we hover during recording to ensure all correct fields, buttons, or menus are selected.

UiPath supports five types of recording, each with its own-use case and functionality.



Basic
This recording is suitable for the single activity and composes a full selector for each activity and no container. The resulted automation is slower than one that uses container.

Desktop

Very similar to Basic recording, this recording is suitable for all types of desktop apps and multiple actions. It generates a container in which activities are enclosed and partial selectors for each activity. It is comparatively faster than Basic Recording.

Web
Dedicated to record user interactions in browsers and web apps. It generates containers and use Simulate Type/Click input method by default.

Image
This recording is used in virtual environments like Citrix, VNC, Virtual Machines and more. It is restricted image, keyboard, and text automation and require explicit automation.

Native Citrix.
It is very similar to desktop recording but specifically meant for Citrix Environment.

All recording types have their own set controllers which helps you automate the process of a particular business cases.

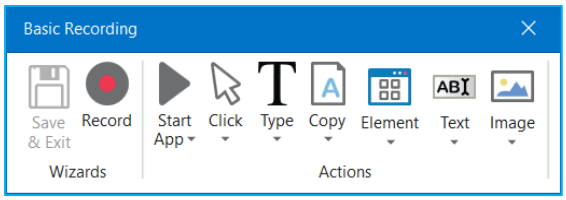


Fig – Basic Recording

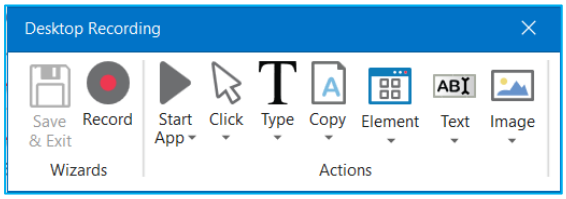


Fig – Desktop Recording

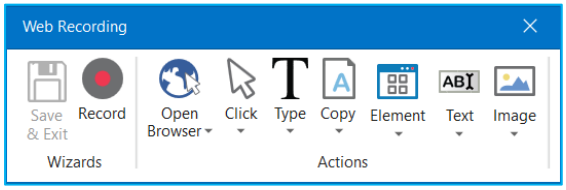


Fig – Web Recording

Save & Exit – To save the recorded activities and quit.

Record – Start automatically record multiple actions

Open Browser / Start App – Start App or Open browser

Click - Clicking on UI element or selecting checkbox

Type – Simulates keyboard shortcuts and keyboard

Copy – Use it to copy text from interface element and perform screen scrapping

Element – Looking for elements / waiting for them to vanish.

Text – Working with the text

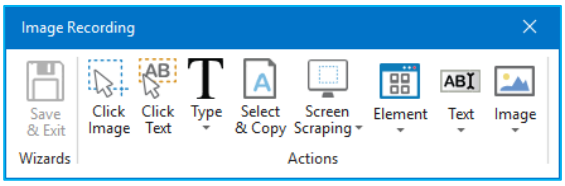


Fig – Image Recording

Click Image / Click Text – Used to click on text or image in citrix environment.

Select & Copy – Select and Copy text from window.

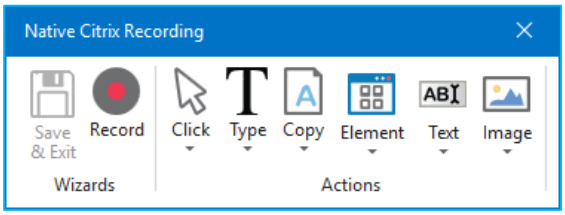


Fig – Native Citrix Recording

// Important Keyboard shortcuts that will be handy during recording.

F2 – Pauses for 3 seconds.

Esc – Stops the recording. Pressing Esc for second time saves the recording as a sequence and you return to your UiPath Studio.

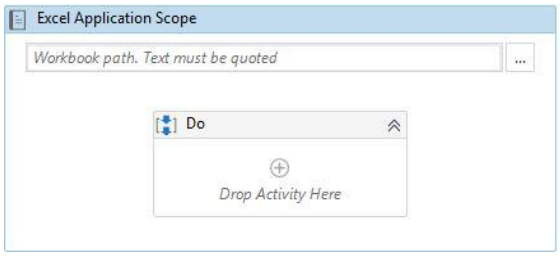
Right Click – Exit the recording.

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Excel & Data Tables

Working with Excel in UiPath

When working with excel the first activity will always be Excel Application Scope. It's a container and all the other excel activities must go inside it.



Use Excel App

- Requires MS Office Excel Installed
- Multiple processes can use the same file
- Visible real-time changes

Direct Access

- Does not require MS Office Excel
- Only one process can use the file
- Works only for .xlsx format

Remember a workbook is a just a reference to a excel file, it can have all types of data, formatting, sheets, layout, merge cells, and multiple data tables. Whereas a data table is the simplest type of spreadsheet made up of rows and columns with optional headers. The simplified format is useful for further processing.

Read Range Action – It reads a portion of Excel file and stores it in a DataTable, where different operations can be performed on it.



Output Data Table Action

Despite its name output data table doesn't print its content in the output pane, it just converts into string so that we can display it properly.

Write Range Action

It's very similar to read range action excepts it needs a data table to write to the file.



Append Range Action

Appends the data from a DataTable to a spreadsheet. If the sheet does not exist, a new one is created with the SheetName value. Changes are immediately saved.



Read Cell

Reads the value of a cell from a spreadsheet as a thing.



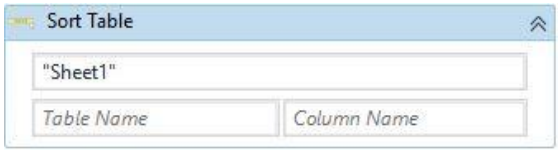
Write Cell Action

Writes a value/formula into a cell or a range from a spreadsheet. If the sheet does not exist, a new one is created with the SheetName value. If a value exists, it is overwritten. Changes are immediately saved.



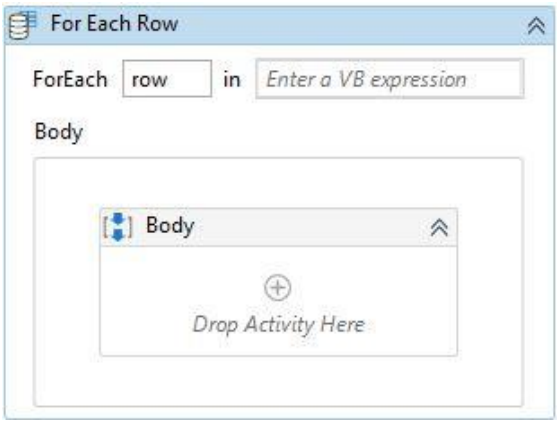
Sort Table Action

Sorts a table from a spreadsheet based on a column.



For Each Row

Executes an action once for each row in the DataTable provided.



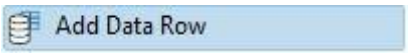
Get Row Item

Gets a value from a Data Row variable according to a specified column.



Add Data Row

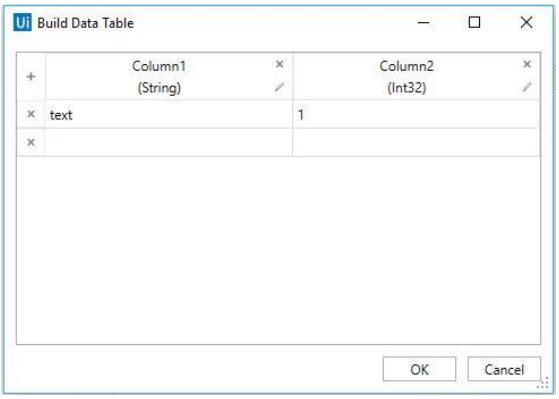
Adds a DataRow to a specified DataTable.



Build Data Table

Creates a DataTable according to a specified schema.





/ 06

Mail Activities

Mail Activities in UiPath

`Uipath.Mail.Activities` packages provides all the activities related to email that can help you automate almost all your email-based automation.

In context to Robotics Process Automation, email interactions can be classified in following two categories

Input of a Process

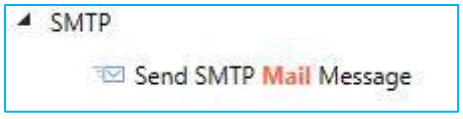
- Names and IDs coming in subject body.
- Input files coming as attachments (.xls, .pdf).

Output of a Process

- Progress reports to managers
- Exception alerts

SMTP

It's a basic protocol used only for sending email.



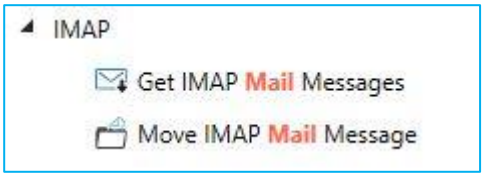
POP3

It stands for Post Office Protocol. It's an old and obsolete protocol. But most email servers support it.



IMAP

It stands for Internet Message Access Protocol and is only used to receive messages but offers some useful features like to mark messages as read or move them between folders.



Exchange

It's Microsoft enterprise email solution that UiPath integrates beautifully. It offers activities for sending and receiving messages, moving email between folders and deleting them.

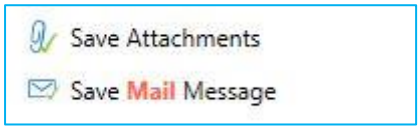


Outlook

The outlook activities are slightly different as they work with the API of the desktop application because of which you don't need to setup servers, users, and other technical details. All existing outlook accounts can me managed with these activities.



Two generic email activities available are **Save Mail Messages** and **Save Attachments** that can used to save email and attachments on the local storage.



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PDF Activities

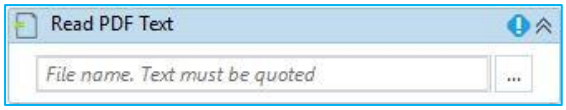
Working with PDF in UiPath

To work on PDF files in UiPath studio, it is necessary to have PDF activities pack installed. If not, you can download it form the Manage Package window and install the same.

A PDF file may contain text, images, and text that are undercover images. UiPath supports various activities and methods for handling PDF files it categorises in two types by their intended use, 1. Large Text – used for larger chunk of text 2. Specific Elements – used for extracting text items PDF file like a product, a name, an invoice and so on.

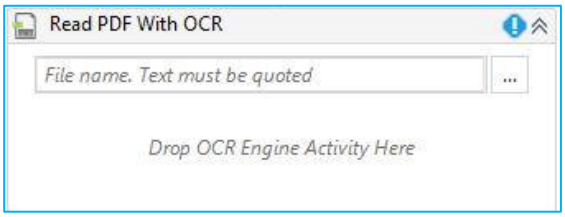
Read PDF Text Activity

To read whole PDF document or specific pages. You can use string operations to modify or extract information out of the generated text. The range parameter in this activity defines if you want to read entire page, specific page or range of pages.



Read PDF with OCR

It uses optical character recognition to scan the images inside the PDF document and output all the text as a variable. You can add any OCR of your choice that is available in the studio.



You may also use **Screen Scrapping** Tool to extract large and small blocks of text.

Get Text activity and **Anchor based** activity are also helpful while working with PDF to extract chunks of data from multiple files.

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What's Next?

Summary and how to go ahead?

Take a moment, and cheer yourself for reaching this section of book, as we are at the last page of this book but most important. As you have gone through this book, I believe you now have an idea what is RPA and what can be done with an RPA tool in this case UiPath studio. So, what's next? This is the time you start learning the practical implementation of everything that you've learned and to do so there are tons of resources. Bellow mentioned are some official resources that you must consider if you want to go ahead and learn more about UiPath.

1. **UiPath Academy**
   http://academy.uipath.com

2. **UiPath Community Forum**
   https://forum.uipath.com

3. **Video Tutorials**
   https://www.uipath.com/developers/video-tutorials

4. **UiPath Connect**
   https://connect.uipath.com

5. **UiPath Go**
   http://go.uipath.com

6. **UiPath MeetUp Group**
   https://forum.uipath.com/t/official-uipath-rpa-meetup-groups-all-of-them/96051

7. **UiPath Documentation**
   https://www.uipath.com/developers/guides-and-resources

8. **UiPath Certification**
   https://certificate.uipath.com



#CodeWithSimon

Hi, my name is Stephen SIMON and I happen to be the one who has penned down this book. Whatever I've achieved today in my young professional career most of it has come from the community, and that is why I've always believed in giving back and sharing knowledge. This free E-Book is one for the same. I'm active on social platforms and would like to connect with you through other channels too.

Thank You!

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LinkedIn.com/in/codewithsimon

YouTube.com/stephensimon

codewithsimon.com

