

SYLLABUS

Robotic Process Automation - (CCS361)

UNIT I INTRODUCTION TO ROBOTIC PROCESS AUTOMATION

Emergence of Robotic Process Automation (RPA), Evolution of RPA, Differentiating RPA from Automation - Benefits of RPA - Application areas of RPA, Components of RPA, RPA Platforms. Robotic Process Automation Tools - Templates, User Interface, Domains in Activities, Workflow Files. **(Chapter - 1)**

UNIT II AUTOMATION PROCESS ACTIVITIES

Sequence, Flowchart & Control Flow : Sequencing the Workflow, Activities, Flowchart, Control Flow for Decision making. Data Manipulation : Variables, Collection, Arguments, Data Table, Clipboard management, File operations Controls : Finding the control, waiting for a control, Act on a control, UiExplorer, Handling Events. **(Chapter - 2)**

UNIT III APP INTEGRATION, RECORDING AND SCRAPING

App Integration, Recording, Scraping, Selector, Workflow Activities. Recording mouse and keyboard actions to perform operation, Scraping data from website and writing to CSV. Process Mining. **(Chapter - 3)**

UNIT IV EXCEPTION HANDLING AND CODE MANAGEMENT

Exception handling, Common exceptions, Logging - Debugging techniques, Collecting crash dumps, Error reporting. Code management and maintenance : Project organization, Nesting workflows, Reusability, Templates, Commenting techniques, State Machine. **(Chapter - 4)**

UNIT V DEPLOYMENT AND MAINTENANCE

Publishing using publish utility, Orchestration Server, Control bots, Orchestration Server to deploy bots, License management, Publishing and managing updates. RPA Vendors - Open Source RPA, Future of RPA. **(Chapter - 5)**

UNIT I

1

Introduction to Robotic Process Automation

Syllabus

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1.1 Introduction

- Compared to other automation options, robotic process automation is more economically viable.
- In the IT sector, it's the newest buzzword. It has changed how business tasks are traditionally completed inside an organization-from being done manually to being done automatically.
- RPA technology automates processes by using bots that interact with emails, websites, spreadsheets and online applications in a manner similar to that of a person.
- Though the Atari 2600 was not the first generalized gaming system, it was the first extraordinarily successful one. Unlike games for modern consoles, most games for the Atari were created by a single individual who was responsible for all the art, design and programming. Development cycles were also substantially shorter - even the most complicated games were finished in a matter of months.
- Programmers in this era also needed to have a much greater understanding of the low-level operations of the hardware. The processor ran at 1.1 MHz and there was only 128 bytes of RAM.
- With these limitations, usage of a high-level programming language such as C was impractical due to performance reasons. This meant that games had to be written entirely in assembly. To make matters worse, debugging was wholly up to the developer. There were no development tools or a Software Development Kit (SDK) Atari Era (1977-1985)

1.1.1 Emergence of Robotic Process Automation (RPA)

- Robotic Process Automation or RPA, is the technology behind software solutions that automate repetitive, manual or rule - based human processes.
- Generally speaking, it works significantly faster than a person alone, almost like a bot.
- These RPA software bots can communicate with internal apps, websites, user portals and more.
- They also never sleep and never make errors.
- They have the ability to log into programs, input data, see emails and attachments, do calculations and tasks and then log out.

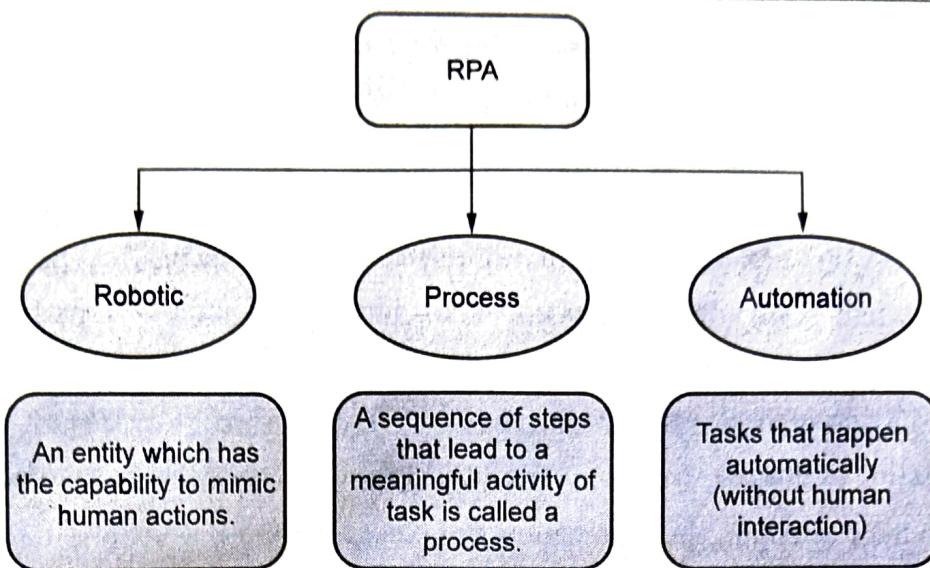


Fig. 1.1.1

- The term "robot" in "RPA" refers to a virtual system that assists in automating repetitive business process or manual computing chores rather than an actual robot.
- The following advantages of robotic process automation technology are offered :
 - Cost savings : Since RPA is usually less expensive than employing an individual to do the same set of activities, it helps organizations save a tonne of money.
 - Less error : RPA employs conventional reasoning and is not easily bored, sidetracked or worn out. As a result, there is a far lower chance of making mistakes, which results in less rework and an improved reputation for efficiency.
 - Faster processing : RPA processes tasks more quickly than human workers since computer software can carry out repetitive tasks continuously and doesn't need breaks, meals or rest. RPA makes processing times regular and predictable, ensuring excellent customer service across the organization.
 - Improved regulatory compliance : RPA software processes data and logic inputs, acting only as required to carry out instructions. Therefore, the likelihood of breaking the normative rules is negligible.
 - Better customer service : When RPA is used in a company, many of its workers have more time to focus on tasks that are linked to customers. It is especially helpful for companies that get a lot of consumer inquiries. Employee productivity also rises as a result.

1.2 Evolution of RPA

- Over the last seventy years or more, computers have played a significant role in driving this trend. Throughout history, several eras of automation have occurred, contingent

upon the nature of the prevailing technology. They would furthermore provide RPA platforms a base.

- Mainframe Era : Big computers created by IBM and other firms. Large corporations could largely afford them, but entrepreneurs like Ross Perot would later develop outsourcing services to make them more accessible. However, they proved to be very helpful in managing vital business operations like payroll and client accounts.
- PC revolution : The technology sector was completely transformed by Intel's CPU and Microsoft's operating system development. Because of this, almost any kind of organization might use word processors and spreadsheets to automate some procedures.
- Despite their strength, the automation technologies were not without flaws. They may quickly lead to intricate IT infrastructures that needed bespoke development and costly, time - consuming interconnections.
- The foundational ideas of RPA, which evolved in the early 2000s, stemmed from this.
- Screen scraping or the automation of data movement across apps, played a significant role in this and ultimately resulted in a good increase in productivity. But there wasn't much focus on the emerging RPA market. For the most part, it was seen as low - tech and generic.
- Rather of concentrating on conventional IT systems, Silicon Valley investors and entrepreneurs paid more attention to the quickly expanding cloud sector. But the RPA market reached a turning point in 2012 or so. This resulted from a confluence of many tendencies, including the following :
 - Following the financial crisis, businesses searched for methods to reduce their expenses. In other words, established technologies such as ERP were maturing. Thus, businesses had to find new drivers
 - Businesses also realized they needed to figure out how to avoid being disrupted by digital firms.
 - RPA was seen as a simpler and more affordable method of becoming digital;
 - Banking and other sectors were becoming more regulated. Stated differently, there was a strong need to identify methods for reducing paperwork while enhancing audit, security and control.
 - RPA technology was beginning to become more advanced and user - friendly, resulting in increased Return On Investment (ROI).

- RPA was beginning to be used by big businesses for applications that were really necessary. Demographics also had a major role. As millennials began to join the workforce, they expressed a desire for more interesting jobs.
- They wanted careers, not jobs.
 - Fast forward to today, RPA is the fastest growing part of the software industry. According to Gartner, the spending on this technology jumped by 63 % to \$850 million in 2018 and is forecasted to reach \$1.3 billion by 2019. Or consider the findings from Transparency Market Research. The firm projects that the global market for RPA will soar to \$5 billion by 2020.

1.3 The Benefits of RPA

- There are many more advantages of RPA than simply how it affects the bottom line. Technology has the power to change a business.
 - The Significance of Minor Enhancements An employee who completes a job, even one as easy as copying and pasting, in less than ten to twenty seconds may appear insignificant at first. However, it's not. In a worldwide organization with thousands of people, the effect may undoubtedly be substantial.
- For instance, some businesses monitor the number of hours saved by the use of RPA, which is included into the total return on investment computation.
- Relatively simple to implement : RPA often requires less complicated integration and setup than conventional corporate apps like CRMs or ERPs. Why ? Keep in mind that the programmed sits atop already in place IT infrastructure. Because it does not need the user to learn sophisticated code, RPA is also comparatively simple to use.
- In summary, RPA implementers will be able to accomplish their goals more quickly and the IT staff will have more time to work on higher priority tasks. This is significant since there is still a tendency towards lower IT investment.
- Compliance : A single breach of a government rule may have a gravely negative effect on an organization. It may even pose a hazard to its own survival.
- Enron and Theranos are two examples of companies that demonstrate this point. Although most workers are trustworthy and hardworking, sometimes they make errors or don't comprehend certain rules. However, RPA is not the problem here. A bot may be simply configured to ensure that its activities comply with legal obligations. A lot of RPA providers additionally include their own compliance systems, which manage regulations like HIPAA (Health Insurance Portability and Accountability Act of 1996),

GDPR and Sarbanes - Oxley Act. Less interference with user data means less opportunity for fraud, which is another advantage of compliance.

- Customer service : In today's world, customers want prompt and precise replies from their businesses. However, this is challenging to provide, particularly when a business is inundated with new connections. However, here is where RPA can really help. The bots are designed to ensure that every step is done, on a large scale. Metrics measuring customer happiness, such as the Net Promoter Score (NPS), often rise as a consequence.
 - Employee contentment : Yes, your team ought to profit from RPA as well. Ultimately, it implies that people are spared from wasting their precious time on monotonous tasks. Productivity may increase and turnover may decrease as a consequence.
- Broad application : An enterprise application often concentrates on a certain area of a business's divisions or operations. RPA, however, is broad. Almost every department of a business, including legal, finance, HR, marketing and sales, may utilize it.
- Data quality should be significantly enhanced as there will be a reduced possibility of human mistake. In fact, since the automation is scalable, there will likely be a lot more data. To put it another way, the datasets for AI and analytics will be more reliable and valuable.
- CEOs consider digital transformation to be of utmost importance. However, integrating or replacing the legacy systems used by many businesses would be costly. RPA is a method that may assist with this procedure, which is often speedier and less expensive.
- Scalability : Hiring additional staff might be quite challenging in the event of a sharp increase in demand. Yet, RPA could be a workaround. Adding more bots to satisfy demand is quicker and much less expensive.

1.4 Application Areas of RPA

Robotic process automation In healthcare

- The healthcare sector handles a great deal of very sensitive customer interactions, but it also handles a lot of time - consuming, monotonous administrative tasks that don't need technological know - how. RPA has the ability to automate jobs throughout the whole organization, including front-office operations, operational procedures, patient involvement and bill collection. It may save expenses, speed up operations, simplify tasks, increase business process productivity and improve patients' experiences in medical facilities. The healthcare sector is one of the finest where RPA applications can be seen and the necessity for robotic process automation (RPA) is only predicted to

increase. The worldwide market is expected to reach \$10.7 billion in the next seven years at a CAGR of 33.6 %.

Robotic process automation in supply chain management

- Production, efficiency and accuracy are three areas where the business process sector is anticipated to be greatly impacted by RPA in supply chain. Robotic Process Automation (RPA) is used in the supply chain to automate tasks that are now carried out manually, minimizing the chance of mistakes and aberrations. Businesses will be able to hire and train workers for problem-solving and brainstorming assignments using robots in place of boring, laborious activities. Additionally, research has shown that robotic process automation has reduced processing times by 43 % for tasks like credit, collections, invoicing, etc. Businesses are acting swiftly to automate their supply chains in order to make them more efficient and productive, even though robotic process automation is still in its infancy when it comes to supply chain operations. But soon, the sector will serve as a shining example of the finest uses of RPA.

Robotic process automation for customer service

- By lowering administrative effort, robotic process automation, or RPA, improves and elevates customer service. Software robots expedite customer care by retrieving documents and data from several systems, managing service requests and updating client information. Thanks to robots, customer requests can be handled more quickly and user feedback and satisfaction metrics can be better controlled. By aiding in the gathering of information and documents and the updating of customer requests and data, RPA also increases efficiency. Customer service is undoubtedly one of the most important use cases for RPA.

Robotic process automation in banking

- The banking sector is one of the finest places to use RPA. With the help of technology advancements that have made services faster, more trustworthy and more dependable overall, the banking and financial industry has seen exponential expansion in recent years. By automating laborious manual tasks, RPA helps banking and accounting departments gain a competitive advantage and free up staff time for other crucial tasks. In order to better manage and automate time-consuming banking tasks, RPA has been extensively used in this sector. In fact, studies predict that RPA in the banking industry would reach \$1.12 billion by 2025. By transferring the majority of the tedious, manual tasks from employees to machines, banks have been able to significantly reduce the requirement for human involvement. This has had an impact on everything from staffing issues and expenses to productivity and efficiency levels.

Robotic process automation in human resources

- Even while RPA isn't as well-known as other types of intelligent automation used in HR, as more use cases surface, HR professionals are starting to use it. RPA is presently widely utilized in HR to automate operations such as facilitating health plan enrollment, creating badges for conferences and special events, sending job offer letters to applicants, onboarding new personnel and consolidating or evaluating datasets. Moreover, RPA may be used in HR in conjunction with machine learning and Natural Language Processing (NLP) to build chatbots with specific functions. Instead of interacting with a real person, workers may engage with virtual assistants when they need assistance or to register claims or paperwork. It may significantly improve the flow and accuracy of information to specific workers around the company, making data simpler to obtain and guaranteeing faster decision-making for their claims. This supports the idea that RPA has many uses once again.

1.4.1 Advantages of RPA

- Some of the significant advantages of Robotic Process Automation software are given below :

1. Code - free

- No prior programming or coding experience is necessary to use RPA. Modern RPA solutions are used to automate applications in any department within an organisation that handles secretarial work. As a result, employees just need to get basic training on RPA in order to construct bots using various user-friendly wizards and GUIs (Graphical User Interface). It provides an edge over more conventional automation techniques and speeds up the supply of commercial applications. Additionally, this platform lowers the upfront costs associated with deployment, training and installation.

2. Non - disruptive

- One of the biggest obstacles to IT adoption is the complicated or hazardous transformation process that keeps big businesses from improving, replacing or rethinking their current systems. Nonetheless, RPA's transformation procedure is quite easy to understand and uncomplicated. The RPA software robots access the end-user system in the same way that people do by adhering to the current security, quality and data integrity requirements. Additionally, these software robots preserve functioning and safeguards while averting any type of disturbance.

3. User - friendly

- RPA does not need specialized knowledge in areas like programming, coding or significant IT expertise. RPA software is simple to use, comprehend and navigate. With the help of an integrated screen recorder component, RPA solutions enable users to rapidly and easily develop bots by recording keystrokes and mouse movements. Using the task editor, users of some RPA software may manually build and modify bots.

4. Rich - analytical suite

- An integrated analytical suite in RPA software assesses the effectiveness of robot processes. The RPA analytical suite facilitates the monitoring and management of automated operations via a centrally located, remotely accessible interface. It provides fundamental data on processes, robotics and other topics. Users may follow activities and identify problems with the analytical suite's analysis. Since everything is pre-configured and integrated, no integration is required.

5. Security

- An organization's automation will lead to an increase in the number of users requesting access to RPA solutions. Consequently, having strong user access control capabilities is crucial. To guarantee action - specific permissions, role-based security capabilities may be assigned using RPA technologies. In addition, all automated data, audits and instructions that bots may access are encrypted to prevent unauthorized manipulation. The business RPA technologies also provide comprehensive information on user activity logs, job completion rates and tracking of individual users. As a result, it keeps industrial rules in compliance and guarantees internal security.

6. Hosting and deployment options

- Deployment options are offered by the RPA system spanning cloud, terminal services and virtual machines. Because of its scalability and flexibility, cloud deployment is one of the greatest solutions available and draws in the majority of users. Therefore, in order to access data for carrying out repeated processes, enterprises might install RPA tools on desktops and put them on servers. Hundreds of robots may be autonomously deployed using RPA systems. In a similar vein, several bots might be used to handle large amounts of data while carrying out various jobs within a single process.

7. Actionable intelligence

- The capacity to acquire and use knowledge as skills is referred to in this RPA characteristic. Robots gather the data, process it into information and then turn that information into intelligence that users may utilize to take action. RPA systems have characteristics with artificial and cognitive intelligence, which enable bots to make better decisions over time.

1.4.2 Disadvantages of RPA

- Some of the major drawbacks of Robotic Process Automation software are given below :

1. Potential job losses

- It is believed that human input will not be required if a robot can operate more quickly and steadily. It is the primary worry of the workforce, which poses a serious risk to the labour market. But this way of thinking is incorrect. Amazon has provided a superb illustration of this restriction. During the time that they have raised the number of robots from 1000 to over 45000, the employment rate has climbed quickly.

2. Initial investment costs

- Since RPA is still in its infancy, there may be obstacles that lead to unintended consequences. Consequently, it is difficult for businesses to determine whether they should spend money on robotic automation now or later when it grows. When thinking about using this technology, a thorough business case has to be created; otherwise, it will be pointless if the returns are minimal and may not be worth the risk.

3. Hiring skilled staff

- Many companies think that staff members need to be highly technical automation experts in order to work with RPA since robots sometimes need to be programmed and operated. It also compels companies to teach current staff members to acquire new skills or recruit a trained workforce.
- An automation firm may be useful in the early stages of setup and installation. But only in the long run can the trained personnel accept and operate the robots.

4. Employee resistance

- People are often habitual, thus any changes made to the organization might make the workers feel stressed. Individuals working with new technologies will be given new tasks and will need to pick up new knowledge about that particular technology. Since

there could be differences in understanding across workers, it might drive current employees to quit.

5. Process selection

- Selecting repetitive, rule-based jobs that don't involve human judgment is always the best course of action. It is difficult to automate non-standard procedures and human intervention is necessary to finish them. Therefore, the jobs that RPA can automate are restricted.

1.5 RPA Life Cycle

- RPA Lifecycle does not have any particular defined structure. It includes different phases of the automation process, from the creation of bots to the execution of the bots.
- Check out the following diagram displaying all these phases :

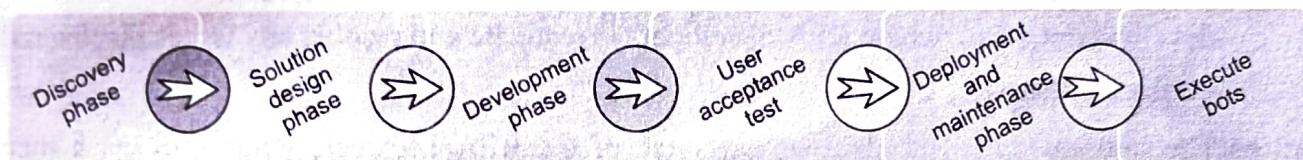


Fig. 1.5.1

1. Discovery phase

- The RPA lifecycle begins with the discovery phase. The RPA process architect examines the client's needs at this stage. Next, a decision is made on the process's automation potential. The RPA analyst team may consult with the RPA architect team to assess the process's complexity whether it can be automated.

2. Solution design phase

- The steps to automate the process are defined based on the criteria. The process architect and the RPA technical architect work together to create a Process Definition Document (PDD) that contains details about the whole process. In order to save manual labour as much as possible, they create a plan to automate certain jobs while adhering to the developing process. Selecting the project's budget, personnel, timeline and other details comes next, when all criteria have been met. After that, the analyst team draws a flowchart to illustrate how the processes work, which helps in selecting which operations should be automated. Following process selection, jobs are automated and bot creation is started using the RPA tool.

3. Development phase

- Using RPA technologies, the RPA developer writes scripts or bots to automate processes during this phase. The market offers a wide variety of RPA tools. Automation scripts and bots are created by adhering to the PDD that was previously created. Generally speaking, coding is not necessary. However, this might vary based on the tasks that need to be automated. Testing the produced bots comes next once they have been developed.

4. UAT (User acceptance tests)

- The RPA development team tests the created bots at this stage. In a pre-production setting, these bots are evaluated to see how users can utilise them to automate certain activities. It moves on to the next step if the testing phase is successfully completed. Additionally, in the event that testing is unsuccessful, the project reverts to the development stage, where RPA developers investigate and resolve any issues discovered during testing.
- The bots go on to the deployment stage of the RPA Lifecycle when they pass their testing.

5. Deployment and maintenance phase

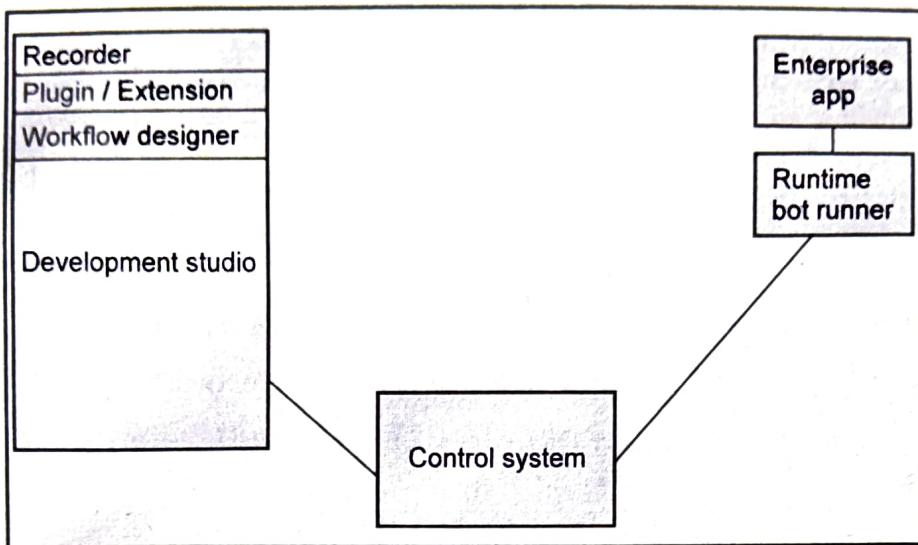
- Once the development and testing stages are over, the bots are brought into the production environment. Users may utilize them to automate tasks after the deployment process. The bots are then sent to the RPA development and testing team if there are still issues, such as the bots not automating. The development team will examine the bots once again and fix any issues.

6. Execute bots

- This stage involves the bots' post-deployment execution. To make sure the implementation is carried out in accordance with the specifications, bots are also examined.

1.6 Components of RPA

- Any robotics process automation platform provides some basic components, which together build the platform. The following are the basic or core components of RPA :
 - Recorder
 - Development studio
 - Plugin / Extension
 - Bot runner

Control center :**Fig. 1.6.1****Recorder**

- The area of the development studio where developers configure the robots is called the recorder.
- It works similarly to how Excel's macro recorder and any platform's bot recorder capture steps.
- The UI's mouse and keyboard motions are recorded and this recording may be played back again to perform the same actions.
- This facilitates fast automation. This element has been a major contributor to RPA's popularity.

Development studio

- Developers establish robot configurations or train robots using the development studio.
- Robots are programmed with a set of instructions and decision-making logic using the development studio.
- While some systems need coding, others, like Visio, include flow-charting tools that make it very simple to draw process phases.
- In most studios, developers must possess a reasonable level of programming expertise in order to work on commercial projects. Examples of this knowledge include loops, if-else statements, variable assignment and so on.

Extensions and plugins

- To make creating and managing bots easier, the majority of platforms include a wide range of plugins and extensions.

- Why it is difficult to identify UI controls separately using conventional methods in many programs, such Java SAP.
- Vendors of RPA have created extensions and plugins to assist with these problems.

Bot runner

- This is also referred to as the robot, other components make it run.

Control center

- The control room's main goal is to provide robot management tools.
- It oversees and manages a robot's performance inside a network.
- It may be used to manage licenses and credentials, start and stop robots, schedule them, update and publish code and redeploy robots to new jobs.

1.7 RPA Platforms

- The market for RPA vendors has been expanding steadily and continuously. The US and UK are the two biggest markets, but the Asia Pacific (APAC) region is also seeing significant growth.
- The rising need for RPA, particularly in sectors that require large - scale deployments, will motivate additional companies to embrace this technology as a result of successful pilot projects and greater customer satisfaction among early adopters.
- Retail, telecom and media, healthcare and pharmaceuticals and banking and finance are the main industries using RPA.

1. Automation anywhere

- Businesses may automate business operations with the use of automation anywhere. They concentrate on business analytics, RPA and cognitive data (natural language processing and machine learning). Both organized and unstructured data may be handled by their bots.
- There are three main parts to the system :
 1. A customer for the construction of a bot
 2. A runtime environment where a bot may be deployed
 3. A centralized command center to manage many bots and assess their effectiveness :

2. UiPath

- UiPath is a provider of RPA technology, creating and distributing software that facilitates business automation.

- There are three components to the RPA platform :
 - UiPath studio for process design
 - UiPath robot for task automation created in UiPath studio
 - UiPath orchestrator for process management and execution

3. Blue prism

- By offering automation that is scalable, adaptable and centrally controlled.,
- Blue prism seeks to deliver automation that businesses may use in accordance with their requirements.
- It sells its software through its partners, some of which are Accenture, Capgemini, Deloitte, Digital Workforce Nordic, HPE, HCL, IBM, TCS, Tech Mahindra, Thoughtonomy and Wipro.

4. WorkFusion

- Automation based on RPA and machine learning is provided by Work Fusion.
- It provides software as a way to automate large amounts of data.
- Work Fusion makes it possible for humans and machines to collaborate in organizing, automating or optimizing processes.

5. Thoughtonomy

- Thoughtonomy utilizes blue prism and other automation tools and customizes it.
- It provides software to assist in automating business and IT operations.

6. KOFAX

- Automating and delivering rule - based and repetitive tasks is possible using Kofax's RPA platform.
- Information is extracted and consolidated using robots.
- Robot performance, a monitoring system and a management panel for deploying and managing bots make up the software platform.
- When there is a lot of work to be done, this software may also prioritise jobs that should be finished by the robot first. Machine learning, however, is absent from Kofax's software.

1.8 Robotic Process Automation Tools

Ui PATH

- One RPA provider of software to assist businesses in automating their business operations is UiPath. The organization wants to free up time - consuming and repetitive jobs so that people may focus on more exciting and creative endeavors.
- The CEO of UiPath, Daniel Dines, launched the company. Its offices are located in Bangalore, Singapore, Hong Kong, Singapore, London, Bucharest, Tokyo and Paris. With customers across the globe from North America to the United Kingdom, Continental Europe to Asia Pacific nations, the business has had impressive development in the last year in terms of both revenue and personnel.
- Today, a lot of businesses utilise its software to automate business procedures. But UiPath's software is also being progressively used by the IT industry. BFSI, Telecom and media, healthcare, retail and consumer and manufacturing are some of UiPath's major industry customers.
- Software robots may be configured to emulate human behaviour on computer systems' user interfaces using UiPath automation software.
- The basic components of the UiPath RPA.
- The components of the UiPath platform are UiPath Studio, UiPath Robot, and UiPath Orchestrator, see the following sections.

1. UiPath studio

- UiPath studio is a flowchart - based modelling application that assists users who are not proficient in coding to build robotic processes via a visual interface.
- Automation is thus more convenient and quicker.
- Multiple individuals may work on the same process at once.
- Modelling is made considerably simpler by the availability of a recorder that replicates user actions and a visual signal that highlights model flaws.

2. UiPath robot

- UiPath robot runs the processes designed in UiPath studio
- It works in both attended (working only on human trigger) and unattended environments (self-trigger and work on their own).

- The following are types of robots :
 - Attended : It assists the user in doing everyday chores by operating on the same workstation as a person. Usually, user events set it off. These robots cannot operate behind a locked screen or be started as processes via Orchestrator.
 - Unattended : It can automate any number of tasks and operate in virtual environments without supervision. Apart from the functions of the attended robot, this robot is in charge of work queue support, scheduling, monitoring and remote execution.
 - Free : Though it can only be used for testing and research, not in a production setting, it is comparable to unattended robots.

3. UiPath orchestrator

- UiPath orchestrator is a web - based platform that runs and manages robots.
- It is capable of deploying multiple robots and monitoring and inspecting their activities.
- Orchestrator's main capabilities :
 - It helps in creating and maintaining the connection between robots
 - It ensures the correct delivery of the packages to robots
 - It helps in managing the queues
 - It helps in keeping track of the robot identification
- It stores and indexes the logs to SQL or Elasticsearch
- Behind the scenes, Orchestrator server uses :
 - IIS server
 - SQL server
 - Elasticsearch
 - Kibana.

1.9 Domains in Activities

- In Robotic Process Automation (RPA), activities can be categorized into several domains based on the nature of tasks they handle and the areas they impact. Here are some common domains of activities in RPA :

1. Operational efficiency domain

- **Data entry and migration** : Automating the transfer of data between systems.
- **Transaction processing** : Automating repetitive transactions, such as invoice processing or order fulfillment.
- **Data validation and cleansing** : Ensuring data accuracy and consistency across systems.

2. Customer service domain

- **Customer support automation** : Automating responses to customer inquiries through chatbots and email automation.
- **Customer onboarding** : Automating the process of new customer registration and account setup.
- **Feedback and surveys** : Automating the collection and processing of customer feedback and surveys.

3. Finance and accounting domain

- **Invoice processing** : Automating the capture, validation and processing of invoices.
- **Expense management** : Automating the approval and processing of expense reports.
- **Financial reporting** : Automating the generation of financial reports and statements.

4. Human resources domain

- **Employee onboarding and offboarding** : Automating the creation and termination of employee accounts and access.
- **Payroll processing** : Automating the calculation and distribution of employee salaries.
- **HR Data management** : Automating the maintenance and updating of employee records.

5. IT and infrastructure management domain

- **System monitoring and alerts** : Automating the monitoring of IT systems and sending alerts for anomalies.
- **User account management** : Automating the creation, modification and deletion of user accounts.
- **Software deployment and updates** : Automating the deployment and updating of software applications.

6. Compliance and risk management domain

- **Regulatory reporting** : Automating the preparation and submission of reports to regulatory bodies.
- **Audit trail maintenance** : Automating the logging and tracking of activities for audit purposes.
- **Risk assessment** : Automating the identification and assessment of potential risks.

7. Supply chain and logistics domain

- **Inventory management** : Automating the tracking and management of inventory levels.

- **Order processing** : Automating the end-to-end order processing from receipt to fulfillment.
- **Shipping and tracking** : Automating the coordination and tracking of shipments.

8. Sales and marketing domain

- **Lead generation** : Automating the collection and qualification of sales leads.
- **Email campaigns** : Automating the creation and distribution of marketing emails.
- **CRM management** : Automating updates and maintenance of customer relationship management systems.
- These domains encompass various activities that RPA can streamline, leading to increased efficiency, reduced errors and cost savings. By identifying and categorizing activities into these domains, organizations can better plan and implement RPA solutions to optimize their operations.

1.10 Workflow Files

- Sequence, flowchart and control Flow

1. Sequencing the workflow

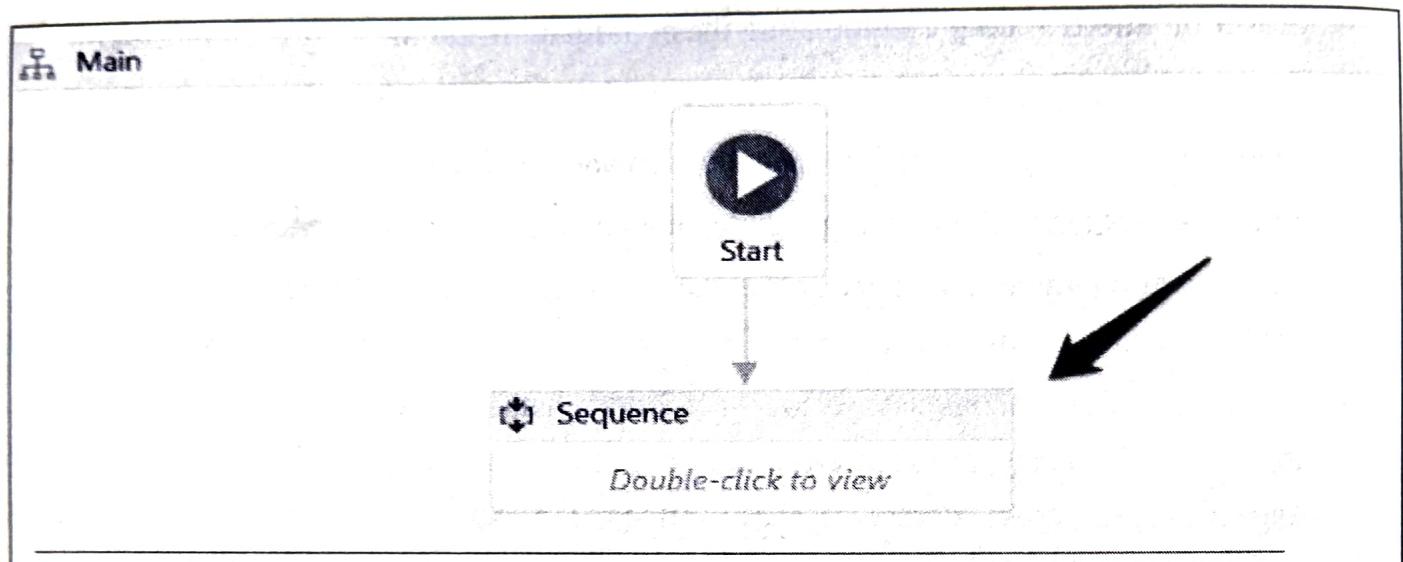
Ui Path provides four types of projects :

- Sequences
- Flowcharts
- User events
- State machines
 - A flowchart and sequence are mainly used for simple automation.
 - User events are beneficial for implementing front office robots.
 - While state machines are used for dealing with complex business processes.

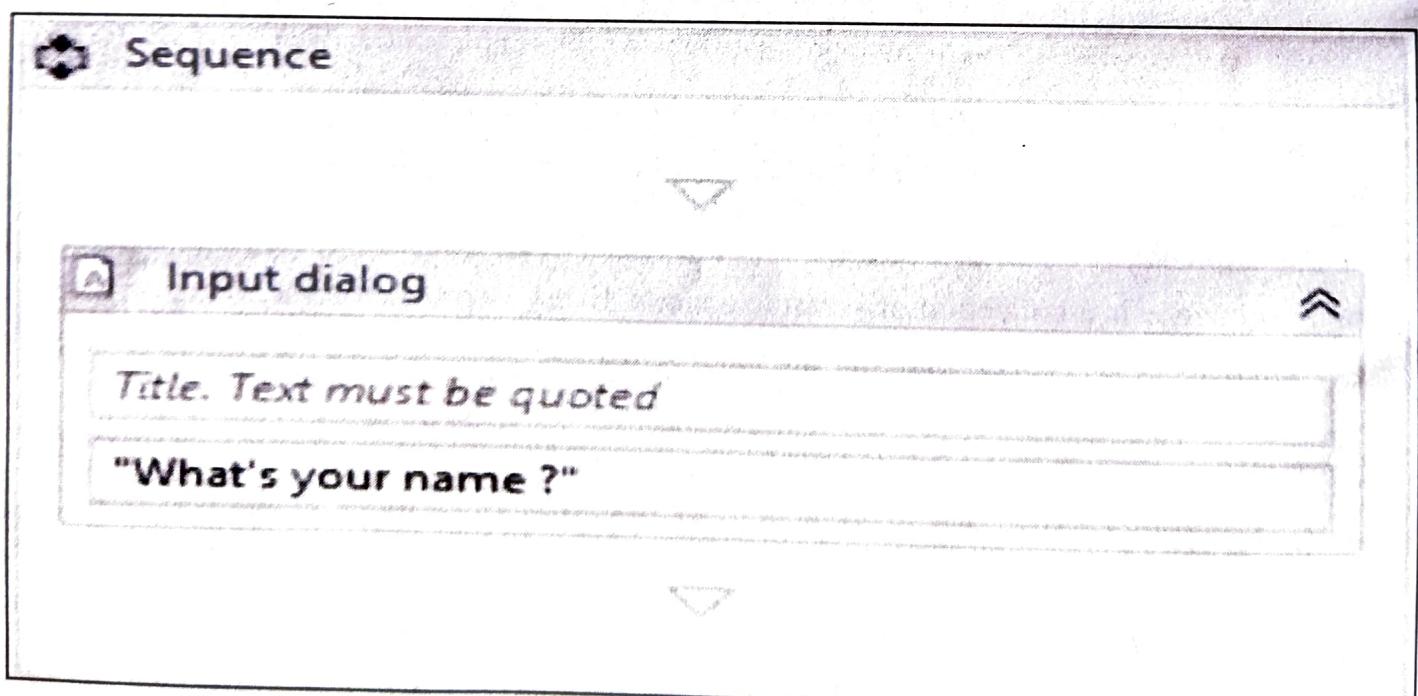
What is a sequence ?

- A sequence is a collection of sensible actions. Every step stands for a task or an activity. When processes occur one after the other in a straight succession, they are referred to be sequences.
- Sequences are the smallest of UiPath's three project kinds.
- In the example that follows, we will create a basic project that requests the user's name and then shows the response :
 1. Launch Ui Path Studio, then choose blank to begin working on a new project. Give it a catchy moniker. Drag and drop a flowchart activity from the activities panel onto the designer panel.

2. Locate sequence using the activities panel's search function and then drag and drop it onto the flowchart, as the example below illustrates :

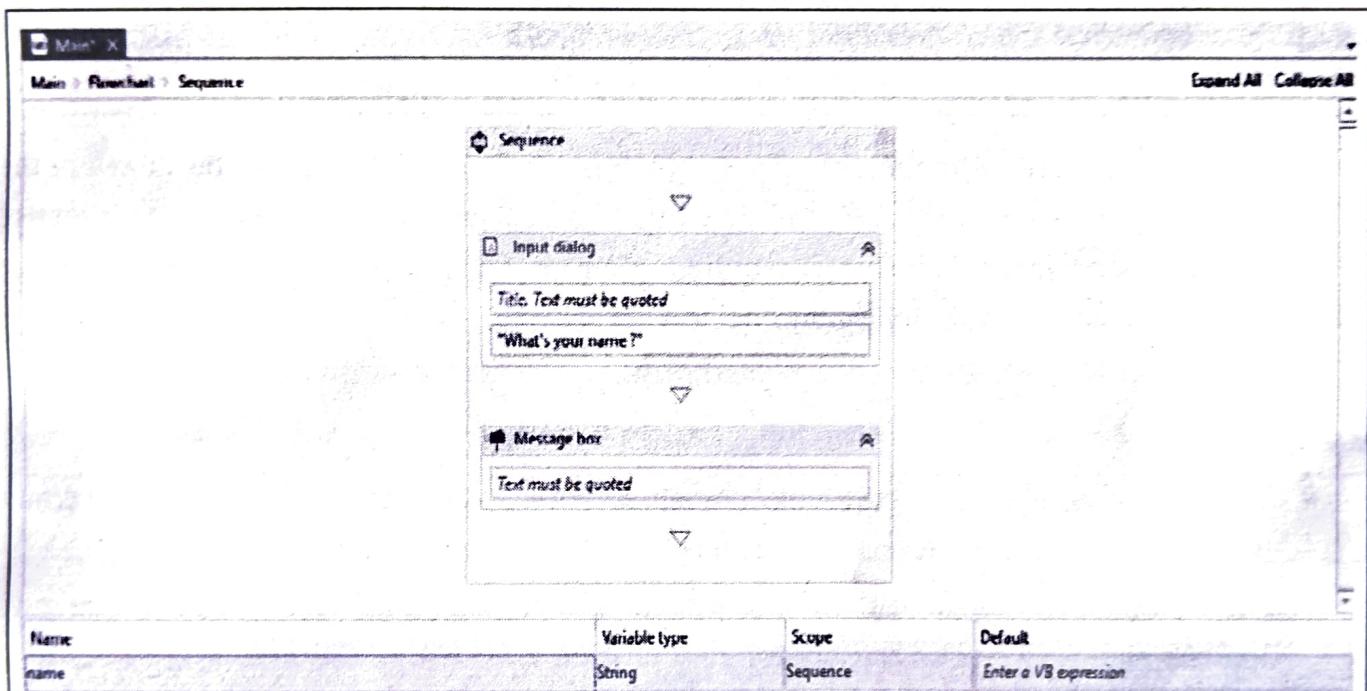


3. Double-click on the sequence. The measures we want to take must now be added. Think of every step as an activity. A sequence may have several stages added to it. To keep things simple, we'll add these two steps :
- o Use the input dialogue box to request the username.
 - o Show the username in the message field.
4. Use the activities panel's search panel to look for the "Input" dialogue. The input dialogue activity is a dialogue box that displays with a message or a question, to which the user must provide a response. Drag and drop the activity within the sequence :

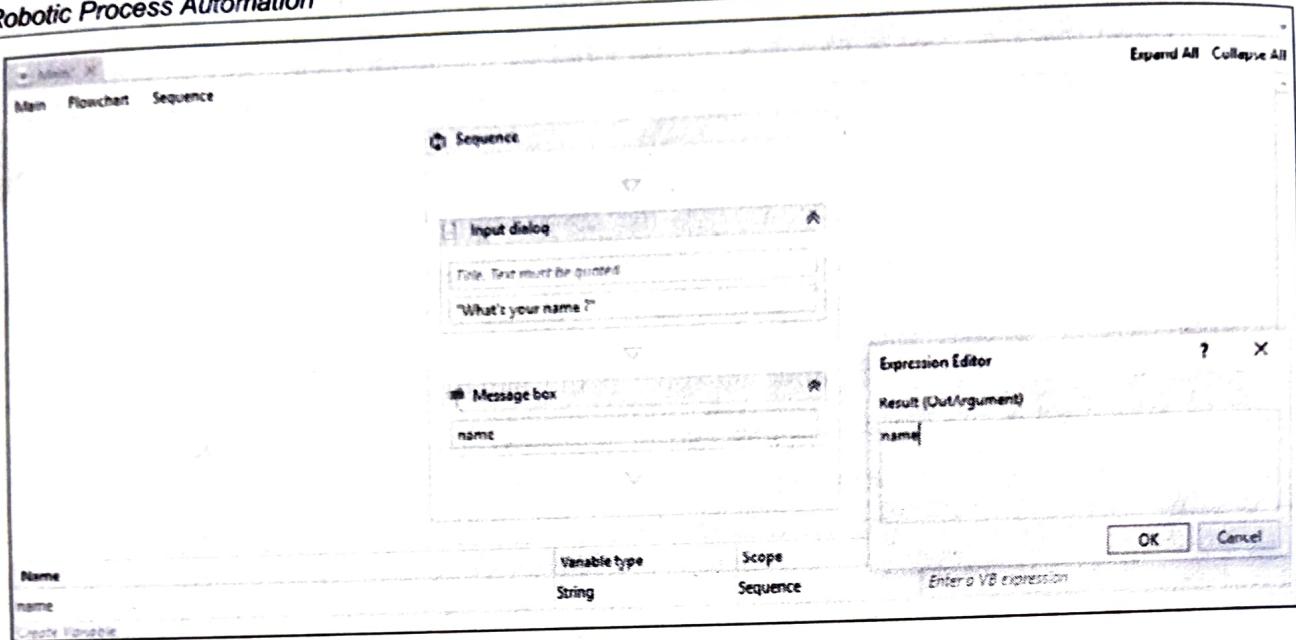


Write the appropriate message on the label of this input dialog to ask for the user's name. In our case, we have put in "What's your name ?".

5. A message box activity may be dropped and dragged into the sequence. (A message box shows a predetermined text, as the name implies. In this instance, we'll utilise it to show the text or response the user entered in the Input dialogue box when prompted to introduce themselves.)
6. After that, create a variable and give it the name you want. The text that the user submitted in the Input dialogue box in answer to our query - that is, their name - will be assigned to this variable :



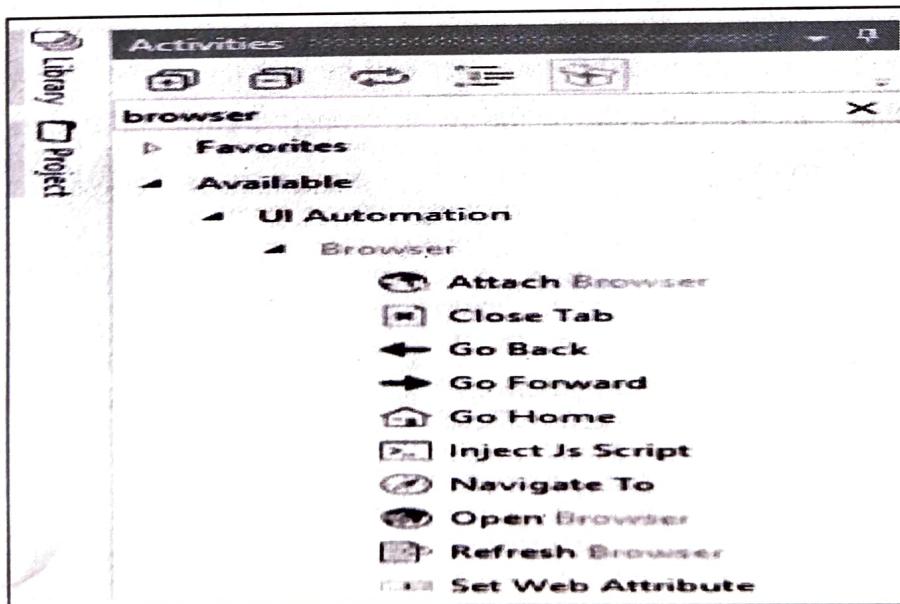
7. The input dialogue box's result attribute must now be specified (in the properties panel). The text submitted by the user will be sent there when the variable name is specified. On the rightside of the result property, click the dotted icon. Give the variable name now :



8. In the text field of the message box, which is where you enter text to be shown in the message box, enter the name of the variable we established. Connecting the sequence to the start icon is all that is required. You may choose set as start node from the context menu when you right - click on the sequence activity.
9. Click the "Run" button to view the outcome.

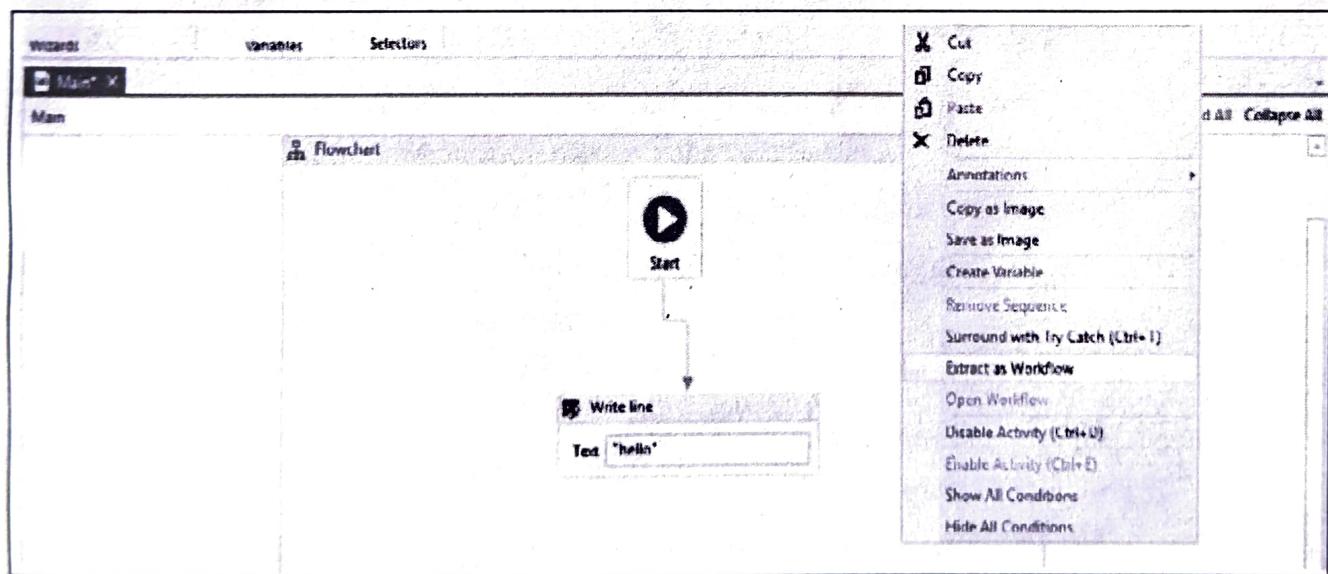
Activities

- The unit of an action is represented by an activity. Every activity carries out a certain task. Combining these actions results in the creation of a process.
- On the activities panel of the main designer panel, each activity is located. You may look up and use a certain activity for your project.
- For instance, the activities panel will display all of the browser activities when we search for "browser," as shown in the picture below :

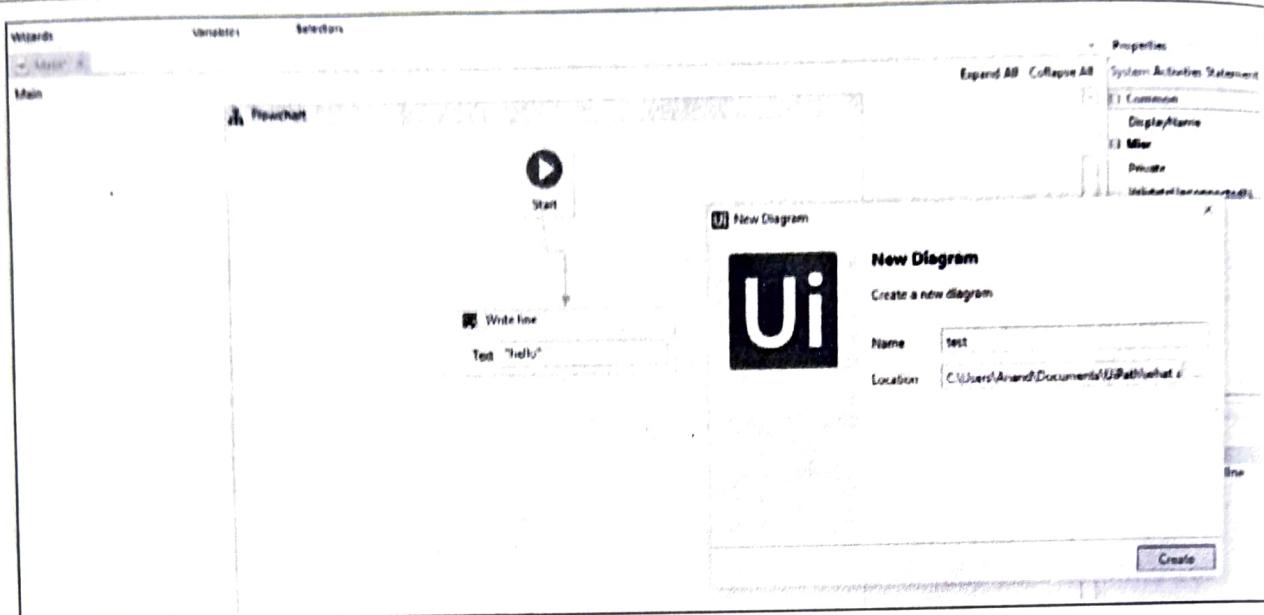


Using activities with workflows

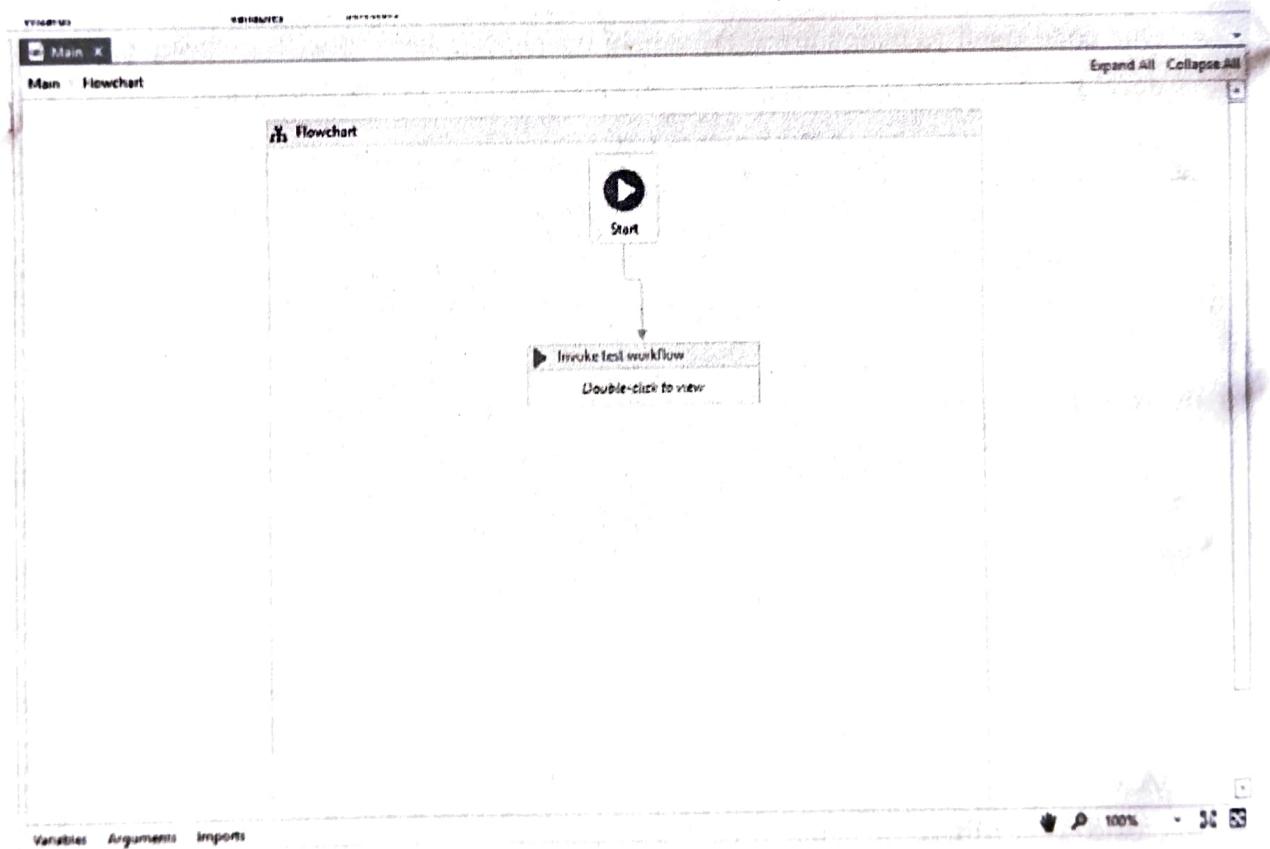
- We've shown how simple it is to look for a certain activity. Let's now examine their use in a workflow :
 1. Use the activities panel search box to look for flowchart in the same manner that we looked for browser activities. The flowchart activity may be dropped and moved inside the designer panel.
 2. The designer panel displays the flowchart, with a specified start node. The starting point of execution is specified by the start node.
 3. We are prepared to use various tasks inside our flowchart. Any activity or activities within the flowchart are available for usage. Let's only use a write line exercise for the sake of simplicity.
 4. In the flowchart, drag and drop the write line activity. Give it a string value to set its text attribute. By right-clicking on the write line activity and choosing set as start node, you can link it to the start node.
- Our code quality, maintainability, reliability and readability will all be improved by developing several processes and putting them together in a logical sequence.
- To choose extract as workflow, right-click on the main designer panel and select it.



- A window will pop up asking for the name. Give it a meaningful name and click on create. This will be the name of your workflow :



- We have just used activities and extracted them in a workflow. If you check the main designer panel, it looks like the following screenshot :



- It automatically generates the invoke test workflow activity. Now, when we run the program, it will invoke the workflow that we have extracted (double-click on the Invoke test workflow activity to see which workflow it is going to invoke and where it is generated).