ROBOTICS PROCESS AUTOMATION

An Industrial Internship Report

submitted by

MITARTH JAIN

(17BCE0765)

in partial fulfillment for the award of the degree of

B.TECH.

in

COMPUTER SCIENCE & ENGINEERING

SCHOOL OF COMPUTER SCIENCE AND ENGINEERING

AUGUST,2019

DECLARATION BY THE CANDIDATE

I hereby declare that the Industrial Internship report entitled "**ROBOTICS PROCESS AUTOMATION**" submitted by me to Vellore Institute of Technology, Vellore in partial fulfillment of the requirement for the award of the degree of **B.TECH.** in **Computer Science & Engineering** is a record of bonafide industrial training undertaken by me under the supervision of **Mrs. Neelam Mohapatra at SUN PHARMACEUTICALS INDUSTRIES LTD.** I further declare that the work reported in this report has not been submitted and will not be submitted, either in part or in full, for the award of any other degree or diploma in this institute or any other institute or university.

Signature of the student

Name: Mitarth Jain
Reg.Number: 17BCE0765

VIT®

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

School of Computer Science and Engineering

<u>BONAFIDE CERTIFICATE</u>

This is to certify that the Industrial Internship report entitled "**ROBOTICS PROCESS AUTOMATION**" submitted by **MITARTH JAIN(17BCE0765)** to Vellore Institute of Technology, Vellore in partial fulfillment of the requirement for the award of the degree of **B.TECH** in **Computer Science & Engineering**> is a record of bonafide Industrial Internship undertaken by him under my supervision. The training fulfills the requirements as per the regulations of this Institute and in my opinion meets the necessary standards for submission. The contents of this report have not been submitted and will not be submitted either in part or in full, for the award of any other degree or diploma in this institute or any other institute or university.

(Name & Signature of the Supervisor)

SUPERVISOR

Date:

(Signature)
Internal Examiner (s)

(Signature)
External Examiner (s)

SPIL/COR /19
June 11, 2019

TO WHOMSOEVER IT MAY CONCERN

This is to certify that Mitarth Jain (Reg. Number – 17BCE0765) from Vellore Institute of Technology, Vellore, Tamilnadu has undergone the Summer Internship in **Sun Pharmaceutical Industries Ltd** in **Information Technology Department** and has completed the project report on "Robotic Process Automation (RPA) for Purchase requisition, Bank statement automation & OCA (Optical character recognition) Automation", under the guidance of Neelam Mohapatra from **10th May to 11th June 19.**

The internship was completed to the satisfaction of the company guide and the organization.

We wish you success in all future endeavors.

Yours sincerely,

For **SUN PHARMACEUTICAL INDUSTRIES LTD.**

AUTHORISED SIGNATORY

ACKNOWLEDGEMENT

I want to thank **VIT University Management** for introducing me to this course,which gave me the industry experience. I also want to thank my School SCOPE(School of Computer Science & Engineering) for offering us courses which helped me a lot in successfully completion of this internship. I am very thankful to **SUN PHARMACEUTICALS INDUSTRIES LTD.** for giving me the opportunity to undertake my summer training and take the project of "**ROBOTICS PROCESS AUTOMATION**". It was a good learning experience to work on this project. I would like to convey my heartiest thanks to **Mrs. Neelam Mohapatra** . Her guidance helped me to complete the project successfully. I also learnt how to be good professional and to do work smartly.

Place   : Vellore

(Mitarth Jain)

Date   :

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CHAPTER - 1

ABSTRACT

The Automation age will be simply the age of "Do it yourself". The phrase here means that the automation is going to be the future of business industries. The automation has changed the world completely and this is continuing as it made our life very easy. At the time, from when the computer is designed, the developers were seeking out the best approaches to expand the computing technology as much as they can. Nowadays, we are surrounded by various technologies around us which have offered ascend to the automation that ranges from a basic task to numerous complex tasks.

Robotic Process Automation (RPA) is an emerging tool of automation technology based on notion of software robots or Artificial Intelligence (AI). RPA is the use of software with artificial intelligence (AI) and Machine Learning (ML)capabilities to handle high-volume, repeatable tasks that previously required a human to perform. RPA has the capability of software and services which allow to transact in any IT application, typically in the same way a human would, to automate complex, rule based work. In other words, RPA software allows developers to develop complex automations to suit for company's processes.

CHAPTER -2

ABOUT SUN PHARMACEUTICALS INDUSTRIES LTD.

Sun Pharmaceuticals was established by Mr. Dilip Shanghvi in 1983 in Vapi, Gujarat with five products to treat psychiatry ailments. Today it is the largest chronic prescription company in India and a market leader in psychiatry, neurology, Cardiology, orthopedics, opthalmology, gastroenterology and nephrology. The 2014 acquisition of Ranbaxy has made the company the largest Pharma company in India, the largest Indian pharma company in US, and the 5th largest specialty generic company globally.Today Sun Pharma is the second largest and the most profitable pharmaceutical company in India, as well as the largest pharmaceutical company by market capitalisation on the Indian exchanges.

CHAPTER - 3

Introduction to Robotics Process Automation

What is Robotics Process Automation(RPA)?

Robotic process automation (RPA) is the application of technology that allows employees in a company to configure computer software or a "robot" to capture and interpret existing applications for processing a transaction, manipulating data, triggering responses and communicating with other digital systems. Any company that uses labor on a large scale for general knowledge process work, where people are performing high-volume, highly transactional process functions, will boost their capabilities and save money and time with robotic process automation software. Just as industrial robots are remaking the manufacturing industry by creating higher production rates and improved quality, RPA "robots" are revolutionizing the way we think about and administer business processes, IT support processes, workflow processes, remote infrastructure and back-office work. RPA provides dramatic improvements in accuracy and cycle time and increased productivity in transaction processing while it elevates the nature of work by removing people from dull, repetitive tasks. The technology of RPA can be applied specifically to a wide range of industries.

Features of RPA

1. RPA is code free: RPA does not require any programming knowledge. The workforce, with any educational qualification can be trained easily to automate the RPA tool. It has drag and drop functionality which enables the user to automate the processes very easily. These processes are related to any desktop tool or web application.

2. RPA is very user-friendly: The RPA is accepted not only in IT department, but in various business operations. RPA project is easy to implement and learn, thus requires less IT skills and investment.

3. RPA is non-troublesome: It avoids risk and complexity. The robots are able to access the end user's system easily through a controlled user interface, and therefore the requirement of systems programming is reduced to a great extent.

Why RPA?

It reduces the cycle time and enhances throughput: The software robotic tools are able to carry out various tasks quicker than a human. It is possible to perform the various operations 24/7 with the robotic tool, as it won't require any sleep.

Exhaustive data capture: The software robot process is designed to capture the data completely. Its various tasks can be observed and noted at every step, so that it can produce valuable data and a review track which can provide a needed support for the further process enhancement efforts and also help with monitoring submission.

Scalability and flexibility: When a process that can be implemented by a robot is defined as a sequence of guidelines, it can be planned for a particular time. According to this, the number of robots is arranged quickly to perform it. Also, the robots can be easily reallocated the tasks when there are many more important processes, as the robots are able to carry out many types of processes.

Saves time and increases accuracy: The software robots are programmed to enhance the accuracy, it follows rules and does not make any mistakes, thus a lot of time can be saved. The robots do not apply perceptions that give rise to the human errors, problems and abnormalities, as the robots perform the tasks in a manner which are guided by them.

The planned deployment of resources: The various tasks and processes which are appropriate for the automation are the most difficult and less enjoyed by the teams. Employees released of these actions are relocated on other higher-valued actions that provides more reward for them.

Cost saving: Since most of the manual and repetitive jobs can be automated easily, the staff size can be reduced as well as the human errors are also eliminated and therefore the cost is also decreasing.

It provides a quick Return of Investment: The robot process automation will raise productivity throughout the various industries because one software robot is capable enough to perform the task of about three workers. This creates positive ROI much quicker than predictable.

CHAPTER - 4

Tools Used to Perform Robotics Process Automation

UiPath Studio was used to perform Robotics Process Automation. **UiPath Studio** – a tool that enables you to design automation processes in a visual manner, through diagrams. **UiPath** Robot - executes the processes built in **Studio**, as a human would. **UiPath** Orchestrator - a web application that enables you to deploy, schedule, monitor and manage Robots and processes.It is used to automate boring repetitive tasks. It also eliminates the human intervention. With drag and drop functionality for all activities, it is the simplest RPA tool.

Many enterprises are adopting digital methods for their operation because they understood that future lies in routine operation being fully automated. Speed of execution and accuracy are the two biggest advantages of digitization. On the other side, right tool and skilled manpower are the two biggest challenges of digitization. That is why industry was looking for a fast and reliable solution which they got in the form of RPA tool named **UiPath.**

WHY UI PATH?

Intuitive Working with UiPath and creating robots is very instinctive because it uses drag and drop and flowchart activities. It is very easy to learn too.

Extensive Activity Library UiPath is having an extensive activity library consisting of hundreds of pre-built, drag & drop actions.

Security UiPath also offers high level security because we can store and encrypt the credentials on the centralized server.

Recording UiPath provides the facility of recording as well. It has special recorders for desktop apps, Citrix environment and terminal emulators which makes creating automation much faster and precise.

Universal Search It is having universal search feature which allows us to perform single search for all automation resources like libraries, activities, projects and workflows.

Powerful Debugging UiPath offers its user a very powerful debugging which is very intuitive and flexible.

Collaboration UiPath promotes collaboration too, as we can store, protect and share scripts in MS Team Foundation and SVN. We can also re-use the workflow.

Third-party Integration UiPath also provide third party integration facility. We can plug in various cognitive and OCR technologies from ABBYY, IBM Watson, Google, Microsoft text analysis at the API level.

Server-Based Licensing Uipath allows server-based licensing which makes licensing process centralized and easy to use.

Powerful	Complete	Collaboratio	Secure	Third-Party

Why UiPath?

Intuitiv	Extensive	Universal	Recording	Third-Party

CHAPTER - 5

Learning & Certifications

1.) I completed the Level-1 Foundation Training Of Ui Path Academy.

Its contents were :-

- Introduction to Ui path
- Data Manipulation
- Recording
- Advanced Ui Interaction
- Selectors
- Image and Text Automation
- Excel & Pdf Automation
- Debugging & Exception Handling

This helped me in learning about RPA and Ui path studio,how to use the activities and different methods in UI path.Completed examples of Product Searching on flipkart and fetching prices, Email automation etc.

2.) I completed level-2 Orchestrator training of Ui Path academy.

   Its contents were about the setup of RPA bots in virtual machines or how to orchestrate a bot, the scheduling of the bot, running on multiple machines can be done using the orchestrator platform. Where bots are setup for their working environment.

This included lessons about how to setup the environment, the job which the bot has to do. The scheduling and activation of bot status is maintained in here.

CHAPTER - 6

Objectives

6.1)Task 1:-

The master data of Maharashtra's state doctors was provided, it consisted of various attributes filled by different MR's of different areas who supply their products to doctors across the state.The objective was to prepare a clean dataset out of the master data by cleansing the data, removing duplicacy,applying validation etc. They needed a clean data of the doctors of the state. I was asked to develop a method for the master data that can be applied, to get the results. The algorithm should be capable enough to handle very large doctor's dataset.

6.2)Task 2:-

To develop a Robotics Process Automation in which we have to make a bot which processes the email of bank statement. After receiving the email with bank statement attached to it, the bot has to download the pdf file. The file consist of various attributes such as cheque no., name, amount details ,total transaction amount. The main objective was to fetch the data from the pdf and store it in excel file to perform further operations.

6.3)Task 3:-

To develop an Optical Character Automation.The image provided was of products from medical stores, I was asked to determine the product and the number of that product present in the image. The main objective was to develop a method to find product stock details by OCR automation. The data should be stored in excel file with name of product & quantity.
Use different OCR activities present in UiPath studio and compare the results.

6.4)Task 4:-

To develop a Robotics Process Automation using UI path studio, for Purchase Requisition process, it should fetch the data from the pdf file and the result should be a excel data where product related all details are mentioned(Product Name, Price, Final Quantity, and total Amount).The purchase requisition involves the inventory management, it includes the required products , their specifications, their quantity ,budget etc. To do it manually it may take more time and chances of error are high. The RPA bot should be made such that it scans the document and searches for the product on e-commerce and fetches all the details for the company.

CHAPTER - 7

Implementation

TASK - 1

The given Maharashtra's doctors data, it was prepared by different MR's of different areas who supply their products to doctors. The data was not very clean as it had duplicacy, blank cells.Validation errors in name, mobile no. data, address and email ids.I have to develop a solution in such a way that the result sheet has all unique values of a particular doctor.Using excel methods such as filtering, removing exact duplicate values and checking for valid data the invalid and duplicate data were removed, for example different MR's have filled same doctors record so after removing duplicacy it got converted into one single row of data.

It had some attributes which can be used as parameters to remove the repeating doctors. For example one MR has filled data with doctor name Dr. N Gupta and all the details and other MR has filled data as Dr. Nilesh Gupta and all details, so to see if the this two doctors are same or not we had a few parameters to verify its the same doctor.

The method I developed to solve this problem is to remove the duplicacy first and then go for different attributes of that data, the attributes such as their sc_code Name, Qualification, Hospital name, address and email. The data obtained after the first process will be arranged such that for exact same sc_code the attribute value will be the most frequent value. For example if one doctor mobile no. is filled by different MR so it can be different, the most frequent out of them will be stored associated with the particular doctor.

The most frequent results were not accurate as there was lot of invalid data in the dataset.

After applying the methods I was able to reduce the data and get the clean data. Duplicacy in names, degree filled by different MRs were filtered and we got the filtered data which had entries upto 64,000 doctors.

TASK- 2

Process Flowchart
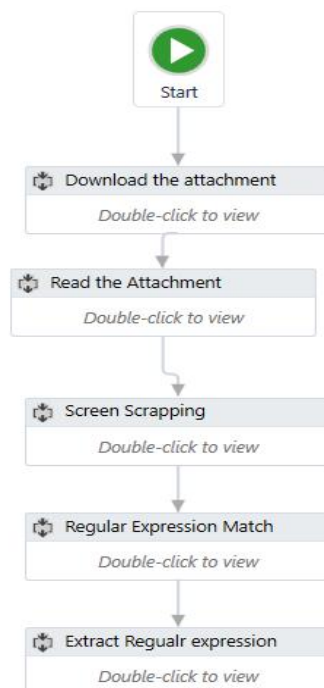
ICICI Bank

CMS HUB

SPIL LCC Transaction Report With Instrument Details For Pooling Sl : 1 On 03-09-2018

To

SUN PHARMACEUTICAL INDUSTRIES LTD
SYNERGY HOUSE SUBHANPURA
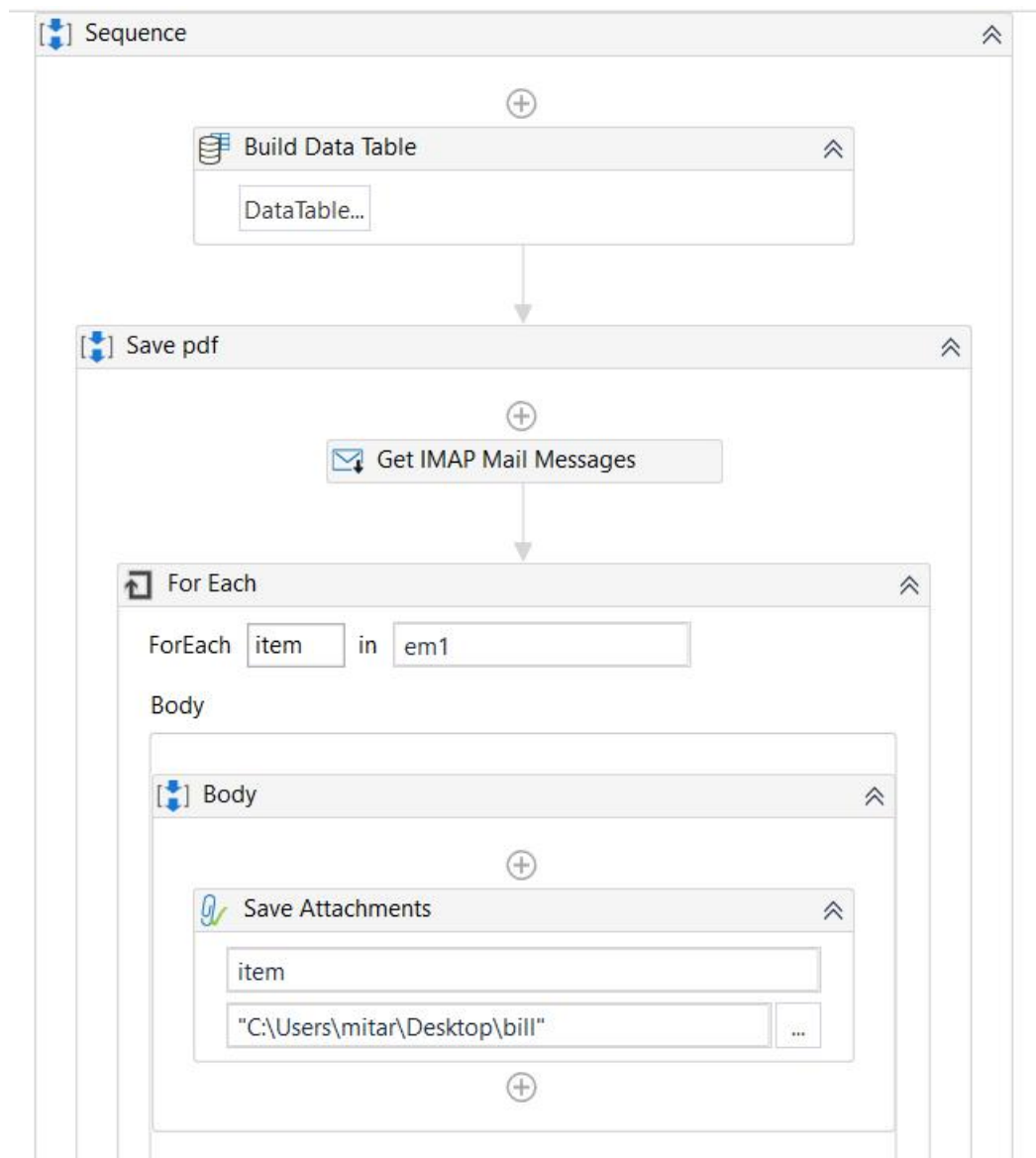GORWA ROAD, BORODA
VODODARA, GUJARAT

Pin Code : 390007

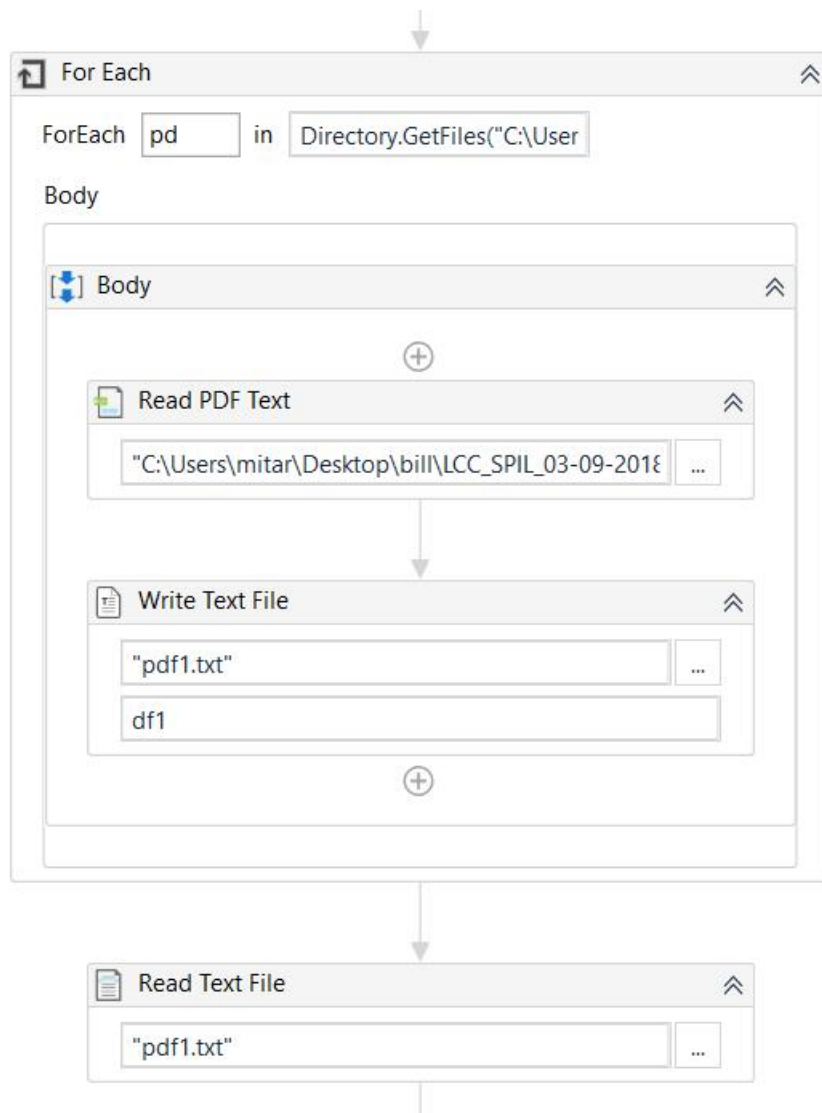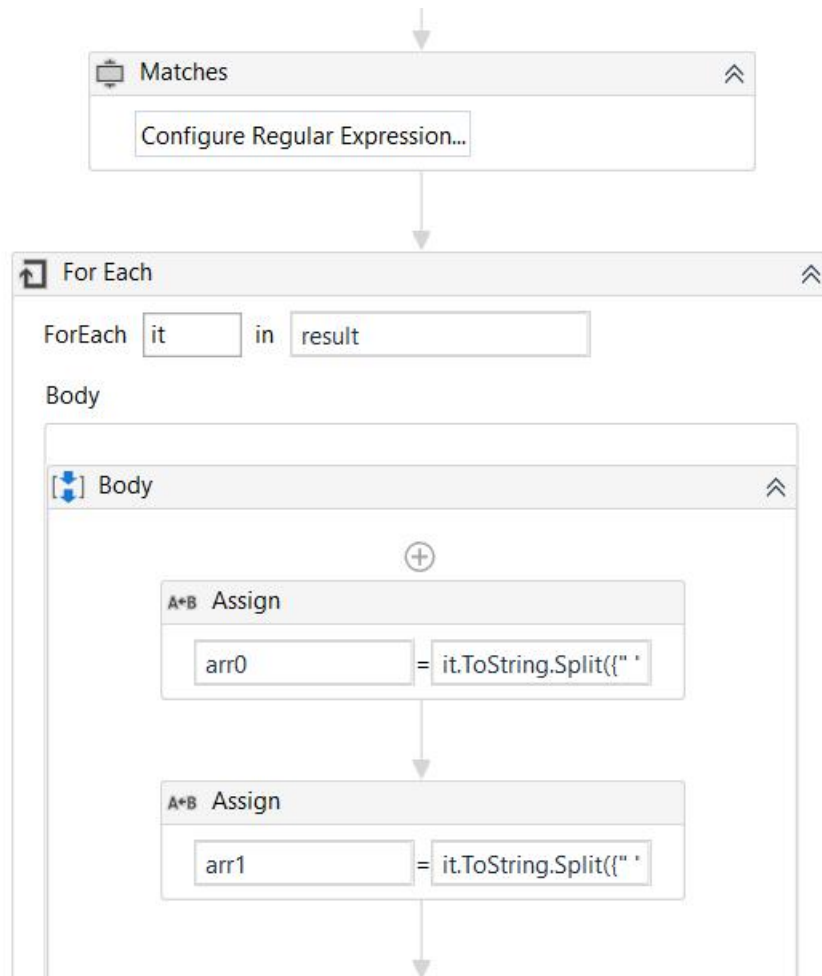| | | | | Customer Code | : SPIL |
				Mode of Pooling:	: Credit to Account
				Kind Attn.	: SANJAY POKHARE
				Fax No	:

Customer Code : SPIL   SUN PHARMACEUTICAL INDUSTRIES LTD

Product : LCCBRN   I-CLEARCOLLECT

A.Collections

Sl.No	Deposit Slip Number	Date of Deposit	Date of RBI/SBI	No.of Insts		Deposit Slip Amount
Instrument Number		Instrument Amount	Drawer Code	Drawer Name		Dealer / Sub Customer Name
Hierarchy Code	SP801	MUMBAI				
Branch	04	MUMBAI				
1	11734611	01-09-2018	03-09-2018	4	INR	41,29,562.00
2092	INR	7,96,500.00		P J HEALTHCARE		
922173	INR	25,22,520.00		MURLI KRISHNA		
794941	INR	3,42,200.00		NEON LAB		
307399	INR	4,68,342.00		ASHAPURA DRUG		
2	911734612	01-09-2018	01-09-2018	1	INR	2,91,129.00
34359	INR	2,91,129.00		KAWARLAL CO		
Branch Wise Total				INR	44,20,691.00	
Total Collections				INR	44,20,691.00	
B.Returns						

In this task the the bot should be able to download the mail attachment and then it should read it.The bank statement has information about the company cheque transactions, the attributes such as Cheque no., amount, Drawer's name. The RPA is to be developed here to scan the document and fetch all the transaction details and store it in the csv file. This is done generally using data scrapping or screen scrapping activity, but here in this case the length of attribute values varies.Firstly we will apply screen scrapping activity to extract text out of the pdf file and then by using Regular Expression method present in the UiPath studio we can fetch the complete information about the cheque no. , amount, drawer's name and store the details in csv file.

Sequence

Build Data Table

DataTable...

Save pdf

Get IMAP Mail Messages

For Each

ForEach `item` in `em1`

Body

Body

Save Attachments

item

"C:\Users\mitar\Desktop\bill"

For Each

ForEach `pd` in `Directory.GetFiles("C:\User`

Body

> **[↕] Body**
>
> ⊕
>
> **Read PDF Text**
>
> `"C:\Users\mitar\Desktop\bill\LCC_SPIL_03-09-2018` ...
>
> **Write Text File**
>
> `"pdf1.txt"` ...
>
> `df1`
>
> ⊕

Read Text File

`"pdf1.txt"` ...

Result

| details	Currency	Amount	Name	mname
2092	INR	7,96,500.00	P	J
922173	INR	25,22,520.0	MURLI	KRISHNA
794941	INR	3,42,200.00	NEON	LAB
307399	INR	4,68,342.00	ASHAPURA	DRUG
34359	INR	2,91,129.00	KAWARLAL	CO

TASK - 3

Process Flowchart
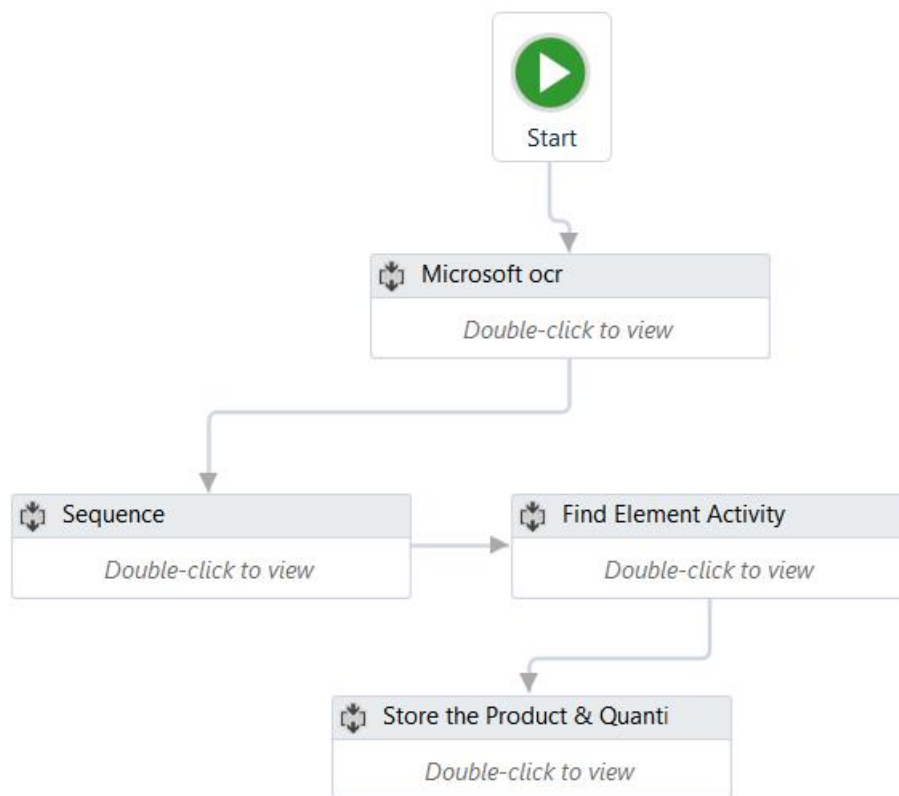
This task includes OCR automation method used in various Robotics Process Automations. In the provided image I have to make a bot to fetch the product names available in image using various ocr activities present in UiPath Studio. Google ocr and Microsoft were the activity that I used for this task. By applying the Google OCR activity to the image, it was not able to recognize the text written in it, then after increasing the scale upto 6, the results were improved a bit but they were not accurate. By using Microsoft OCR at scale 6, the results obtained were not accurate but they are sufficient enough. As the OCR automation accuracy is not much in Robotics Process Automation. This automation is generally used in simpler images with less components to get more accurate results.
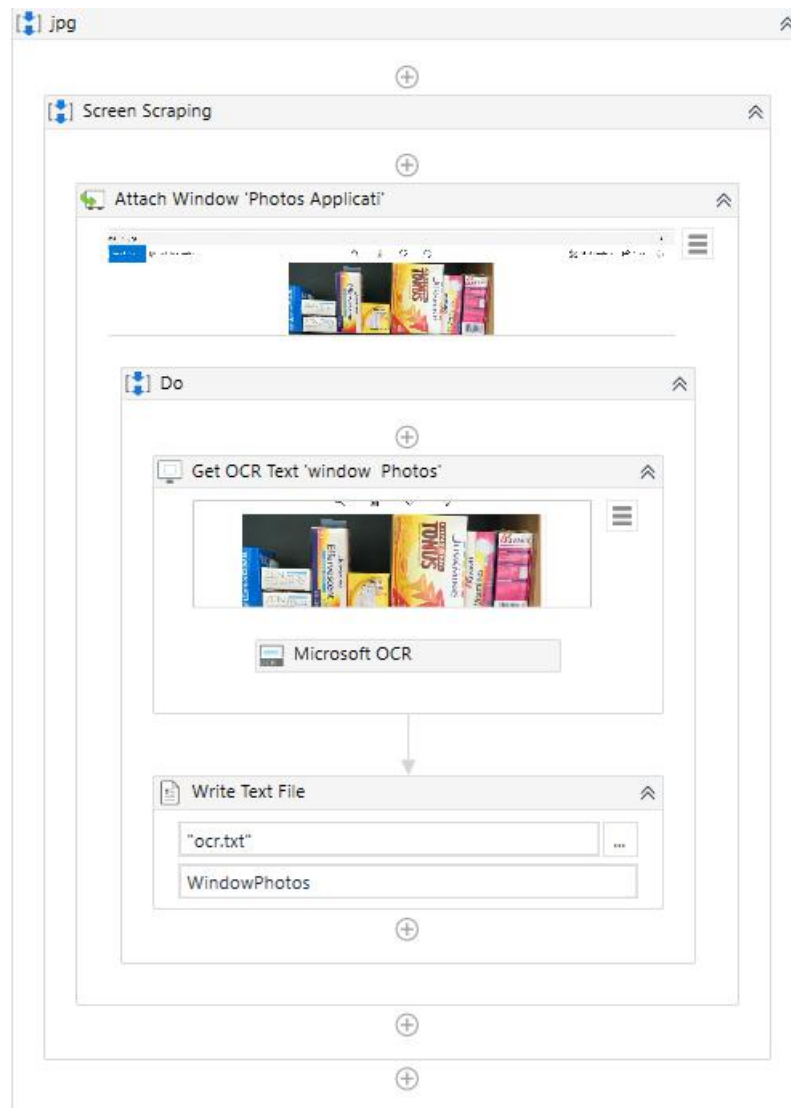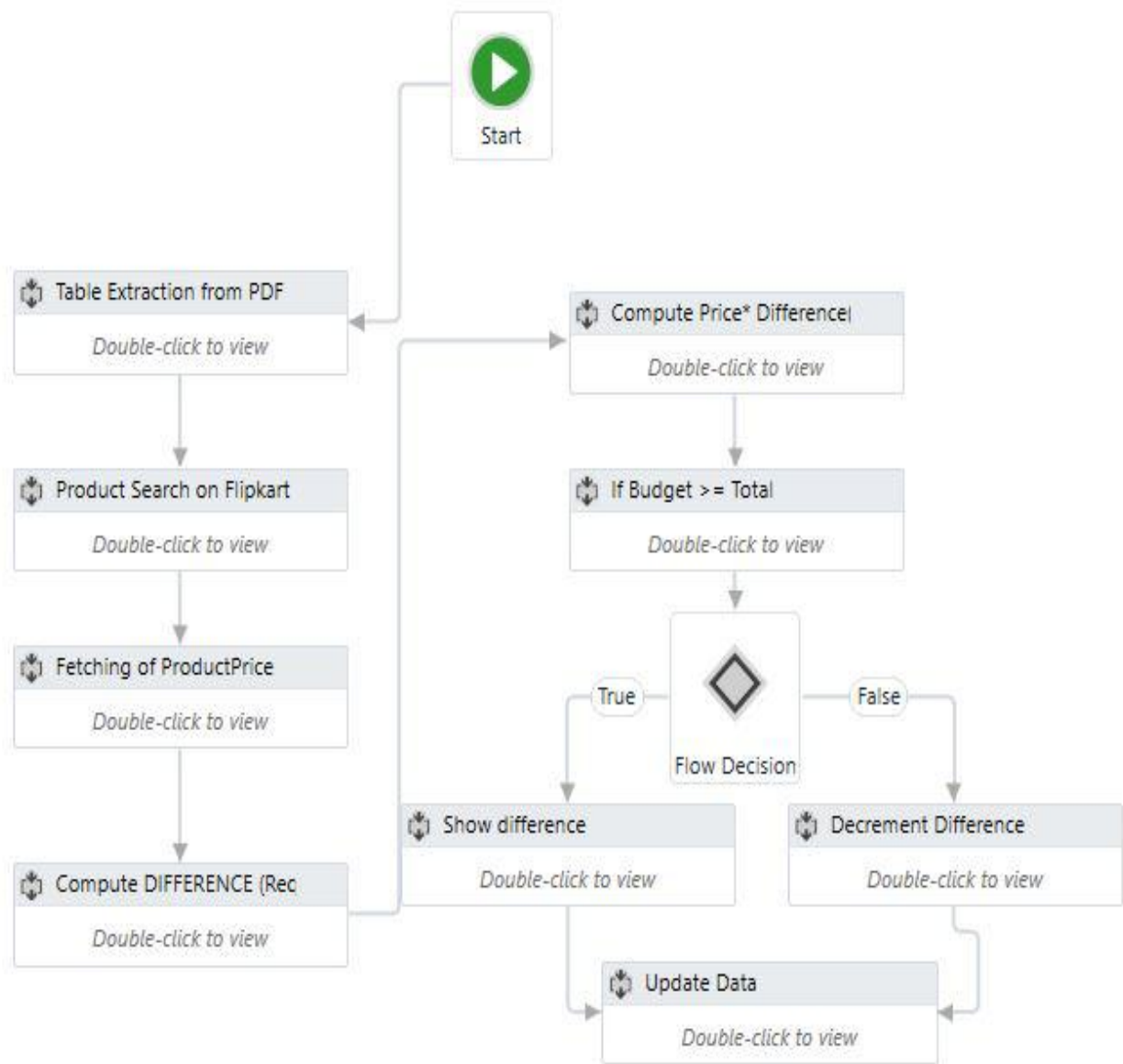
TASK- 4

Process Flowchart

|	PRODUCT	COMPANY	DETAIL	REQUIRED	C.I	BUDGET
1	LAPTOP	LENOVO	Lenovo ThinkPad 13 Core i5 - (4 GB/128 GB SSD/Windows 7 Professional) 20GJ000RUS Laptop (13.3 inch, Silver)	10	7	300000
2	MOUSE	HP	HP 1000 Wired Optical Mouse (USB 2.0, USB 3.0, Black)	10	4	1500
3	CHAIR	KS CHAIR	Ks chairs Fabric Study Arm Chair (Black)	100	87	45000
4	TELEPHONE	PANASONIC	Panasonic KX-TS880MXBD Corded Landline Phone (Black)	25	18	20000
5	PROJECTOR	EPSON	Epson EB-S41 Projector (White)	17	16	5000
6	TELEVISON	SAMSUNG	Samsung 80cm (32 inch) HD Ready LED TV 2018 Edition	10	0	200000

Using Data Scraping method the table data was extracted. The product name string is passed then to the search box of flipkart and the details were fetched from there. The bot reads the detail extracted and search it and after searching it compares the results and find the best match out of all. The flipkart webpages is a fixed format of UI, so by using UiPath studio we can scrape all the information about our product. And then the information is fetched from the web page and stored in csv files.
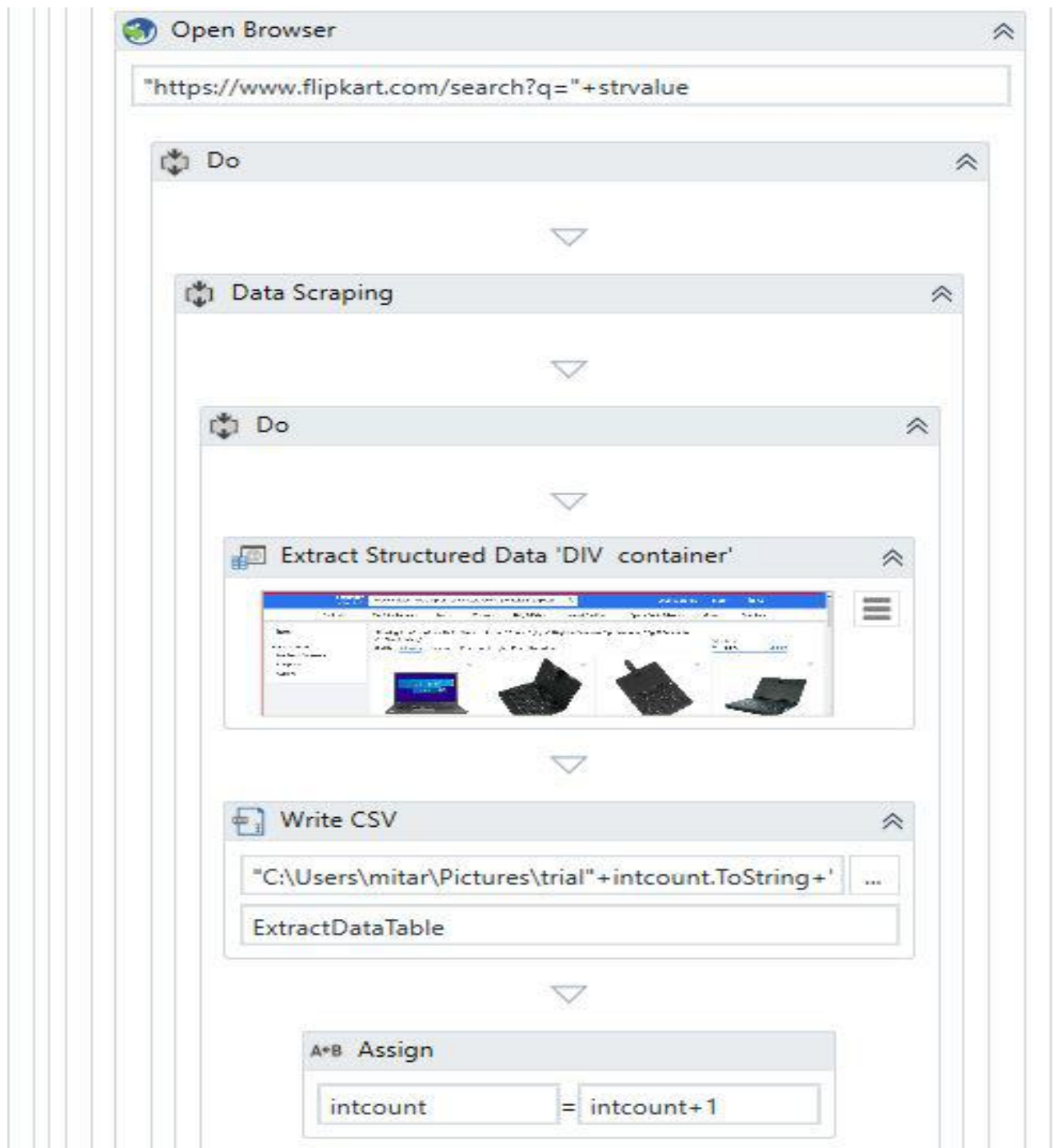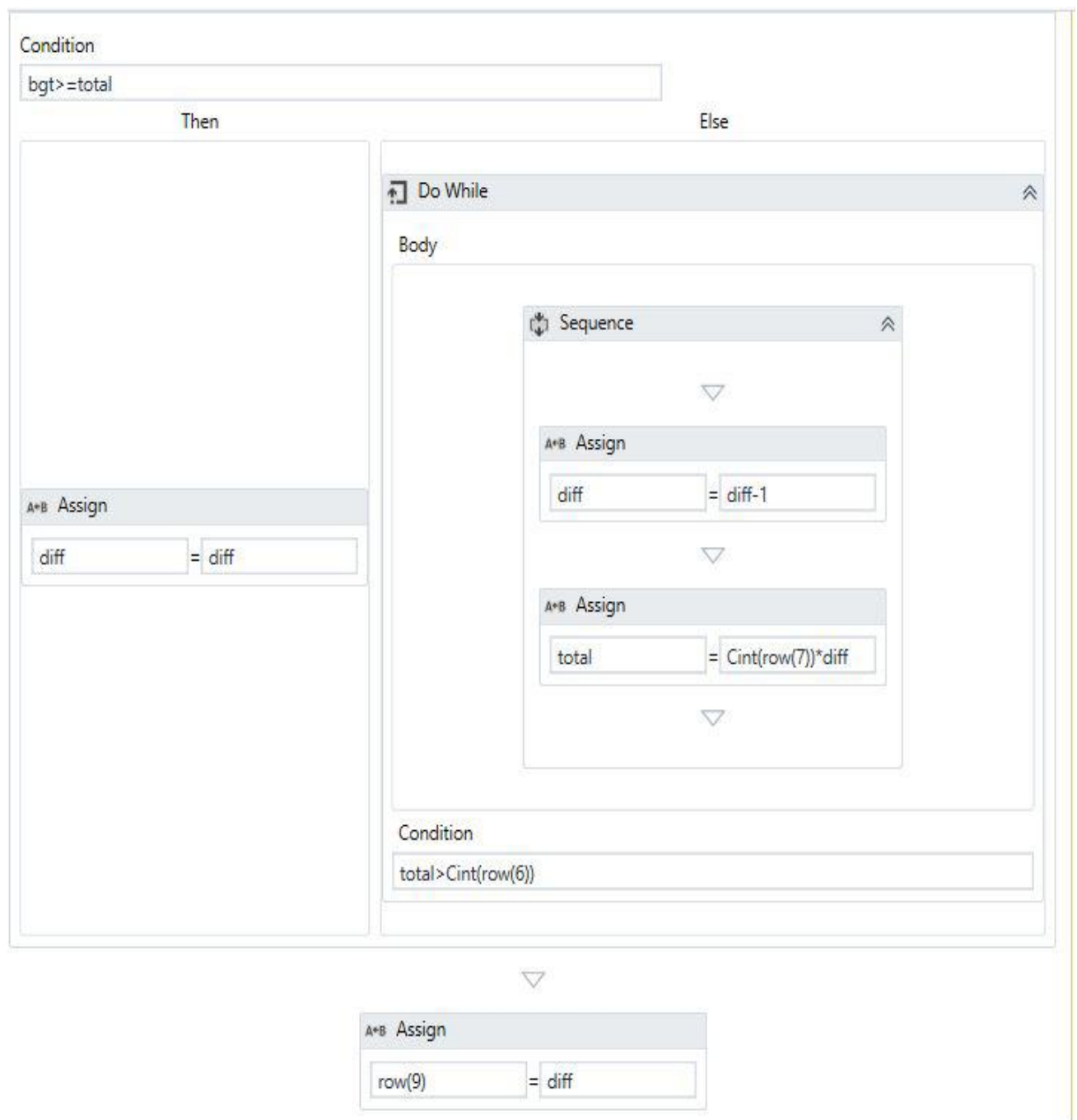
The bot now fetches each product price, in the extracted table we had columns of Required and Current Inventory(CI) details, by finding the difference of Required and CI, we will get the quantity required of the product.

Difference= Req. - CI

Calculate total= ProductPrice * Difference
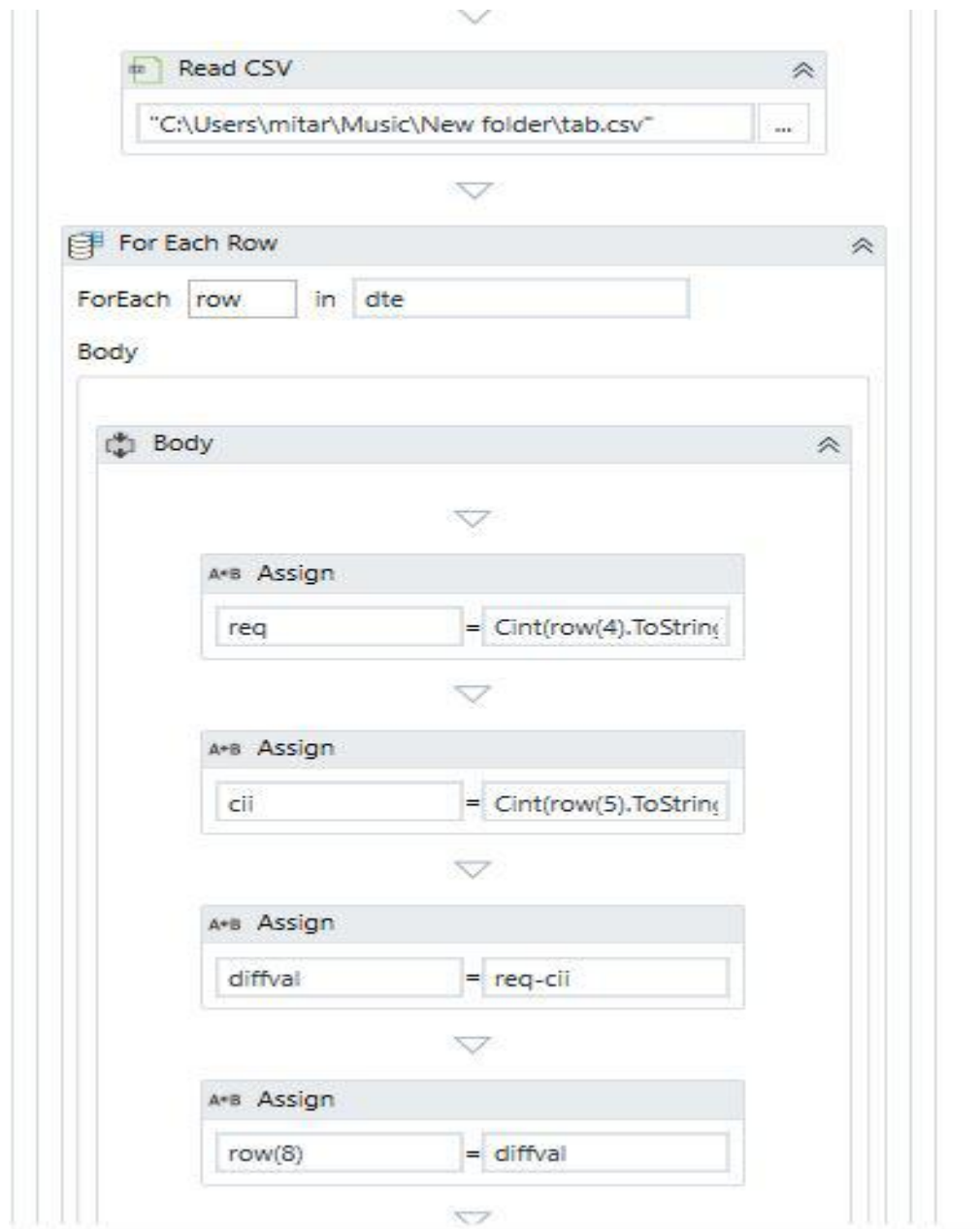
Now the data sheet has product price, difference, total, the next objective was to check whether the total is less than or equal to budget. So the bot developed will compare the budget and total using If-else decision activity and if total is less than or equal to budget then it will buy the product so the difference value will remain as it is & using Do-while activity in else case the difference will decrement by 1 and the new difference will multiply with price and new total will be calculated, this process will continue till the total is less than or equal to budget. The final difference values will get stored in the csv file and multiplication with product price the amount column is added.

Condition

bgt>=total

Then	Else

Then:

A*B Assign

diff	=	diff

Else:

⤒] Do While　　　　　　　　　　　　　　　　　　　　⌃

Body

⟟ Sequence　　　　　　　　　　　　　　　　⌃

▽

A*B Assign

diff	=	diff-1

▽

A*B Assign

total	=	Cint(row(7))*diff

▽

Condition

total>Cint(row(6))

▽

A*B Assign

row(9)	=	diff

Result

Column-0	PRODUCT	COMPANY	DETAIL	REQUIRED	C.I	BUDGET	price	diff	finalitem	total amoun
1	LAPTOP	LENOVO	Lenovo ThinkPad 13 Core i5 - (4 GB/128 GB SSD/Windows 7 Professional) 20GJ000RUS Laptop (13.3 inch, Silver)	10	7	300000	87,947	3	3	263841
2	MOUSE	HP	HP 1000 Wired Optical Mouse (USB 2.0, USB 3.0, Black)	10	4	1500	259	6	5	1295
3	CHAIR	KS CHAIR	Ks chairs Fabric Study Arm Chair (Black)	100	87	45000	2,949	13	13	38337
4	TELEPHONE	PANASONIC	Panasonic KX-TS880MXBD Corded Landline Phone (Black)	25	18	20000	2,750	7	7	19250

CHAPTER - 9

Conclusion

This automation are being frequently used in the industries, in various departments.It helps to save time and provides more efficient results. The automations are easy to build and can be modified according to use. It can perform operations on a very big data , in just a couple of seconds. The concept of Industry 4.0 also include Robotics automation which is about intelligent bots to perform a automation on the basis of their learning. The tasks are being use in supply chain management, business analytics, SAP work,etc.

This bots can also work in virtual machines and can be scheduled also.It will start working when there is a trigger. It will perform the operation and save the result wherever user want.
It's easy to build as it just requires you to tell the logic of the complete process in a sequence or flowchart manner. It helps the bot to understand step by step process and not get any errors.
It's activity are widely used in industries for Data Scraping, Screen Scraping, Bots to filll the Data in excels or in softwares.
Robotics Process Automation is being used in Banking for Customer Support, Loan Processing, Cards Activation, Health Care for Patient Registration & Billing, Business for ERP automation, Invoice processing & Automation of logistic data , Insurance for Premium Calculation, Processing Claims & Responding to queries, etc.