

AUTOMATION TESTING – HC FACETS WITH UFT

report submitted in partial fulfillment of the requirement for the degree of

BACHELOR OF TECHNOLOGY

IN

ELECTRONICS AND COMMUNICATION ENGINEERING

By

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UNDER

COGNIZANT



JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

May 2021

TABLE OF CONTENTS

CAPTION	PAGE NO.
DECLARATION	I
ACKNOWLEDGEMENT	ii
LIST OF ACRONYMS AND ABBREVIATIONS	iii
LIST OF FIGURES	iv
ABSTRACT	vi
CHAPTER-1: INTRODUCTION	1
1.1 Software	1
1.1.1 Types of software	1
1.2 Product vs project	1
1.3 Software testing	1
1.3.1 Importance of software testing	2
1.3.2 Benefits of software testing	3
1.3.3 Types of software testing	3
1.4 Testing documentation	3
CHAPTER-2: FUNCTIONAL TESTING	5
FUNDAMENTALS	
2.1 Software testing lifecycle(STLC)	5
2.2 Software development lifecycle (SDLC)	5
2.2.1 Types of SDLC models	5
2.3 Defect	12
2.4 Functional testing	13
2.5 Methods of software testing	15
2.6 Test case	19
2.7 List of hands on done in week 1	19
2.8 Results	19
CHAPTER-3: DataSource (SQL + XML + JSON)	22
3.1 SQL	22
3.2 MySQL workbench	22
3.3 Data definition language (DDL)	22
3.4 Data manipulation language (DDL)	22
3.5SQL aggregate functions	23
3.6 SQL scalar functions	23
3.7 SQL JOINS	23
3.8 Subqueries	24
3.9 JSON	24

3.9.1 Features of JSON	24
3.9.2 Advantages of JSON	25
3.9.3 Disadvantages of JSON	25
3.10 XML	26
3.10.1 Features of XML	26
3.10.2 Advantages of using XML	26
3.10.3 Disadvantages of using XML	26
3.11 JSON and XML similarities	26
3.12 JSON and XML differences	27
3.13 List of hands on done on week 2	27
3.14 Results	28
CHAPTER-4: VB SCRIPT	30
PROGRAMMING LANGUAGE	
4.1 VBScript (Visual Basic Script)	30
4.1.1 Basic features of VB script	30
4.2 List of hands on done in week 3	30
4.3 Results	31
CHAPTER-5: UFT AUTOMATION	33
5.1 Micro Focus Unified Functional Testing	33
5.2 GUI testing tools	33
5.3 List of hands on done in week 4-6	34
5.4 Results	35
5.5 Mini project – Unregistered user verification	37
CHAPTER-6:FUTURE WORK AND CONCLUSION	41
REFERENCES	42

DECLARATION

I hereby declare that the work reported in the B.Tech Project Report entitled “**AUTOMATION TESTING - HC FACETS WITH UFT**” submitted at **Jaypee University of Information Technology, Wagnaghat, India** is an authentic record of my work carried out in the training period under Cognizant. I have not submitted this work elsewhere for any other degree or diploma.



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Roll no. 171056

Project Report Undertaking

I Ms. Prachi Pal - Roll No. 171056 Branch ECE is doing my internship with Cognizant from 27th feb,2021 to 11th june,2021

As per procedure I have to submit my project report to the university related to my work that I have done during this internship.

I have compiled my project report. But due to COVID-19 situation my project mentor in the company is not able to sign my project report.

So I hereby declare that the project report is fully designed/developed by me and no part of the work is borrowed or purchased from any agency. And I'll produce a certificate/document of my internship completion with the company to TnP Cell whenever COVID-19 situation gets normal.



Signature _____
Name Prachi Pal
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Date 17/05/2021

ACKNOWLEDGEMENT

I would like to express my deep and sincere gratitude to the company Cognizant for giving me a chance of doing this internship. I would like to thank my training coach Sowndhariya Ravichandran for providing her invaluable guidance throughout training period.

Apart from this, I would also like to thank other mentors who shared their knowledge and experience with me. The dynamism, vision, sincerity and motivation of all the mentors inspired me a lot. They taught me the methodology to carry out the training work and to present it clearly. It was a great privilege and honor to work under Cognizant.

I am also grateful to my university and all the faculty members for guiding me and making me capable of building my future with confidence.

LIST OF ACRONYMS AND ABBREVIATIONS

UFT	Unified functional testing
CPU	Central processing unit
AUT	Application under test
XML	extensible markup language
STLC	Software testing lifecycle
SDLC	Software development lifecycle
SQL	Structured query language
GPU	graphics processing unit
JSON	JavaScript Object Notation
DDL	Data definitionLanguage
VB script	Visual basic script
DML	Data manipulation language
GUI	graphical user interface

LIST OF FIGURES

	Page no.
FIGURE 1.1 Types of software testing	2
FIGURE 2.1 Software testing life cycle	5
FIGURE 2.2 Waterfall model	6
FIGURE 2.3 V model	7
FIGURE 2.4 Incremental model	9
FIGURE 2.5 Agile model	11
FIGURE 2.6 Steps in functional testing	14
FIGURE 2.7 Test Scenario	19
FIGURE 2.8 Test cases	20
FIGURE 2.9 Defect report	20
FIGURE 2.10 RTM	21
FIGURE 3.1 JOINS in SQL	24
FIGURE 3.2 Difference in syntax of XML and JSON	27
FIGURE 3.3 Rental details based on return date	28
FIGURE 3.4 Maruthi car owner details	28
FIGURE 3.5 Employee Details	28
FIGURE 3.6 XML file in explorer	29
FIGURE 4.1 Exception handling	31
FIGURE 4.2 Outputs	32
FIGURE 4.3 Occurrence count	32
FIGURE 4.4 Outputs	32
FIGURE 5.1 Micro focus UFT software	34
FIGURE 5.2 Data table with iterations	35
FIGURE 5.3 Excel sheet data	35
FIGURE 5.4 Outputs	35
FIGURE 5.5 Automate datatble script	36
FIGURE 5.6 Excel sheet created in script	36
FIGURE 5.7 Excel sheet exported	36
FIGURE 5.8 Link Count	36
FIGURE 5.9 Record and run settings	37
FIGURE 5.10 Website recorded	37
FIGURE 5.11 Login page	37
FIGURE 5.12 Invalid credentials entered	38
FIGURE 5.13 Checkpoint added	38
FIGURE 5.14 Script	38
FIGURE 5.15 Object repository	39

FIGURE 5.16 Error message printed	39
FIGURE 5.17 Results passed , Checkpoint verified	40

ABSTRACT

The overall training period was based on “AUTOMATION TESTING - HC FACETS WITH UFT”. The domain of internship was software testing. The training was week wise and every week a quiz and a coding challenge took place. For every week I had to submit the hands on. The complete learning journey is formalized using adult learning principles, where problem solving and applying the skills gained are given more importance than conceptual learning.

The training included functional testing, SQL, XML, JSON, VB script, UFT automation and HC facets. Test automation also called automation testing is a technique used for testing the software. It is a product testing strategy.

The software testing domain has a great future as it is very necessary to built a quality software as if there are defects in a software it can cause a loss to the company moreover it can be very dangerous also.

CHAPTER 1

INTRODUCTION

1.1. Software :

It is a collection of instructions which tells a computer how to work or it is a collection of programs that helps us to perform a task. It is basically the opposite of hardware as hardware describes the physical aspects of a computer.

1.1.1. Types of software

- a) System software
 - OS
 - Device drivers
 - Utilities
 - Servers
- b) Programming software
 - compilers
 - interpreters
 - debuggers
- c) Application software
 - industrial automation
 - games
 - business software
 - telecoms

1.2. Product vs project : If software is developed for specific requirement of customer then it is known as a Project. Whereas if software is developed for multiple customers requirement then it is known as a Product.

1.3. Software Testing

It is a strategy to check whether the genuine programming item coordinates with anticipated necessities. It is done to guarantee that the product item isn't having any imperfection. It incorporates execution of programming/structure sections using manual or robotized gadgets to

evaluate at any rate one properties of premium. The justification programming testing is to perceive botches, openings or missing necessities instead of genuine essentials.

It includes Black Box Testing, white box testing and grey box testing also. In straightforward terms, testing implies Verification of Application Under Test (AUT).

1.3.1. Importance of software testing:

Software testing is significant since, in such a case that there are any bugs or errors in the item, it might be recognized early and can be handled before movement of the item thing. Properly took a stab at programming thing ensures reliability, security and unrivaled which further results in effective, cost suitability and shopper unwaveringness.

Software testing is significant as software bugs can be costly and surprisingly hazardous. Programming bugs may cause money related, human misfortune, can see that set of experiences is brimming with such models.

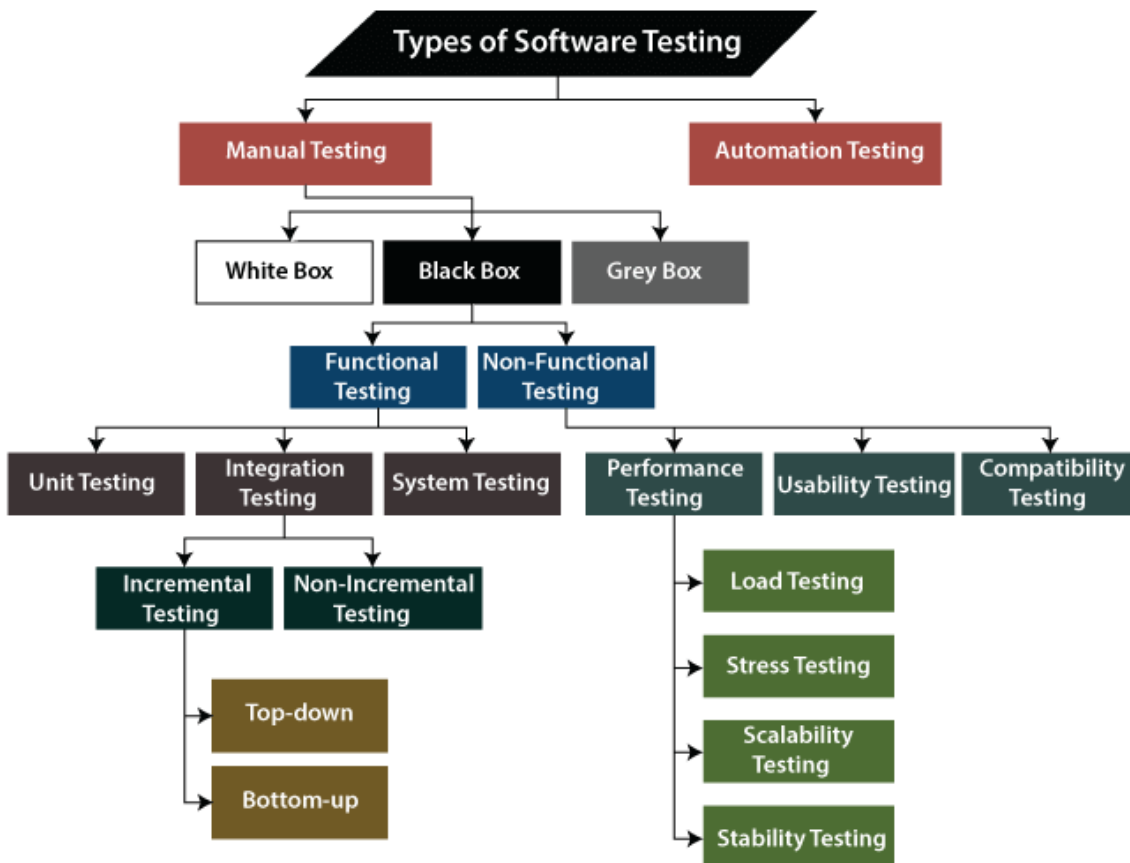


FIGURE 1.1 : Types of software testing

1.3.2. Benefits of Software Testing

- **Cost-Effective:** One of the huge advantage of programming testing. Testing any project on time help you to save your money to an extent that this would be possible. If bugs are caught in past period of testing then it costs less in order to be fixed.
- **Security:** The most vulnerable and sensitive benefit of programming testing. People are looking for trusted in things. It helps in disposing of threats and issues earlier.
- **Product quality:** basically testing ensures that quality thing is passed on to customers.
- **Customer Satisfaction:** most important thing in any field is to offer some satisfaction to their customers. UI/UX testing makes sure the best customer experience.

1.4. Types of software testing

- **Manual testing :** Manual testing is a process in which test cases are executed manually without using any automated tool. All take a look at instances done via the tester manually in keeping with the end person's angle. It ensures whether or not the utility is operating, as cited within the requirement document or no longer. check instances are deliberate and applied to finish almost 100 % of the software application. Test cases are generally are generated manually.

Types of manual testing :

- white box testing
- back box testing
- grey box testing

These techniques are discussed in the next chapter. The black box technique includes functional and non – functional testing.

- **Automation testing :** Automation testing uses some automated specific tools in order to execute test scripts. It is an acceptable way to enhance the productivity efficiency and test coverage of testing .It can be done using UFT or selenium.

1.5. Testing Documentation

It is the documentation in which artifacts are created throughout or before the testing of a software utility. Documentation displays the significance of strategies for the person and client and also the organization. Careful documentation can keep the efforts, time and wealth of the corporation.

Types of test document

- Test case
- Test scenarios
- Test plan
- Test strategy
- Requirement traceability matrix(RTM)
- Bug report
- Test data
- Test execution report

CHAPTER 2

FUNCTIONAL TESTING FUNDAMENTALS

2.1. (STLC) Software Testing Life Cycle :

It is the trying interaction executed in an arranged way. In this interaction, a few exercises are completed to improve nature of item. Be that as it may, STLC just arrangements with testings identifying mistakes and not turn of events.

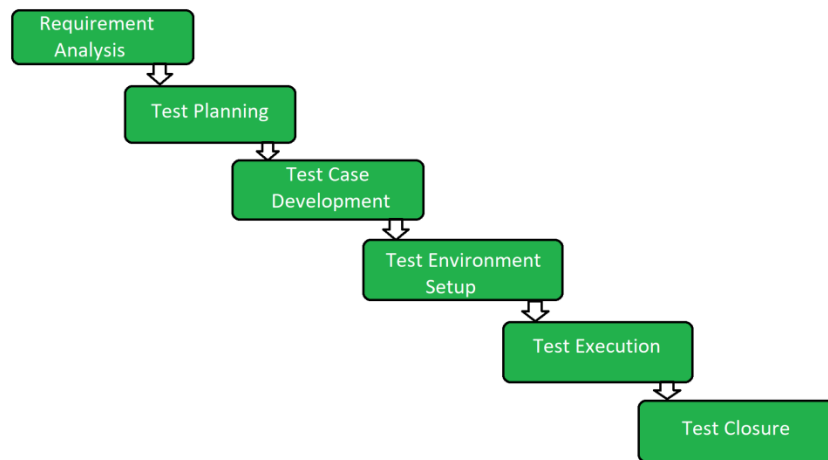


FIGURE 2.1: Software Test Life Cycle

2.2. Software Development Life Cycle(SDLC) :

The activities carried out by the developers in order to design and develop a good quality software. SDLC life cycle develops software in the following ways

1. Gathering the requirements
2. Software design
3. Software building
4. Testing the software
5. Deployment of software
6. Maintenance

2.2.1. Types of SDLC models:

a) WATERFALL MODEL: The main SDLC model was the Waterfall model. This model is not difficult to fathom and entirely prominent in the improvement cooperation.

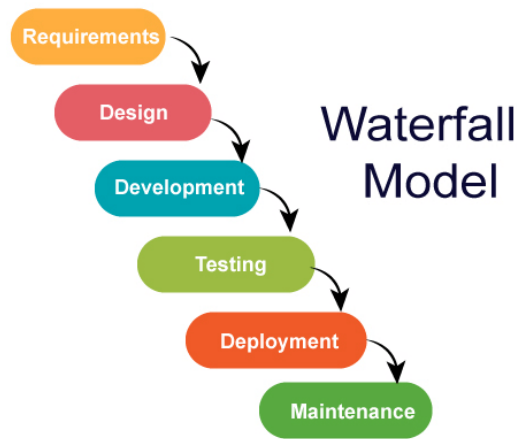


FIGURE 2.2 : Waterfall model

The standard thought of this model is that solitary when one headway level is done will the accompanying one be begun. At the completion of each stage, a review ends up choosing whether the assignment is on the right way and whether to continue or discard the endeavor.

ADVANTAGES:

- The Waterfall technique is also striking by programming engineers
- The Waterfall Model capacities honorably for more humble exercises where necessities are most likely known
- Cost-ampleness: Time spent consistently in the item creation cycle can provoke the more unmistakable economy at later stages

DISADVANTAGES:

- The crucial obstacle of this model is that trying is seen as a "once" action around the completion of the endeavor not well before the appearance of the action.
- The test is seen as a "last examination", a relationship to a gathering evaluation before giving up the thing to the customer.
- High proportions of risk and weakness
- Powerless model for complex and article arranged exercises

All in all, the Waterfall Model suggested being utilized in projects with an unmistakable and profound comprehension of undertaking necessities, plan, specialized instruments, and foundations.

- b) V MODEL : This is the most widely recognized model in the advancement interaction. The model has an "V" shape. Basic thought in a V-Model is that improvement errands and test undertakings are similarly significant equal assignments, to be specific addressed by the different sides of the "V".

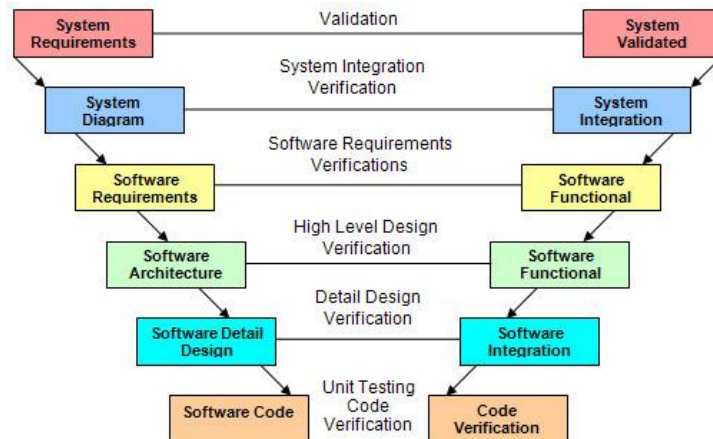


FIGURE 2.3 : V model

The improvement system continues from the upper left factor of the V towards the right, completing at the top legitimate point. In the left-hand, descending inclining part of the V, improvement representatives characterize business venture necessities, utility format boundaries, and plan strategies. At the base factor of the V, the code is composed. In the right-hand, up inclining part of the V, testing and troubleshooting is completed.

The unit giving a shot is executed first, seen with the guide of rear up incorporation looking at. The extreme top legitimate factor of the V addresses item dispatch and progressing help.

Like in Waterfall-Model each portion should be finished sooner than the resulting segment begins, V-form sincerely is an altered model of a Waterfall-Model. The V-variant appoints that the code looking at documentation is written couple with the advancement levels significance, for instance, the joining checks should be reported as and when the serious level design is finished and the unit checks must be prepared as and keeping in mind that the specific determinations are set down

In this rendition, analyzers ought to be engaged with looking into advancement execution as fast as could be expected. Like the Waterfall-Model looking at procedure and tackling flaws might be executed at any level inside the existence cycle, anyway the expense of finding and settling shortcomings will increment significantly as improvement advances.

The reach and profundity of the test stages might be altered in accordance with the special wishes of the mission and for every improvement degree, there's a relating investigate degree.

ADVANTAGES

- Due to the truth that inside the V-Model imperfections are being fixed a speedy time when they had been recognized, it is reasonable to fix them.
- The form has gained notoriety for a generally excellent base for the parceling of testing.
- All the people inside the improvement of a machine have an obligation for best assurance and testing.
- Testing sports like necessities, test planning show up pleasantly sooner than coding. This reality saves various time and furthermore helps in fostering an awesome comprehension of the endeavor on the underlying degree.

DISADVANTAGES

- The V-Model is inflexible and the most un-adaptable, which implies that on the off chance that one of the prerequisites is changing, the analyzer need to supplant the accept a glance at documentation as a whole.
- This model pertinent normally to huge partnerships on the grounds that the model wishes a ton of assets.
- The sum and the force of the investigate stages should be custom-made reliable with the specific wishes of the errand.

In outline: In the V-Model the area of giving a shot inside the improvement way is significant. The shortcoming finding happens inside the beginning phase of the improvement strategy which bears the cost of the less expensive chance for fixing it.

c) **INCREMENTAL /ITERATIVE MODEL:** It is basically an arrangement of improving the software, wherein necessities are basicaly separated in several independent modules of programming advancement cycle. A fast improvement is finished in the form of strides from execution, assessment format, testing or confirmation. Every cycle passes by means of the necessities, coding, plan, evaluating levels. Each next arrival of contraption add a highlight to the past discharge until all planned usefulness has been completed.

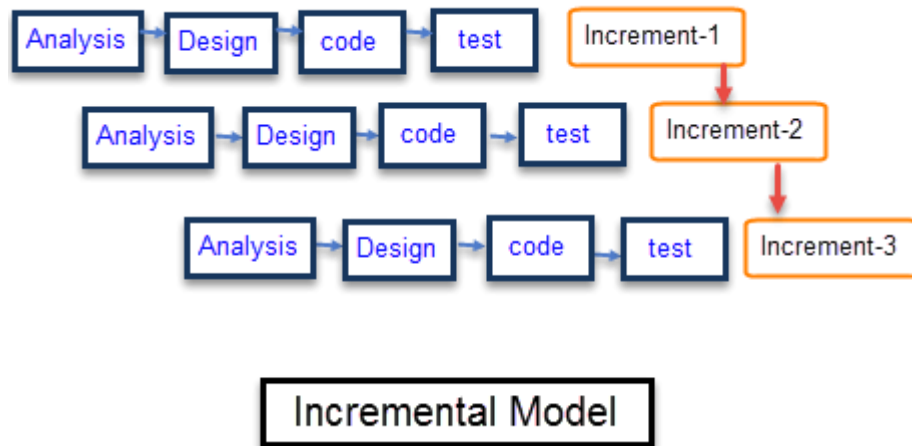


FIGURE 2.4: Incremental model

The basic framework is situated in the creation meanwhile the principal augmentation is very well conveyed. The major augmentation is generally a middle item, where the essential prerequisites are required and advantageous highlights are being added inside the ensuing additions. The moment the center item is broke down by a customer, there should be a plan advancement for the ensuing addition. This model is used :

- When interest for an early arrival of an item emerges
- When programming program designing group aren't very well proficient or prepared
- When unreasonable danger abilities and objectives are concerned
- Such technique is more meddlesome for net utility and item based absolutely organizations

ADVANTAGES

- The programming can be created expedient all through the product presence cycle
- It is bendy and significantly less extravagant to exchange necessities and extension
- Throughout the improvement levels adjustments might be done
- This is less costly as contrasted with others
- Errors are smooth to be distinguished

DISADVANTAGES

- It requires a marvelous making arrangements planning
- Problems may cause in light of machine engineering as such not all necessities gathered up the front for the entire programming program lifecycle
- Each cycle fragment is very inflexible and doesn't cover each other
- Rectifying an issue in one unit requires revision in every one of the units and burns through several time

d) **AGILE MODEL:** The Agile Model of programming improvement is a reasonable structure for programming program designing that advances improvement emphases during the presence pattern of the endeavor. The Agile strategy meaning in light of the fact that the name alludes suggests something to do immediately. Thus, Agile Testing alludes to approve client prerequisites as fast as could be expected and make them buyer agreeable. Coordinated practices are particularly customized to get rid of a wide range of waste showing in an item lifecycle, however more extraordinarily, upgrading the fine of the high level item is a main aim strung into a large portion of that training. There are numerous light-footed improvement strategies; greatest limit hazard via developing programming in fast amounts of time.

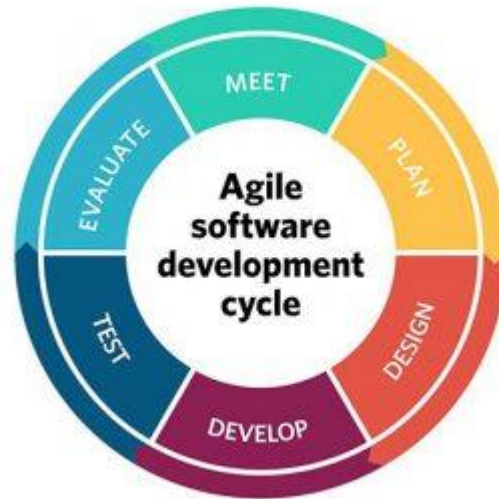


FIGURE 2.5: Agile model

Software fostered all through one unit of time is known as an emphasis, which may likewise shutting from one to about a month. Each new delivery is a whole programming program adventure: which incorporates arranging, prerequisites examination, plan, coding, looking at, and documentation. In Agile giving a shot as fast in light of the fact that the form is out, trying is expected to begin and report the bugs speedy if any found. There are a couple of notable homes to Agile Development, for instance:

- Short discharge cycles-nimble improvement can't be called coordinated until it's far accomplished in short tedious emphases.
- Customer inclusion. The analyzer need to give his contemplations at the customer's necessities in inclination to just being the intended interest group at the furthest edge.
- Responding to substitute – spry improvement is centered around short reactions to trade and consistent turn of events.
- Individuals and associations over cycles and gear

ADVANTAGES

- Saving cash and time.
- Focus more at the utility instead of reporting matters.

- Daily gatherings and conversations for the mission following an Agile model can assist with deciding the issues pleasantly ahead of time and work on them thusly.
- Requirements changing over even in the past due degree of progress
- The quit result is amazingly acceptable programming program at all reasonable time-frame and happy clients.

DISADVANTAGES

- The task can without issues get taken misguided if the buyer delegate isn't clear what absolute last result that they need.
- There is a deficiency of accentuation on fundamental planning and documentation.
- User contribution is generally a limit bother especially in enormous and muddled undertakings
- Agile approaches are really best pertinent to items wherein unwavering quality isn't crucial.

2.3. Defect:

It very well might be truly characterized as a difference among expected and real. Imperfection is a mistake seen after the application goes into creation. It normally alludes to various issues with the product program items, with its outer lead or with its inward highlights. In different expressions Defect is the qualification among anticipated and genuine achieve the setting of testing. It is the deviation of the client necessity. Imperfection might be ordered into the accompanying:

- Wrong: When necessities are applied not in the correct manner. This problem is a change from the given detail.
- Missing: A necessity of the benefactor that turned into not, at this point satisfied. This is a fluctuation from the determinations, a representation that a particular was not, at this point completed, or a prerequisite of the supporter changed into dismissed practically.
- Extra: A prerequisite consolidated into the item that turned into not, at this point given by utilizing the stop buyer. This is continually a change from the particular, anyway can be a characteristic wanted by utilizing the client of the item. Be that as it may, it's far viewed as an issue as it's a change from the current necessities.
- ERROR: A blunders is a misstep, bogus impression, or bogus impact with respect to a product engineer. In the class of designer we comprise of computer programmers, software engineers,

experts, and analyzers. For example, a designer may moreover misjudge a de-signal documentation, or a software engineer would potentially type a variable call inaccurately – brings about an Error. It is the lone which is produced due to wrong login, circle or because of punctuation. Blunder as a rule emerges in programming program; it prompts substitute the usefulness of the program.

- **BUG:** An Error found in the improvement climate before the item is conveyed to the client. A programming mistake that makes an application work inadequately, produce wrong impacts or crash. A mistake in programming system or equipment that reasons an application to glitch. Bug is wording of Tester.
- **FAILURE:** A disappointment is the failure of a product program framework or issue to do its necessary highlights inside particular execution necessities. At the point when an issue arrives at the surrender client it is alluded to as a Failure. During improvement Failures are generally dictated via analyzers.
- **FAULT:** An off-base advance, cycle or measurements definition in a PC program which makes this framework act in an accidental or unexpected manner. A shortcoming is brought into the product as the outcome of a missteps. It is a peculiarity in the product which can reason it to carry on erroneously, and now not with regards to its determination. It is the outcome of the error.

2.4. Functional Testing :

It is a kind of programming testing that approves the product program framework contrary to the reasonable prerequisites/determinations. The motivation behind Functional checks is to test each component of the product application, by utilizing offering suitable info, confirming the yield contrary to the Functional necessities. Practical giving a shot explicitly includes dark field testing and it isn't included around the inventory code of the application.

This evaluating checks User Interface, APIs, Database, Security, Client/Server discussion and other capacity of the Application Under Test. The looking at might be finished either physically or utilizing computerization.

The high level headed of Functional testing is checking the functionalities of the product framework. It particularly focuses on -

- Mainline highlights: Testing the standard elements of an application
- Basic Usability: It includes essential ease of use giving a shot of the framework. It checks whether an individual can unreservedly explore by means of the screens with no issues.
- Accessibility: Checks the openness of the machine for the client
- Error Conditions: Usage of evaluating procedures to test for blunders circumstances. It appraisals whether suitable blunders messages are shown

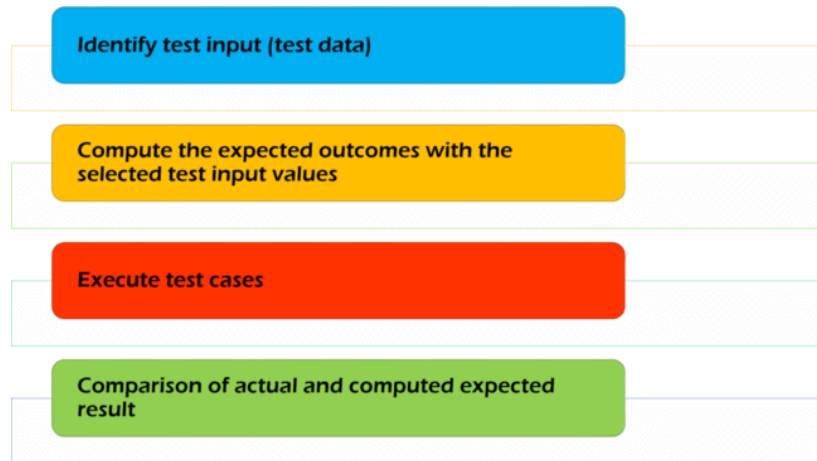


FIGURE 2.6: Steps in functional testing

TABLE 2.1 : Functional vs non - functional testing

Functional Testing	Non-Functional Testing
Performed utilizing useful determination that are given by a customer. It checks the framework against utilitarian necessities.	Checks execution, versatility, unwavering quality and other non - utilitarian parts of the product.
It is executed first	It is performed after functional testing
Manual Testing and robotization instruments are utilized for useful testing	Utilizing apparatuses will be successful
Business prerequisites are the sources of info taken for useful testing	Execution boundaries like adaptability and speed are taken as contributions to non-utilitarian testing.

Depicts what the item does	Depicts how great the item functions
Doing Manual Testing is simple	Doing Manual Testing is intense

2.5. Methods for software testing:

a) Black-Box Testing

The approach of testing while not having any information of the indoors workings of the utility is called black-field checking out. The tester is oblivious to the gadget structure and does not have get right of entry to the source code. Typically, while performing a black-box test, a tester will have interaction with the gadget's user interface with the aid of supplying inputs and examining outputs without knowing how and in which the inputs are labored upon.

The following desk lists the advantages and downsides of black-field trying out.

The following table lists the advantages and disadvantages of black-box testing.

TABLE 2.2: Advantages and disadvantages of black box testing

Advantages	Disadvantages
Well material and effective for gigantic code sections.	Restricted protection, in light of the fact that handiest a specific scope of investigate situations is unquestionably done.
Code access isn't needed.	Wasteful looking at, because of the way that the analyzer least difficult has kept information around a product.
Unmistakably isolates individual's point from the designer's demeanor through apparently characterized jobs.	Daze protection, for the explanation that analyzer can't objective specific code sections or blunders defenseless regions.

Enormous quantities of genuinely gifted analyzers can test the utility without a data of execution, programming language, or working designs.	The check occurrences are difficult to plan.
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b) White-Box Testing

White-field trying out is the special research of inner common sense and structure of the code. White-container checking out is also known as glass trying out or open-box testing. In order to carry out white-box checking out on an software, a tester wishes to recognize the internal workings of the code. The tester desires to have a glance within the source code and discover which unit/bite of the code is behaving inappropriately.

TABLE 2.3: Advantages and disadvantages of white box testing

Advantages	Disadvantages
As the analyzer has mastery of the source code, it will turn out to be exceptionally smooth to find which kind of information can help in looking at the utility adequately.	Because of the way that an expert analyzer is needed to perform white-box testing, the costs are expanded.
It permits in upgrading the code.	Here and there it's miles difficult to investigate each corner and corner to find covered up mistakes that can make issues, as numerous ways will go untested.
Additional hints of code can be dispensed with which can convey in secret imperfections.	It is hard to hold white-holder looking at, in light of the fact that it calls for particular stuff like code analyzers and investigating devices.
Because of the analyzer's data roughly the code, most protection is achieved at some stage in investigate circumstance composing.	

c) Grey-Box Testing

This is a way to check the utility with having a restricted knowledge of the inner workings of an software. In software program checking out, the phrase the more you already know, the better contains a whole lot of weight whilst trying out an software. Mastering the area of a device continually offers the tester an facet over someone with restricted area know-how. Unlike black-box testing, where the tester best assessments the utility's user interface; in gray-field checking out, the tester has get entry to to layout documents and the database. Having this expertise, a tester can prepare higher test facts and check eventualities while making a take a look at plan.

TABLE 2.2: Advantages and disadvantages of grey box testing

Advantages	Disadvantages
Offers mixed benefits of black-box and white-field looking at every possible opportunity.	Since the admittance to source code isn't generally accessible, the ability to move over the code and check protection is kept.
Dark box analyzers don't depend upon the source code; rather they rely upon interface definition and useful determinations.	The appraisals can be excess if the product program clothier has effectively run an experiment.
Based at the restricted data accessible, a dim box analyzer can plan great check situations uncommonly around discussion conventions and information kind adapting to.	Testing each doable enter course is ridiculous in light of the fact that it may require some investment; thusly, numerous product ways will go untested.
The look at is conveyed according to the perspective of the individual and not the clothier.	

TABLE 2.5: Comparison of Testing Methods

Black-Box Testing	Grey-Box Testing	White-Box Testing
The inward functions of an	The analyzer has limited data of	Analyzer has total information

application need presently don't be known.	the internal operations of the product.	on the inner operations of the utility.
Additionally called shut box testing, data driven testing, or intentional testing.	Otherwise called clear testing, in light of the fact that the analyzer has limited data of the inner parts of the application.	Otherwise called clear-box testing, primary testing, or code-principally based looking at.
Performed through surrender clients and furthermore through analyzers and engineers.	Performed with the guide of end-clients and also through analyzers and engineers.	Regularly accomplished through analyzers and manufacturers.
Testing is principally founded on external anticipations - Internal direct of the utility is obscure.	Testing is done on the possibility of significant level data set graphs and data accept circumstances for what they are charts.	Inside functions are totally known and the analyzer would layout be able to test information consequently.
It is comprehensive and the least tedious.	Somewhat time-ingesting and comprehensive.	The most thorough and time-eating type of testing.
Not ideal for calculation testing.	Not worthy for set of rules testing.	Appropriate for calculation testing.
This can handiest be executed via preliminary and-mistakes technique.	Information space names and interior limits might be tried, whenever perceived.	Information areas and inner restrictions can be better analyzed.

Expected results	Actual results	Pass/Fail	Defect id	Remarks
website is opened	The website is opened	Pass		
The location radio should be selected	The location radio button is selected			
The country should be selected	The country is selected			
The city should be selected	The city is selected			
The date of check in should be selected	The date of check in is selected			
The date of check out should be selected	The date of check out is selected			
The nationality should be selected	The nationality is selected			
The number of rooms should be selected	The number of rooms are selected			
The adults and children should be selected in room 1	The adults and children are selected in room 1			
The adults and children should be selected in room 2	The adults and children are selected in room 2			
User should be navigated to the next page	The user is navigated to the next page			
website is opened	The website is opened	Fail	D_01	
The international radio button should be selected and the list box country should not be displayed	The international radio button is selected and the list box country is not displayed			
The country should be selected	The country list box is not displayed			
The city should be selected	The city is selected			
The date of check in should be selected	The date of check in is selected			

FIGURE 2.8 : Test cases

Serial no.	Defect id	Description	Reproducible (yes/no)	Steps to reproduce	Severity	Priority
TS_01/TC_02	D_01	On clicking "International" Radio Button, the List Box - "Country" is not displayed.	Yes	Enter the url_"www.raj.travels" Select valid international radio button Select the valid "Country" in the list box Select the valid "City" in the list box Select the valid "Check In" date in the list box Select the valid "Check Out" date in the list box Select valid "nationality" in the list box Select the valid "Number of rooms" in the list box Select the "Number of Adults & Children" in room 1 in the list box Select the valid "Number of Adult & Children" in the room 2 in the list box. Click on Search button	High	High
TS_02/TC_04	D_02	The Traveler enters Check-in date greater than Check-Out date, fills other details and clicks the "Search" button. The application displays all records.	Yes	Enter the url_"www.raj.travels"	High	High

FIGURE 2.9 : Defect report

CHAPTER 3

DataSource (SQL + XML + JSON)

3.1. SQL : SQL known as Structured Query Language is used to carry out some operation on the facts saved inside the database which include updating records, deleting statistics, creating and modifying tables, perspectives, and so on. SQL is only a question language; it is not a database. To perform SQL queries, you want to put in any database like Oracle, MongoDB, MySQL, PostGre SQL, DB2, SQL Server, and so on.

3.2. MySQL Workbench: It is tool for builders and database architects and DBAs. MySQL Workbench provides information modelling, SQL improvement, and complete management equipment for server configuration, user management, backup, and lots more. MySQL Workbench is to be had on Linux, Windows and Mac OS X.

3.3. Data Definition Language : It includes SQL instructions that are used to outline schema of database. It really manages portrayals of the data set construction and is utilized to make and alter the design of data set articles inside the database.

DDL commands:

- CREATE - it creates the database and its objects (like index, table, function, triggers, store procedure, views).
- ALTER - it alters the database structure.
- DROP – it deletes the objects from database.
- COMMENT – it add comments in data dictionary
- TRUNCATE – it basically erases all the records from table
- RENAME – it renames the object which is existing in database.

3.4. Data Manipulation Language:

SQL commands dealing with manipulation of the data present in database belongs to Data Manipulation Language.

DML commands:

- INSERT – insert data into table
- DELETE – delete records from table.

- UPDATE – update existing data in table.
- Select: retrieve data from database.

3.5. SQL Aggregate Function : Returns a single value that is calculated from the values in column of a table.

- AVG() – Returns average value
- FIRST() - Returns first value
- COUNT() - Returns number of rows
- LAST() - Returns last value
- MIN() - Returns smallest value
- MAX() - Returns largest value
- SUM() - Returns sum

3.6. SQL Scalar functions : Returns single value that is based on an input value.

- UCASE() - Converts field into upper case
- MID() - Extract characters from text
- LCASE() - Converts field into lower case
- LEN() - Returns length of a text
- ROUND() - Rounds number to the number of decimals being specified
- FORMAT() - Formats how a field should be displayed
- NOW() - Returns current system date, time

3.7. SQL JOIN : Combine rows from two or more tables that is based on related columns between them.

- INNER JOIN: Returns all the records having matching value in both the tables
- RIGHT JOIN: Return records from right table and records matched from left table
- LEFT JOIN: Return records from left table and records matched from right table
- FULL OUTER JOIN: Return records when a match is there in either right or left table

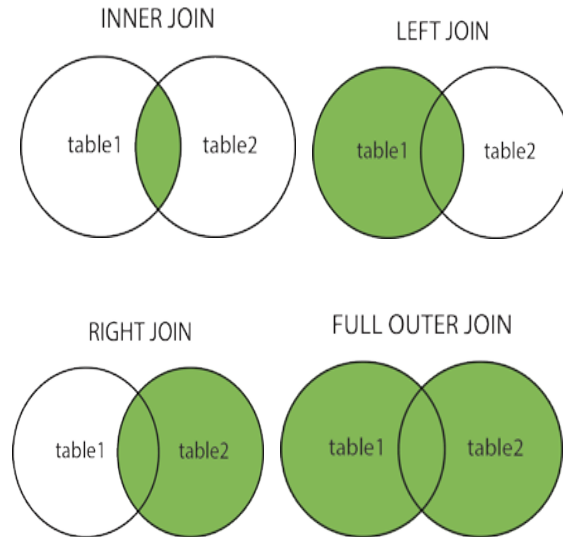


FIGURE 3.1 : JOINS in sql

3.8. Subquery :

Subquery or internal inquiry or a Nested question is a question inner some other sq. inquiry and inserted within the in which provision. A subquery is utilized to go back records so as to be applied within the fundamental inquiry as a situation to additionally limit the records to be recovered. Subqueries can be applied with the pick out replace, INSERT, DELETE articulations alongside the administrators like = , > , < , >= and <=, between, IN and so forth.

3.9. JSON : JSON is utilized to keep measurements in a pre-arranged, and simple to-get to way. Its full structure is JavaScript Object Notation. It gives a comprehensible arrangement of records which might be gotten to consistently.

3.9.1. Features of JSON

- Easy to apply - JSON API offers high-stage veneer, which assists you with working on ordinarily utilized use-cases.
- Performance - JSON is very quick as it burns-through extremely less memory territory, that is specifically reasonable for huge thing diagrams or constructions.
- Free gadget - JSON library is open stockpile and allowed to utilize.
- Doesn't need to make planning - Jackson API gives default planning to parts objects to be serialized.
- Clean JSON - Creates clean, and appropriate JSON outcome that is direct to analyze.

- Dependency - JSON library doesn't need each and every library for handling.

3.9.2. Advantages of using JSON

- Provide help for all programs
- Easy to examine and compose
- Straightforward language structure
- You can locally parse in JavaScript utilizing eval() include
- Easy to make and control
- Supported via all fundamental JavaScript systems
- Supported with the guide of greatest backend innovation
- JSON is distinguished locally through JavaScript
- It allows in you to communicate and serialize subordinate insights the utilization of an organization association.
- You can utilize it with contemporary programming dialects.
- JSON is text which can be changed over to any object of JavaScript into JSON and send this JSON to the worker.

3.9.3. Disadvantages of using JSON

- No namespace help, hence terrible extensibility
- Limited advancement gear help
- It offers assistance for formal language structure definition

3.10. XML :

XML is a markup language that is intended to keep data. It's prominently utilized or switch of records. It is case delicate. XML offers you to characterize markup components and produce hand crafted markup language. The straightforward unit inside the XML is known as a component.

Expansion of XML record is .Xml

3.10.1. Features of XML

- XML labels aren't predefined. You need to characterize your redid labels.

- XML changed into intended to hold records, not permits you to show that insights.
- Mark-up code of XML is not difficult to secure for a human.
- Well, the based organization is direct to analyze and compose from applications.
- XML is an extensible markup language like HTML.

3.10.2. Advantages of using XML

- Makes reports compact all through constructions and projects. With the help of XML, you can change data rapidly among unprecedented constructions.
- XML isolates the data from HTML
- XML works on stage trade framework

3.10.3. Disadvantages of using XML

- The XML language structure might be actually similar to various options 'text-based absolutely' records transmission designs that is every so often confusing
- No inborn records type help
- The XML punctuation is repetitive
- Does n't license the buyer to make his labels.

3.11. JSON and XML similarities

- JSON and XML are "self depicting" (intelligible)
- JSON and XML are progressive (values inside qualities)
- JSON and XML might be parsed and utilized by a lot of programming dialects
- JSON and XML can be gotten with a XMLHttpRequest

3.12. JSON and XML differences :

- JSON doesn't utilize stop tag
- JSON is more limited
- JSON is speedier to contemplate and compose
- JSON can utilize exhibits

- JSON is superior to XML in light of the fact that XML is parcels more prominent difficult to parse than JSON and JSON is parsed directly into an equipped to-utilize JavaScript thing.



FIGURE 3.2 : Difference in syntax of XML and JSON

3.13. List of hands on done in week 2

- Insert Records - DepartmentCoding exercise
- Department name based on block numberCoding exercise
- Student and their Department Based on CityCoding exercise
- Concatenating DetailsCoding exercise
- Hotels that took order based on monthCoding exercise
- Rental details based on return dateCoding exercise
- No of time rented by each carCoding exercise
- Total sale daywiseCoding exercise
- Maruthi car owner detailsCoding exercise
- Cars not taken for rentCoding exercise
- Well Formed XML - Employee DetailCoding exercise
- Well Formed XML - Department DetailsCoding exercise
- Well Formed XML - Department Details -2Coding exercise

- Well Formed XML - Hotel InformationCoding exercise
- Well Formed XML - Multiple Department DetailsCoding exercise

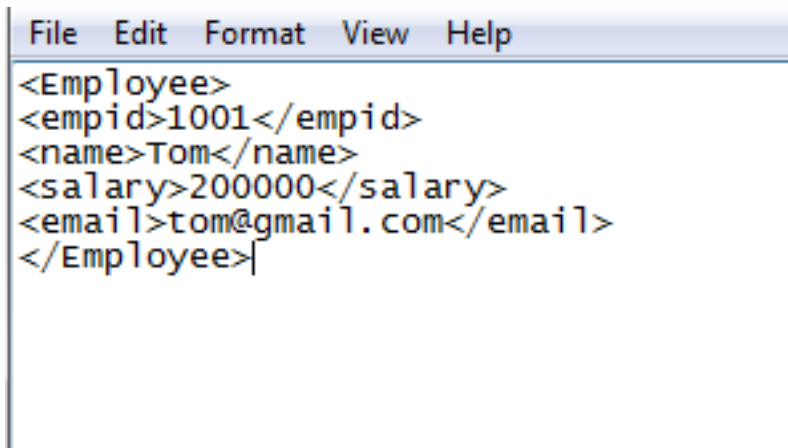
3.14. Results :

```
select rental_id,car_id,customer_id,km_driven from rentals
where return_date between '2019-08-1' and '2019-08-31'
order by rental_id;
```

FIGURE 3.3: Rental details based on return date

```
select DISTINCT o.owner_id,o.owner_name,o.address,o.phone_no from owners o
join cars c on o.owner_id = c.owner_id
where car_name LIKE 'Maruthi%'
order by o.owner_id;
```

FIGURE 3.4: Maruthi car owner details



The image shows a screenshot of a text editor window with a menu bar containing 'File', 'Edit', 'Format', 'View', and 'Help'. The main text area contains the following XML code:

```
<Employee>
<empid>1001</empid>
<name>Tom</name>
<salary>200000</salary>
<email>tom@gmail.com</email>
</Employee>
```

FIGURE 3.5 : Employee details

```
<?xml version="1.0"?>  
- <Employee>  
    <empid>1001</empid>  
    <name>Tom</name>  
    <salary>200000</salary>  
    <email>tom@gmail.com</email>  
</Employee>
```

FIGURE 3.6 : XML file in explorer

CHAPTER 4

VB SCRIPT PROGRAMMING LANGUAGE

4.1. VBScript

Full form visual basic script. It is advanced by way of Microsoft with the goal of developing dynamic web pages. It is customer-side scripting language like JavaScript. VBScript is a light version of Microsoft Visual Basic. The syntax of VBScript may be very similar to that of Visual Basic. If you want your web site to be extra active and interactive, then you can contain VBScript for your code.

VBScript is only a scripting language. So, it cannot run its code on its personal. It needs a bigger programming language to host it. Now, VB Script is used because the default scripting language of ASP.

4.1.1. Basic Features of VB script

- It is a prearranging language advanced by Microsoft.
- It is a light form of Microsoft Visual Basic and the VBScript sentence structure is actually similar to that of Visual Basic.
- VBScript program should be facilitated on any of those three conditions:
 - Internet Information Server – Own web worker programming program of microsoft
 - Windows Scripting Host – Local site facilitating environmental factors of the Windows OS
 - Internet Explorer – Most straightforward site facilitating environmental factors we will use to run VBScript
- VB Script can just sudden spike in demand for Windows machines , Internet Explorer program.
- The just gear that you could use to make and run VBScript or IE or any word processor

4.2. List of hands on done in week 3

- Find Factorial Assignment
- Sort Strings Assignment
- Basic Arithmetic Operation Assignment
- Display Month Assignment
- Directory Creation Assignment

- Find Occurrence Count Assignment
- File Creation Assignment
- Display Date in Specific Format Assignment
- Generate Unique Number Assignment
- Implement ISEmpty Function Assignment
- Data Types and Basic Operations Assignment
- Error Handling - 1Assignment
- Handle ArrarOutOfIndex Assignment
- Validate String Assignment
- Error Handling - 2Assignment
- Regular Expression Match Assignment
- Replace Numbers Assignment
- Validate Email Address Assignment

3.3. Results :

```

error2.vbs - Notepad
File Edit Format View Help
"prachi pal 915947
option Explicit
dim date
On Error Resume Next
date = Inputbox("Enter a valid date in format DD-MM-YYYY : ")

if len(date)<>10 then
Err.Raise 101
msgbox "Enter a valid date. Error : " & CStr(Err.Number)
else
if IsDate(date) then
msgbox "valid date : " & date
else
Err.Raise 101
msgbox "Please enter a valid date. Error : " & CStr(Err.Number)
end if
end if

```

FIGURE 4.1 : Error Handling

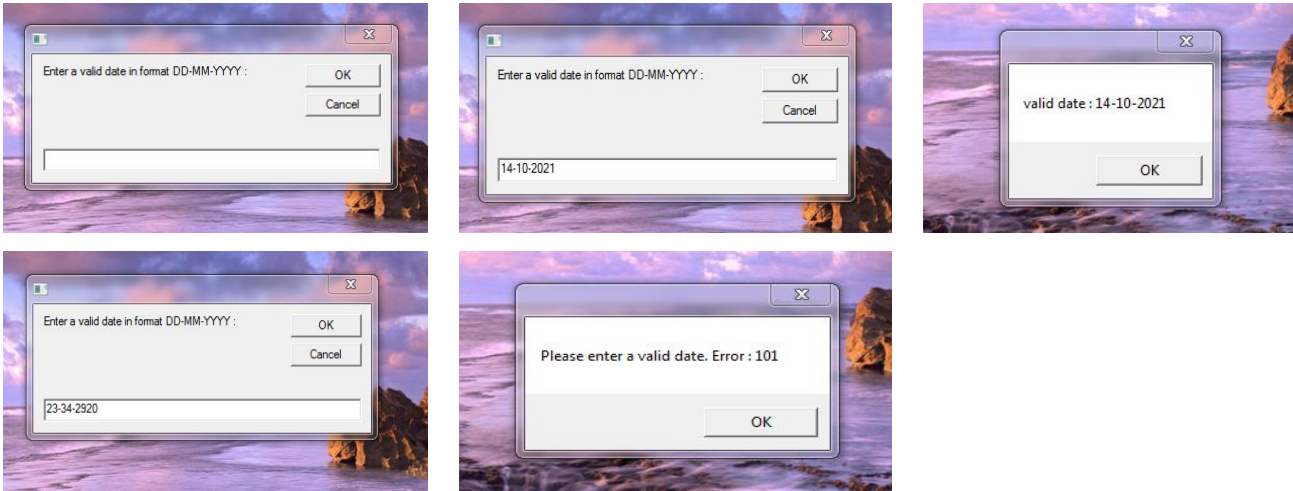


FIGURE 4.2 : Outputs

```

occurrence.vbs - Notepad
File Edit Format View Help
'PRACHI PAL 915947
option Explicit
dim word,alphabet,c
c=0
word = InputBox("Enter a word ")
alphabet = InputBox("Enter an alphabet")
call strocc(word,alphabet)
Function strocc(w,a)
c= len(w)-len(replace(w,alphabet,""))
End Function
MsgBox "In the word " & word & ", " & alphabet & " is repeated " & c & " times."

```

FIGURE 4.3 Occurrence Count

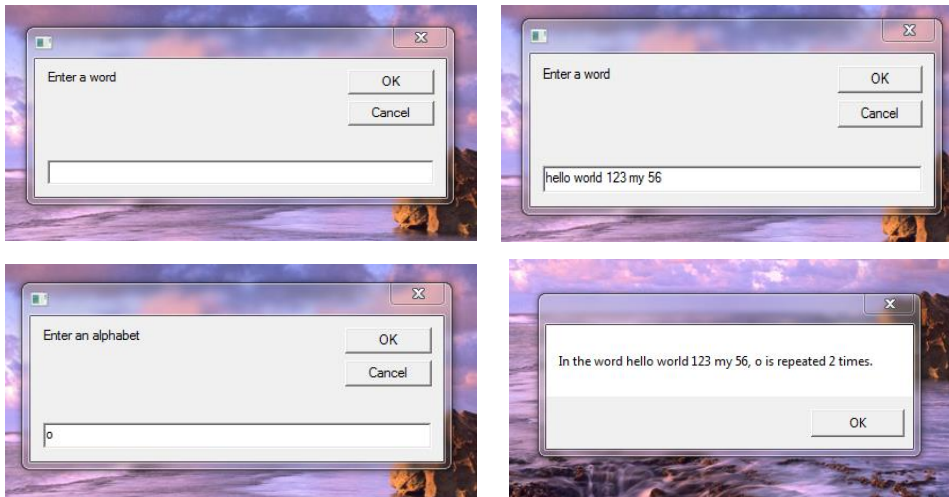


FIGURE 4.4 Outputs

CHAPTER 5

UFT Automation

5.1. Micro Focus Unified Functional Testing

Micro Focus Unified Functional Testing (UFT), formerly known as QuickTest Professional (QTP), is software program that offers functional and regression take a look at automation for software programs and environments. UFT allows catchphrase and prearranging interfaces and competencies a graphical UI. It utilizes the visual basic Scripting edition (VBScript) prearranging language to decide a check technique, and to control the articles and controls of the software beneath look at. UFT lets in developers to check each of the 3 layers of application's tasks from an single reassure the interface and the transporter layer, statistics set layer.

UFT transformed into to begin with composed through Mercury Interactive and called QuickTest professional. Mercury Interactive became out to be at remaining gotten thru Hewlett-Packard (HP) in 2006. UFT 11.five blended HP QuickTest expert and HP carrier check without delay into an single programming application package deal, which end up available from the HP software program department until 2016, even as the division modified into sooner or later bought to Micro focus. Miniature consciousness UFT is automatic comparing programming intended for testing diverse programming program bundles and conditions. It plays realistic and relapse trying out in a UI comprising of a nearby GUI or net interface. It works with the guide of checking out the articles in the software man or woman interface or an internet internet site web page and seeming favored tasks along mouse snaps or console activities it might likewise catch object homes like name or overseer identification. HP Unified useful testing makes use of a VBScript prearranging language to indicate the look at scenario and to manipulate the gadgets and controls of the product underneath inspect. To carry out greater subtle movements, customers may also likewise want to control the basic VBScript. no matter the reality that UFT is generally applied for UI based totally take a look at Case computerization, it likewise can robotize a few non-UI primarily based test instances, comprising of file device sports, information set trying out, internet administrations testing and also API testing.

5.2. GUI testing tools

GUI (Graphical user Interface) checking out tool is used to locate the defects that befell inside the layout phase, which enhance the fine of the software. With the help of these equipment, we are able to pick out the loopholes speedy as opposed to performing GUI testing manually. we are able to check the utility based totally on application overall performance, that is related to mouse and

keyboard actions, and some of the GUI objects like buttons, toolbars, conversation boxes, Menu bars, and the edit fields.

Following are a few crucial techniques that we can carry out beneath GUI trying out:

Navigation validation, confirm the test screens, records integrity validation, verification of usability conditions, and additionally take a look at the numeric, date subject codecs.

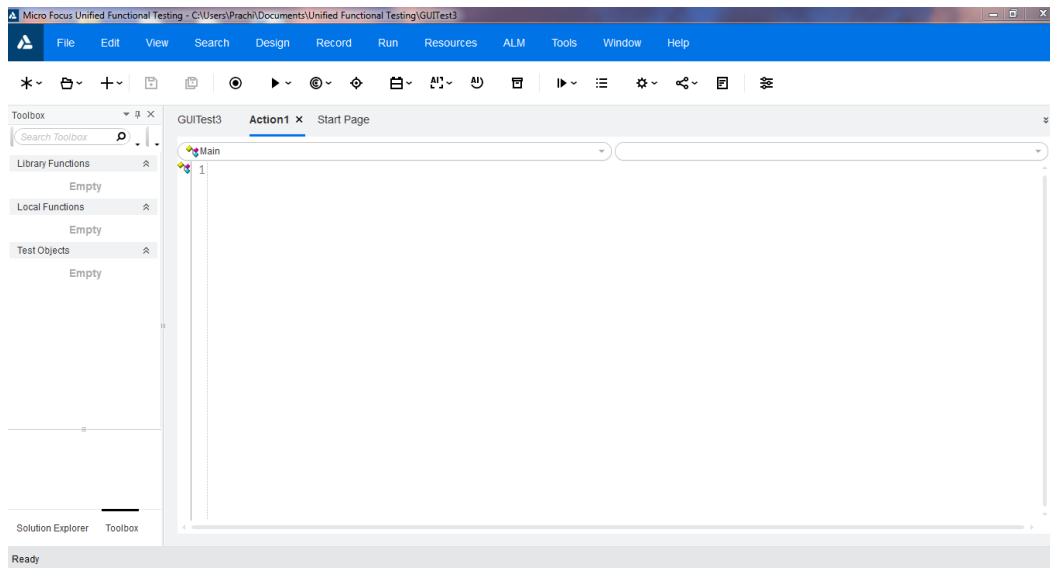


FIGURE 5.1 : Micro focus UFT software

5.3. List of hands on done in week 4 - 6

- Verify Add-Ins Assignment
- Explore Web Objects Assignment
- Explore Multiple Objects Assignment
- Environment Variables Assignment
- Library Files Assignment
- subroutines and functions Assignment
- DataTable Object Methods Assignment
- Data Table with Iterations Assignment
- Record Script Assignment
- Automate Data Table Assignment
- Descriptive Programming Assignment
- Array Implementation Assignment

- File Handling Assignment
- Use ADODB Assignment
- XML File Handling Assignment
- UFT End to End automation Assignment

5.4. Results

```

Action1 X UFT Report : datatableobjectmethod - Res1 Start Page
Main
1
2 datatable.ImportSheet "C:\Users\Administrator\Documents\Unified Functional Testing\Book2.xlsx", "Sheet1", "Global"
3
4 For i = 1 To datatable.GetSheet("Global").GetRowCount Step 1
5   datatable.SetCurrentRow(i)
6
7   Browser("Compound Interest Calculator").Page("Compound Interest Calculator").WebEdit("res1").Set datatable.Value("principal", "Global")
8   Browser("Compound Interest Calculator").Page("Compound Interest Calculator").WebEdit("res2").Set datatable.Value("rate", "Global")
9   Browser("Compound Interest Calculator").Page("Compound Interest Calculator").WebEdit("res3").Set datatable.Value("time", "Global")
10
11   Browser("Compound Interest Calculator").Page("Compound Interest Calculator").WebButton("Calculate").Click
12   Next
13
14
15

```

FIGURE 5.2 : Data Table with Iterations

principal	rate	time
232	3.26	4
2556	7.00	5
1322	6.50	6
32.21	3.32	4.4

FIGURE 5.3 : Excel sheet data

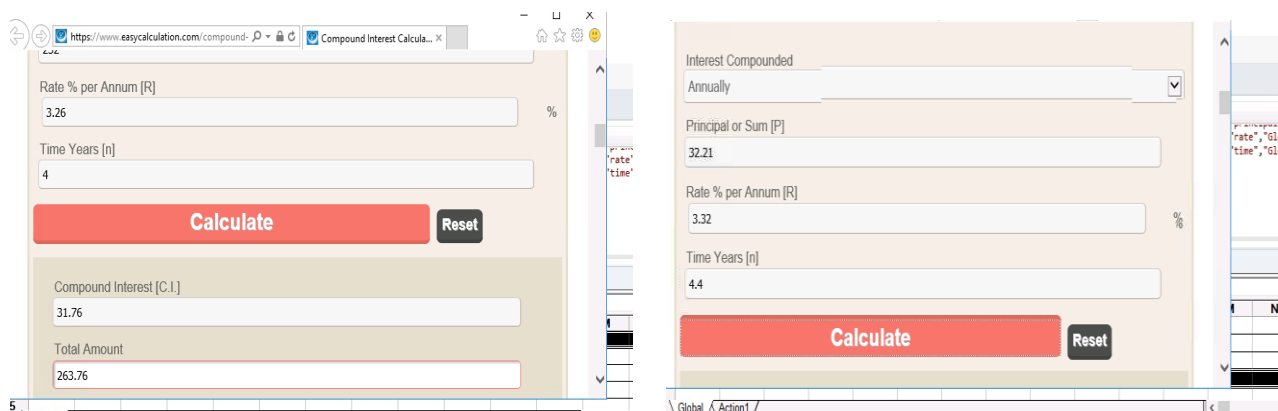


FIGURE 5.4 : Outputs

```

Main
1 Set desc=description.Create()
2
3 desc("micclass").value="Link"
4 Set objLink =Browser("creationtime:=0").Page("title:=.*").childobjects(desc)
5
6 msgbox objLink.count
7
8 Browser("Google").Page("Google").WebEdit("Search").Set "news"
9 datatable.GlobalSheet.AddParameter"Links_Google",""
10
11 For i = 0 To 19 Step 1
12
13 datatable.SetCurrentRow(i+1)
14
15 datatable("Links_Google") = webed(i).getROProperty("name")
16 Next
17 datatable.Export"C:\Users\Administrator\Documents\Unified Functional Testing\google_links.xls"
18

```

FIGURE 5.5 Automate datatable script

```

5 Set objLink =Browser("creationtime:=0'
6
7 msgbox objLink.count
8

```

Links_Google	B	C	D
Videos			
Books			
Maps			
Images			
Shopping			

FIGURE 5.6 Excel sheet crated in script

A	B	C	D	E	F	G
Videos						
Books						
Maps						
Images						
Shopping						
Flights						
Finance						
Search settings						
Languages						
Hide explicit results						
Advanced search						
Search history						
Your data in Search						
Search help						

FIGURE 5.7 Excel sheet exported

```

=.*").childobjects(desc)

```

FIGURE 5.8 Link count

5.4. Mini Project - Unregistered user verification

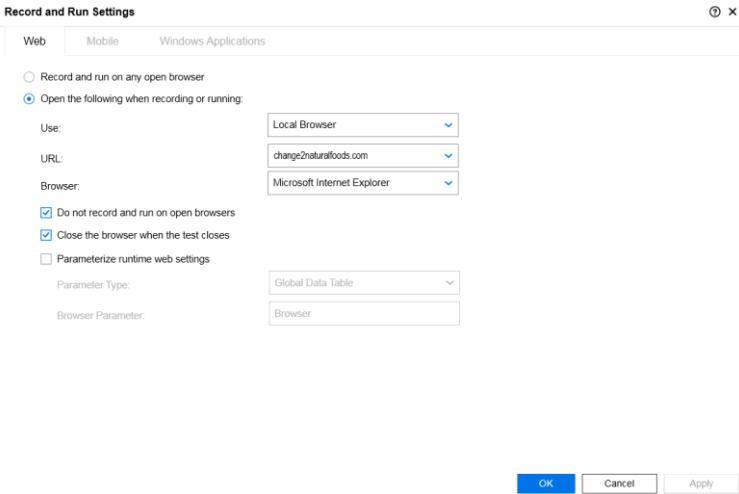


FIGURE 5.9 : Record and run settings

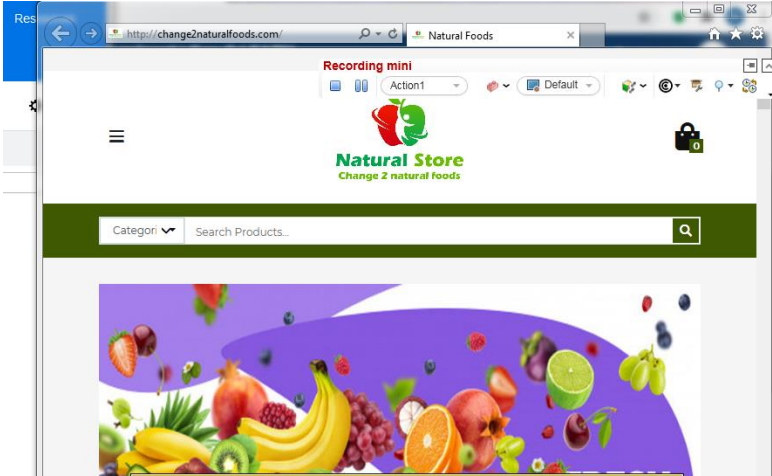


FIGURE 5.10 : Website recorded

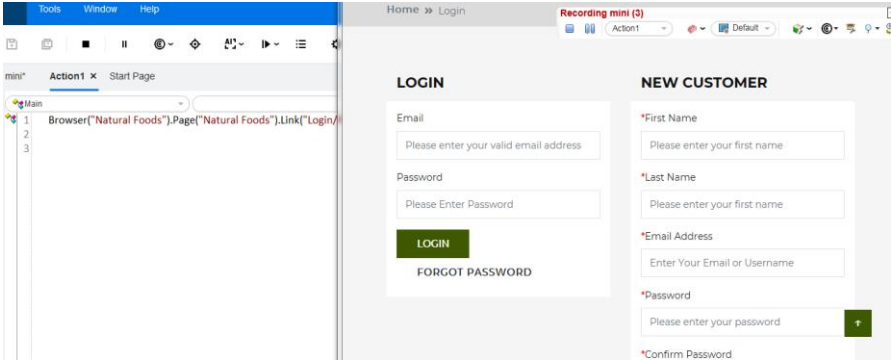


FIGURE 5.11: Login Page

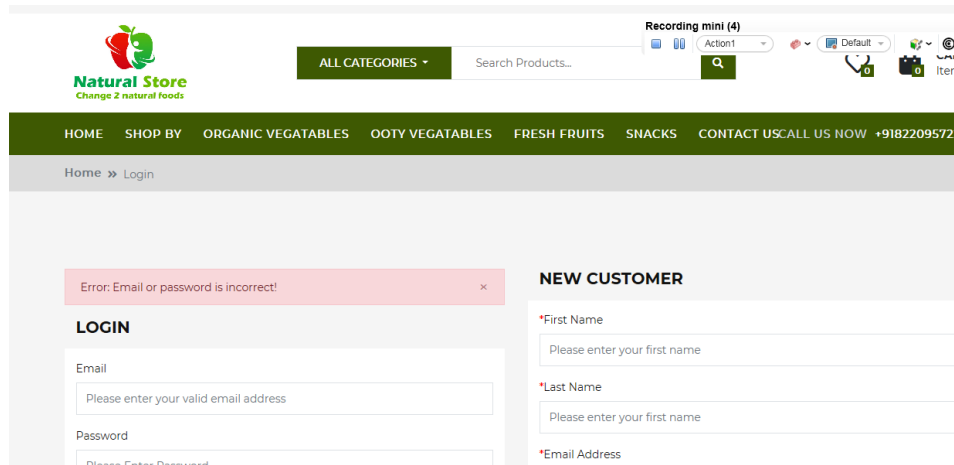


FIGURE 5.12 : Invalid credentials entered

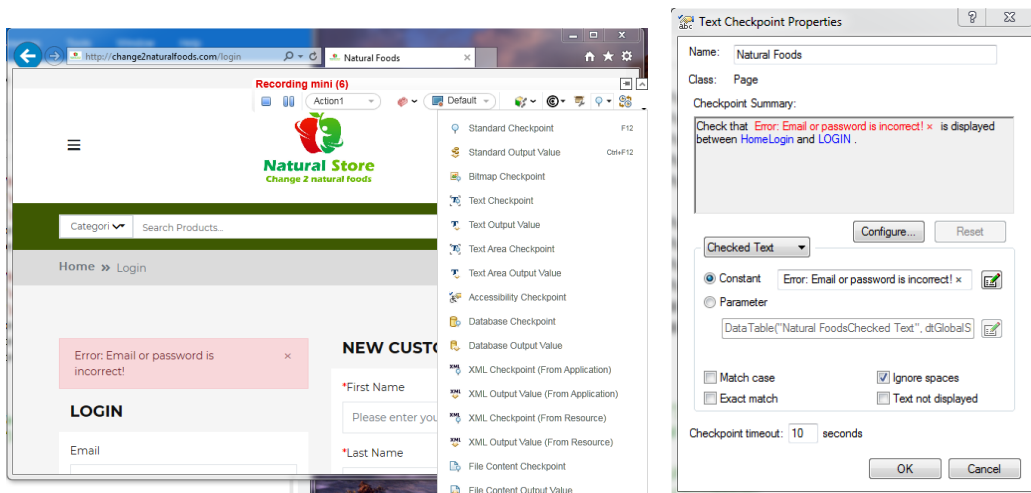


FIGURE 5.13 : Checkpoint added

```

3  'login with unregistered credentials
4  Browser("Natural Foods").Page("Natural Foods").Link("Login/Register").Click
5  Browser("Natural Foods").Page("Natural Foods_2").WebEdit("email").Set "prachi@gmail.com"
6  Browser("Natural Foods").Page("Natural Foods_2").WebEdit("password").SetSecure "609bc6d5be50baa2a352512453b3973078391266fcd6006b"
7  Browser("Natural Foods").Page("Natural Foods_2").WebButton("Login").Click
8
9  'add a checkpoint
10
11 Browser("Natural Foods").Page("Natural Foods_2").Check CheckPoint("Natural Foods")
12 If Browser("Natural Foods").Page("Natural Foods_2").WebElement("Error: Email or password").Exist Then
13
14 print Browser("Natural Foods").Page("Natural Foods_2").WebElement("Error: Email or password").GetROProperty("innertext")
15 reporter.ReportEvent micPass , "Error message display " , "The error message has been displayed "
16
17 End If
18
19 Browser("Natural Foods").Page("Natural Foods_2").Sync
20 Browser("Natural Foods").CloseAllTabs 'close all the tabs
21
22

```

FIGURE 5.14: Script

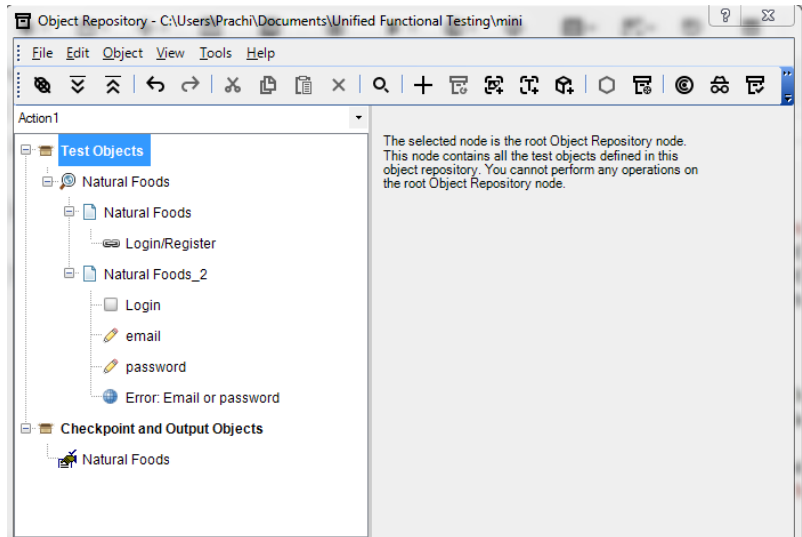


FIGURE 5.15: Object repository

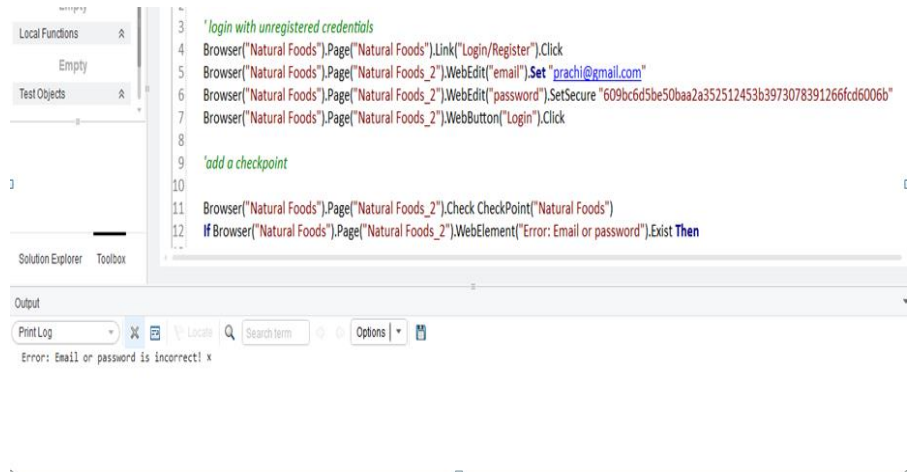


FIGURE 5.16: Error message printed

UFT Report: mini - Res2 x mini* Action1 Start Page

Passed 9 (100%)
Warnings 0 (0%)
Failed 0 (0%)

mini - Res2

Test Data
 Execution Time 2021-05-18 22:51:36 Duration 00:00:13 Tool Name Micro Focus Unified Functional Testing 15.0.2
 Show More ▶

Errors list **Test flow** Search... Collapse All Expand All

- Test Iteration: Row 1
 - Action1
 - Login/Register Click
 - email Set

Test Iteration Details

Test Iteration
 Iteration: Row 1

Execution Time
 2021-05-18 22:51:38

UFT Report: mini - Res2 x mini* Action1 Start Page

Passed 9 (100%)
Warnings 0 (0%)
Failed 0 (0%)

mini - Res2

Test Data
 Execution Time 2021-05-18 22:51:36 Duration 00:00:13 Tool Name Micro Focus Unified Functional Testing 15.0.2
 Show More ▶

Errors list **Test flow** Search... Collapse All Expand All

- Login/Register Click
- email Set
- password SetSecure
- Login Click
- Text Checkpoint: Natural Foc
- Error: Email or passw...

Checkpoint Details

Text Checkpoint
 "Natural Foods"

Description
 Text Checkpoint: captured "Error: Email or password is incorrect! *"
 between HomeLogin and LOGIN Match case: OFF Exact match:
 OFF Ignore spaces: ON

UFT Report: mini - Res2 x mini* Action1 Start Page

Passed 9 (100%)
Warnings 0 (0%)
Failed 0 (0%)

mini - Res2

Test Data
 Execution Time 2021-05-18 22:51:36 Duration 00:00:13 Tool Name Micro Focus Unified Functional Testing 15.0.2
 Show More ▶

Errors list **Test flow** Search... Collapse All Expand All

- Text Checkpoint: Natural Foc
- Error: Email or passw...
- Custom: Error message display
- Natural Foods_2 Sync
- Natural Foods: Close All Tabs

Custom Step Details

Custom Step
 Error message display

Description
 The error message has been displayed

Execution Time
 2021-05-18 22:51:49

FIGURE 5.17: Results passed and Checkpoint verified

CHAPTER 6

FUTURE WORK AND CONCLUSION

FUTURE WORK :

In the coming weeks the training includes project deliverables and Hackathon. There will be coding challenges in the upcoming weeks.

Also, in the upcoming weeks the training will be based on HC facets. HC facets is the last topic of the training.

CONCLUSION :

In the training period I was able to understand all the concepts of software testing and to implement them practically. The training included the concepts of functional testing, SQL, XML, JSON, VB script and UFT automation.

Software testing is very important as the bugs in the software can be very expensive and even dangerous. It provides security as well as customer satisfaction which leads to more profit. Therefore, software testing has a great future scope.

REFERENCES

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- [2] <https://www.guru99.com/>
- [3] <https://www.tutorialspoint.com/>
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