

# **UNIFIED FUNCTIONAL TESTING**

*Project report submitted in partial fulfilment of the requirement of the degree of*

**BACHELOR OF TECHNOLOGY**  
**IN**  
**ELECTRONICS AND COMMUNICATION ENGINEERING**

**By**

Mukul Bhatia (171003)

**UNDER THE GUIDANCE OF**

Sowndhariya Ravichandran



**JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY,  
WAKNAGHAT**

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## DECLARATION

I hereby declare that the work reported in the B.Tech Project Report entitled “Unified Functional Testing” submitted at **Jaypee University of Information Technology, Wagnaghat, India** is an authentic record of our work carried out in the internship at Cognizant Technology Solutions under the supervision of our guide Sowndhariya Ravichandran. I have not submitted this work elsewhere for any other degree or diploma.



Mukul Bhatia

171003

This is to certify that the above statement made by the candidates is correct to the best of my knowledge.

Sowndhariya Ravichandran

Date: 19/05/2021

Head of the Department/Project Coordinator

## **ACKNOWLEDGEMENT**

I would like to thank Cognizant Academy team for guiding me throughout my internship and to acknowledge our project supervisor Sowndhariya Ravichandran, for her undying support, priceless motivation and proper guidance throughout the project duration. Moreover, I extend our sincere gratitude to all the other trainers, Behavioural Coaches and the Mentors of the CognizantTechnology Solutions for their contribution in the successful completion of this work.

I would like to thank Dr. Rajeev Kumar, Head of the Department of ECE Jaypee University of Information Technology Waknaghat for giving us this opportunity to carry out this project.

To our families, I appreciate the support you have given us throughout our academic journey. This quest has not been easy but you have always solemnly stood by our side.

Thank you.

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## **ABSTRACT**

This report focuses on the topic UnifiedFunctional Testing and the other components of automation testing which are require to perform the tests. We start with basic functional testing and then we see how to write the testcases and different kinds of models. Then some basic knowledge of the Data sources such as SQL and XML are there. Then comes the most important part i.e. VB Script in which we see how to do scripting and how it's useful in the Automation Testing. Then finally we talked about the Unified Functional Testing and the test processes present in it. Various functionalities such as associating the Object Repositories and the Recording of the script is there.

# CHAPTER – 1

## FUNCTIONAL TESTING

### 1.1 Introduction

Functional testing basically tests the feature of the software. How a software should work. It is a quality assurance process. The functional testing is used to test different functions of software or application by providing the valid inputs and verifying the outputs. It's a form of black-box testing.

In this type of testing, the functionalities of software is tested by giving different inputs.

The process of Functional testing involves:

- Identifying the functionality of the software.
- Creating an input data based on the requirements.
- Preparation and Execution of the test cases.
- At last, comparing the actual results with the expected results and show the errors (if any).

For example: Testing the functionality of Facebook's login page, payment gateway, flight/Hotel booking etc.



Fig1.1 Principal objectives of Functional testing



## 1.2 Models

There are different types of models in software testing.

SDLC: Software Development Lifecycle describes the types of activities performed at different stages in a software development project and how they relate to each other logically.

There are two types of SDLC models.

- Sequential
- Iterative/Incremental

The activities performed are as follows.

- Requirement Analysis
- Design
- Implementation
- Testing
- Evolution / Maintenance

Also known as waterfall model as the activities are completed after one another.

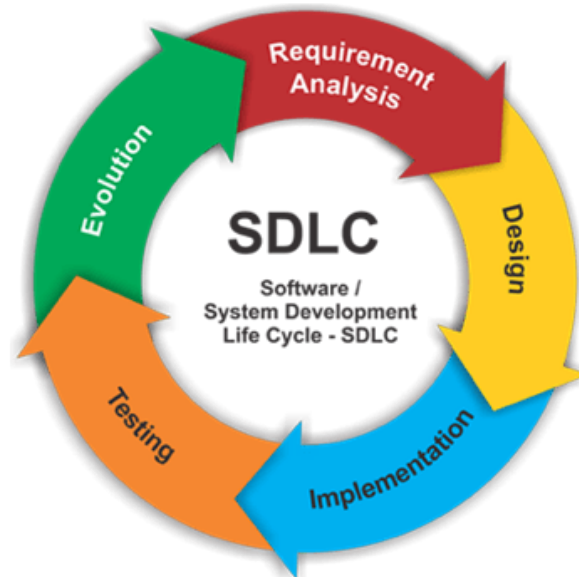


Fig 1.2 SDLC

V-Model: It's a development process which can be considered as an advancement to the waterfall model. In this model instead of moving down in a linear way, the steps are bent upwards after the coding phase. It forms a V-shaped structure in 2 phases, Verification Phase and Validation Phase.

Unlike Waterfall model, the V-Model integrates the test process throughout the development process. This implements the principal of early testing.

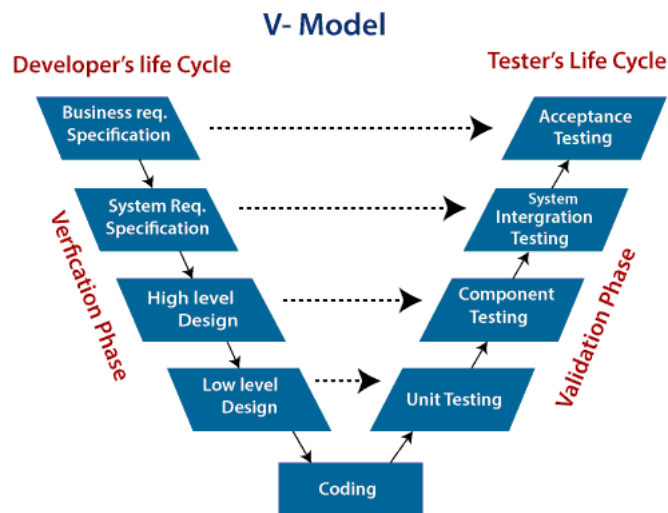


Fig1.3 V Model

SCRUM Model: It's a development process which relies on the incremental development. In this model each iteration tends to be of relatively short time period (e.g. hours, days or few weeks). It's an Agile management framework which contains constituent and practices. Work is done in small tasks assigned to different teams.

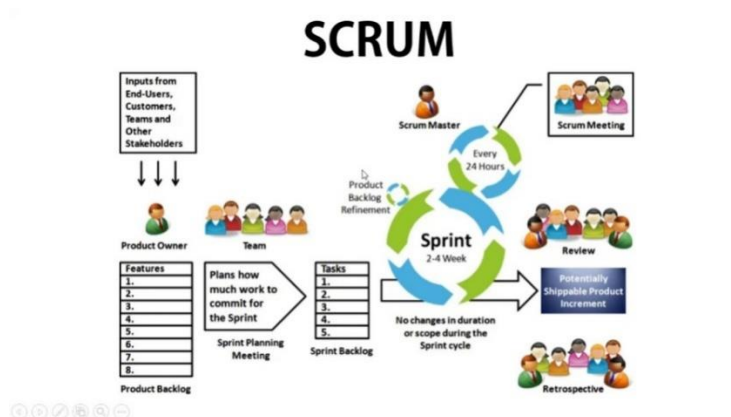


Fig1.4 Scrum Model

## 1.3 What is Testing?

Software testing is basically a way to assess the quality of the software and reduce the risk of software failure in the operation phase. There are two types of Software testing Dynamic testing and Static testing. In Dynamic testing the execution of code is there. In Static testing the review of requirements, design and user manual is there.

The other component of Static testing is Verification. Here the verification of the product is there, whether we built the product in a good/right way or not.

Whereas the other component of Dynamic testing is Validation. In this the validation of product is there. We built the right product but whether the user is happy with the product or not.

### 1.3.1 Test Processes

There are 3 major types of test processes.

- Planning: Analysis  
Strategy  
Plan  
Tools
  
- Design: Test Cases  
Scripts  
Scenarios  
Environment
  
- Execution: Test Report  
Defect Tracking  
Defect Analysis  
Report

### 1.3.2 Types of testing

- Functional Testing: Mainly testing what system does. Usually answered with a yes or no.
- Non-Functional Testing: Testing how the system performs. Hard to answer with a yes or no.  
Usually measured in a range.
- Black-Box Testing: Performing test without knowing the internal structure of a system.
- White-Box Testing: Testing while monitoring the internal structure of the system.
- Dynamic Testing: Testing which includes execution of the software.
- Static Testing: Doesn't includes execution of the software.
- Retesting: Testing after debugging to ensure whether the defects are fixed or not.
- Smoke Testing: Testing main functionalities to ensure that the build is stable enough to continue testing.

### 1.4 Test Case Writing

A Test Case is a set of preconditions, inputs, actions (where applicable), expected results and post conditions which are developed based on the test conditions. Then we look for errors (if any).

Taking an example of a Login window and writing testcases for it.

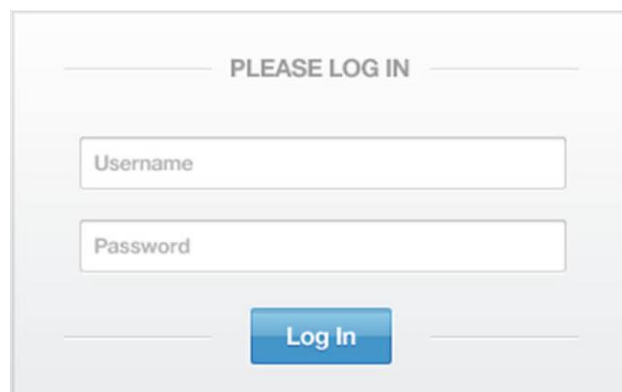


Fig1.6 Login window

- Test Case Title:

Verify login with a valid username and password.

- **Precondition:**  
User is already registered
- **Test Steps:**  
Enter a valid Username and Password. Click on the Login Button.
- **Expected Result:**  
User must be logged in successfully and must be redirected to (xyz) page.
- **Test Scenario:**  
Login
- **Actual Result:**  
User is logged in successfully and got redirected to the (xyz).

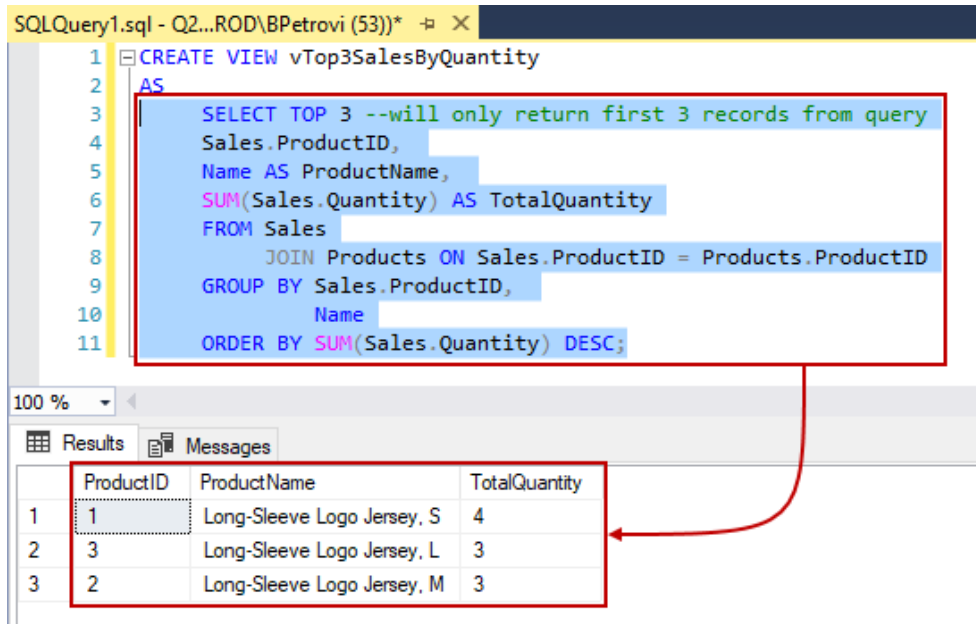
# CHAPTER 2

## Datasource

### 2.1 SQL

SQL stands for structured query language designed for managing the data in a relational database management system (RDBMS). It's basically a language which is used to communicate with the databases. SQL can be used for various database operations such as creation, deletion, modification, sorting and displaying the database.

There are several queries which are used to perform different tasks. Using these queries, we can easily create the data, retrieve the already created data, sort it, put conditional statements and get the desired output. SQL is used in the RDBMS systems where the data is stored in the form of records and can be accessed with the help of primary keys. It is used in various organizations where data is stored in the form of records.



```
1 CREATE VIEW vTop3SalesByQuantity
2 AS
3 SELECT TOP 3 --will only return first 3 records from query
4 Sales.ProductID,
5 Name AS ProductName,
6 SUM(Sales.Quantity) AS TotalQuantity
7 FROM Sales
8 JOIN Products ON Sales.ProductID = Products.ProductID
9 GROUP BY Sales.ProductID,
10 Name
11 ORDER BY SUM(Sales.Quantity) DESC;
```

	ProductID	ProductName	TotalQuantity
1	1	Long-Sleeve Logo Jersey, S	4
2	3	Long-Sleeve Logo Jersey, L	3
3	2	Long-Sleeve Logo Jersey, M	3

Fig 2.1 A basic SQL query

### **2.1.1 DDL, DML and SELECT Statements**

DDL: Stands for Data Definition Language. It is basically the syntax for creating and modifying the databases. Commands such as CREATE, DROP, ALTER, COMMENT, RENAME, TRUNCATE.

DML: Stands for Data Manipulation Language. It is used for data manipulation. It consists of commands such as INSERT, UPDATE, DELETE.

SELECT: It is a statement which is used to select the data from a database table. It is used to retrieve records from one or more table. It can be used with other commands such as WHERE, AND etc.

### **2.1.2 JOINS and SUBQUERIES**

In SQL, JOIN Statement allows us to retrieve data from two or more tables at once. It joins two tables with the help of a primary key. So, if there is any same information in the two tables, then that information can be concatenated in a single table and this can help in reducing the duplicate information. There are 4 types of join operations:

- **INNER JOIN**: It will return the concatenated dataset table from a dataset having matching values in both the tables, exempting the matching values.
- **LEFT JOIN**: It will return all the records from the left table and the matching records from the right table.
- **RIGHT JOIN**: It is totally opposite from the left join. It returns all the records from right table and the matching records from the left table.

- **OUTER JOIN:** It returns all the records from both the tables when there is a match in either of the left table and the right table.

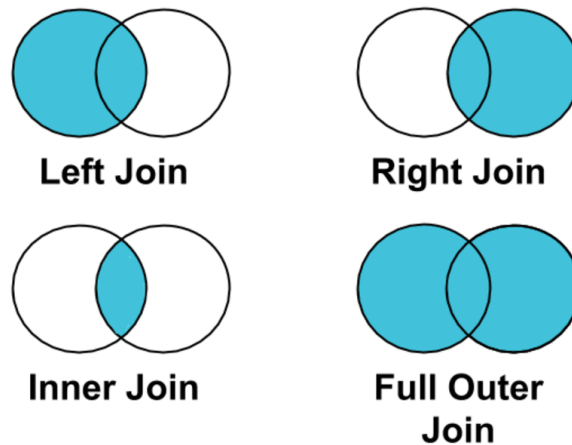


Fig 2.2 Joins

### 2.1.3 Scaler Aggregate

- **Aggregate Functions:** These are the functions which are used to perform operations from the values taken from the columns of data present in tables and return a single value. Some of the functions are:

AVG()

SUM()

COUNT()

FIRST()

LAST()

MAX()

MIN()

- **Scaler Functions:** These are the functions which are used to modify the data based on the user input. This kind of functions also return a single value. Some of the scaler functions are:



UCASE()  
LCASE()  
MID()  
LEN()  
ROUND()  
NOW()  
FORMAT()

### SQL Functions

- Aggregate Functions
  - SQL aggregate functions **return a single value**, calculated from **all the values in a column**.

Pk_int_id	Vchr_product	int_price
1	Pen	10
2	Book	15
3	Eraser	2
4	Pencil	6

→ Returns a single value

- Select **AVG(int\_price)** from tbl\_stock; // returns 8
- Select **SUM(int\_price)** from tbl\_stock; // returns 33
- Select **MIN(int\_price)** from tbl\_stock; // returns 2

Fig 2.3 Aggregate Functions

## 2.2 XML

Extensible Markup Language (XML) is a markup language which is designed to store and carry data. It is much like HTML, but HTML was designed to display the data and in HTML the main focus is on how the data looks. But in XML, the main focus is on what is data and it was designed to transport the data. XML is an easy language which is self-descriptive. It is understandable by both humans as well as machines. XML is extensible, which means even if the new data is added or removed the applications of XML is expected to work.

```
<?xml version="1.0" encoding="utf-8" standalone="yes"?>
<Table>
  <Product>
    <Product_id>1</Product_id>
    <Product_name>Product 1</Product_name>
    <Product_price>1000</Product_price>
  </Product>
  <Product>
    <Product_id>2</Product_id>
    <Product_name>Product 2</Product_name>
    <Product_price>2000</Product_price>
  </Product>
  <Product>
    <Product_id>3</Product_id>
    <Product_name>Product 3</Product_name>
    <Product_price>3000</Product_price>
  </Product>
  <Product>
    <Product_id>4</Product_id>
    <Product_name>Product 4</Product_name>
    <Product_price>4000</Product_price>
  </Product>
</Table>
```

Fig 2.4 Basic XML Script

XML also allows its users to customize and create their new markup symbols. XML users have complete control of things. Moreover, XML files are compatible with many other languages like Java, Oracle and other softwares like UFT and VB script.

The main positives about XML includes simplification of data sharing, data transportation, data availability. It stores data in a plain text forma. It makes an ease to expand or upgrade to new operating systems and applications without losing our data.

## **CHAPTER 3**

### **VB Script**

VB Script is a scripting language developed by Microsoft and modelled on Visual Basic. It's a very light weight language which is easy to code. It's a great programming language for the beginners because you can learn most of the programming techniques. We don't even have to install a separate software for writing a code in VB Script. We just need to write a script in a text file and save it as .vbs. Moreover, it's not a case sensitive language like other languages.

VB Script can access the elements of the environment within which it's being running. It has a File System Object (FSO) functionality by which we can create, read, update and delete the files present in our system. For example, with a script we can create an xml file and in that file we can store the names of the countries, names of the days in the week etc.

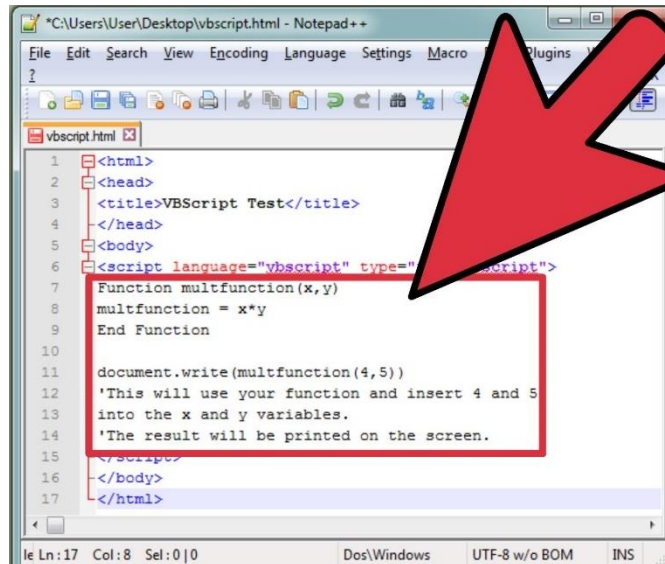
VB Script is extracted from Visual Basic programming language. In VB Script, even if we don't declare a variable still we can use it. VB Script supports only one data type called Variant.

Variant contains subtypes. Subtypes is basically different kinds of data types such as Integer, Boolean, String, Date. We also have different types of operators in VB Script such as Arithmetic Operators, Comparison Operators, Logical Operators, Concatenation Operators.

VB Script is used as a language in UFT/QTP. When we Record the Script in a UFT application, it automatically generates a script in the editor box as soon as we start performing the tasks. The automated script which is generated in UFT/QTP is VB Script. There is a very major role of VB Script in the field of automation testing. Without VB Script it would be very difficult to perform all the functions with such ease.

We can also use a dedicated VS Code editor which can be downloaded from the internet and specially used for the scripting a VB Script only. But some other softwares are also present to do Scripting such as Notepad++ which is much easier to use.

This is an example of a VB Script used inside an HTML Program. A function called as multifunction is being used which basically takes the product of two numbers x and y.



```
1 <html>
2 <head>
3 <title>VBScript Test</title>
4 </head>
5 <body>
6 <script language="vbscript" type="text/vbscript">
7   Function multifunction(x,y)
8     multifunction = x*y
9   End Function
10
11   document.write(multifunction(4,5))
12   'This will use your function and insert 4 and 5
13   into the x and y variables.
14   'The result will be printed on the screen.
15 </script>
16 </body>
17 </html>
```

Fig 3.1 VB Script

# CHAPTER4

## UNIFIED FUNCTIONAL TESTING

### 4.1 INTRODUCTION

Microfocus Unified Functional Testing is basically an Automation Testing tool. As an Automation testing tool, you instruct the tool in a form some test scripts. This is going to help in automating our manual activities minimizing our efforts and time. It's a commercial tool. It's not an open-source tool like Selenium.

It enables us to automate the functional and regression testing. It also supports suit applications such as Windows, Web, Mobile, .Net, Java, Visual Basics and WPF. These can be selected as add-ins in the starting of the application.

It supports the VB Script Language.

Earlier UFT was called as QTP i.e. Quickest Professional. And it was firstly owned by the Mercury and then bought by the HP and then HP handed over the tool to the Microfocus. Firstly, it had the compatibility to test on GUI on a web based or a window-based application.

Then later on from version 11.5 it was declared as Unified Functional Testing. Now its compatible to test mobile applications, web application, windows application, GUI, API testing, API Load test and Business flow test.

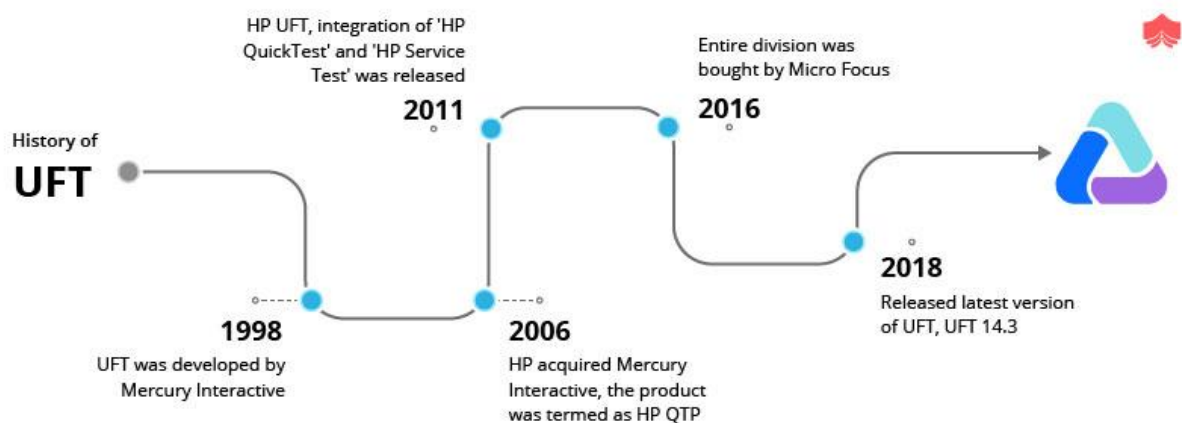


Fig 4.1 History of UFT

## 4.2 Interface

So, this tool works as a communication between the tool and the application. It can be installed on our windows. This tool can interact with all the other applications present in our system. You can address or call the different applications from the UFT which is called the Interface.

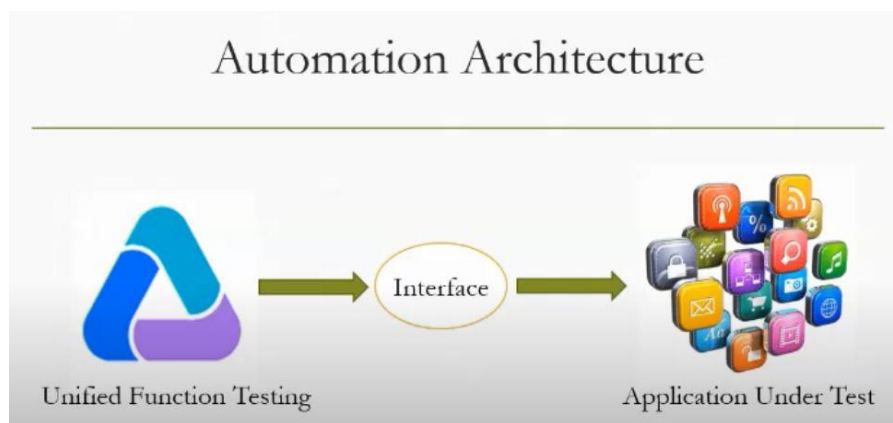


Fig 4.2 Automation Interface

## 4.3 Object Repository

Precisely in UFT we call the interface as Object Repository. Object Repository stands for the database. It's the database of all the Objects, their Properties and their respective values. This acts like a memory of UFT and we have to work with these properties of this application. Object Repository is present in the Action page of the UFT and we can also spy the objects from the different applications or the webpages. Then we can also save these objects and call them through going to the Resources option and selecting the Associate Repositories. After associating the repositories to the script, we can now Run the script without any errors. After clicking on the run button the script should run successfully. Here's the icon of Object Repository.

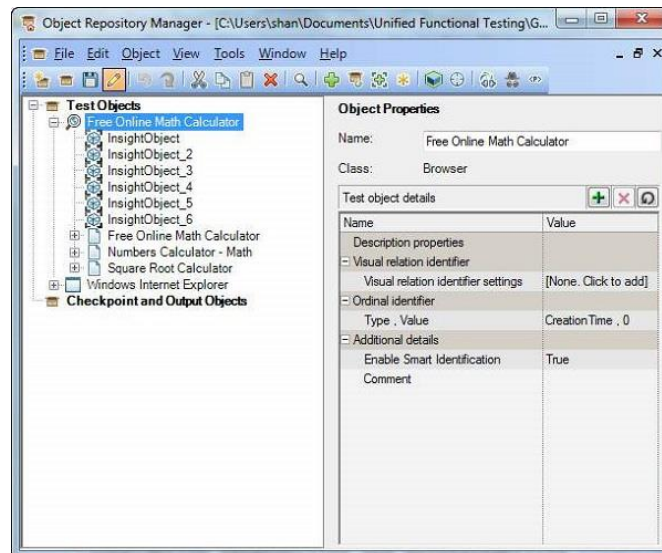
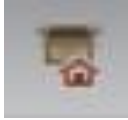


Fig 4.3 Object Repository Manager

## 4.4 Recording of the Application

These are the Steps involved in recording of the Application and generating the automated script:

- Launch the Microfocus UFT and select all the required add-ins and then move to the Homepage
- Click on the New button and then select the GUI test option. Give the name to the test and click on the OK button.
- Then in Action page, click on the Record button and then select Record and Run any browser. Then click on OK button.
- Then the Recording will start. Go to the Cargo cost calculation webpage and fill the required details.
- After performing the Required actions, close the web application and stop the recording.
- You will be redirected to the VB Script Action page and your script will be recorded.

## REFERENCES

- [1] <https://www.microfocus.com/en-us/home>
- [2] [https://www.w3schools.com/sql/sql\\_intro.asp](https://www.w3schools.com/sql/sql_intro.asp)
- [3] <https://www.tutorialspoint.com/vbscript/index.html>
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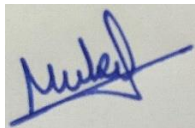
## Project Report Undertaking

I Mr. MUKUL BHATIA Roll No.171003Branch ECE is doing my internship with COGNIZANT TECHNOLOGY SOLUTIONSfrom 28 Feb 2021to 11 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: Mukul Bhatia

Roll No.: 171003

Date: 17 May 2021