Testing is a process of executing a program with the aim of finding error. To make our software perform well it should be error free.If testing is done successfully it will remove all the errors from the software.

### Types of Testing -

Unit Testing

Unit testing is the first level of testing and is often performed by the developers themselves. It is the process of ensuring individual components of a piece of software at the code level are functional and work as they were designed to. Developers in a test-driven environment will typically write and run the tests prior to the software or feature being passed over to the test team. Unit testing can be conducted manually, but automating the process will speed up delivery cycles and expand test coverage.

Example:

a) In a program we are checking if loop, method or function is working fine

b) Misunderstood or incorrect, arithmetic precedence.

c) Incorrect initialization

## Integration Testing

After each unit is thoroughly tested, it is integrated with other units to create modules or components that are designed to perform specific tasks or activities. These are then tested as group through integration testing to ensure whole segments of an application behave as expected (i.e, the interactions between units are seamless). These tests are often framed by user scenarios, such as logging into an application or opening files.

Integration testing is of four types: (i) Top down (ii) Bottom up (iii) Sandwich (iv) Big-Bang   
Example 

(a) Black Box testing:- It is used for validation.

In this we ignore internal working mechanism and focuses on **what is the output?**.

(b) White Box testing:- It is used for verification.

In this we focus on internal mechanism i.e. **how the output is achieved?**

## System Testing

System testing is a black box testing method used to evaluate the completed and integrated system, as a whole, to ensure it meets specified requirements. The functionality of the software is tested from end-to-end and is typically conducted by a separate testing team than the development team before the product is pushed into production.

This include functional as well as non functional testing

## Acceptance Testing

Acceptance testing is the last phase of functional testing and is used to assess whether or not the final piece of software is ready for delivery. It involves ensuring that the product is in compliance with all of the original business criteria and that it meets the end user’s needs.

#### Alpha Testing

This is a type of validation testing.It is a type of *acceptance testing*which is done before the product is released to customers. It is typically done by QA people.   
Example: 

When software testing is performed internally within the organization

#### Beta Testing

The beta test is conducted at one or more customer sites by the end-user of the software. This version is released for the limited number of users for testing in real time environment   
Example: 

When software testing is performed for limited number of people

#### Regression Testing

Every time new module is added leads to changes in program. This type of testing make sure that whole component works properly even after adding components to the complete program.   
Example 

In school record suppose we have module staff, students and finance combining these modules and checking if on integration these module works fine is regression testing

#### Smoke Testing

This test is done to make sure that software under testing is ready or stable for further testing   
It is called smoke test as testing initial pass is done to check if it did not catch the fire or smoked in the initial switch on.   
Example: 

If project has 2 modules so before going to module make sure that module 1 works properly

#### Stress Testing

In this we gives unfavorable conditions to the system and check how they perform in those condition.   
Example: 

(a) Test cases that require maximum memory or other resources are executed

(b) Test cases that may cause thrashing in a virtual operating system

(c) Test cases that may cause excessive disk requirement

#### Performance Testing

It is designed to test the run-time performance of software within the context of an integrated system.It is used to test speed and effectiveness of program. It is also called load testing. In it we check , what is the performance of the system in the given load.  
Example: 

Checking number of processor cycles.

|  |  |  |  |
| --- | --- | --- | --- |
| **Test ID** | **Test Objective** | **Steps** | **Actual Result** |
| 1 | Verify starting of the application. | Click on TSF link. | Website is getting started. |
| 2 | Verify website name | Check the website name | Correct website name is displayed |
| 3 | Verify if logo exists | Check the logo | Logo is displayed |
| 4 | Verify functionality of Join Us in navbar | Click on Join Us | Join Us is getting clicked |
| 5 | Verify whether we can scroll to bottom and top of the page | Scroll down and to the top | Page is getting scrolled up and down |
| 6 | Verify textbox of name, email in Join Us field | Fill the name, email field | Values are getting displayed |
| 7 | Verify drop down in Join Us field | Select any value in drop down | Selected value is getting displayed |
| 8 | Verify clicking on the logo brings back to home page | Click on the logo | Logo clicked and back to home page |
| 9 | Verify color of the navbar | Check the color | Color gets displayed |
| 10 | Verify whether the video plays | Click on the video | Video plays |

**import** java.util.List;

**import** java.util.concurrent.TimeUnit;

**import** org.openqa.selenium.By;

**import** org.openqa.selenium.WebDriver;

**import** org.openqa.selenium.WebElement;

**import** org.openqa.selenium.chrome.ChromeDriver;

**import** org.openqa.selenium.JavascriptExecutor;

**import** org.openqa.selenium.interactions.Actions;

**import** org.openqa.selenium.support.ui.Select;

**public** **class** script

{

**public** **static** **void** main(String[] args) **throws** Exception

{

System.*setProperty*("webdriver.chrome.driver","C:\\selenium\\chromedriver.exe");

WebDriver driver =**new** ChromeDriver();

driver.manage().window().maximize();

driver.manage().timeouts().implicitlyWait(10,TimeUnit.***SECONDS***);

driver.get("https://thesparksfoundationsingapore.org");

Thread.*sleep*(2000);

System.***out***.println(driver.getCurrentUrl());

System.***out***.println(driver.getTitle());

//check if logo or image exists

WebElement logo = driver.findElement(By.*xpath*("//\*[@id=\"home\"]/div/div[1]/h1/a/img"));

Boolean logo\_is\_loaded = (Boolean) ((JavascriptExecutor)driver).executeScript("return arguments[0].complete && typeof arguments[0].naturalWidth != \"undefined\" && arguments[0].naturalWidth > 0", logo);

**if**(!logo\_is\_loaded)

{

System.***out***.println("Logo is not displayed");

}

**else**

{

System.***out***.println("Logo is displayed");

}

WebElement navbar = driver.findElement(By.*id*("bs-example-navbar-collapse-1"));

System.***out***.println("Color of navbar: " + navbar.getCssValue("color"));

//click on navbar and then click on subitem Join Us

WebElement ip = driver.findElement(By.*xpath*("//\*[@id=\"link-effect-3\"]/ul"));

Actions act = **new** Actions(driver);

act.moveToElement(ip).perform();

List<WebElement> elements = driver.findElements(By.*xpath*("//\*[@id=\"link-effect-3\"]/ul/li[5]"));

**for**(WebElement element : elements)

{

**if**(element.getText().equals("Join Us"))

{

element.click();

driver.findElement(By.*linkText*("Why Join Us")).click();

**break**;

}

}

//scroll to bottom

JavascriptExecutor js = (JavascriptExecutor) driver;

js.executeScript("window.scrollBy(0,700)");

//fill values in join us

driver.findElement(By.*name*("Name")).sendKeys("Frank");

driver.findElement(By.*name*("Email")).sendKeys("frank@gmail.com");

Select dropdown = **new** Select(driver.findElement(By.*cssSelector*("select.form-control")));

dropdown.selectByVisibleText("Student");

//scroll to top

js.executeScript("window.scrollBy(0,0)");

driver.findElement(By.*id*("toTopHover")).click();

//clicking on homelogo

WebElement getImageClick = driver.findElement(By.*xpath*("//div[@id='home']/div[1]/div[1]/h1[1]/a[1]/img[1]"));

getImageClick.click();

System.***out***.println("Successfully clicked on logo");

//play video

driver.switchTo().frame("youtube-video");

WebElement frameElement = driver.findElement(By.*xpath*("//button[@aria-label='Play']"));

frameElement.click();

driver.switchTo().parentFrame();

}

}