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# Mobile Testing: QA Strategy for Manual and Automated Testing



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# Overview

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- Introduction
- What is mobile testing?
- What are key aspects of mobile testing?
- Factors to consider when determining if there is value to automation
- Common test automation tools
- Conclusion

# Introduction

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Companies are moving into mobile technology at a rapid pace, which has significantly increased the need for manual testing in that area. Companies are turning to automation to help ease the workload, but it is not always obvious what should be automated. Mobile has its own set of complications, compounded by a huge variety of devices and OS platforms.

# Definition

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- Mobile Web – Access to the world wide web from a handheld mobile device, such as a smartphone or a tablet, that is connected to a mobile or wireless network
- Mobile App – software applications developed specifically for using on wireless computing devices, such as smartphones and tablets, rather than desktop or laptop computers. For iOS, the programming language is Objective C. For Android, the programming language is Java

# Definition

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- Mobile Hybrid App – combines elements of both native and Web applications
- Responsive Design – approach to web page creation that makes use of flexible layouts, flexible images and cascading style sheet media queries. The goal of responsive design is to build web pages that detect the visitor's screen size and orientation and change the layout accordingly

# What is Mobile Testing?

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- The process of testing software developed for use on a mobile device, such as a smartphone or tablet
- Includes installed mobile apps (i.e., from the app store), as well as mobile or responsive web apps
- Can be done with manual and automated techniques

# Discussion

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- Why is mobile testing challenging?
- How to minimize mobile testing challenges?

# What is Mobile Test Automation?

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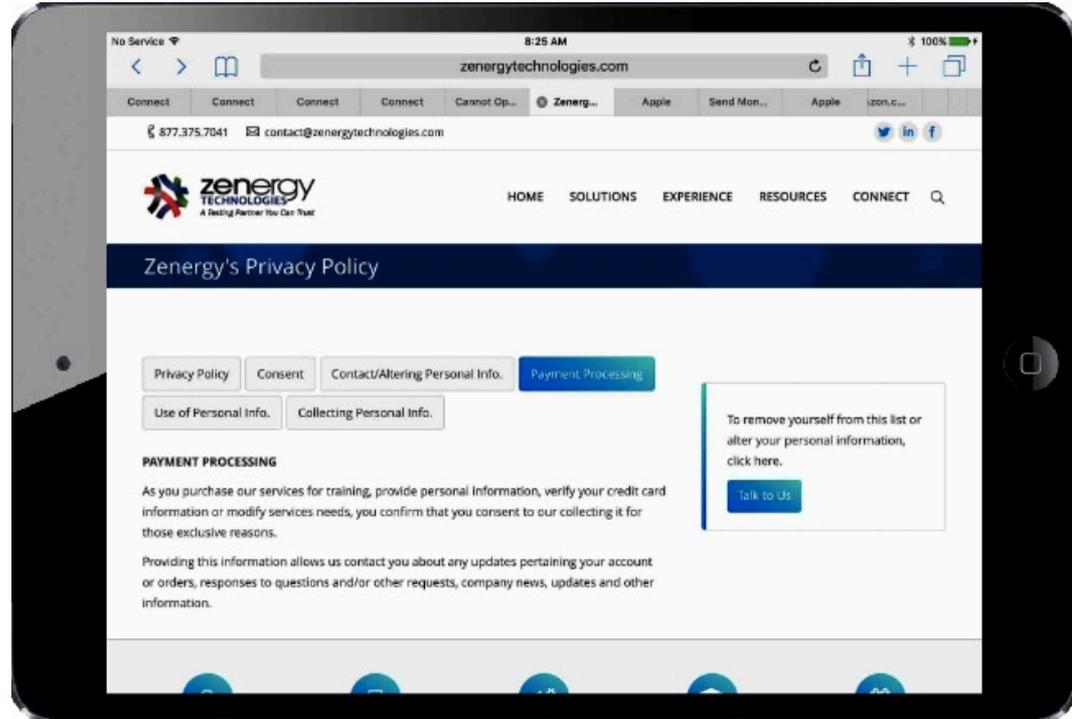
- Test automation that is run on real or simulated mobile devices
- Many tools and frameworks have been developed for mobile automation, such as Appium, Calaba.sh, Robotium, Selendroid, and UiAutomator

# QA/Testing Best Practices

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- Unit testing
- Functional testing
- System testing
- Integration testing
- Business process testing
- Data verification
- Etc.

# QA/Testing Best Practices



What should we test?



# Mobile Testing Requires Additional Considerations

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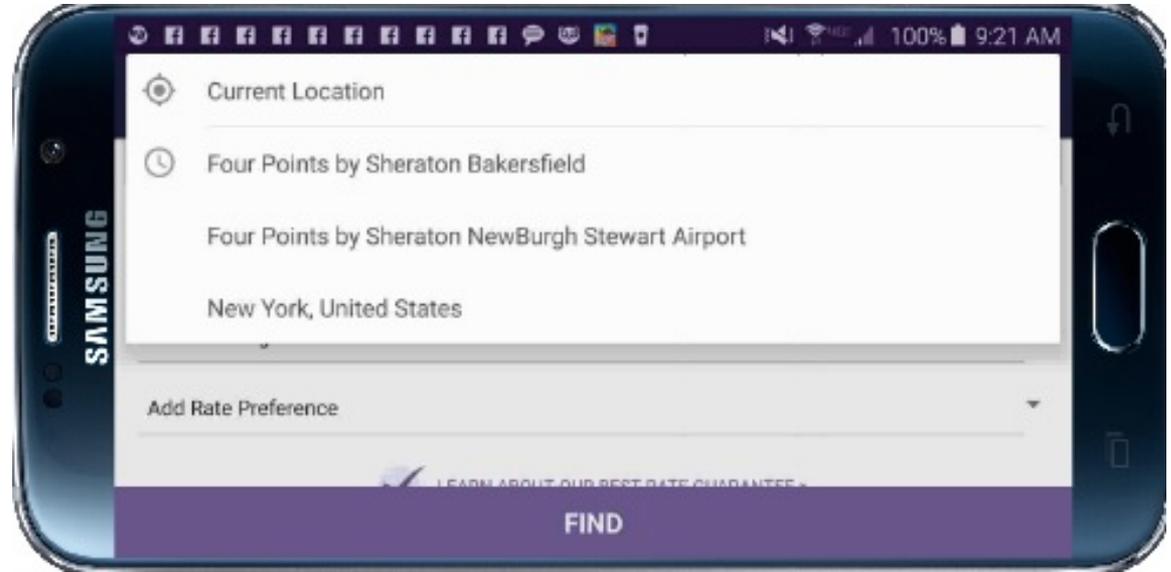
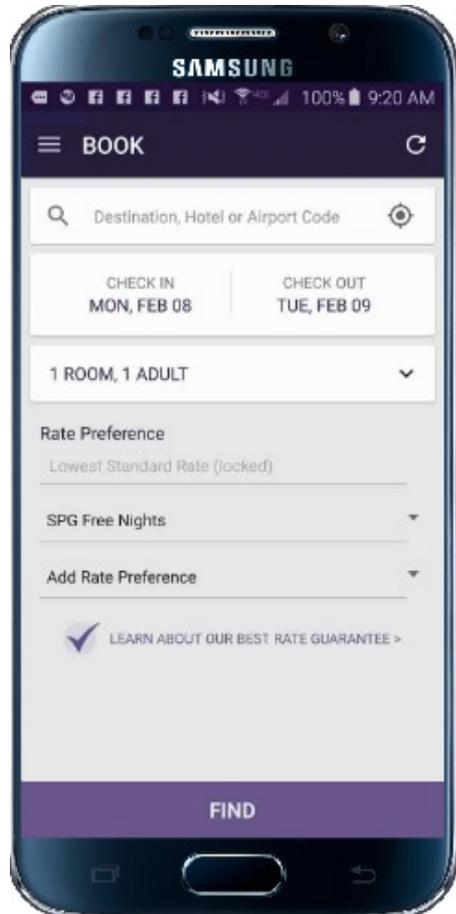
- User Experience
- Interruption
- On/off network
- Devices features

# User Experience

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- The goal of user experience (UX) design and testing is to maximize the quality of the user's interactions with an application:
  - Is the intended use of the app obvious?
  - Can the user easily accomplish the intended goal?
  - How obvious is the next step?
  - Is there appropriate help/support if the user gets stuck?
  - Is the app visually appealing?
  - Does the app fit the screen? Is it readable and usable?

# User Experience - Examples



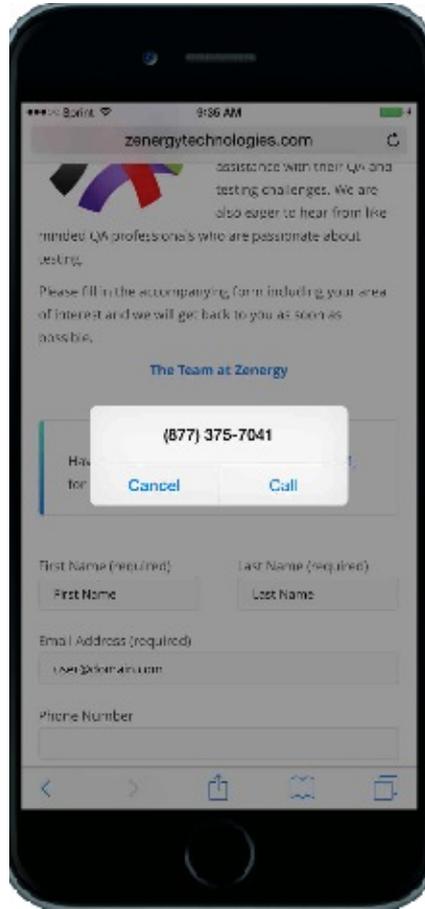
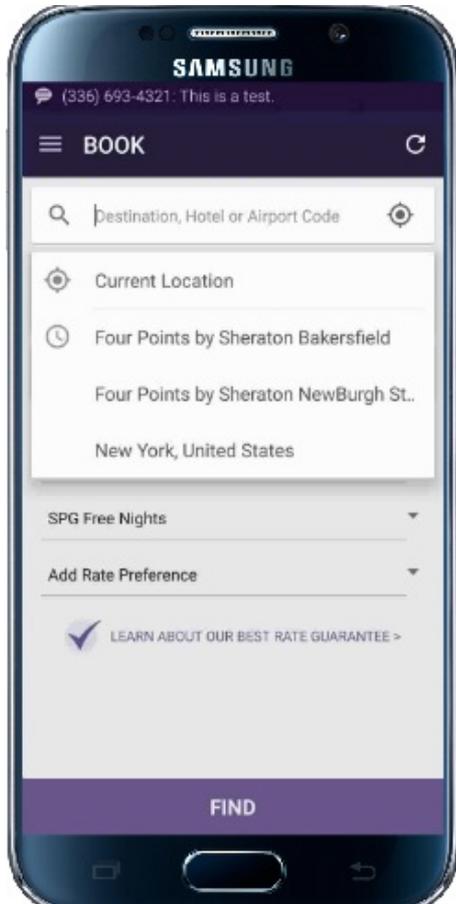
Automatically defaults to location based on destination when changing from portrait to landscape

# Interruption

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- When an incoming call or notification interrupts the application in use, the application should not be negatively impacted:
  - Does the application crash?
  - Can a user resume the current application session?
  - Is the session state maintained?

# Interruption - Examples



Text  
message and  
call  
interruptions

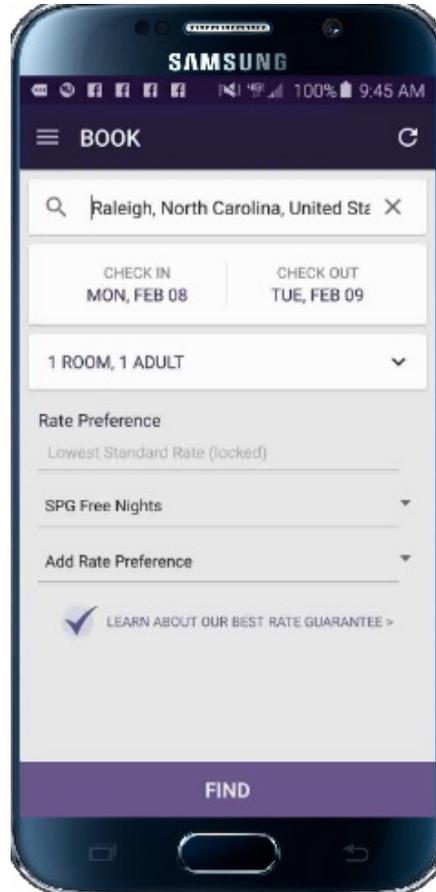
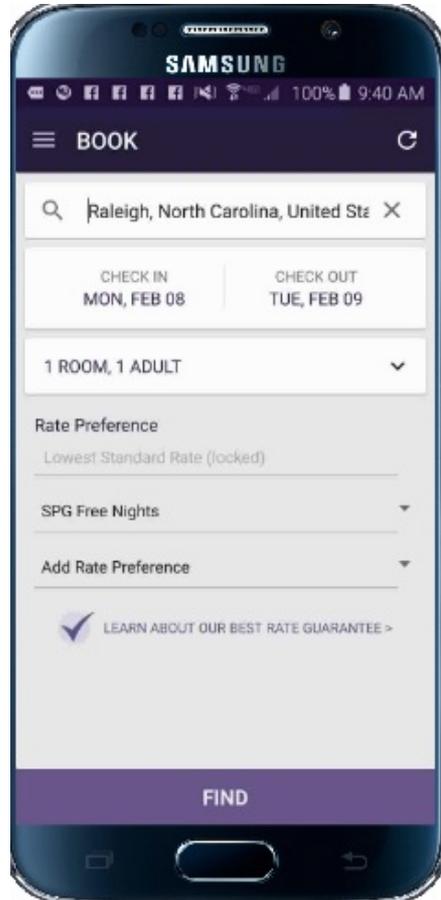


# On/off Network

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- Mobile devices automatically switch between WiFi and cell networks as they become available:
  - How does the application respond to this switch?
  - Do in-progress data transfers fail or get interrupted?

# On/off Network - Examples



Switching from  
Wi-Fi to cellular  
network during  
the process of  
booking a  
reservation

# Device Features

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- There are many features unique to mobile devices that must be considered from a testing standpoint:
  - Gestures such as pinching and swiping
  - Accelerometer (for device orientation, step counter, etc.)
  - Location-based features
  - Camera-based features, such as taking a photo of a check for deposit
  - Voice to text

# Key Considerations for Mobile Automation

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- Is there any ROI to automate the manual test case?
  - For example, automating pinch and zoom
- What is the risk for not automating the test?
- What are the test automation development efforts to automate the test?
- How much maintenance time is needed if the automated test needs to be changed?
- Does the automation tool support the necessary features?

# Discussion

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- What should be automated?
- What should not be automated?

# Factors for Test Automation Consideration

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## ➤ To Automate

- Smoke testing of the mobile website or native app
- Key application functionality
  - e.g., login, search
- Data intensive application features
  - e.g., loan or insurance quotes or pre-approvals
- Repeatable flows
  - e.g., branching logic or options
- Static content
  - e.g., links and text

# Factors for Test Automation Consideration

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- Not to Automate (In most cases)
  - Look and feel
    - e.g., application layout, element spacing
  - Device orientation
  - OS level features
    - e.g., camera, voice to text, Accelerometer, etc...
  - Interrupt testing
  - On/off network
  - Deviation across all devices/platforms
  - User Experience

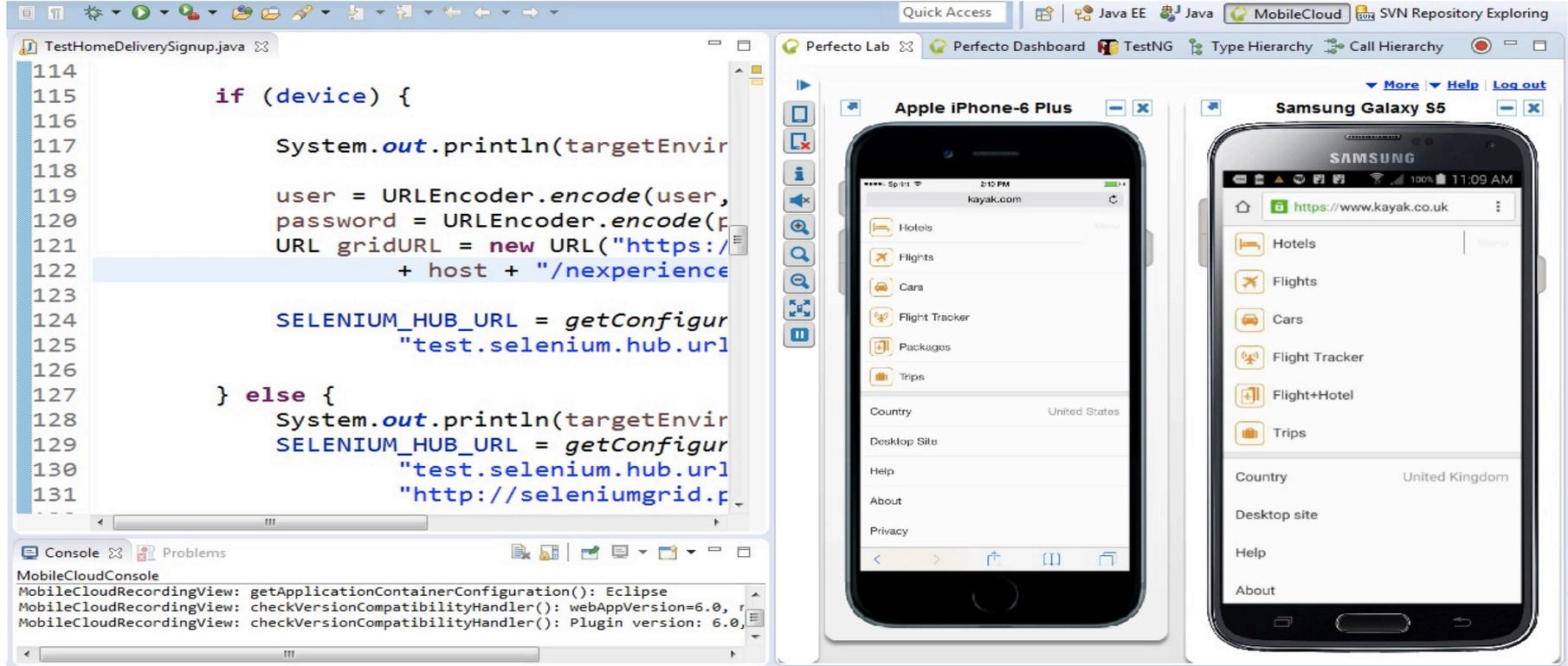
# Test Automation Tools

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- Common Test Automation Tools
  - There are multiple mobile test automation tools. We will highlight the three most widely used:
    - Perfecto Mobile - A web-based tool that allows users to create and execute automated scripts
    - Mobile Labs - Mobile Labs offers a private onsite mobile device cloud to automated mobile website and app testing
    - Appium - Open source framework for writing automated test scripts that run on real mobile devices or simulators

# Establishing an Automated Testing Strategy

## ➤ Perfecto Mobile



The image displays a development environment for automated mobile testing. On the left, an IDE window shows the code for `TestHomeDeliverySignup.java`. The code includes a conditional block for device-specific configuration and Selenium WebDriver initialization.

```
114
115     if (device) {
116         System.out.println(targetEnvir
117
118
119         user = URLEncoder.encode(user,
120         password = URLEncoder.encode(p
121         URL gridURL = new URL("https://
122             + host + "/nexperience
123
124         SELENIUM_HUB_URL = getConfigur
125             "test.selenium.hub.url
126
127     } else {
128         System.out.println(targetEnvir
129         SELENIUM_HUB_URL = getConfigur
130             "test.selenium.hub.url
131             "http://seleniumgrid.p
```

The right side of the image shows the Perfecto Lab interface. It features a dashboard with tabs for 'Perfecto Dashboard', 'TestNG', 'Type Hierarchy', and 'Call Hierarchy'. Two mobile device emulators are displayed: an Apple iPhone-6 Plus and a Samsung Galaxy S5. Both devices show the Kayak mobile application interface, which includes a menu with options like Hotels, Flights, Cars, Flight Tracker, Packages, and Trips, along with a search bar and a 'Country' dropdown menu.

Console output at the bottom left shows the following logs:

```
MobileCloudConsole
MobileCloudRecordingView: getApplicationContainerConfiguration(): Eclipse
MobileCloudRecordingView: checkVersionCompatibilityHandler(): webAppVersion=6.0, r
MobileCloudRecordingView: checkVersionCompatibilityHandler(): Plugin version: 6.0,
```

# Establishing an Automated Testing Strategy

## ➤ Mobile Labs

The image displays a comprehensive automated testing workflow for mobile devices. It features the following components:

- QuickTest Professional (QTP):** The main testing environment showing a test script with actions like "Automate login to deviceConnect in Web Browser" and "Multimate connecting to a mobile device from the deviceConnect".
- Mobile Labs Device Connect:** A web portal for managing mobile devices, showing a list of devices and their status.
- HP Run Results Viewer:** A window displaying the results of a test run, including an executive summary and statistics. The test is marked as "Passed".
- Mobile Application:** A screenshot of a mobile application interface for searching inventory, showing fields for item name, manufacturer, and operating system.

Field	Value	Field	Value
Test name:	Test	Product name:	QuickTest
Results name:	TempResults	Product version:	11.03
Time zone:	Eastern Standard Time	Host name:	QAKAREN
Run started:	2/1/2013 - 16:13:29	Operating system:	Windows
Run ended:	2/1/2013 - 16:14:15		
Total time:	00:00:46		

Category	Count
Passed	0
Failed	0
Warning	0

# Appium

The screenshot displays the Eclipse IDE interface. The left pane shows the Java source code for `ContactUsPageTests.java`. The code includes package declarations, imports, and two test methods: `testsubmitContactUsForm()` and `testContactFormErrorValidation()`. The right pane shows a mobile application interface for `www.zenergytechnologies.com`. The app features a logo, a navigation menu, and promotional text: "Trust the Experts the QA Industry Trusts" and "Multiple, in-demand speakers, Mobile Testing Experts".

```
1 package com.zenergy.test;
2
3 import static org.testng.Assert.*;
4
15 public class ContactUsPageTests extends TestBase {
16
17
18     @Factory(dataProvider = "webDriverFactory", dataProviderClass = WebDriverFactory.class)
19     public ContactUsPageTests(RemoteWebDriver driver) {
20         super(driver);
21     }
22
23     @Test (description = "Verify that the contact form on the Contact Us page
24             + "when properly filled out.")
25     public void testsubmitContactUsForm() {
26         Header header=pages.header();
27         header.clickSubNavLink(MainNavLink.CONNECT, ConnectNavLink.CONTACT_US);
28         pages.contactUsPage().atPage(), "Expected to be at Contact Us Page.");
29         pages.contactUsPage().submitContactUsForm(Inquiry.builder().build());
30         assertTrue(pages.contactUsPage().isSuccessMessageDisplayed(),
31             "Expected Contact Us form success message to be displayed.");
32     }
33
34     @Test (description = "Verify that the contact form on the Contact Us page
35             + "and displays error messages when improperly filled out.")
36     public void testContactFormErrorValidation() {
37         Header header=pages.header();
38         header.clickSubNavLink(MainNavLink.CONNECT, ConnectNavLink.CONTACT_US);
39         pages.contactUsPage().atPage(), "Expected to be at Contact Us Page.");
40         pages.contactUsPage().submitContactUsForm(
41             Inquiry.builder().setFirstName("").setLastName("").setEmail("").build());
42         assertTrue(pages.contactUsPage().isErrorMessageDisplayed(),
43             "Expected CONTACT US form error message to be displayed.");
44     }
45 }
46
47
```

Mobile App Interface (www.zenergytechnologies.com):

- Header: zenergy TECHNOLOGIES, A Testing Partner You Can Trust
- Menu: MENU
- Content: Mobile Testing Experts, Ensure your mobile sites and apps perform for an ever growing audience. Learn More
- Text: Trust the Experts the QA Industry Trusts
- Text: Multiple, in-demand speakers,

Node Detail Table:

index	0
text	
resource-id	
class	android.widget.FrameLayout
package	com.android.chrome
content-desc	Web View
checkable	false
checked	false
clickable	true
enabled	true
focusable	true
focused	true
scrollable	false
long-clickable	false

# Appium



# Conclusion

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It is necessary and critical to test mobile websites and mobile apps to reduce the risk of defects and failures:

- Understand the challenges of testing on mobile devices
- Determine what to automate
- Understand the Pros and Cons of test automation frameworks/tools

# Questions?

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- Final questions or discussion?

Thank you!



# Contact Info

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