

K.T.S.P. MANDAL'S

HUTUTMA RAJGURU MAHAVIDYALAYA,
RAJGURUNAGAR TAL-KHED, DIST-PUNE 410 505

DEPARTMENT OF COMPUTER SCIENCE

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Prof. Pallavi G. Darakhe

DEPARTMENT OF COMPUTER SCIENCE



Chapter 4

Testing Web Applications

What is Web Testing?

Web Testing, or website testing is checking your web application or website for potential bugs before its made live and is accessible to general public. Web Testing checks for functionality, usability, security, compatibility, performance of the web application or website.

During this stage issues such as that of web application security, the functioning of the site, its access to handicapped as well as regular users and its ability to handle traffic is checked.

Test Web Application or Website

1. Functionality Testing of a Website

Functionality Testing of a Website is a process that includes several testing parameters like user interface, APIs, database testing, security testing, client and server testing and basic website functionalities. Functional testing is very convenient and it allows users to perform both manual and automated testing. It is performed to test the functionalities of each feature on the website.

2. Usability testing:

Usability Testing has now become a vital part of any web based project. It can be **carried out by testers** like you **or a small focus group** similar to the target audience of the web application.

Test the site Navigation:

Menus, buttons or Links to different pages on your site should be easily visible and consistent on all webpages

Test the Content:

Content should be legible with no spelling or grammatical errors. Images if present should contain an “alt” text

Tools that can be used: [Chalkmark](#), [Contentsquare](#), and Clixpy

3.Interface Testing:

Three areas to be tested here are – Application, Web and Database Server

- **Application:** Test requests are sent correctly to the Database and output at the client side is displayed correctly. Errors if any must be caught by the application and must be only shown to the administrator and not the end user.
- **Web Server:** Test Web server is handling all application requests without any service denial.
- **Database Server:** Make sure queries sent to the database give expected results.

Test system response when connection between the three layers (Application, Web and Database) cannot be established and appropriate message is shown to the end user.

Tools that can be used: [Ranorex](#)

4. Compatibility testing.

Compatibility tests ensures that your web application displays correctly across different devices. This would include-

Browser Compatibility Test: Same website in different browsers will display differently. You need to test if your web application is being displayed correctly across browsers, JavaScript, AJAX and authentication is working fine. You may also check for [Mobile](#) Browser Compatibility.

The rendering of web elements like buttons, text fields etc. changes with change in Operating System. Make sure your website works fine for various combination of Operating systems such as Windows, Linux, Mac and Browsers such as Firefox, Internet Explorer, Safari etc.

Tools that can be used: [Dynatrace](#)

5. Performance Testing:

This will ensure your site works under all loads. Software Testing activities will include but not limited to –

- Website application response times at different connection speeds
- Load test your web application to determine its behavior under normal and peak loads
- Stress test your web site to determine its break point when pushed to beyond normal loads at peak time.
- Test if a crash occurs due to peak load, how does the site recover from such an event
- Make sure optimization techniques like gzip compression, browser and server side cache enabled to reduce load times

Tools that can be used: [Loadrunner](#), [JMeter](#)

7. Security testing:

[Security Testing](#) is vital for e-commerce website that store sensitive customer information like credit cards. Testing Activities will include-

Test unauthorized access to secure pages should not be permitted
Restricted files should not be downloadable without appropriate access

Check sessions are automatically killed after prolonged user inactivity

On use of SSL certificates, website should re-direct to encrypted SSL pages.

8 Dimensions of Software Quality

The ISO/IEC 25010 standard provides a useful model of 8 software quality dimensions. Below we'll explain each dimension and suggest how to measure it in your software project, letting you catch quality issues early and react to them.

Quality Dimension	How to Measure
<p>1. Maintainability</p> <p>How easily you can modify or adapt your software for use by other teams, new purposes or changing requirements. The more complex your code is, the harder it will be to maintain. High quality code is easier to work with and can be easily adapted to new requirements.</p>	<ul style="list-style-type: none"> • Lines of Code (LOC) • Static code analysis • Cyclomatic complexity (and other complexity measurements) • Peer review
<p>2. Portability</p> <p>How easily you can move a software component to another environment. Robust software should be able to run on multiple operating systems and in different environments, for example on the cloud or on-premises, and dependencies on other software should be minimized and well defined.</p>	<ul style="list-style-type: none"> • Setting up realistic testing environments • Automating tests of installation/uninstallation • UI and regression tests to identify problems on specific platforms
<p>3. Functionality</p> <p>How well software functions compared to user expectations. Functionality is the “what” – if the software does what the user needs it to do, it is functioning properly.</p>	<ul style="list-style-type: none"> • Regression tests • Integration tests • UI automation • Acceptance tests
<p>4. Performance</p>	<ul style="list-style-type: none"> • Stress testing • Soak testing

Quality Dimension	How to Measure
<p>How well software performs under a workload. Performance includes response time and latency, scalability, and stability under maximum expected loads.</p>	<ul style="list-style-type: none"> • Page load times
<p>5. Compatibility How well software runs on different browsers, devices, or operating systems. Modern applications are expected to work seamlessly across a large matrix of devices and screen sizes.</p>	<ul style="list-style-type: none"> • Cross browser testing • UI automation
<p>6. Usability How easily users can understand and use software functionality. UI/UX is a major focus in modern software development. Software needs to be prototyped and tested with usability in mind, and then continuously monitored to see if new usability issues come up.</p>	<ul style="list-style-type: none"> • User acceptance testing • Website engagement and conversion • Real user monitoring • Customer satisfaction
<p>7. Reliability How likely a software system is to fail or malfunction. The more reliable your software, the less likely users are to experience bugs in production.</p>	<ul style="list-style-type: none"> • Production defects • Unit tests • Integration tests • Acceptance tests

Quality Dimension	How to Measure
<p>8. Security</p> <p>How vulnerable software is to cyber attacks. The more secure your software, the better it protects users against breaches and service interruption as a result of malicious or accidental human actions.</p>	<ul style="list-style-type: none">• Number of incidents• Number of breaches• Existing known vulnerabilities• Mean Time to Repair (MTTR)