DEPI Graduation Project

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TRACK: SOFTWARE TESTING

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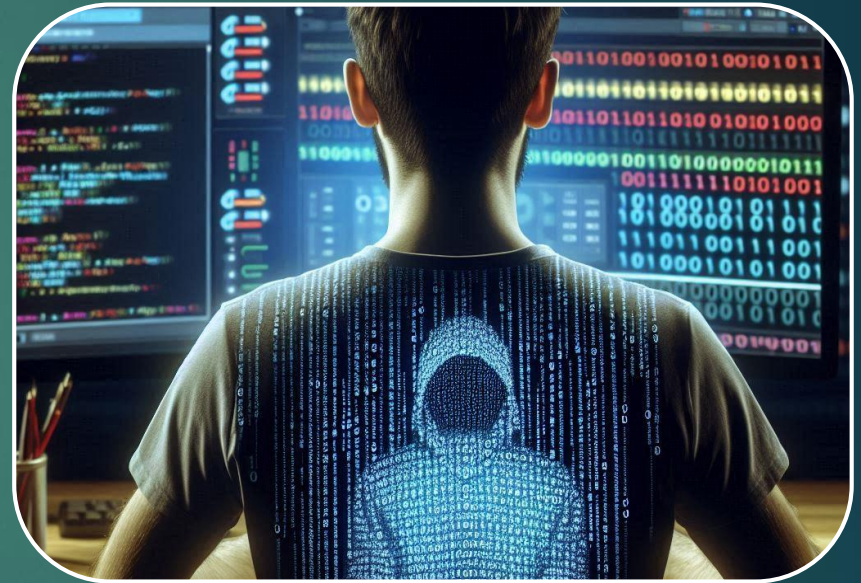
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Introduction

Overview of the Project:

This project is divided into two parts:

Manual testing

Automation testing

Introduction

▶ The first part, **manual testing**, focuses on identifying bugs, usability issues, and functionality gaps by simulating real-world scenarios that end users might encounter across various domains, such as **e-commerce**, **government services**, and **healthcare**.

▶ In this part, we manually test tasks such as:

1. Product filtering in e-commerce platforms
2. Passport application processes in government services
3. Doctor appointment scheduling systems in healthcare environments

Introduction

▶ The second part of this project focuses on **automation testing**, which involves using specialized tools and scripts to perform tests on software applications, minimizing the need for human intervention.

▶ In this phase, we automate different scenarios that an end user would typically encounter on an e-commerce website, such as:

1. User registration
2. Login functionality
3. Landing page interactions
4. Wishlist management

Objective and Goals:

Manual Testing

- The primary goal is to ensure these systems operate smoothly, meet user expectations, and provide a high-quality user experience.

Automation Testing

- The primary goal is to enhance efficiency, accuracy, and test coverage, especially for repetitive tasks that would be time-consuming and error-prone if performed manually. By automating these scenarios, we can quickly verify that the core functionalities of the e-commerce platform work seamlessly across multiple test cycles.

Market Research

▶ The software testing market is rapidly evolving, driven by advancements in technology and the increasing complexity of software applications across industries. According to various market reports, the global software testing market was valued at around $45-50 billion in 2022 and is expected to grow at a compound annual growth rate (CAGR) of 6-7% over the next few years, reaching $60-70 billion by 2027.

▶ Several key factors are driving this growth:

   o Digital Transformation

   o Adoption of Agile and DevOps

   o Cloud and IoT

Market Research

- Market research for manual testing and automation testing involves analyzing the current trends, demand, technologies, tools, and industry needs related to these testing practices.

- Market research shows a strong and growing trend towards automation due to the demand for faster, more reliable testing at scale.

- Despite the growing use of automation, manual testing remains an important practice for ensuring a well-rounded evaluation of software quality.However, manual testing continues to hold value in areas where human insight is irreplaceable.

- A hybrid approach, using both manual and automated testing, is common in many industries, offering the best of both worlds.

Project Scope and Requirements (Manual)

User Story:

As a customer, I want to filter products by category, so I can easily find items that match my interest.

Project Scope

Develop a product filtering feature on an e-commerce website that allows customers to filter items based on categories such as clothing, electronics, home appliances, etc.

Ensure the filtering system is user-friendly and responsive on both desktop and mobile devices.

Include sorting options and additional filters like price range, brand, and customer ratings.

Functional Requirements

Category filter should be available on product listing pages.

Customers should be able to select multiple categories to filter products.

The system should dynamically update product listings based on the selected filters.

Provide an option to clear all selected filters.

Display the number of products available in each category.

Non-Functional Requirements

The filtering process should be quick, with results displayed within 2-3 seconds.

The interface should be optimized for both desktop and mobile.

Filters should be intuitive and visually accessible.

Testing

Create test cases for selecting single and multiple filters.

Test performance for large product databases.

Conduct usability testing on various devices.

Project Scope and Requirements (Manual)

User Story:
As a citizen, I want to apply for a new passport online, so I can avoid visiting the passport office in person.

Project Scope

Build an online application system that allows citizens to apply for new passports, submit necessary documentation, and track application status.

Ensure the system is secure and meets government regulations.

Provide clear instructions, payment options, and confirmation notifications for users.

Functional Requirements

Provide an online form for users to enter personal details (name, address, birth date, etc.).

Allow users to upload required documents (photo, proof of identity, etc.).

Include an integrated payment gateway for application fees.

Send confirmation and status updates via email/SMS.

Allow users to track the progress of their application.

Non-Functional Requirements

The application form should be responsive and accessible across all devices.

Ensure compliance with data security and privacy regulations (e.g., GDPR).

Implement secure file upload functionality with virus scanning.

Provide support for multiple languages (if required by the region).

Testing

Test form validation for each field, including file uploads and payment processes.

Perform security testing for sensitive data and ensure encrypted storage.

Test on various browsers and devices to ensure compatibility.

Project Scope and Requirements (Manual)

User Story:

As a patient, I want to schedule an appointment with my doctor online, so I can choose a convenient time without calling the office.

Project Scope

Develop an online scheduling system for patients to view available slots and book appointments with their doctors.

Ensure the system is easy to use, provides confirmation, and allows users to reschedule or cancel appointments.

Include reminders via email or SMS.

Functional Requirements

Display available appointment slots for doctors based on the patient's selected date.

Allow patients to book, reschedule, or cancel appointments.

Integrate a user authentication system for returning patients.

Send email or SMS reminders for upcoming appointments.

Provide an option for patients to add notes or specify reasons for the appointment.

Non-Functional Requirements

Ensure real-time updates on appointment availability to prevent double bookings.

The interface should be responsive and optimized for mobile devices.

The system should scale to handle multiple users booking at the same time.

Data privacy and security compliance (e.g., HIPAA for healthcare).

Testing

Test the booking process to ensure accuracy in available slots and patient bookings.

Perform load testing to ensure the system can handle multiple users.

Test notifications to ensure emails/SMS are sent on time and to the correct recipients.

Ensure compliance with data protection regulations and encryption for sensitive data.

Project Scope and Requirements (Automation)

TC1: Validate an error message is displayed when the user leaves the "Confirm Password" field empty

TC2: Validate an error message is displayed when the password and confirm password do not match

TC3: Validate that after registration with valid data, the user is navigated to the "My Account" page

- **Register**

TC1: Validate that the user can log in with a registered email and password

- **Login**

TC1: Validate that "Hot Sellers" is displayed and each card contains a price in $

TC2: Validate that each product card contains an "Add to Cart" button and is clickable

TC3: Validate that a guest user can add products to the cart

- **Landing Page**

TC1: Validate that guest users cannot add products to the wishlist

TC2: Validate that logged-in users can add products to the wishlist

- **Wishlist**

Project Scope and Requirements (Automation)

- The scope of this project is to test core user-facing functionalities within an e-commerce platform (LUMA Website), including user registration, login, product interactions, and wishlist features.

- Both guest and logged-in users' experiences tested, covering form validation, error handling, and functionality of essential features like adding products to the cart or wishlist.

- The goal is to ensure these features work seamlessly across multiple scenarios, enhancing the user experience and reducing potential errors.

Challenges and Solutions

For Manual

▶ Writing manual test cases can come with several challenges. Sometimes, the requirements are unclear or incomplete, making it difficult to know what to test. so it's important to write clear and detailed steps with specific expected outcomes.

▶ Time pressure is another challenge, especially when there's a tight deadline. Prioritizing critical areas, reusing existing test cases, and writing reusable steps can help manage time better.

For Automation

▶ Automation testing offers many advantages but also has its challenges.

▶ One challenge is Keeping test scripts up to date as the software changes is another issue. Using stable element locators and breaking scripts into small parts helps with maintenance.

▶ Managing test data can be difficult, but using dynamic data or automating its generation makes it easier such as (using excel sheet as data provider).

▶ Sometimes, tests passed or failed randomly (flaky tests). So we could solve it by adding waits for slow pages and ensuring the test environment is stable.

Project Outcome

For our project, practicing both manual and automation testing was very useful in several ways:

▶ **Learning the Testing Process**: Manual testing helped us understand how to test software like real users for different platforms likje e-commerce and healthcare.

▶ **Knowing When to Use Each Method**: We saw when to use manual testing, like for checking the look and feel of a website, and when automation is better, like for repeating tasks (login, checkout).

▶ **Saving Time**: Automation testing made testing faster and more efficient. Instead of manually running the same tests over and over, automation helped us find issues quickly and freed up time for more important tests.

▶ **Real-World Experience**: We used real tools like Selenium for automation and Jira for managing manual tests. This gave us practical experience that we can use in future projects.

The project showed us that both manual and automation testing are important. In short, practicing both methods helped us become better at testing, saving time, and preparing us for real-world software projects.