**DELIVERABLE 2**

Software Quality Engineering

**Methods used for testing:**

1. **Equivalence class partitioning**
2. **Boundary value analysis**

## **Boundary Value Analysis:**

We conducted boundary value analysis on fields such as address, username, password, and email to identify potential errors within those parameters.

**Equivalence Class Partitioning:**

By exploring both the valid and invalid boundary values for each field, the analysis aims to uncover potential issues that might arise at the edges of the acceptable data ranges. This approach helps in ensuring robustness and accuracy in handling various scenarios related to user registration and input validation**.**

**LOGIN PAGE**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable | Valid ECs | Representing Values | | Invalid ECs | Representing Values |
|  |  | For Valid | On Boundary (N/A) |  |  |
| Username | 1-Username with a conventional length (6 to 20).    2-Username containing letters, numbers, hyphen and underscore. | 1-Ali123  2-Fatima\_9 | | 1-Username with length less than 6    2-Username with length greater than 20  3- Username with NULL value    4-Username Containing invalid characters e.g. spaces and non -alphanumeric numbers | Asma      Halloween\_123-heheelayyy456  NULL    Rohma -3 |
| Password | 1- Passwords with a length within the specified range (e.g., 8 to 20 characters).    2- Passwords containing a mix of uppercase and lowercase letters, numbers, and special characters. | 1- abcd1234!@#$        2- fatiMAY!@#9 | | 1- Passwords with a length less than the minimum allowed (e.g., less than 8 characters).    2- Passwords with a length greater than the maximum allowed (e.g., more than 20 characters).    3- Passwords containing only letters or only numbers.    4- Weak passwords that do not meet specified complexity requirements.    5-Password is NULL / unfilled | Hello1        12345abcde678910fghij@      Alizayyy OR 12345678      1234556789      NULL |

Payment Processing

**Billing and Amount:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable | Valid ECs | Representing Values | | Invalid ECs | Representing Values |
| For Valid | On Boundary |
| 2-Billing Information | 1- Valid billing address, city, state, and ZIP code, email. | Garden town, Lahore, Punjab, 1100, fama12@gmail.com (must exist in records) | N/A | 1-Invalid billing address, city, state, and ZIP code, email.      2 Only mail is valid    3-Only ZIP code is valid    4-Only state is valid    5-Only city is valid    6-Only address is valid    2 Only mail and address are valid    3-Only ZIP code and state are valid    4-Only state and city are valid    5-Only city and mail are valid    6-Only address and zip code are valid    7- Missing billing address.    8- Missing city, state, or ZIP code. | Wonderland, Skyland, neuro, 024, 123@.com  (not existed in records)      Remaining not existed in records  Remaining not existed in records  Remaining not existed in records  Remaining not existed in records  Remaining not existed in records  Remaining not existed in records    Remaining not existed in records    Remaining not existed in records    Remaining not existed in records    Remaining not existed in records    Unfilled      unfilled |
| 3-Payment Amount | 1-Payment amount within the allowed range(500-50,000). | 501-49999 | 500-50,000 | 1-Payment amount less than the minimum allowed.    2- Payment amount greater than the maximum allowed. | 299          55,000 |

**CREDIT CARD:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable | Valid ECs | Representing Values | | Invalid ECs | Representing Values |
|  |  | For Valid | On Boundary |  |  |
| Credit Card | 1- correct card number, correct CVV, correct expiration date | All details should be existed in records of banks for verification | N/A | 1- Incorrect card number, Incorrect CVV, Incorrect expiration date    2- correct card number, Incorrect CVV, Incorrect expiration date    3- Incorrect card number, correct CVV, Incorrect expiration date    4- Incorrect card number, Incorrect CVV, correct expiration date    5- correct card number, correct CVV, Incorrect expiration date    6- correct card number, Incorrect CVV, correct expiration date    7- incorrect card number, correct CVV, correct expiration date | All the details failed to verify      CVV and Expiration date failed to verify        Card number and expiration date failed to verify        Card number and CVV failed to verify      Expiration date failed to verify          CVV failed to verify        Card number failed to verify |

**Manage Category**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable** | **Valid ECs** | **Representing Values** | | **Invalid ECs** | **Representing Values** |
| **For Valid** | **On Boundary** |
| **Add** | 1. Adding a category with a valid name and description.    2. Adding a category with a valid length(6-20) and a valid description length(20-100).    3. Adding a category with a correct price(positive) | 1.Electronics Description: Gadgets      2.Fast Food  Description:  a strong priority placed on speed of service    3.Price: 100 | N/A | 1. Adding a category with an invalid name and description.    2. Adding a category with an invalid name but a valid description    3. Adding a category with a valid name but an invalid description    4. Adding a category with a length of 5 characters and a description of 101    5. Adding a category with a length of 21 characters and a description of 90    6. Adding a category with a length of 10 characters and a description of 10    7. Adding a category with an empty name and empty description    8. Adding a category with an empty name and a correct description.    9. Adding a category with a correct name and an empty description.    10. Adding a category with a negative price. | 1. Abcdef  Description: nonononono      2. Ppoppp  Description:  Made for kids.      3. Chinese  Description:  Chinese cuisine      4. Food  Description:  Length of 101 description      5. Add name of 21 length.  Description:  Add description of 90 length    6. Thai Food  Description:  Food from        7. Description:        8. Description: Food made in Pakistan  9.Indian food Description: 10.price: -100 |
| **Delete** | 1. Deleting an existing category  2. Deleting an existing product | 1. Category ID:123  2. Product ID:26 | N/A | 1. Attempting to delete a non-existent category  2. Attempting to delete a non-existing product | 1. Category: 69420  2. Product: 109986 |
| **Update** | 1. Updating the name or description of an existing category with valid data      2. Updating the details of an existing product with valid data    3. Updating the quantity of an existing product with a valid positive number | 1. Updated Name: "Updated Electronics," Description: "Updated Gadgets"    2. Updated Name: "Updated Smart phone," Updated Description: "Enhanced features," Updated Price: $699.99    3. Product ID: 123, Quantity: 50 | N/A | 1. Updating the name or description of an existing category with invalid data    2. Updating the details of an existing product with invalid data    3. Updating the quantity of an existing product with a valid negative number    4. Updating the quantity of a non-existent product | 1. Updated Name: "Updated Electronics!@#", Description: "Invalid Gadgets"    2. Updated Name: "Invalid Smartphone!@#", Updated Description: "Invalid features," Updated Price: -$50    3. Product ID: 456, Quantity: -10    4. Product ID: 999, Quantity: 100 |

Contact

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable | Valid ECs | Representing Values | | Invalid ECs | Representing Values |
| For Valid | On Boundary  **(N\A)** |
| Product | 1. Any sequence of Characters saved in database in products | 1. Apple (must exist in records) | | 1. Any Sequence of Characters not saved in database in products  2. Numeric values | 1. Banana  2. 45 |
| Contact Number | 1. Contact number saved in database of the user logged in | 1. 0558758748 | | 1. Numeric value not the logged in user’s contact number  2. Any alphabetic or alphanumeric value | 1. 0234738334 (say lisa is logged in)  2. 123abc |
| Email Id | 1. Email Id of the logged in user | 2. lisa@gmail.com | | 1. Some Character string which isn’t the logged in user’s email id  2. Numeric values | 1. admin@nyan.cat  2. 123 |
| Category | 1. String value saved as category in database | 2. Fruits | | 1. Any String which isn’t saved as a category name in database  2. Numeric value | 1. Laptop  2. -2 |
| Description | 1. Any alphanumeric value | 2. Pink | | N/A | N/A |

**FUNCTIONAL TESTING:**

On the basis for ECP and BVA

**Test Case 1:** Valid Username and Password

Test Case ID: TC001

Inputs:

Username: Ali123

Password: abcd1234!@#$

Execution Steps:

Enter the valid username 'Ali123'.

Enter the valid password 'abcd1234!@#$'.

Click the login button.

Verify that the login is successful.

**Test Case 2:** Invalid Username (Length Less Than 6)

Test Case ID: TC002

Inputs:

Username: Asma

Password: fatiMAY!@#9

Execution Steps:

Enter the invalid username 'Asma' with a length less than 6 characters.

Enter the valid password 'fatiMAY!@#9'.

Click the login button.

Verify that an error message is displayed for the invalid username.

**Test Case 3:** Invalid Password (Length Greater Than 20)

Test Case ID: TC003

Inputs:

Username: Fatima\_9

Password: 12345abcde678910fghij@

Execution Steps:

Enter the valid username 'Fatima\_9'.

Enter the invalid password '12345abcde678910fghij@' with a length greater than 20 characters.

Click the login button.

Verify that an error message is displayed for the invalid password length.

**Test Case 4:** Invalid Username (NULL Value)

Test Case ID: TC004

Inputs:

Username: NULL

Password: Hello1

Execution Steps:

Leave the username field empty or enter NULL.

Enter the valid password 'Hello1'.

Click the login button.

Verify that an error message is displayed for the empty/NULL username.

**Test Case 5:** Invalid Password (No Special Characters)

Test Case ID: TC005

Inputs:

Username: halloween\_123-heheelayyy456

Password: Alizayyy OR 12345678

Execution Steps:

Enter the valid username 'halloween\_123-heheelayyy456'.

Enter the invalid password 'Alizayyy OR 12345678' without any special characters.

Click the login button.

Verify that an error message is displayed for the password missing special characters.

**Test Case 6:** Invalid Password (Weak Password)

Test Case ID: TC006

Inputs:

Username: Rohma

Password: 1234556789

Execution Steps:

Enter the valid username 'Rohma'.

Enter the invalid weak password '1234556789'.

Click the login button.

Verify that an error message is displayed for the weak password.

**Test Case 7:** Incorrect Card Number

Test Case ID: TC007

Inputs:

Card Number: 1111222233334444 (incorrect)

CVV: 123 (correct)

Expiration Date: 12/25 (correct)

Execution Steps:

Enter the incorrect card number '1111222233334444'.

Enter the correct CVV '123'.

Enter the correct expiration date '12/25'.

Click the process payment button.

Verify that an error message is displayed for the incorrect card number.

**Test Case 8:** Incorrect CVV and Expiration Date

Test Case ID: TC008

Inputs:

Card Number: 5555666677778888 (correct)

CVV: 999 (incorrect)

Expiration Date: 01/23 (incorrect)

Execution Steps:

Enter the correct card number '5555666677778888'.

Enter the incorrect CVV '999'.

Enter the incorrect expiration date '01/23'.

Click the process payment button.

Verify that an error message is displayed for both incorrect CVV and expiration date.

**Test Case 9:** Incorrect Card Number and CVV

Test Case ID: TC009

Inputs:

Card Number: 9999888877776666 (incorrect)

CVV: 456 (incorrect)

Expiration Date: 06/28 (correct)

Execution Steps:

Enter the incorrect card number '9999888877776666'.

Enter the incorrect CVV '456'.

Enter the correct expiration date '06/28'.

Click the process payment button.

Verify that an error message is displayed for both incorrect card number and CVV.

**Test Case 10:** Incorrect Expiration Date

Test Case ID: TC010

Inputs:

Card Number: 1234567812345670 (correct)

CVV: 789 (correct)

Expiration Date: 03/20 (incorrect)

Execution Steps:

Enter the correct card number '1234567812345670'.

Enter the correct CVV '789'.

Enter the incorrect expiration date '03/20'.

Click the process payment button.

Verify that an error message is displayed for the incorrect expiration date.

**Test Case 11:** Valid Billing Information and Payment Amount

Test Case ID: TC011

Inputs:

First Name: Fatima

Last Name: Hamid

Billing Address: Garden Town

City: Lahore

State: Punjab

ZIP Code: 1100

Email: fama12@gmail.com

Payment Amount: 501

Execution Steps:

Enter the valid first name 'Fatima'.

Enter the valid last name 'Hamid'.

Enter the valid billing address 'Garden Town'.

Enter the valid city 'Lahore'.

Enter the valid state 'Punjab'.

Enter the valid ZIP code '1100'.

Enter the valid email 'fama12@gmail.com'.

Enter the payment amount '501'.

Click the submit button.

Verify that the payment is processed successfully.

**Test Case 12:** Invalid Billing Information (Missing City)

Test Case ID: TC012

Inputs:

First Name: Wonderland

Last Name: Skyland

Billing Address: neuro

State: 024

ZIP Code: 12345

Email: 123@.com

Payment Amount: 5000

Execution Steps:

Enter the valid first name 'Wonderland'.

Enter the valid last name 'Skyland'.

Enter the valid billing address 'neuro'.

Enter the invalid state '024'.

Enter the valid ZIP code '12345'.

Enter the valid email '123@.com'.

Enter the payment amount '5000'.

Click the submit button.

Verify that an error message is displayed for the missing city.

**Test Case 13:** Invalid Payment Amount (Less Than Minimum)

Test Case ID: TC013

Inputs:

First Name: John

Last Name: Doe

Billing Address: 123 Main St

City: Anytown

State: CA

ZIP Code: 98765

Email: john.doe@example.com

Payment Amount: 299

Execution Steps:

Enter the valid billing information.

Enter the payment amount '299' (less than the minimum allowed).

Click the submit button.

Verify that an error message is displayed for the insufficient payment amount.

**Test Case 14:** Invalid Billing Information (Unfilled)

Test Case ID: TC014

Inputs:

First Name: [Unfilled]

Last Name: [Unfilled]

Billing Address: [Unfilled]

City: [Unfilled]

State: [Unfilled]

ZIP Code: [Unfilled]

Email: [Unfilled]

Payment Amount: 10000

Execution Steps:

Leave some or all of the billing information fields unfilled.

Enter a valid payment amount '10000'.

Click the submit button.

Verify that an error message is displayed for the unfilled billing information.

These test cases cover various scenarios for testing billing information and payment amount validation during payment processing.

**Test Case ID:** 15

Title: Add Category with Valid Data

Inputs:

Category Name: "Electronics"

Description: "Gadgets"

Price: 100

Execution Steps:

Enter the valid category name "Electronics" in the category name field.

Enter the valid description "Gadgets" in the description field.

Enter the valid price "100" in the price field.

Click on the "Add" button to add the category.

Confirm that the system adds the category successfully.

**Test Case ID:** 16

Title: Add Category with Valid Length and Description Length

Inputs:

Category Name: "Fast Food"

Description: "A strong priority placed on speed of service"

Price: N/A

Execution Steps:

Enter the valid category name "Fast Food" (within the range of 6-20 characters) in the category name field.

Enter the valid description (within the range of 20-100 characters) in the description field.

Click on the "Add" button to add the category.

Confirm that the system adds the category successfully.

**Test Case ID:** 17

Title: Add Category with Invalid Data

Inputs:

Category Name: "Abcdef"

Description: "nonononono"

Price: N/A

Execution Steps:

Enter the invalid category name "Abcdef" in the category name field.

Enter the invalid description "nonononono" in the description field.

Click on the "Add" button to add the category.

Confirm that the system rejects the addition due to invalid data.

**Test Case ID:** 18

Title: Add Category with Invalid Name Length and Description Length

Inputs:

Category Name: "Add name of 21 length."

Description: "Add description of 90 length"

Price: N/A

Execution Steps:

Enter the invalid category name "Add name of 21 length." in the category name field.

Enter the valid description (within the range of 20-100 characters) in the description field.

Click on the "Add" button to add the category.

Confirm that the system rejects the addition due to invalid category name length.

**Test Case ID:** 19

Title: Add Category with Empty Name and Empty Description

Inputs:

Category Name: ""

Description: ""

Price: 100

Execution Steps:

Leave both the category name and description fields empty.

Click on the "Add" button to add the category.

Confirm that the system rejects the addition due to empty name and empty description.

**NON-FUNCTIONAL TESTING:**

Possible test cases for non functional testing for any e-commerce website including the website given to us in the project.

**Test Case ID:** 20

Title: Load Testing - Simulating Multiple Users

Inputs:

Number of simulated users: 100

Execution Steps:

Simulate 100 users accessing the e-commerce website simultaneously.

Monitor website response times and server resource usage.

Expected Output:

Confirm that the website maintains acceptable response times and the server can handle the load without significant degradation.

**Test Case ID:** 21

Title: Stress Testing - Assessing Breaking Point

Inputs:

Gradual increase in load until the breaking point is reached.

Execution Steps:

Gradually increase the simulated user load beyond the expected capacity.

Observe system behaviour, response times, and server stability.

Expected Output:

Identify the breaking point where the system starts to show signs of degradation or instability.

**Test Case ID:** 22

Title: Scalability Testing - Handling Increased Transactions

Inputs:

Incremental increase in transaction volume.

Execution Steps:

Increase the transaction volume incrementally.

Monitor the website's ability to scale horizontally or vertically.

Expected Output:

Confirm that the website scales effectively, ensuring performance and reliability as transaction volume grows.

**Test Case ID:** 23

Title: Availability Testing - Uptime Verification

Inputs:

Monitor website uptime during regular and peak hours.

Execution Steps:

Continuously monitor website availability and response times.

Introduce simulated peak loads to assess performance under stress.

Expected Output:

Verify that the website meets or exceeds defined service level agreements (SLAs) for uptime and responsiveness.

**Test Case ID:** 24

Title: Recovery Testing - Graceful System Recovery

Inputs:

Intentional disruption of services (e.g., server shutdown).

Execution Steps:

Intentionally disrupt services to simulate a failure.

Observe and measure the system's recovery time and stability.

Expected Output:

Confirm that the system recovers gracefully and efficiently from intentional disruptions.

**Test Case ID:** 25

Title: Usability Testing - Cross-Browser and Cross-Device Compatibility

Inputs:

Use different devices (desktop, mobile) and browsers (Chrome, Firefox, Safari).

Execution Steps:

Access the website using various devices and browsers.

Evaluate the consistency, clarity, and user-friendliness of the user interface.

Expected Output:

Ensure a consistent and user-friendly experience across different devices and browsers.

**Test Case ID:** 26

Title: Accessibility Testing - Ensuring Inclusivity

Inputs:

Use a screen reader tool, keyboard navigation.

Execution Steps:

Test the website with a screen reader to ensure compatibility.

Verify that keyboard navigation is intuitive and accessible.

Expected Output:

Confirm compliance with accessibility standards, making the website accessible to users with disabilities.

**Test Case ID:** 27

Title: Security Testing - Data Encryption Verification

Inputs:

Test with user login and payment transactions.

Execution Steps:

Perform user login and initiate payment transactions.

Use packet sniffing tools to analyse data packets for encryption.

Expected Output:

Confirm that sensitive data, such as user credentials and payment information, is encrypted during transmission.

**GUI-TESTING:**

Gui-testing for any e-commerce websites such as the one given to us in the project.

**Test Case ID:** 28

Title: GUI Testing - Consistency Across Pages

Inputs:

Navigate through various pages (home, product listings, checkout).

Execution Steps:

Visit different pages on the website.

Evaluate the consistency of design elements, navigation, and layout.

Expected Output:

Confirm that the GUI maintains a consistent design and layout across all pages for a seamless user experience.

**Test Case ID:** 29

Title: GUI Testing - Responsive Design Across Devices

Inputs:

Access the website on different devices (desktop, tablet, mobile).

Execution Steps:

Use different devices to access the website.

Verify that the GUI adapts responsively to different screen sizes.

Expected Output:

Ensure the GUI is visually appealing and functional on devices with varying screen sizes.

**Test Case ID:** 30

Title: HCI Testing - User-Friendly Navigation

Inputs:

Perform common user tasks (searching for products, adding to cart, and checking out).

Execution Steps:

Simulate common user tasks, such as searching for products and completing a purchase.

Evaluate the intuitiveness of navigation and ease of completing tasks.

Expected Output:

Confirm that users can easily navigate through the website and perform tasks without confusion.

**Test Case ID:** 31

Title: HCI Testing - Error Messages and Feedback

Inputs:

Deliberately input incorrect information during registration and checkout.

Execution Steps:

Intentionally provide incorrect information during registration and checkout.

Verify the clarity and helpfulness of error messages provided by the system.

Expected Output:

Ensure error messages are clear, informative, and guide users to correct their input.

**Test Case ID:** 32

Title: HCI Testing - Usability for Different User Personas

Inputs:

Emulate scenarios for different user personas (first-time user, returning customer, tech-savvy, non-tech-savvy).

Execution Steps:

Simulate scenarios for different user personas.

Assess the website's usability and ease of use for each persona.

Expected Output:

Confirm that the website caters to the needs and preferences of users with varying levels of technical proficiency.

**Test Case ID:** 33

Title: GUI Testing - Image and Multimedia Rendering

Inputs:

Visit product pages with images and multimedia content.

Execution Steps:

Access product pages with images and multimedia content.

Verify that images load correctly, and multimedia content plays without issues.

Expected Output:

Ensure a visually appealing presentation of products with accurate rendering of images and multimedia elements.

**Test Case ID:** 34

Title: HCI Testing - Feedback Mechanisms

Inputs:

Initiate actions that require user feedback (submitting a review, completing a survey).

Execution Steps:

Perform actions that trigger user feedback (e.g., submitting a review).

Evaluate the clarity and completeness of feedback mechanisms.

Expected Output:

Confirm that users receive clear and appropriate feedback for their actions.