THE UNIVERSITY OF SCIENCE

FACULTY OF INFORMATION TECHNOLOGY

Kiểm thử phần mềm - 22KTPM3

Domain Testing - HW2

Thành Viên

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Chapter 1

Group Information and Task Allocation

Full Name	Student ID	Features
Cao Uyen Nhi	22127310	- Sign Up - Checkout -> Payment - Product Management
Luu Thanh Thuy	22127410	- Sign In - User Managerment - Filter and Search
Nguyen Phuoc Minh Tri	22127424	- Home - Catalog - Categories
Vo Le Viet Tu	22127435	- Multi-language - Order Management - My Profile
Tran Thi Cat Tuong	22127444	- Contact - Category Management

Chapter 2

Equivalence partitioning and Boundary value analysis design process

2.1 Feature 1: Catalog

2.1.1 Sort

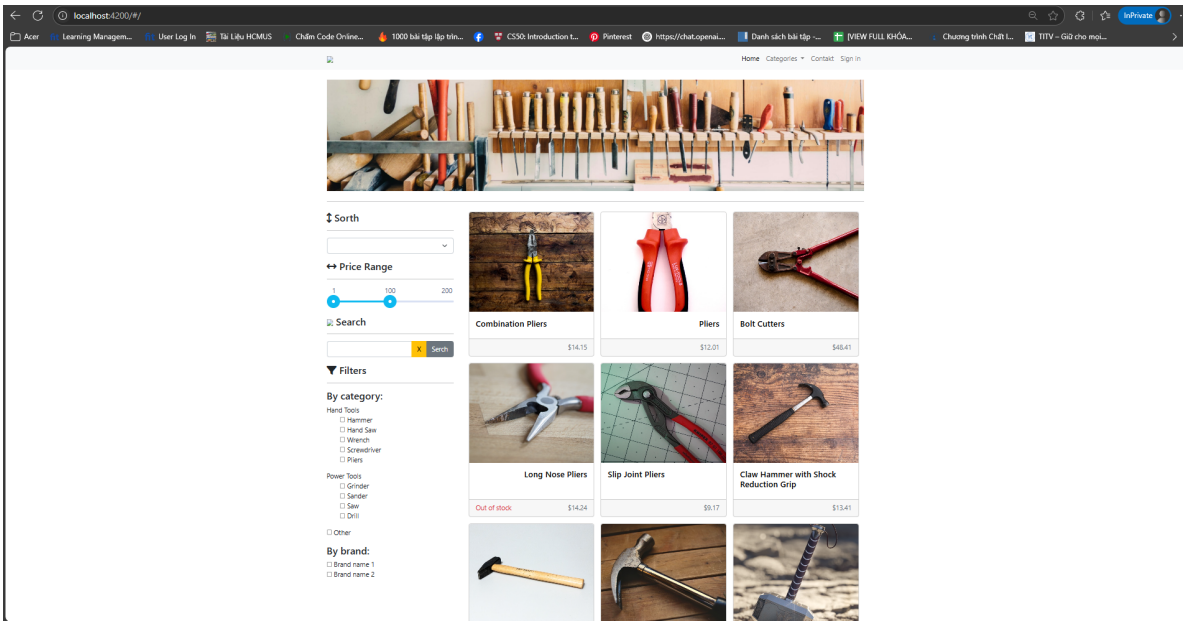

Figure 2.1: Sort

Inputs and Constraints:

- **Input:**

  - Field name: Sort
  - Data type: string
  - Allowed values: Name (A - Z), Name (Z - A), Price (High - Low), Price (Low - High), Empty string (“” - indicates no sorting)

- **Constraints:**
  - The value must be exactly one of the 5 allowed strings.
  - Invalid if: The string is not in the allowed list.
  - The string has typos or incorrect formatting (e.g., “name a-z”, “Price low-high”, “Price (Low - High)”)

2.1.1.1 Equivalence Partitioning (EP)

Field	Valid Partition	Invalid Partition
Sort	Name (A - Z), Name (Z - A), Price (High - Low), Price (Low - High), Empty string	name a-z, Price low-high, Price (Low - High),…

2.1.1.2 Boundary Value Analysis (BVA)

Test Case	Description
Select first option (index 0)	Boundary start - “” - indicates no sorting
Select second option (index 1)	Just above lower boundary — Name (A - Z)
Select third option (index 2)	Mid-range — Name (Z - A)
Select fourth option (index 3)	Upper boundary — Price (High - Low)
Select fourth option (index 4)	Boundary end - Price (Low - High)
Try to select index 5 or undefined	Invalid — out of range

2.1.2 Price Range

Inputs and Constraints:

- **Input:**
  - Field name: min_price and max_price

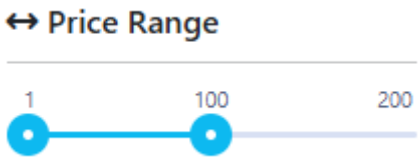

Figure 2.2: Price Range

  - Data type: integer

- **Constraints:**
  - 200 max_price min_price 0

2.1.2.1 Equivalence Partitioning (EP)

Field	Valid Partition	Invalid Partition
min_price	Integer value in range [0, max_price]	Negative values, greater than max_price, non-integer
max_price	Integer in range [min_price, 200]	Negative values, less than min_price, value greater than 200, non-integer
min max	True	False

2.1.2.2 Boundary Value Analysis (BVA)

- BVA for min_price:

Test Case	min_price	Description
1	-1	Just below lower bound (Invalid)
2	0	Lower boundary
3	1	Just above lower bound
4	199	Just below upper bound
5	200	Upper boundary
6	201	Just above upper bound (Invalid)

- BVA for max_price (assume min_price = 0):

Test Case	max_price	Description
1	-1	Below lower bound (Invalid)
2	0	Lower boundary
3	1	Just above lower bound
4	199	Just below upper bound
5	200	Upper boundary
6	201	Just above upper bound (Invalid)

- BVA for the min max:

min_price	max_price	Test Purpose
50	50	Boundary: min = max
49	50	Just below boundary
51	50	Invalid: min max

2.1.3 Search

Figure 2.3: Search

Inputs and Constraints:

- **Input:**
  - Field name: query
  - Data type: text
- **Constraints:**
  - Maximum length: 100 characters
  - Cannot contain malicious content
  - Accepts alphanumeric and space characters
  - Can be empty (optional search)

2.1.3.1 Equivalence Partitioning (EP)

Field	Valid Partition	Invalid Partition
Length	Length between 0 and 100 characters	Length 100 characters
Content Format	Alphanumeric and space characters (e.g. “drill”)	Contains malicious or special characters

2.1.3.2 Boundary Value Analysis (BVA)

Test Case	query (Length)	Description
1	0	Lower boundary
2	1	Just above lower boundary
3	99	Just below upper boundary
4	100	Upper boundary
5	101	Just above upper boundary (Invalid)

2.1.4 Filter

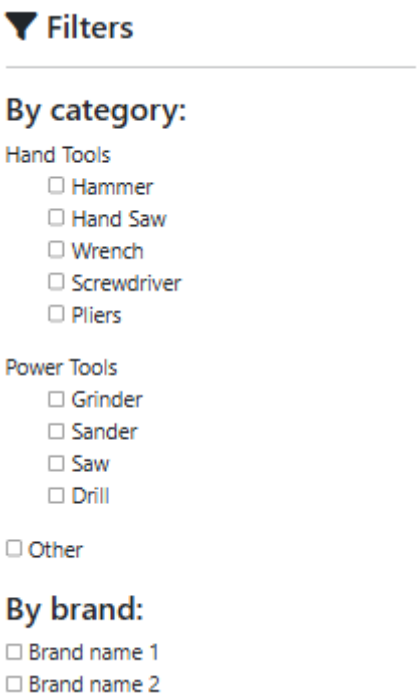

Figure 2.4: Filter

Inputs and Constraints:

- **Input:**
  - categories[] – multiple selection (checkbox group)
  - brands[] – multiple selection (checkbox group)
  - Type: Array of strings
- **Constraints:**
  - Each selected value must match a valid predefined item (e.g. “Hammer”, “Grinder”)
  - At least 0 selection is allowed (optional)
  - Accepts alphanumeric and space characters
  - Invalid values (e.g. injected strings, unexpected values) must be rejected

2.1.4.1 Equivalence Partitioning (EP)

Field	Valid Partition	Invalid Partition
categories[]	“Hammer” , [“Drill”, “Sander”], []	[“X”], [“], [” “]
brands[]	[“Brand name 1”], []	[“Unknown brand”], [““]

2.1.4.2 Boundary Value Analysis (BVA)

BVA for Selection Count

Test Case	Description
0 selections	Lower boundary (no filter applied)
1 selection	Minimum meaningful use
All items selected	Upper boundary (~9 for category, 2 for brand)
10+ selections	Extreme case test (if UI allows)

BVA for Value Length (defensive)

Test Case	Description
0-char string	Invalid (empty string)
Normal length	Valid (e.g. “Hammer”)
Very long string	Invalid (e.g. “a” * 256) – possible injection attempt

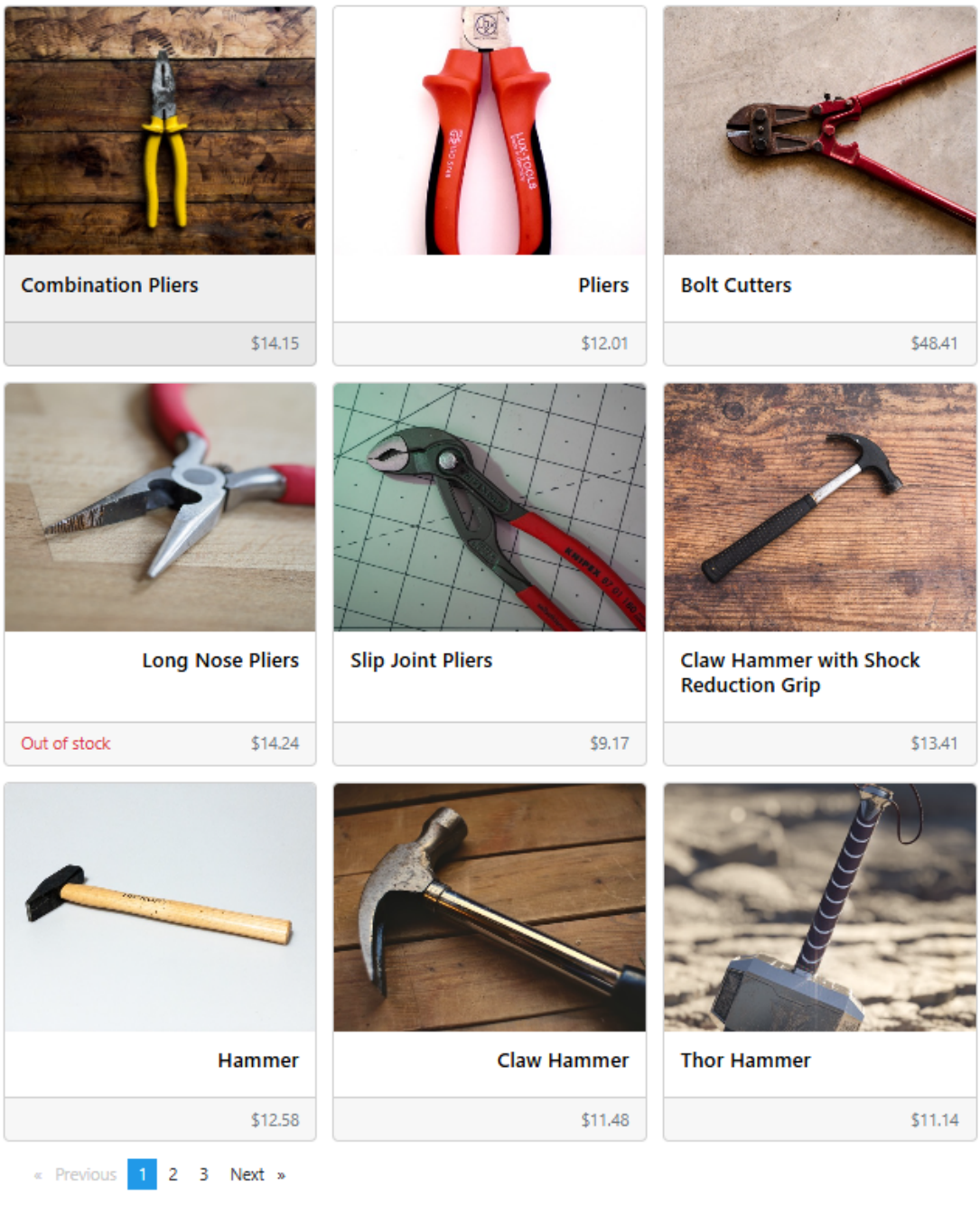

Figure 2.5: Pagination

2.1.5 Pagination

Inputs and Constraints:

- **Input:**
  - Field name: page (number)
  - Data type: integer
- **Constraints:**
  - page 1
  - page total_pages
  - Cannot go before page 1 or beyond max page

2.1.5.1 Equivalence Partitioning (EP)

Field	Valid Partition	Invalid Partition
page	Integer between 1 and 3	Less than 1, greater than 3, non-integer
Prev button	Disabled if on page 1	N/A
Next button	Disabled if on last page (3)	N/A

2.1.5.2 Boundary Value Analysis (BVA)

Test Case	Page	Description
1	0	Just below lower boundary (invalid)
2	1	Lower boundary
3	2	Middle value
4	3	Upper boundary
5	4	Just above upper boundary (invalid)

2.2 Feature 2: Categories

2.2.1 Hand Tools

Inputs and Constraints:

- **Input:**

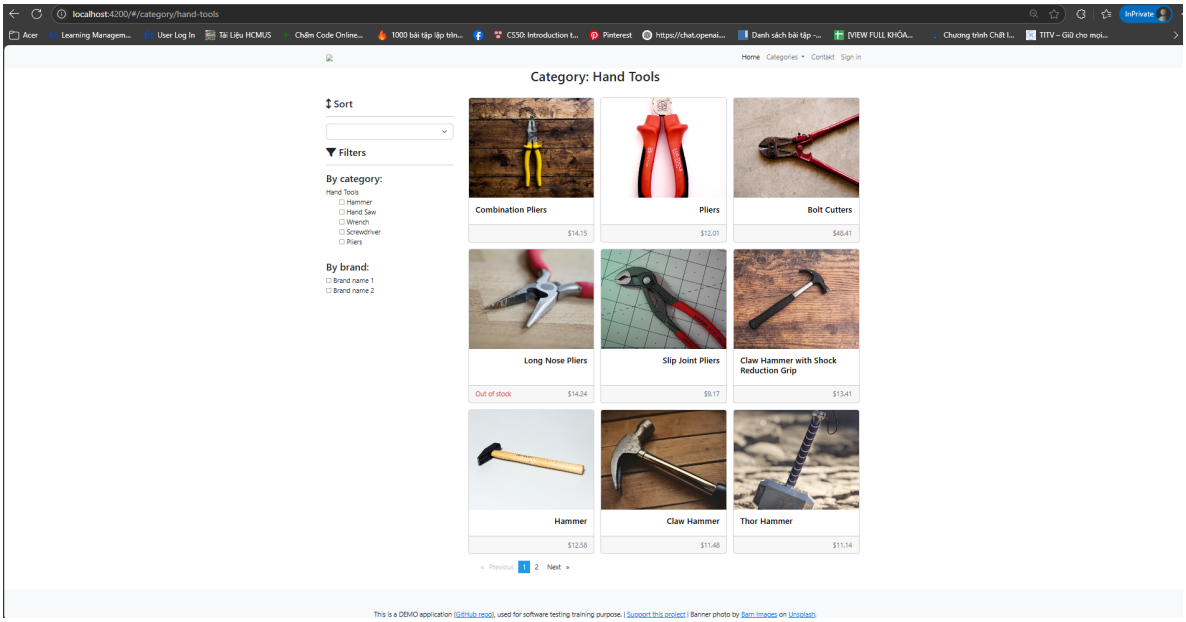

Figure 2.6: Hand Tools

  - Sort: String value selected from dropdown
  - Filters: Array of strings from checkbox selections (e.g., [“Hammer”], [“Brand name 1”], or [] for no filter).
  - Page: Integer, current page number

- **Constraints:**
  - Sort must be one of the predefined options: “Name (A - Z)”, “Name (Z - A)”, “Price (High - Low)”, “Price (Low - High)”, or “” (empty)
  - Filters must contain only valid Hand tools or brand names
  - Page must be an integer 1 and total number of pages
  - Input is invalid if:
    * Sort is not in the allowed list
    * Filters contain unknown or malformed values
    * Page $<$ 1 or total pages

2.2.1.1 Equivalence Partitioning (EP)

Field	Valid Partition	Invalid Partition
Sort	Name (A - Z), Name (Z - A), Price (High - Low), Price (Low - High), Empty string	name a-z, Price low-high, Price (Low - High),...

Field	Valid Partition	Invalid Partition
Filters	[“Hammer”], [“Brand name 1”], [], …	[“Invalid Category”], [“ “]
Page	1, 2, 3 (assuming 3 total pages)	0, -1, 4, “abc”

2.2.1.2 Boundary Value Analysis (BVA)

1. Sort (Dropdown)

Test Case	Sort Value	Description
1	Name (A - Z)	Lower boundary (first option)
2	Name (Z - A)	Just above lower boundary
3	Price (High - Low)	Mid-range
4	Price (Low - High)	Upper boundary (last valid option)
5	Price (Low - High)	Invalid – extra spaces
6	name a-z	Invalid – incorrect format/case
7	“”	Empty (default) – valid

2. Filters (Category & Brand Selections)

Test Case	Filters	Description
1	[]	Lower boundary – no filters applied
2	[“Hammer”]	Single valid item (category)
3	[“Brand name 1”]	Single valid item (brand)
4	[“Hammer”, “Brand name 1”]	Multiple valid selections
5	[“Invalid Category”]	Invalid – not in allowed list
6	[“ “]	Invalid – empty string
7	[“]	Invalid – injection/malicious input

3. Pagination (Page number)

Assuming total_pages = 3:

Test Case	Page	Description
1	1	Just below lower boundary (invalid)
2	2	Lower boundary (first page)
3	3	Mid-range
4	4	Upper boundary (last page)
5	5	Just above upper boundary (invalid)

2.2.2 Power Tools

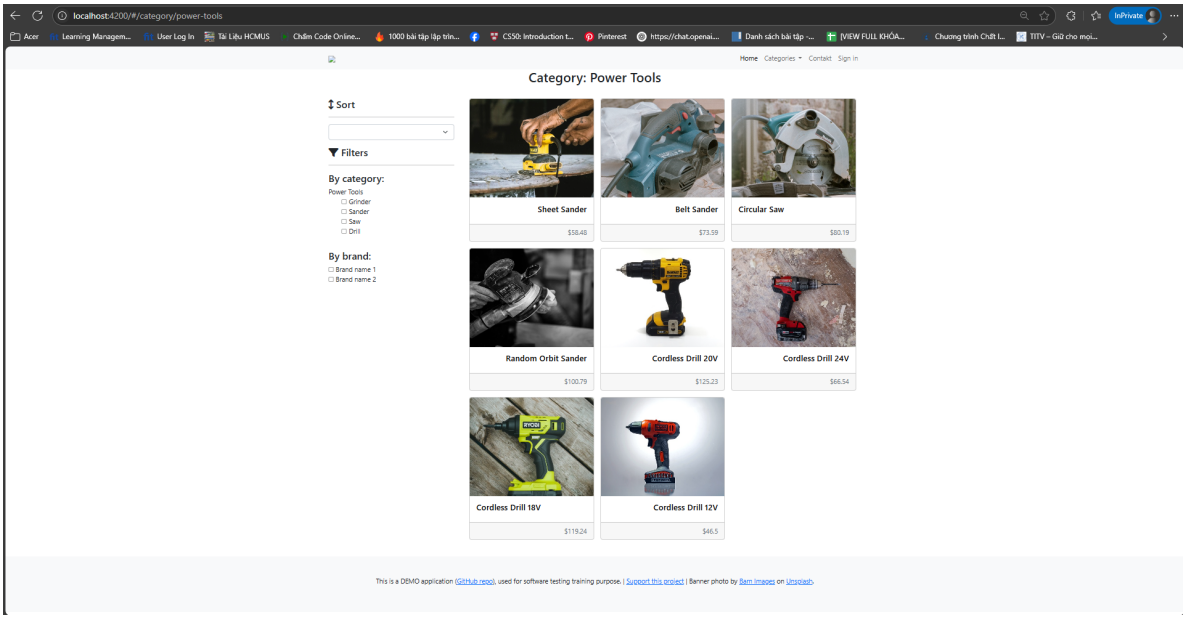

Figure 2.7: Power Tools

Inputs and Constraints:

- **Input:**
  - Sort: String value selected from dropdown
  - Filters: Array of strings from checkbox selections (e.g., [“Grinder”], [“Brand name 1”], or [] for no filter).
  - Page: Integer, current page number
- **Constraints:**
  - Sort must be one of the predefined options: “Name (A - Z)”, “Name (Z - A)”, “Price (High - Low)”, “Price (Low - High)”, or “” (empty)
  - Filters must contain only valid Power tools or brand names

- Page must be an integer 1 and total number of pages
- Input is invalid if:
  - Sort is not in the allowed list
  - Filters contain unknown or malformed values
  - Page < 1 or total pages

2.2.2.1 Equivalence Partitioning (EP)

Field	Valid Partition	Invalid Partition
Sort	Name (A - Z), Name (Z - A), Price (High - Low), Price (Low - High), Empty string	name a-z, Price low-high, Price (Low - High),…
Filters	[“Grinder”], [“Brand name 1”], [], …	[“Invalid Category”], [““]
Page	1, 2, 3 (assuming 3 total pages)	0, -1, 4, “abc”

2.2.2.2 Boundary Value Analysis (BVA)

1. Sort (Dropdown)

Test Case	Sort Value	Description
1	Name (A - Z)	Lower boundary (first option)
2	Name (Z - A)	Just above lower boundary
3	Price (High - Low)	Mid-range
4	Price (Low - High)	Upper boundary (last valid option)
5	Price (Low - High)	Invalid – extra spaces
6	name a-z	Invalid – incorrect format/case
7	“”	Empty (default) – valid

2. Filters (Category & Brand Selections)

Test Case	Filters	Description
1	[]	Lower boundary – no filters applied
2	[“Grinder”]	Single valid item (category)
3	[“Brand name 1”]	Single valid item (brand)

Test Case	Filters	Description
4	[“Hammer”, “Brand name 1”]	Multiple valid selections
5	[“Invalid Category”]	Invalid – not in allowed list
6	[“”]	Invalid – empty string
7	[“]	Invalid – injection/malicious input

3. Pagination (Page number)

Assuming total_pages = 3:

Test Case	Page	Description
1	1	Just below lower boundary (invalid)
2	2	Lower boundary (first page)
3	3	Mid-range
4	4	Upper boundary (last page)
5	5	Just above upper boundary (invalid)

Chapter 3

Use of AI Tools

Tool Name: ChatGPT (GPT-4.5) by OpenAI

Prompts Used: During the testing task for the "Catalog" and "Categories" features, I provided the AI with multiple prompts. Some representative examples include:

1. Write Equivalence Partitioning and Boundary Value Analysis for Sort
2. Write 20 test case for Price Range in table form. For each test case, provide:
    - Test Case ID
    - Title
    - Preconditions (if any)
    - Input values
    - Test steps
    - Expected result
    - Type(EP or BVA)
3. Generate test cases for Search feature based on EP and BVA
4. Write 15 test cases for Hand Tools including Sort, Filter, and Pagination
5. Write test cases for Power Tools similar to Hand Tools

Validation and Refinement Process:

- I reviewed each AI-generated test case against the actual UI and functionality of the system under test (SUT).
- I confirmed that:
    - All sort values matched the dropdown in the UI.
    - Filters used only valid values from the checkbox lists.
    - Pagination logic matched the observed number of pages.

  - Invalid and edge cases were realistic and applicable.

- Some test cases were adjusted manually to better fit my system's behavior (e.g., renaming fields, correcting values, adding specific brand/tool names).

Test Case Origin:

Test case group	Origin	Notes
Sort (Catalog & Categories)	AI generated, Mixed	Validated against dropdown in UI
Price Range	AI generated, Mixed	Based on BVA and EP, refined for 0–200 range
Search	Mixed	Base structure by AI; values added manually
Filter (Category/Brand)	Mixed	Base structure by AI; values added manually
Pagination	Manually created	Not suggested by AI

Chapter 4

Self-Evaluation

Criteria	Description	Max Points	Self-Evaluation
Feature Selection	2 important features selected	1.0	1.0
EP Technique	Correct and complete partition identification	2.0	2.0
BVA Technique	Correct identification of boundaries and rationale	1.0	1.0
Test Case Design	Test cases are clear, traceable, professional	2.0	2.0
Use of AI Tools	Prompt transparency, critical validation, added value	1.0	1.0
Test Execution	All designed test cases executed, results logged	1.0	1.0
Bug Reporting	Clear and complete bug report(s), if applicable	1.0	1.0

Criteria	Description	Max Points	Self-Evaluation
Merging and Final Review	Proper combination and deduplication of test cases	0.5	0.5
Presentation & Clarity	Document is well-organized, readable, with self assessment	0.5	0.5
Total		10	10