

An approach to improve User Acceptance Testing with Generative AI and RSL – Results, review and validation

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B - Advanced scenario

For the advanced scenario, generated results that require tool validation (RSL requirements and Robot Framework automation script) are presented, with respective correction if necessary. The corrections were based on the AI assistant's response after including the error as input in the prompt.

1. RSL requirements generation

Below are the sections of the RSL file before and after review. Errors are marked in red and corrections in green.

- System Definitions - Before and after review

```
RSL_advanced_generated.rsl x
TestWorkProducts > RSL_advanced_generated.rsl > ...
1 Package QA_Testing_Hub
2
3 /*****
4 System Definition
5 *****/
6 System QA_Testing_Hub_App "QA Testing Hub" : Application [
7   description "A website for professional testers to stay updated on software testing, explore blog posts, news, events, purchase e-books, and contact the author."
8 ]
9
```

Figure 1. System Definitions section validated.

- Actors – Before review

```
9
10 /*****
11 Actors
12 *****/
13 Actor a_User "User" : Person [
14   description "A professional tester using the QA Testing Hub."
15 ]
16
```

Figure 2. Actors section before correction.

- Actors – After review

```
9
10  /*****
11  |   Actors
12  | *****/
13  Actor a_User "Website User" : User [
14  |   description "A professional tester using the QA Testing Hub."
15  | ]
16
```

Figure 3. Actors section after correction.

- Data Entities – Before review

```
16
17  /*****
18  |   Data Entities
19  | *****/
20  DataEntity e_Ebook "Ebook" : Master [
21  |   attribute id "Ebook ID" : Integer [constraints (PrimaryKey)]
22  |   attribute name "Ebook Name" : String(100)
23  |   attribute price "Price" : Decimal
24  |   description "Data entity representing an e-book with its price."
25  | ]
26
27  DataEntity e_Cart "Cart" : Master [
28  |   attribute id "Cart ID" : Integer [constraints (PrimaryKey)]
29  |   attribute total "Total Price" : Decimal
30  |   description "User's shopping cart containing e-books and total price."
31  | ]
32
```

Figure 4. Data Entities section before correction.

- Data Entities – After review

```
16
17  /*****
18  |   Data Entities
19  | *****/
20  DataEntity e_Ebook "Ebook" : Master [
21  |   attribute ID "Ebook ID" : Integer [constraints (PrimaryKey)]
22  |   attribute Title "Ebook Name" : String(100)
23  |   attribute price "Price" : Decimal
24  |   description "Data entity representing an e-book with its price."
25  | ]
26
27  DataEntity e_Cart "Cart" : Master [
28  |   attribute ID "Cart ID" : Integer [constraints (PrimaryKey)]
29  |   attribute total "Total Price" : Decimal
30  |   description "User's shopping cart containing e-books and total price."
31  | ]
32
```

Figure 5. Data Entities section after correction.

- Action Definitions – Before and after review

```
32
33 ✓ /*****
34 |   Action Definitions
35 | *****/
36 ActionType a_OpenPage "Open Page" [
37 |   description "User navigates to a specific webpage."
38 | ]
39
40 ActionType a_VerifyText "Verify Text" [
41 |   description "User verifies that specific text is present on a page."
42 | ]
43
44 ActionType a_AddToCart "Add to Cart" [
45 |   description "User adds an e-book to the shopping cart."
46 | ]
47
48 ActionType a_HandleAlert "Handle Alert" [
49 |   description "User handles the alert message after adding an item to the cart."
50 | ]
51
52 ActionType a_UpdateTotal "Update Cart Total" [
53 |   description "System updates the cart's total price after adding an e-book."
54 | ]
55
56 ActionType a_VerifyFinalPrice "Verify Final Price" [
57 |   description "User verifies the total price of all e-books in the cart."
58 | ]
59
```

Figure 6. Actions Definitions section before and after review.

- Events – Before review

```
59
60 /*****
61 |   Events
62 | *****/
63 Event ev NavigateToEbooksPage "Navigate to the e-books page" : Trigger [
64 |   action a_OpenPage, a_VerifyText
65 |   description "User navigates to the e-books page."
66 | ]
67
68 Event ev AddEbooksToCart "Add e-books to cart" : Trigger [
69 |   action a_AddToCart, a_HandleAlert, a_UpdateTotal
70 |   description "User adds one or more e-books to the cart, and the system updates the total."
71 | ]
72
73 Event ev ConfirmFinalPrice "Confirm final price" : Trigger [
74 |   action a_VerifyFinalPrice
75 |   description "User verifies and confirms the final total price of the e-books in the cart."
76 | ]
77
```

Figure 7. Events section before review.

- Events – After review

```

59 -
60 /*****
61 | Events
62 | *****/
63 Event ev_NavigateToEbooksPage "Navigate to the e-books page" : Conditional [
64 |     description "Triggered when the user navigates to the e-books page."
65 | ]
66
67 Event ev_AddEbooksToCart "Add e-books to cart" : Conditional [
68 |     description "Triggered when the user adds e-books to the shopping cart."
69 | ]
70
71 Event ev_ConfirmFinalPrice "Confirm final price" : Conditional [
72 |     description "Triggered when the user confirms the final price in the cart."
73 | ]
74

```

Figure 8. Events section after correction.

- Use Cases – Before review

```

77 -
78 /*****
79 | Use Cases
80 | *****/
81 UseCase uc_1_NavigateToEbooksPage "Navigate to E-books Page" : EntityRead [
82 |     actorInitiates a_User
83 |     actions a_OpenPage, a_VerifyText
84 |     description "User navigates to the e-books page of the QA Testing Hub."
85 | ]
86
87 UseCase uc_2_AddEbooksToCart "Add E-books to Cart" : EntityUpdate [
88 |     actorInitiates a_User
89 |     dataEntity e_Ebook
90 |     actions a_AddToCart, a_HandleAlert, a_UpdateTotal
91 |     description "User adds one or more e-books to the cart, and the cart total is updated."
92 | ]
93
94 UseCase uc_3_ConfirmFinalPrice "Confirm Final Price" : EntityRead [
95 |     actorInitiates a_User
96 |     dataEntity e_Cart
97 |     actions a_VerifyFinalPrice
98 |     description "User reviews the cart and confirms the total price."
99 | ]

```

Figure 9. Use Cases section before correction.

- Use Cases – After review

```
74
75 /*****
76 | Use Cases
77 *****/
78 UseCase uc_1 NavigateToEbooksPage "Navigate to E-books Page" : EntityRead [
79 |   primaryActor a_User
80 |   actions a_OpenPage, a_VerifyText
81 |   description "User navigates to the e-books page of the QA Testing Hub."
82 ]
83
84 UseCase uc_2 AddEbooksToCart "Add E-books to Cart" : EntityUpdate [
85 |   primaryActor a_User
86 |   dataEntity e_Ebook
87 |   actions a_AddToCart, a_HandleAlert, a_UpdateTotal
88 |   description "User adds one or more e-books to the cart, and the cart total is updated."
89 ]
90
91 UseCase uc_3 ConfirmFinalPrice "Confirm Final Price" : EntityRead [
92 |   primaryActor a_User
93 |   dataEntity e_Cart
94 |   actions a_VerifyFinalPrice
95 |   description "User reviews the cart and confirms the total price."
96 ]
97
```

Figure 10. Use Cases section after correction.

2. Automation script generation – Advanced scenario

Below is the automation script before and after review. Errors are marked in red and corrections in green (Figure 11 and Figure 12).

- Automation script – Before review

```
AT_advanced_generated.robot U X
QATestingHub > public > AT_advanced_generated.robot
1  *** Settings ***
2  Library      SeleniumLibrary
3
4  *** Variables ***
5  ${URL}       https://www.qatesthub.info/
6  ${EBOOK_1_PRICE} //div[@data-id='1']//span[@class='total-price']
7  ${EBOOK_2_PRICE} //div[@data-id='2']//span[@class='total-price']
8  ${FINAL_PRICE} //span[@id='final-price']
9  ${QUANTITY_EBOOK_1} //input[@id='quantity-ebook-1']
10 ${ADD_EBOOK_1} //button[@onclick='addToCart(1)']
11 ${QUANTITY_EBOOK_2} //input[@id='quantity-ebook-2']
12 ${ADD_EBOOK_2} //button[@onclick='addToCart(2)']
13
14 *** Test Cases ***
15 Open Browser And Navigate To E-Books Page
16 | Open Browser    ${URL}    Edge
17 | Maximize Browser Window
18 | Click Link      xpath=//a[text()='E-books']
19 | Wait Until Page Contains Element  xpath=//h1[text()='E-books']
20
21 Add First E-Book To Cart
22 | Input Text      ${QUANTITY_EBOOK_1}    1
23 | Click Button    ${ADD_EBOOK_1}
24 | Handle Alert
25
26 Add Second E-Book To Cart
27 | Input Text      ${QUANTITY_EBOOK_2}    2
28 | Click Button    ${ADD_EBOOK_2}
29 | Handle Alert
30
31 Verify Final Price
32 | ${ebook_1_price}=    Get Text    ${EBOOK_1_PRICE}
33 | ${ebook_2_price}=    Get Text    ${EBOOK_2_PRICE}
34 | ${final_price}=      Get Text    ${FINAL_PRICE}
35 | Should Be Equal As Numbers    ${final_price}    ${ebook_1_price + ebook_2_price}
36
37 *** Keywords ***
38 Handle Alert
39 | Alert Should Be Present
40 | Accept Alert
41
```

Figure 11. Robot Framework script before correction.

- Robot Framework script – After review

```
AT_advanced_validated.robot U X
QATestingHub > public > AT_advanced_validated.robot
1  *** Settings ***
2  Library      SeleniumLibrary
3
4  *** Variables ***
5  ${URL}       https://www.qatesthub.info/
6  ${EBOOK_1_PRICE} //div[@data-id='1']//span[@class='total-price']
7  ${EBOOK_2_PRICE} //div[@data-id='2']//span[@class='total-price']
8  ${FINAL_PRICE} //span[@id='final-price']
9  ${QUANTITY_EBOOK_1} //input[@id='quantity-ebook-1']
10 ${ADD_EBOOK_1} //button[@onclick='addToCart(1)']
11 ${QUANTITY_EBOOK_2} //input[@id='quantity-ebook-2']
12 ${ADD_EBOOK_2} //button[@onclick='addToCart(2)']
13
14 *** Test Cases ***
15 Open Browser And Navigate To E-Books Page
16   Open Browser    ${URL}    Edge
17   Maximize Browser Window
18   Click Link      xpath=//a[text()='E-books']
19   Wait Until Page Contains Element  xpath=//h1[text()='E-books']
20
21 Add First E-Book To Cart
22   Input Text      ${QUANTITY_EBOOK_1}    1
23   Click Button    ${ADD_EBOOK_1}
24   Handle Alert    ACCEPT
25
26 Add Second E-Book To Cart
27   Input Text      ${QUANTITY_EBOOK_2}    2
28   Click Button    ${ADD_EBOOK_2}
29   Handle Alert
30
31 Verify Final Price
32   ${ebook_1_price}=    Get Text    ${EBOOK_1_PRICE}
33   ${ebook_2_price}=    Get Text    ${EBOOK_2_PRICE}
34   ${final_price}=      Get Text    ${FINAL_PRICE}
35
36   # Convert the prices to numbers by first applying replace on the string, then converting to float
37   ${ebook_1_price_num}= Evaluate    float('${ebook_1_price}'.replace('$', '').strip())
38   ${ebook_2_price_num}= Evaluate    float('${ebook_2_price}'.replace('$', '').strip())
39   ${final_price_num}=   Evaluate    float('${final_price}'.replace('$', '').strip())
40
41   # Sum the prices of both e-books
42   ${expected_total}=    Evaluate    ${ebook_1_price_num} + ${ebook_2_price_num}
43
44   # Verify the final price matches the expected total
45   Should Be Equal As Numbers    ${final_price_num}    ${expected_total}
46
47
```

Figure 12. Robot Framework script after correction.

Below is evidence of the final execution of automation, after the mentioned corrections (Figure 13 and Figure 14).

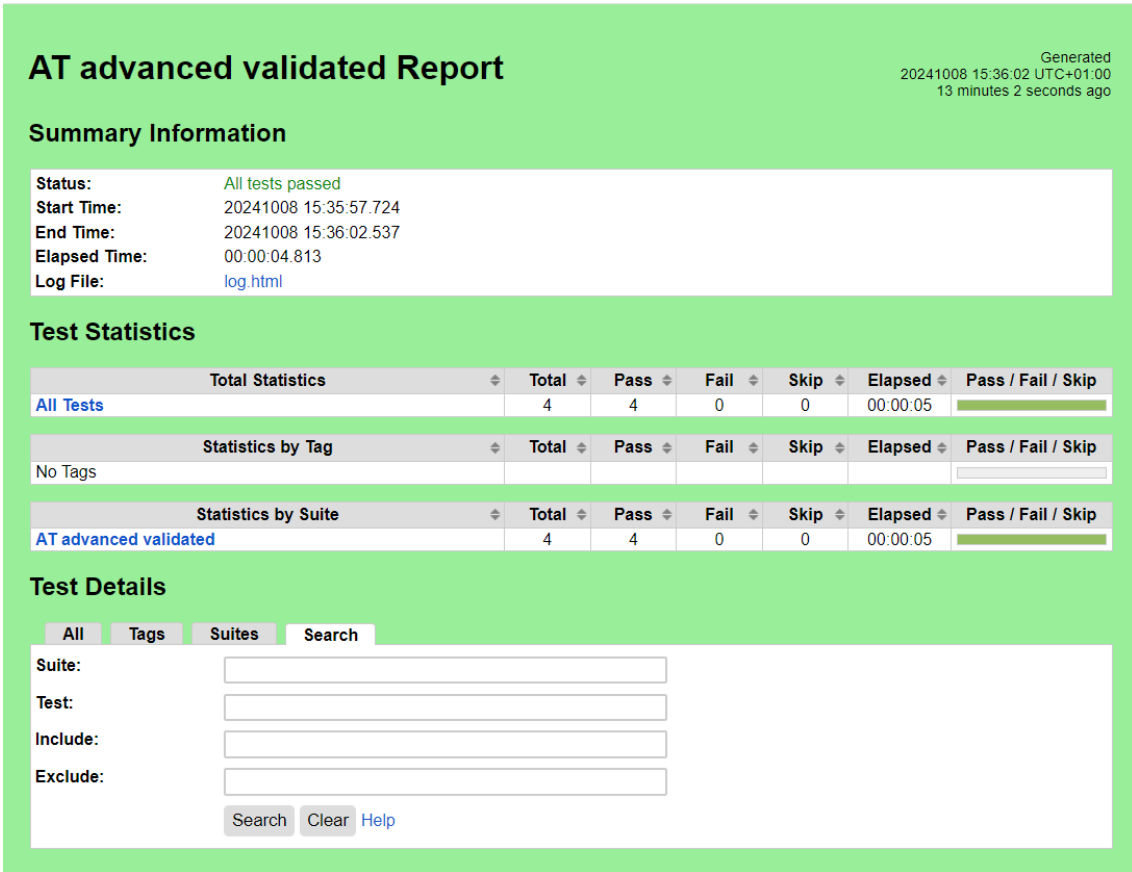


Figure 13. Successful automation Report.

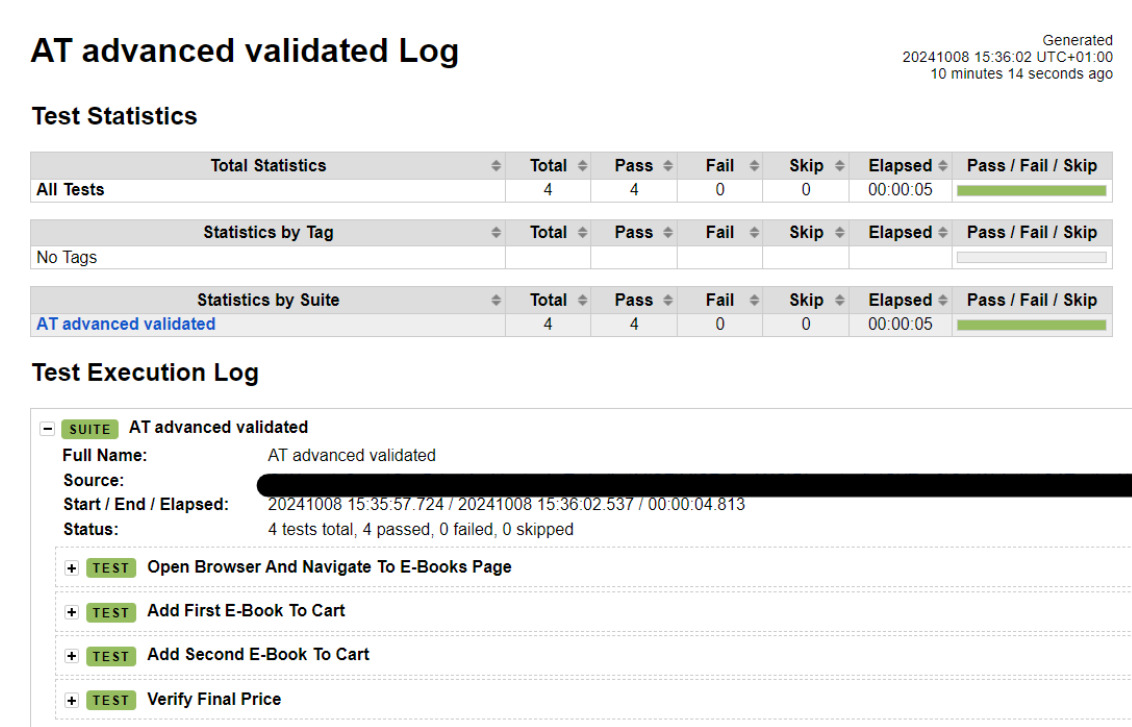


Figure 14. Successful automation Log.