Admin Controller:

1. L : Admin Login
2. C : Category Management
3. S : Product Management
4. O : Admin Operations

L1 = {Correct admin username and password}
L2 = {Correct admin username and incorrect password}
L3 = {Incorrect admin name}

C1 = {category with a valid name}
C2 = {category with an empty name}

S1 = {product with valid details}
S2 = {product with invalid details}

O1 = {Update Category}
O2 = {Add Category}
O3 = {Delete Category}
O4 = {Add Product}
O5 = {Delete Product}
O6 = {Update Product}
O7 = {View Customers}

Orthogonal Array for the above set:

[0. 0. 0. 0.]   [1. 0. 0. 3.]   [2. 0. 0. 6.]
[1. 0. 0. 0.]   [2. 0. 0. 3.]   [0. 1. 0. 6.]
[2. 0. 0. 0.]   [0. 1. 0. 3.]   [1. 1. 0. 6.]
[0. 1. 0. 0.]   [1. 1. 0. 3.]   [2. 1. 0. 6.]
[1. 1. 0. 0.]   [2. 1. 0. 3.]   [0. 0. 1. 6.]
[2. 1. 0. 0.]   [0. 0. 1. 3.]   [1. 0. 1. 6.]
[0. 0. 1. 0.]   [1. 0. 1. 3.]   [2. 0. 1. 6.]
[1. 0. 1. 0.]   [2. 0. 1. 3.]   [0. 1. 1. 6.]
[2. 0. 1. 0.]   [0. 1. 1. 3.]   [1. 1. 1. 6.]
[0. 1. 1. 0.]   [1. 1. 1. 3.]   [2. 1. 1. 6.]
[1. 1. 1. 0.]   [2. 1. 1. 3.]
[2. 1. 1. 0.]   [0. 0. 0. 4.]
[0. 0. 0. 1.]   [1. 0. 0. 4.]
[1. 0. 0. 1.]   [2. 0. 0. 4.]
[2. 0. 0. 1.]   [0. 1. 0. 4.]
[0. 1. 0. 1.]   [1. 1. 0. 4.]
[1. 1. 0. 1.]   [2. 1. 0. 4.]
[2. 1. 0. 1.]   [0. 0. 1. 4.]
[0. 0. 1. 1.]   [1. 0. 1. 4.]
[1. 0. 1. 1.]   [2. 0. 1. 4.]
[2. 0. 1. 1.]   [0. 1. 1. 4.]
[0. 1. 1. 1.]   [1. 1. 1. 4.]
[1. 1. 1. 1.]   [2. 1. 1. 4.]
[2. 1. 1. 1.]   [0. 0. 0. 5.]
[0. 0. 0. 2.]   [1. 0. 0. 5.]
[1. 0. 0. 2.]   [2. 0. 0. 5.]
[2. 0. 0. 2.]   [0. 1. 0. 5.]
[0. 1. 0. 2.]   [1. 1. 0. 5.]
[1. 1. 0. 2.]   [2. 1. 0. 5.]
[2. 1. 0. 2.]   [0. 0. 1. 5.]
[0. 0. 1. 2.]   [1. 0. 1. 5.]
[1. 0. 1. 2.]   [2. 0. 1. 5.]
[2. 0. 1. 2.]   [0. 1. 1. 5.]
[0. 1. 1. 2.]   [1. 1. 1. 5.]
[1. 1. 1. 2.]   [2. 1. 1. 5.]
[2. 1. 1. 2.]   [0. 0. 0. 6.]
[0. 0. 0. 3.]   [1. 0. 0. 6.]

After Mapping to the Original Values I have:

['L1' 'C1' 'S1' 'O1']	['L1' 'C1' 'S2' 'O4']	**L** : Admin Login
['L2' 'C1' 'S1' 'O1']	['L2' 'C1' 'S2' 'O4']	**S** : Product
['L3' 'C1' 'S1' 'O1']	['L3' 'C1' 'S2' 'O4']	**C** : Category
['L1' 'C2' 'S1' 'O1']	['L1' 'C2' 'S2' 'O4']	**O** : Admin operation
['L2' 'C2' 'S1' 'O1']	['L2' 'C2' 'S2' 'O4']	
['L3' 'C2' 'S1' 'O1']	['L3' 'C2' 'S2' 'O4']	
['L1' 'C1' 'S2' 'O1']	['L1' 'C1' 'S1' 'O5']	
['L2' 'C1' 'S2' 'O1']	['L2' 'C1' 'S1' 'O5']	
['L3' 'C1' 'S2' 'O1']	['L3' 'C1' 'S1' 'O5']	
['L1' 'C2' 'S2' 'O1']	['L1' 'C2' 'S1' 'O5']	
['L2' 'C2' 'S2' 'O1']	['L2' 'C2' 'S1' 'O5']	
['L3' 'C2' 'S2' 'O1']	['L3' 'C2' 'S1' 'O5']	
['L1' 'C1' 'S1' 'O2']	['L1' 'C1' 'S2' 'O5']	
['L2' 'C1' 'S1' 'O2']	['L2' 'C1' 'S2' 'O5']	
['L3' 'C1' 'S1' 'O2']	['L3' 'C1' 'S2' 'O5']	
['L1' 'C2' 'S1' 'O2']	['L1' 'C2' 'S2' 'O5']	
['L2' 'C2' 'S1' 'O2']	['L2' 'C2' 'S2' 'O5']	
['L3' 'C2' 'S1' 'O2']	['L3' 'C2' 'S2' 'O5']	
['L1' 'C1' 'S2' 'O2']	['L1' 'C1' 'S1' 'O6']	
['L2' 'C1' 'S2' 'O2']	['L2' 'C1' 'S1' 'O6']	
['L3' 'C1' 'S2' 'O2']	['L3' 'C1' 'S1' 'O6']	
['L1' 'C2' 'S2' 'O2']	['L1' 'C2' 'S1' 'O6']	
['L2' 'C2' 'S2' 'O2']	['L2' 'C2' 'S1' 'O6']	
['L3' 'C2' 'S2' 'O2']	['L3' 'C2' 'S1' 'O6']	
['L1' 'C1' 'S1' 'O3']	['L1' 'C1' 'S2' 'O6']	
['L2' 'C1' 'S1' 'O3']	['L2' 'C1' 'S2' 'O6']	
['L3' 'C1' 'S1' 'O3']	['L3' 'C1' 'S2' 'O6']	
['L1' 'C2' 'S1' 'O3']	['L1' 'C2' 'S2' 'O6']	
['L2' 'C2' 'S1' 'O3']	['L2' 'C2' 'S2' 'O6']	
['L3' 'C2' 'S1' 'O3']	['L3' 'C2' 'S2' 'O6']	
['L1' 'C1' 'S2' 'O3']	['L1' 'C1' 'S1' 'O7']	
['L2' 'C1' 'S2' 'O3']	['L2' 'C1' 'S1' 'O7']	
['L3' 'C1' 'S2' 'O3']	['L3' 'C1' 'S1' 'O7']	
['L1' 'C2' 'S2' 'O3']	['L1' 'C2' 'S1' 'O7']	
['L2' 'C2' 'S2' 'O3']	['L2' 'C2' 'S1' 'O7']	
['L3' 'C2' 'S2' 'O3']	['L3' 'C2' 'S1' 'O7']	
['L1' 'C1' 'S1' 'O4']	['L1' 'C1' 'S2' 'O7']	
['L2' 'C1' 'S1' 'O4']	['L2' 'C1' 'S2' 'O7']	
['L3' 'C1' 'S1' 'O4']	['L3' 'C1' 'S2' 'O7']	
['L1' 'C2' 'S1' 'O4']	['L1' 'C2' 'S2' 'O7']	
['L2' 'C2' 'S1' 'O4']	['L2' 'C2' 'S2' 'O7']	
['L3' 'C2' 'S1' 'O4']	['L3' 'C2' 'S2' 'O7']	

Test Cases:

No. of test Cases: 83

TID	Purpose	Inputs				Expected Output	Actual Output
		Login	Category	Product	Operation		
01	To check if the system allows an admin to update category of the product	Correct admin username and password	category with a valid name	product with a valid name	Update Category	Category Updated	As Expected
02	To check if the system detects the wrong password of a saved admin	Correct admin username and incorrect password	category with a valid name	product with a valid name	Update Category	Login Required	Login successful, Update Category
03	To check if the system checks the incorrect admin name	Incorrect admin name	category with a valid name	product with a valid name	Update Category	Login Required	As Expected
04	To check if the system detects invalid category name	Correct admin username and password	category with an empty name	product with a valid name	Update Category	Invalid Input	As Expected

05	To check if the system detects an invalid admin	Correct admin username e and incorrect password	category with an empty name	product with a valid name	Update Category	Login Required	As Expected
06	To check if the system detects invalid admin	Incorrect admin name	category with an empty name	product with a valid name	Update Category	Login Required	As Expected
07	To check if the system detects the incorrect product informati on	Correct admin usernam e and password	category with a valid name	product with invalid invalid or empty name	Update Category	Invalid Input	Nothing happens
08	To check if the system detects the incorrect password	Correct admin usernam e and incorrect password	category with a valid name	product with invalid invalid or empty name	Update Category	Login Required	As Expected
09	To check allows an invalid admin to update a category with invalid product	Incorrect admin name	category with a valid name	product with invalid invalid or empty name	Update Category	Login Required	As Expected
10	To check if the system allows a valid admin to update	Correct admin usernam e and password	category with an empty name	product with invalid invalid or empty name	Update Category	Invalid Input	Does Nothing

	category with invalid input.						
11	To check if the system allows an invalid admin to update category with invalid product and category name	Correct admin username e and incorrect password	category with an empty name	product with invalid invalid or empty name	Update Category	Login Required	As Expected
12	To check if the system allows an invalid admin to update category with invalid product and category name	Incorrect admin name	category with an empty name	product with invalid invalid or empty name	Update Category	Login Required	As Expected
13	To check if the system allows a valid admin to add a new category with valid inputs.	Correct admin username e and password	category with a valid name	product with a valid name	Add Category	Category Added	As Expected
14	To check if the system	Correct admin usernam e	category with a	product with a	Add Category	Login Required	As Expected

	enters an admin with incorrect password and make changes to the system	e and incorrect password	valid name	valid name			
15	To check if the system enters an admin with incorrect name and make changes to the system	Incorrect admin name	category with a valid name	product with a valid name	Add Category	Login Required	As Expected
16	To check if the system allows logged in admin to add a category with invalid category name	Correct admin username e and password	category with an empty name	product with a valid name	Add Category	Invalid Input	As Expected
17	To check if the system enters an admin with incorrect password and make changes to the	Incorrect admin name	category with an empty name	product with a valid name	Add Category	Login Required	As Expected

	system						
18	To check if the system allows a logged in admin to enter category to an invalid product	Correct admin username and password	category with a valid name	product with invalid invalid or empty name	Add Category	Invalid Input	Does Nothing
19	To check if the system enters an admin with incorrect password and make changes to the system	Correct admin username and incorrect password	category with a valid name	product with invalid invalid or empty name	Add Category	Login Required	As Expected
20	To check if the system enters an admin with incorrect name and make changes to the system	Incorrect admin name	category with a valid name	product with invalid invalid or empty name	Add Category	Login Required	As Expected
21	To check if the system allows a logged in	Correct admin usernam	category with an empty name	product with invalid invalid or	Add Category	Invalid Input	Adds Category

	admin to add an invalid category to an invalid product	e and password		empty name			
22	To check if the system enters an admin with incorrect password and make changes to the system	Correct admin username e and incorrect password	category with an empty name	product with invalid invalid or empty name	Add Category	Login Required	As Expected
23	To check if the system enters an admin with incorrect name and make changes to the system	Incorrect admin name	category with an empty name	product with invalid invalid or empty name	Add Category	Login Required	As Expected
24	To check if the system allows a logged in admin to delete a category using correct name and product info	Correct admin username e and password	category with a valid name	product with a valid name	Delete Category	Category Deleted	As Expected

25	To check if the system enters an admin with incorrect password and make changes to the system	Correct admin username e and incorrect password	category with a valid name	product with a valid name	Delete Category	Login Required	As Expected
26	To check if the system enters an admin with incorrect name and make changes to the system	Incorrect admin name	category with a valid name	product with a valid name	Delete Category	Login Required	As Expected
27	To check if the system allows a logged in admin to delete a category by providing invalid input	Correct admin username e and password	category with an empty name	product with a valid name	Delete Category	Invalid Input	Does Nothing
28	To check if the system enters an admin with incorrect password and	Correct admin username e and incorrect password	category with an empty name	product with a valid name	Delete Category	Login Required	As Expected

	make changes to the system					
29	To check if the system enters an admin with incorrect name and make changes to the system	Incorrect admin name	category with an empty name	product with a valid name	Delete Category	Login Required	As Expected
30	To check if the system allows a logged in admin to delete category of an invalid product	Correct admin username e and password	category with a valid name	product with invalid invalid or empty name	Delete Category	Invalid Input	Does Nothing
31	To check if the system enters an admin with incorrect password and make changes to the system	Correct admin username e and incorrect password	category with a valid name	product with invalid invalid or empty name	Delete Category	Login Required	As Expected
32	To check if the system enters an admin	Incorrect admin name	category with a valid name	product with invalid invalid or	Delete Category	Login Required	As Expected

	with incorrect name and make changes to the system			empty name			
33	To check if the system allows a logged in admin to delete an invalid category of an invalid product	Correct admin username e and password	category with an empty name	product with invalid invalid or empty name	Delete Category	Invalid Input	Does Nothing
34	To check if the system enters an admin with incorrect password and make changes to the system	Correct admin username e and incorrect password	category with an empty name	product with invalid invalid or empty name	Delete Category	Login Required	As Expected
35	To check if the system enters an admin with incorrect name and make changes to the system	Incorrect admin name	category with an empty name	product with invalid invalid or empty name	Delete Category	Login Required	As Expected

36	To check if the system allows to add a product with valid information and valid product	Correct admin username and password	category with a valid name	product with a valid name	Add Product	Product Added	As Expected
37	To check if the system enters an admin with incorrect password and make changes to the system	Correct admin username and incorrect password	category with a valid name	product with a valid name	Add Product	Login Required	As Expected
38	To check if the system enters an admin with incorrect name and make changes to the system	Incorrect admin name	category with a valid name	product with a valid name	Add Product	Login Required	As Expected
39	To check if the system allows a logged in admin to enter a new product with valid	Correct admin username and password	category with an empty name	product with a valid name	Add Product	Invalid Input	Does Nothing

	information and invalid category						
40	To check if the system enters an admin with incorrect password and make changes to the system	Correct admin username and incorrect password	category with an empty name	product with a valid name	Add Product	Login Required	As Expected
41	To check if the system enters an admin with incorrect name and make changes to the system	Incorrect admin name	category with an empty name	product with a valid name	Add Product	Login Required	As Expected
42	To check if the system allows a logged in user to enter an invalid product with valid category	Correct admin username and password	category with a valid name	product with invalid invalid or empty name	Add Product	Invalid Input	Does Nothing
43	To check if the system enters an	Correct admin usernam	category with a	product with invalid	Add Product	Login Required	As Expected

	admin with incorrect password and make changes to the system	e and incorrect password	valid name	invalid or empty name			
44	To check if the system enters an admin with incorrect name and make changes to the system	Incorrect admin name	category with a valid name	product with invalid invalid or empty name	Add Product	Login Required	As Expected
45	To check if the system allows a logged in admin to add a new invalid product with invalid category	Correct admin username e and password	category with an empty name	product with invalid invalid or empty name	Add Product	Invalid Input	Does Nothing
46	To check if the system enters an admin with incorrect password and make changes to the	Correct admin username e and incorrect password	category with an empty name	product with invalid invalid or empty name	Add Product	Login Required	As Expected

	system						
47	To check if the system enters an admin with incorrect name and make changes to the system	Incorrect admin name	category with an empty name	product with invalid invalid or empty name	Add Product	Login Required	As Expected
48	To check if the system allows a logged in admin to delete a saved product by giving valid category	Correct admin username e and password	category with a valid name	product with a valid name	Delete Product	Product Deleted	As Expected
49	To check if the system enters an admin with incorrect password and make changes to the system	Correct admin username e and incorrect password	category with a valid name	product with a valid name	Delete Product	Login Required	As Expected
50	To check if the system enters an admin with incorrect	Incorrect admin name	category with a valid name	product with a valid name	Delete Product	Login Required	As Expected

	name and make changes to the system						
51	To check if the system allows a logged in admin to delete a product by giving invalid product info and category	Correct admin username and password	category with an empty name	product with a valid name	Delete Product	Invalid Input	Does Nothing
52	To check if the system enters an admin with incorrect password and make changes to the system	Correct admin username and incorrect password	category with an empty name	product with a valid name	Delete Product	Login Required	As Expected
53	To check if the system enters an admin with incorrect name and make changes to the system	Incorrect admin name	category with an empty name	product with a valid name	Delete Product	Login Required	As Expected

54	To check if the system allows a logged in user to delete a product from a valid category by giving invalid product info	Correct admin username e and password	category with a valid name	product with invalid invalid or empty name	Delete Product	Invalid Input	Does Nothing
55	To check if the system enters an admin with incorrect password and make changes to the system	Correct admin username e and incorrect password	category with a valid name	product with invalid invalid or empty name	Delete Product	Login Required	As Expected
56	To check if the system enters an admin with incorrect name and make changes to the system	Incorrect admin name	category with a valid name	product with invalid invalid or empty name	Delete Product	Login Required	As Expected
57	To check if the system allows a logged in admin to	Correct admin username e and password	category with an empty name	product with invalid invalid or	Delete Product	Invalid Input	Does Nothing

	delete a product by giving invalid product info and category			empty name			
58	To check if the system enters an admin with incorrect password and make changes to the system	Correct admin username e and incorrect password	category with an empty name	product with invalid invalid or empty name	Delete Product	Login Required	As Expected
59	To check if the system enters an admin with incorrect name and make changes to the system	Incorrect admin name	category with an empty name	product with invalid invalid or empty name	Delete Product	Login Required	As Expected
60	To check if the system allows a logged in admin to update a product by giving valid product	Correct admin username e and password	category with a valid name	product with a valid name	Update Product	Product Updated	As Expected

	details and category					
61	To check if the system enters an admin with incorrect password and make changes to the system	Correct admin username and incorrect password	category with a valid name	product with a valid name	Update Product	Login Required	As Expected
62	To check if the system enters an admin with incorrect name and make changes to the system	Incorrect admin name	category with a valid name	product with a valid name	Update Product	Login Required	As Expected
63	To check if the system allows a logged in admin to update a product by giving a correct product and invalid category	Correct admin username and password	category with an empty name	product with a valid name	Update Product	Invalid Input	Updates Product
64	To check if the system	Correct admin usernam	category with an	product with a	Update Product	Login Required	As Expected

	enters an admin with incorrect password and make changes to the system	e and incorrect password	empty name	valid name			
65	To check if the system enters an admin with incorrect name and make changes to the system	Incorrect admin name	category with an empty name	product with a valid name	Update Product	Login Required	As Expected
66	To check if the system allows a logged in user to update a product with invalid details and valid category	Correct admin username e and password	category with a valid name	product with invalid invalid or empty name	Update Product	No such Product Found	Does Nothing
67	To check if the system enters an admin with incorrect password and make changes	Correct admin username e and incorrect password	category with a valid name	product with invalid invalid or empty name	Update Product	Login Required	As Expected

	to the system					
68	To check if the system enters an admin with incorrect name and make changes to the system	Incorrect admin name	category with a valid name	product with invalid invalid or empty name	Update Product	Login Required	As Expected
69	To check if the system allows a logged in admin to update product details by giving invalid product and invalid category	Correct admin username e and password	category with an empty name	product with invalid invalid or empty name	Update Product	No such category and product found	As Expected
70	To check if the system enters an admin with incorrect password and make changes to the system	Correct admin username e and incorrect password	category with an empty name	product with invalid invalid or empty name	Update Product	Login Required	As Expected
71	To check if the system	Incorrect admin name	category with an	product with invalid	Update Product	Login Required	As Expected

	enters an admin with incorrect name and make changes to the system		empty name	invalid or empty name			
72	To check if the system allows logged in admin to view all customers	Correct admin username and password	category with a valid name	product with a valid name	View Customers	Shows Customers	As Expected
73	To check if the system enters an admin with incorrect password and access information	Correct admin username and incorrect password	category with a valid name	product with a valid name	View Customers	Login Required	As Expected
74	To check if the system enters an admin with incorrect name and access information	Incorrect admin name	category with a valid name	product with a valid name	View Customers	Login Required	As Expected
75	To check if the system	Correct admin usernam	category with an	product with a	View Customers	Shows Customers	As Expected

	allows logged in admin to view all customers	e and password	empty name	valid name			
76	To check if the system enters an admin with incorrect password and access information	Correct admin username e and incorrect password	category with an empty name	product with a valid name	View Customers	Login Required	As Expected
77	To check if the system enters an admin with incorrect name and access information	Incorrect admin name	category with an empty name	product with a valid name	View Customers	Login Required	As Expected
78	To check if the system allows logged in admin to view all customers	Correct admin username e and password name	category with a valid name	product with invalid invalid or empty	View Customers	Shows Customers	As Expected
79	To check if the system enters an admin with incorrect	Correct admin username e and incorrect password	category with a valid name	product with invalid invalid or empty name	View Customers	Login Required	As Expected

	password and access information						

80	To check if the system enters an admin with incorrect name and access information	Incorrect admin name	category with a valid name	product with invalid invalid or empty name	View Customers	Login Required	As Expected
81	To check if the system allows logged in admin to view all customers	Correct admin username and password	category with an empty name	product with invalid invalid or empty name	View Customers	Shows Customers	As Expected
82	To check if the system enters an admin with incorrect password and access information	Correct admin username and incorrect password	category with an empty name	product with invalid invalid or empty name	View Customers	Login Required	As Expected
83	To check if the system enters an admin	Incorrect admin name	category with an empty name	product with invalid invalid or	View Customers	Login Required	As Expected

	with incorrect name and access information			empty name			

User Controller

L : User Login
R : User Registration
O : User Operations

L1 : Correct username and password
L2 : Correct username and incorrect password
L3 : Incorrect username

R1 : Correct username and password
R2 : Correct username and incorrect password
R3 : Incorrect username and correct password
R4 : Incorrect username and incorrect password

O1 : View products
O2 : Add to cart
O3 : Manage cart
O4 : Buy products

Orthogonal Arrays

[0. 0. 0.]	['L1' 'R1' 'O1']	L : User Login
[1. 0. 0.]	['L2' 'R1' 'O1']	R : User Registration
[2. 0. 0.]	['L3' 'R1' 'O1']	O : User Operations
[0. 1. 0.]	['L1' 'R2' 'O1']	
[1. 1. 0.]	['L2' 'R2' 'O1']	
[2. 1. 0.]	['L3' 'R2' 'O1']	
[0. 2. 0.]	['L1' 'R3' 'O1']	

[1. 2. 0.]	['L2' 'R3' 'O1']
[2. 2. 0.]	['L3' 'R3' 'O1']
[0. 3. 0.]	['L1' 'R4' 'O1']
[1. 3. 0.]	['L2' 'R4' 'O1']
[2. 3. 0.]	['L3' 'R4' 'O1']
[0. 0. 1.]	['L1' 'R1' 'O2']
[1. 0. 1.]	['L2' 'R1' 'O2']
[2. 0. 1.]	['L3' 'R1' 'O2']
[0. 1. 1.]	['L1' 'R2' 'O2']
[1. 1. 1.]	['L2' 'R2' 'O2']
[2. 1. 1.]	['L3' 'R2' 'O2']
[0. 2. 1.]	['L1' 'R3' 'O2']
[1. 2. 1.]	['L2' 'R3' 'O2']
[2. 2. 1.]	['L3' 'R3' 'O2']
[0. 3. 1.]	['L1' 'R4' 'O2']
[1. 3. 1.]	['L2' 'R4' 'O2']
[2. 3. 1.]	['L3' 'R4' 'O2']
[0. 0. 2.]	['L1' 'R1' 'O3']
[1. 0. 2.]	['L2' 'R1' 'O3']
[2. 0. 2.]	['L3' 'R1' 'O3']
[0. 1. 2.]	['L1' 'R2' 'O3']
[1. 1. 2.]	['L2' 'R2' 'O3']
[2. 1. 2.]	['L3' 'R2' 'O3']
[0. 2. 2.]	['L1' 'R3' 'O3']
[1. 2. 2.]	['L2' 'R3' 'O3']
[2. 2. 2.]	['L3' 'R3' 'O3']
[0. 3. 2.]	['L1' 'R4' 'O3']
[1. 3. 2.]	['L2' 'R4' 'O3']
[2. 3. 2.]	['L3' 'R4' 'O3']
[0. 0. 3.]	['L1' 'R1' 'O4']
[1. 0. 3.]	['L2' 'R1' 'O4']
[2. 0. 3.]	['L3' 'R1' 'O4']
[0. 1. 3.]	['L1' 'R2' 'O4']
[1. 1. 3.]	['L2' 'R2' 'O4']

Test Cases:

TID	Purpose	Input			Expected Output	Actual Output
		User Login	User Registration	Operation		
01	To check if the system allows a logged in user to view products	Correct username and password	-	View products	Shows Products	As Expected
02	To check is the system allows an invalid user to view all products	Correct username and incorrect password	-	View products	Error	As Expected
03	To check is the system allows an invalid user to view all products	Incorrect username	-	View products	Error	As Expected
04	To check if the system registers the user successfully and allows him to view all products	-	Correct username and correct password	View products	User registered, shows products	As Expected
05	To check is the system checks for an invalid registration and does it allow invalid	-	Incorrect username and incorrect password	View products	Error	Registers User

	access to operations				
06	To check is the system checks for an invalid registration and does it allow invalid access to operations	-	Correct username and incorrect password	View products	Error	Registers and shows products
07	To check is the system checks for an invalid registration and does it allow invalid access to operations	-	Incorrect username and correct password	View products	Error	Registers and shows products
08	To check is the system allows an invalid user to make changes in system	Correct username and incorrect password	-	Add to cart	Error	As Expected
09	To check is the system allows an invalid user to make changes in system	Incorrect username	-	Add to cart	Error	As Expected
10	To check if the system allows a logged in user to add products to cart	Correct username and password	-	Add to cart	Product added	As Expected

11	To check is the system checks for an invalid registration and does it allow invalid access to operations	-	Correct username and incorrect password	Add to cart	Error	Registers the user
12	To check is the system checks for an invalid registration and does it allow invalid access to operations	-	Incorrect username and incorrect password	Add to cart	Error	Registers the user
13	To check is the system checks for an invalid registration and does it allow invalid access to operations	-	Incorrect username and correct password	Add to cart	Error	Registers the user
14	To check if the system registers the user successfully and allows him to add products to cart	-	Correct username and correct password	Add to cart	Product added	Does not add Product
15	To check if the system allows a logged in user to manage	Correct username and password	-	Manage cart	Successful	Does not allow managing cart

	cart					
16	To check is the system allows an invalid user to make changes in system	Incorrect username	-	Manage cart	Error	As Expected
17	To check is the system allows an invalid user to make changes in system	Correct username and incorrect password	-	Manage cart	Error	As Expected
18	To check if the system registers the user successfully and allows him to manage cart	-	Correct username and password	Manage cart	Successful	Does not manage
19	To check is the system checks for an invalid registration and does it allow invalid access to operations	-	Correct username and incorrect password	Manage cart	Error	Registers
20	To check is the system checks for an invalid registration and does it allow invalid access to	-	Incorrect username and incorrect password	Manage cart	Error	Registers the user

	operations					
21	To check is the system checks for an invalid registration and does it allow invalid access to operations	-	Incorrect username and correct password	Manage cart	Error	Registers the user
22	To check is the system allows an invalid user to make changes in system	Correct username and incorrect password	-	Buy products	Error	As Expected
23	To check is the system allows an invalid user to make changes in system	Incorrect username	-	Buy products	Error	As Expected
24	To check if the system allows a logged in user to buy products	Correct username and password	-	Buy products	Successful	Doesnt Work
25	To check if the system registers the user successfully and allows him to buy products	-	Correct username and password	Buy products	Successful	Doesnt work

26	To check is the system checks for an invalid registration and does it allow invalid access to operations	-	Correct username and incorrect password	Buy products	Error	Allows him to access cart
27	To check is the system checks for an invalid registration and does it allow invalid access to operations	-	Incorrect username and incorrect password	Buy products	Error	Registers the user and provides the access of cart and products
28	To check is the system checks for an invalid registration and does it allow invalid access to operations	-	Incorrect username and correct password	Buy products	Error	Registers the user and provides the access of cart and products

Cart DAO + Cart Service + Cart

O1 : Add Cart
O2 : Get Cart

O3 : Update Cart

O4 : Delete Cart

L1 : Is Logged in

L2: is not logged in

D1 : valid data

D2 : invalid data

Orthogonal Array:

[1,1,1]   1 : O
[1,1,2]   2 : D
[1,2,1]   3 : L
[1,2,2]

Total Test Cases: 4x4 = 16

TID	Purpose	Input			Expected Output	Actual Output
		Operation	Data	Session		
01	To check if the system allows a logged in user to add cart with invalid cart data	Add cart	Invalid cart data	Logged In	Error	No Action
02	To check if the system allows a logged in user to add cart with valid cart data	Add cart	Valid cart data	Logged In	Cart Added	No action
03	To check if the system allows a not logged in user to change cart	Add cart	Invalid Cart Data	Not logged in	Login required	As Expected
04	To check if the system	Add cart	Valid cart data	Not Logged in	Login required	As Expected

	allows a not logged in user to change cart					
05	To check if the system allows a logged in user to get saved carts	Get cart	Carts saved	Logged In	Show Cart(s)	No action
06	To check if the system allows a logged in user to get saved carts if there are no saved	Get cart	No saved carts	Logged In	No carts to show	No action
07	To check if the system allows a not logged in user to change cart	Get cart	Carts saved	Not logged in	Login required	As Expected
08	To check if the system allows a not logged in user to change cart	Get cart	No saved Carts	Not Logged in	Login required	As Expected
09	To check if the system allows a logged in user to update saved carts with valid data	Update cart	Valid data	Logged In	Cart Updated	No action
10	To check if the system	Update cart	Invalid data	Logged In	Error	No action

	allows a logged in user to update saved carts with invalid data					
11	To check if the system allows a not logged in user to change cart	Update cart	Valid data	Not logged in	Login required	As Expected
12	To check if the system allows a not logged in user to change cart	Update cart	Invalid data	Not Logged in	Login required	As Expected
13	To check if the system allows a logged in user to delete saved carts	Delete cart	Valid cart	Logged in	Cart Deleted	No action
14	To check if the system allows a logged in user to delete saved carts	Delete Cart	Invalid cart	Logged in	Error	No action
15	To check if the system allows a not logged in user to change cart	Delete cart	Valid cart	Not Logged in	Login Required	As Expected
16	To check if the system	Delete Cart	Invalid cart	Not Logged in	Login Required	As Expected

allows a not logged in user to change cart					

Category DAO + Category Service + Category

O1 : Update Category
O2 : Add Category
O3 : Delete Category
O4 : Get Category

L1 : Logged In
L2 : Not logged in

D1 : Valid Category
D2 : Invalid Category

[1,1,1] [3,1,2] O : Operations
[1,1,1] [3,2,1] L : Session
[1,1,2] [3,2,2] D : Data
[1,2,1] [4,1,1]
[1,2,2] [4,1,2]
[2,1,1] [4,2,1]
[2,1,2] [4,2,2]
[2,2,1]
[2,2,2]
[3,1,1]

Total Test Cases = 16

TID	Purpose	Inputs			Expected Output	Actual Output
		Operation	Session	Data		
01	To check if the system allows a valid user to add a Category with valid	Add Category	Logged In	Valid Category	Category added	As Expected

	details					
02	To check if the system allows a valid user to add Category with invalid details	Add Category	Logged In	Invalid Category	Error	Category Added
03	To check if the system allows anyone to access functionality without logging in	Add Category	Not Logged In	Valid Category	Login Required	As Expected
04	To check if the system allows anyone to access functionality without logging in	Add Category	Not Logged In	Invalid Category	Login Required	As Expected
05	To check if the system allows a valid user to retrieve Category	Get Category	Logged In	Valid Category	Retrieve Category	As Expected
06	To check if the system allows a valid user to retrieve Category with if they don't exist	Get Category	Logged In	Invalid Category	Error	Does Nothing
07	To check if the system allows anyone to access	Get Category	Not Logged In	Valid Category	Login Required	As Expected

	functionality without logging in					
08	To check if the system allows anyone to access functionality without logging in	Get Category	Not Logged In	Invalid Category	Login Required	As Expected
09	To check if the system allows a valid user to delete a cart with valid details	Delete Category	Logged In	Valid Category	Category deleted	As Expected
10	To check if the system allows a valid user to delete cart with invalid details	Delete Product	Logged In	Invalid Category	Error	Does Nothing
11	To check if the system allows anyone to access functionality without logging in	Delete Category	Not Logged In	Valid Category	Login Required	As Expected
12	To check if the system allows anyone to access functionality without logging in	Delete Category	Not Logged In	Invalid Category	Login Required	As Expected
13	To check if	Update	Logged In	Valid	Category	As

	the system allows a valid user to update a Category with valid details	Category		Category	Updated	Expected
14	To check if the system allows a valid user to update Category that does not exist	Update Category	Logged In	Invalid Category	Error	Category Updated
15	To check if the system allows anyone to access functionality without logging in	Update Category	Not Logged In	Valid Category	Login Required	As Expected
16	To check if the system allows anyone to access functionality without logging in	Update Category	Not Logged In	Invalid Category	Login Required	As Expected

Product DAO + Product Service + Product

O1 : Add Product
O2 : Get Product
O3 : Delete Product
O4 : Update Product

L1 : Logged in
L2 : Not Logged in

A1 : Is Admin

A2 : Is not Admin

D1 : valid id
D2 : invalid id

Orthogonal Arrays:

[1,1,1,1]	[3,1,2,1]	O : Operations
[1,1,1,2]	[3,1,2,2]	L : Session
[1,1,2,1]	[3,2,1,1]	A : Admin
[1,1,2,2]	[3,2,1,2]	D : Data
[1,2,1,1]	[3,2,2,1]	
[1,2,1,2]	[4,1,1,2]	
[1,2,2,1]	[4,1,2,1]	
[1,2,2,2]	[4,1,2,2]	
[2,1,1,2]	[4,2,1,1]	
[2,1,2,1]	[4,2,1,2]	
[2,1,2,2]	[4,2,2,1]	
[2,2,1,1]		
[2,2,1,2]		
[2,2,2,1]		
[3,1,1,2]		

Total Test Cases: 32

TID	Purpose	Inputs				Expected Output	Actual Output
		Operation	Session	Admin	Data		
01	To check if the system allows a valid user to add a product with valid details	Add Product	Logged In	Is admin	Valid data	Product added	As Expected
02	To check if the system allows a	Add Product	Logged In	Is admin	Invalid data	Error	Adds Product

	valid user to add product with invalid details					
03	To check if the system is secure in case an invalid user tries to access functionalities	Add Product	Logged In	Is not admin	Valid data	Error	As Expected
04	To check if the system is secure in case an invalid user tries to access functionalities	Add Product	Logged In	Is not admin	Invalid data	Error	As Expected
05	To check if the system allows anyone to access functionality without logging in	Add Product	Not Logged In	Is admin	Valid data	Login Required	As Expected
06	To check if the system allows anyone to access functionality without logging in	Add Product	Not Logged In	Is admin	Invalid data	Login Required	As Expected

07	To check if the system allows anyone to access functionality without logging in	Add Product	Not Logged In	Is not admin	Valid data	Login Required	As Expected
08	To check if the system allows anyone to access functionality without logging in	Add Product	Not Logged In	Is not admin	Invalid data	Login Required	As Expected
09	To check if the system allows a valid user to retrieve products	Get Product	Logged In	Is admin	Valid data	Retrieve Products	As Expected
10	To check if the system allows a valid user to retrieve products with if they don't exist	Get Product	Logged In	Is admin	Invalid data	Error	As Expected
11	To check if the system is secure in case an invalid	Get Product	Logged In	Is not admin	Valid data	Error	As Expected

	user tries to access functionalities					
12	To check if the system is secure in case an invalid user tries to access functionalities	Get Product	Logged In	Is not admin	Invalid data	Error	As Expected
13	To check if the system allows anyone to access functionality without logging in	Get Product	Not Logged In	Is admin	Valid data	Login Required	As Expected
14	To check if the system allows anyone to access functionality without logging in	Get Product	Not Logged In	Is admin	Invalid data	Login Required	As Expected
15	To check if the system allows anyone to access functionality without logging in	Get Product	Not Logged In	Is not admin	Valid data	Login Required	As Expected
16	To check	Get	Not	Is not	Invalid	Login	As

	if the system allows anyone to access functionality without logging in	Product	Logged In	admin	data	Required	Expected
17	To check if the system allows a valid user to delete a product with valid details	Delete Product	Logged In	Is admin	Valid data	Product deleted	As Expected
18	To check if the system allows a valid user to delete product with invalid details	Delete Product	Logged In	Is admin	Invalid data	Error	No Action
19	To check if the system is secure in case an invalid user tries to access functionalities	Delete Product	Logged In	Is not admin	Valid data	Error	As Expected
20	To check if the system is secure in case an invalid user tries to access	Delete Product	Logged In	Is not admin	Invalid data	Error	As Expected

	functional ities						
21	To check if the system allows anyone to access functional ity without logging in	Delete Product	Not Logged In	Is admin	Valid data	Login Required	As Expected
22	To check if the system allows anyone to access functional ity without logging in	Delete Product	Not Logged In	Is admin	Invalid data	Login Required	As Expected
23	To check if the system allows anyone to access functional ity without logging in	Delete Product	Not Logged In	Is not admin	Valid data	Login Required	As Expected
24	To check if the system allows anyone to access functional ity without logging in	Delete Product	Not Logged In	Is not admin	Invalid data	Login Required	As Expected
25	To check if the system	Update Product	Logged In	Is admin	Valid data	Product Updated	As Expected

	allows a valid user to update a product with valid details					
26	To check if the system allows a valid user to update product that does not exist	Update Product	Logged In	Is admin	Invalid data	Error	Updates Product
27	To check if the system is secure in case an invalid user tries to access functional ities	Update Product	Logged In	Is not admin	Valid data	Error	As Expected
28	To check if the system is secure in case an invalid user tries to access functional ities	Update Product	Logged In	Is not admin	Invalid data	Error	As Expected
29	To check if the system allows anyone to access functional ity without logging in	Update Product	Not Logged In	Is admin	Valid data	Login Required	As Expected

30	To check if the system allows anyone to access functionality without logging in	Update Product	Not Logged In	Is admin	Invalid data	Login Required	As Expected
31	To check if the system allows anyone to access functionality without logging in	Update Product	Not Logged In	Is not admin	Valid data	Login Required	As Expected
32	To check if the system allows anyone to access functionality without logging in	Update Product	Not Logged In	Is not admin	Invalid data	Login Required	As Expected

User DAO + User Service + User

O3 : get Users
O4 : add Users

L1 : Logged In
L2 : Not logged in

D1 : Valid User
D2 : Invalid User

[1,1,1]   O : Operations
[1,1,2]   L : Session
[1,2,1]   D : Data
[1,2,2]
[2,1,1]
[2,1,2]
[2,2,1]
[2,2,2]

TID	Purpose	Inputs			Expected Output	Actual Output
		Operation	Session	Data		
01	To check if the system allows user to get all users with valid info	Get Users	Logged In	Valid Users	Users Retrieved	As Expected
02	To check if the system allows user to get all users with invalid info	Get Users	Logged In	InValid Users	Error	As Expected
03	To check if the system allows a not logged in user to get all users	Get Users	Not Logged In	Valid Users	Error	As Expected
04	To check if the system allows a not logged in user to get all users	Get Users	Not Logged In	inValid Users	Error	As Expected
05	To check if	Add User	Logged In	Valid User	User	As

					Added	Expected
	the system allows user to add users with valid info				Added	Expected
06	To check if the system allows user to add users with invalid info	Add User	Logged In	inValid User	Error	As Expected
07	To check if the system allows a not logged in user to add users	Add User	Not Logged In	Valid User	Error	As Expected
08	To check if the system allows a not logged in user to add users	Add User	Not Logged In	Invalid User	Error	As Expected