

TEST CASES AND RESULTS

Below is a comprehensive list of test cases designed to verify the correctness and reliability of the Pizza Ordering System. Each test case includes the objective, preconditions, input steps, expected results, and actual results.

Test Case 1 — Load All Dataset Files Successfully

Test Case ID: TC001

Objective: Verify that all CSV files load correctly when the program starts.

Precondition: Dataset folder contains all five required CSV files.

Step Action

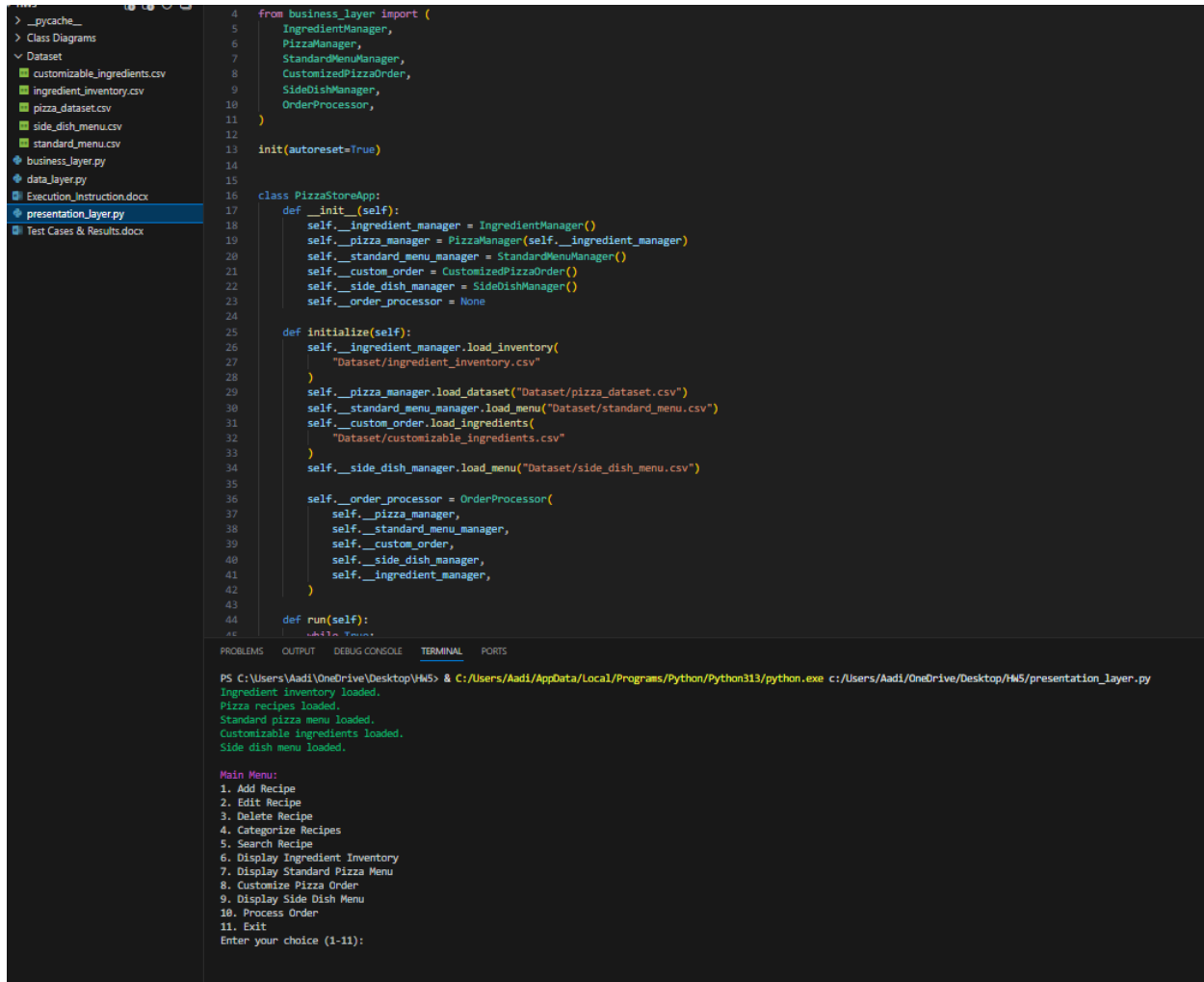
- 1 Run presentation_layer.py
- 2 Observe console messages

Expected Result:

Program prints:

- Ingredient inventory loaded.
 - Pizza recipes loaded.
 - Standard pizza menu loaded.
 - Customizable ingredients loaded.
 - Side dish menu loaded.
- Main Menu appears without errors.

Actual Result:



The screenshot displays a code editor with a file explorer on the left and a terminal at the bottom. The file explorer shows a project structure with files like `customizable_ingredients.csv`, `ingredient_inventory.csv`, `pizza_dataset.csv`, `side_dish_menu.csv`, `standard_menu.csv`, `business_layer.py`, `data_layer.py`, `presentation_layer.py`, and `Test Cases & Results.docx`. The `presentation_layer.py` file is selected and open in the editor.

```
4 from business_layer import (
5     IngredientManager,
6     PizzaManager,
7     StandardMenuManager,
8     CustomizedPizzaOrder,
9     SideDishManager,
10    OrderProcessor,
11 )
12
13 init(autoreset=True)
14
15
16 class PizzaStoreApp:
17     def __init__(self):
18         self.__ingredient_manager = IngredientManager()
19         self.__pizza_manager = PizzaManager(self.__ingredient_manager)
20         self.__standard_menu_manager = StandardMenuManager()
21         self.__custom_order = CustomizedPizzaOrder()
22         self.__side_dish_manager = SideDishManager()
23         self.__order_processor = None
24
25     def initialize(self):
26         self.__ingredient_manager.load_inventory(
27             "Dataset/ingredient_inventory.csv"
28         )
29         self.__pizza_manager.load_dataset("Dataset/pizza_dataset.csv")
30         self.__standard_menu_manager.load_menu("Dataset/standard_menu.csv")
31         self.__custom_order.load_ingredients(
32             "Dataset/customizable_ingredients.csv"
33         )
34         self.__side_dish_manager.load_menu("Dataset/side_dish_menu.csv")
35
36         self.__order_processor = OrderProcessor(
37             self.__pizza_manager,
38             self.__standard_menu_manager,
39             self.__custom_order,
40             self.__side_dish_manager,
41             self.__ingredient_manager,
42         )
43
44     def run(self):
45         # Action: Run the application
```

The terminal output shows the execution of the application:

```
PS C:\Users\Aadi\OneDrive\Desktop\HW5> & C:/Users/Aadi/AppData/Local/Programs/Python/Python311/python.exe c:/Users/Aadi/OneDrive/Desktop/HW5/presentation_layer.py
Ingredient inventory loaded.
Pizza recipes loaded.
Standard pizza menu loaded.
Customizable ingredients loaded.
Side dish menu loaded.

Main Menu:
1. Add Recipe
2. Edit Recipe
3. Delete Recipe
4. Categorize Recipes
5. Search Recipe
6. Display Ingredient Inventory
7. Display Standard Pizza Menu
8. Customize Pizza Order
9. Display Side Dish Menu
10. Process Order
11. Exit
Enter your choice (1-11):
```

Test Case 2 — Add a New Recipe

Test Case ID: TC002

Objective: Verify that a new recipe can be added.

Precondition: “Veggie Delight” recipe does not exist.

Step Action

- 1 Select menu option **1 (Add Recipe)**
- 2 Enter: Name = “Veggie Delight”
- 3 Enter Category = Vegetarian
- 4 Enter Ingredients = Tomato Sauce, Cheese, Bell Peppers
- 5 Enter Price = 15

Expected Result:

System prints:

“Recipe ‘Veggie Delight’ added successfully.”

Inventory reduces by 1 unit for each ingredient used.

Actual Result:

```
Main Menu:
1. Add Recipe
2. Edit Recipe
3. Delete Recipe
4. Categorize Recipes
5. Search Recipe
6. Display Ingredient Inventory
7. Display Standard Pizza Menu
8. Customize Pizza Order
9. Display Side Dish Menu
10. Process Order
11. Exit
Enter your choice (1-11): 1
Enter new recipe name: Veggie Delight
Enter category: Vegetarian
Enter ingredients (comma-separated): Tomato Sauce, Cheese, Bell Peppers
Enter price: 15
Recipe added: Veggie Delight
```

Test Case 3 — Edit an Existing Recipe (Modify: Smoky Supreme)

Test Case ID: TC003

Objective: Test recipe modification with accurate stock adjustments.

Precondition: “Smoky Supreme” exists.

Steps

1. Choose **2 – Edit Recipe**
2. Name: Smoky Supreme
3. New Category: Specialty (optional)
4. New Ingredients:
Thick Crust, Tomato Sauce, Smoked Chicken, Mushrooms, Black Olives, Mozzarella
5. New Price: 18

Expected Result

- Old ingredients returned to inventory:
Thick Crust, Tomato Sauce, Smoked Chicken, Mushrooms, Green Peppers, Mozzarella
- New ingredients deducted again
- Message: “Recipe ‘Smoky Supreme’ updated successfully.”

Actual Result

```
Main Menu:
1. Add Recipe
2. Edit Recipe
3. Delete Recipe
4. Categorize Recipes
5. Search Recipe
6. Display Ingredient Inventory
7. Display Standard Pizza Menu
8. Customize Pizza Order
9. Display Side Dish Menu
10. Process Order
11. Exit
Enter your choice (1-11): 2
Enter recipe name to edit: Smoky Supreme
Enter new category (leave blank to keep): Speciality
Enter new ingredients (comma-separated, blank to keep): Thick Crust, Tomato Sauce, Smoked Chicken, Mushrooms, Black Olives, Mozzarella
Enter new price (blank to keep): 18
Recipe updated: Smoky Supreme
```

Test Case 4 — Delete a Recipe (Smoky Supreme)

Test Case ID: TC004

Objective: Ensure successful deletion and inventory rollback.

Precondition: Recipe exists.

Steps

1. Choose **3 – Delete Recipe**
2. Name: Smoky Supreme

Expected Result

- Recipe removed from memory
- Ingredients returned to stock
- Message: “Recipe deleted successfully.”

Actual Result

```
Main Menu:
1. Add Recipe
2. Edit Recipe
3. Delete Recipe
4. Categorize Recipes
5. Search Recipe
6. Display Ingredient Inventory
7. Display Standard Pizza Menu
8. Customize Pizza Order
9. Display Side Dish Menu
10. Process Order
11. Exit
Enter your choice (1-11): 3
Enter recipe name to delete: Smoky Supreme
Recipe deleted: Smoky Supreme
```

Test Case 5 — Categorize All Recipes

Test Case ID: TC005

Objective: Validate category display matches your dataset.

Steps

1. Choose **4 – Categorize Recipes**

Expected Result

Should display categories from your pizza dataset:

- Vegetarian
- Meat Lovers
- Specialty

Actual Result

```
Main Menu:
1. Add Recipe
2. Edit Recipe
3. Delete Recipe
4. Categorize Recipes
5. Search Recipe
6. Display Ingredient Inventory
7. Display Standard Pizza Menu
8. Customize Pizza Order
9. Display Side Dish Menu
10. Process Order
11. Exit
Enter your choice (1-11): 4

RECIPE CATEGORIES
- Vegetarian
- Meat Lovers
- Specialty
- Speciality
```

Test Case 6 — Search Recipe (Search keyword: “Pesto”)

Test Case ID: TC006

Objective: Verify recipe search based on substring.

Steps

1. Choose **5 – Search Recipe**
2. Enter keyword: Pesto

Expected Result

Should display:

- Pesto Garden

Actual Result

```
Main Menu:
1. Add Recipe
2. Edit Recipe
3. Delete Recipe
4. Categorize Recipes
5. Search Recipe
6. Display Ingredient Inventory
7. Display Standard Pizza Menu
8. Customize Pizza Order
9. Display Side Dish Menu
10. Process Order
11. Exit
Enter your choice (1-11): 5
Enter search keyword: Pesto

Found 1 recipe(s):
- Pesto Garden | Category: Vegetarian | Price: $15.0
  Ingredients: Thin Crust, Pesto Sauce, Mozzarella, Spinach, Cherry Tomatoes
```

Test Case 7 — Display Ingredient Inventory

Test Case ID: TC007

Objective: Ensure stock display and low-stock detection.

Steps

1. Choose **6 – Display Ingredient Inventory**

Expected Result

List all ingredients exactly as in your CSV with stock values:

For example:

- Thin Crust — 20
- Alfredo Sauce — 25
- Black Olives — 24
- Artichoke Hearts — 15
- Cheese Burst Crust — 10 (→ Should show **Low Stock Warning**)

Any item at ≤ 10 triggers a warning.

Actual Result

```
INGREDIENT INVENTORY
Thin Crust: 21 units
Thick Crust: 16 units
Cheese Burst Crust: 10 units (LOW)
Tomato Sauce: 40 units
Pesto Sauce: 31 units
Alfredo Sauce: 25 units
Mozzarella: 51 units
Cheddar: 35 units
Feta: 26 units
Cheese: 19 units
Pepperoni: 40 units
Grilled Chicken: 20 units
Smoked Chicken: 18 units
Mushrooms: 31 units
Spinach: 25 units
Cherry Tomatoes: 28 units
Jalapenos: 22 units
Bell Peppers: 25 units
Caramelized Onions: 20 units
Black Olives: 25 units
Artichoke Hearts: 16 units
Extra Cheese: 40 units
```


Test Case 8 — Display Standard Pizza Menu

Test Case ID: TC008

Objective: Validate menu display from standard_menu.csv.

Steps

1. Choose **7 – Display Standard Pizza Menu**

Expected Result

Should show the 5 menu pizzas:

- Pesto Garden
- Spicy Pepperoni Blaze
- Alfredo Chicken Melt
- Mediterranean Olive Twist
- Smoky Supreme

With descriptions and prices exactly from CSV.

Actual Result

```
STANDARD PIZZA MENU
Name: Pesto Garden
Description: Pesto base with mozzarella,spinach,and cherry tomatoes
Price: $15.0

Name: Spicy Pepperoni Blaze
Description: Tomato sauce,mozzarella,jalapenos,and pepperoni
Price: $16.0

Name: Alfredo Chicken Melt
Description: Alfredo base with grilled chicken,cheddar,and spinach
Price: $17.0

Name: Mediterranean Olive Twist
Description: Pesto base,feta,black olives,and artichoke hearts
Price: $16.0

Name: Smoky Supreme
Description: Tomato sauce,smoked chicken,mushrooms,green peppers,and mozzarella
Price: $17.0
```

Test Case 9 — Build a Customized Pizza (Real Data Customization Test)

Test Case ID: TC009

Objective: Validate custom pizza builder using your exact options.

Steps

1. Choose **8 – Customize Pizza Order**
2. Select Base: Cheese Burst Crust (4.00)
3. Select Sauce: Pesto Sauce (2.00)
4. Select Toppings:
 - Mushrooms (1.00)
 - Cherry Tomatoes (1.50)
5. Select Additional Ingredients:
 - Extra Cheese (2.00)
 - Smoked Chicken (3.00)

Expected Result

Custom pizza summary shows:

- Cheese Burst Crust — 4.00
- Pesto Sauce — 2.00
- Mushrooms — 1.00
- Cherry Tomatoes — 1.50
- Extra Cheese — 2.00
- Smoked Chicken — 3.00

Total Price = 4 + 2 + 1 + 1.5 + 2 + 3 = 13.50

Inventory should NOT be deducted yet (only after order processed).

Actual Result

```
Main Menu:
1. Add Recipe
2. Edit Recipe
3. Delete Recipe
4. Categorize Recipes
5. Search Recipe
6. Display Ingredient Inventory
7. Display Standard Pizza Menu
8. Customize Pizza Order
9. Display Side Dish Menu
10. Process Order
11. Exit
Enter your choice (1-11): 8

Choose Pizza Base:
1. Thin Crust - $2.5
2. Thick Crust - $3.0
3. Cheese Burst Crust - $4.0
Enter number: 3

Choose Sauce:
1. Tomato Sauce - $1.5
2. Pesto Sauce - $2.0
3. Alfredo Sauce - $2.0
Enter number: 2

Choose Toppings:
1. Mushrooms - $1.0
2. Spinach - $1.0
3. Jalapenos - $1.0
4. Cherry Tomatoes - $1.5
5. Green Peppers - $1.0
6. Black Olives - $1.5
Enter numbers separated by commas (0 to skip): 1,4

Choose Additional Ingredients:
1. Pepperoni - $2.0
2. Grilled Chicken - $3.0
3. Smoked Chicken - $3.0
4. Artichoke Hearts - $2.0
5. Extra Cheese - $2.0
Enter numbers separated by commas (0 to skip): 3,5
Pizza customization completed.

CUSTOMIZED PIZZA SUMMARY
- Cheese Burst Crust: $4.0
- Pesto Sauce: $2.0
- Mushrooms: $1.0
- Cherry Tomatoes: $1.5
- Smoked Chicken: $3.0
- Extra Cheese: $2.0
Total Price: $13.5
```

Test Case 10 — Display Side Dish Menu

Test Case ID: TC010

Objective: Display the 6 side dishes from your CSV.

Steps

1. Choose **9 – Display Side Dish Menu**

Expected Result

Displayed items:

- Garlic Herb Wedges — 4.50
- Cheesy Jalapeno Pops — 5.00
- Mini Chocolate Tart — 6.50
- Berry Yogurt Cup — 5.25
- Mint Lemon Cooler — 2.50
- Peach Iced Tea — 3.00

Actual Result

```
Main Menu:
1. Add Recipe
2. Edit Recipe
3. Delete Recipe
4. Categorize Recipes
5. Search Recipe
6. Display Ingredient Inventory
7. Display Standard Pizza Menu
8. Customize Pizza Order
9. Display Side Dish Menu
10. Process Order
11. Exit
Enter your choice (1-11): 9

SIDE DISH MENU
Name: Garlic Herb Wedges
Description: Seasoned potato wedges with garlic and herbs
Type: Appetizer
Price: $4.5

Name: Cheesy Jalapeno Pops
Description: Deep-fried cheese and jalapeno bites
Type: Appetizer
Price: $5.0

Name: Mini Chocolate Tart
Description: Warm chocolate tart topped with cream
Type: Dessert
Price: $6.5

Name: Berry Yogurt Cup
Description: Fresh berries layered with yogurt
Type: Dessert
Price: $5.25

Name: Mint Lemon Cooler
Description: Refreshing lemon drink with mint
Type: Beverage
Price: $2.5

Name: Peach Iced Tea
Description: Cold peach-flavored brewed tea
Type: Beverage
Price: $3.0
```

Test Case 11 — Process Full Order (Standard + Custom + Side)

Test Case ID: TC011

Objective: Validate final order calculation and inventory update.

Steps

1. Add standard pizza: **Spicy Pepperoni Blaze**
2. Customize pizza (use Test Case 9 selections)
3. Add side dish: **Cheesy Jalapeno Pops**
4. Choose **10 – Process Order**

Expected Result

Order summary shows:

Standard Pizza

- Spicy Pepperoni Blaze — 16
Inventory deducted:
Thin Crust, Tomato Sauce, Mozzarella, Jalapenos, Pepperoni

Customized Pizza

Total from TC009: **13.50**

(Then stock deducted for each item)

Side Dish

- Cheesy Jalapeno Pops — 5.00

Final Total

$16 + 13.50 + 5.00 = \mathbf{34.50}$

No errors occur.

Actual Result

```
Main Menu:
1. Add Recipe
2. Edit Recipe
3. Delete Recipe
4. Categorize Recipes
5. Search Recipe
6. Display Ingredient Inventory
7. Display Standard Pizza Menu
8. Customize Pizza Order
9. Display Side Dish Menu
10. Process Order
11. Exit
Enter your choice (1-11): 10

PROCESSING ORDER

Standard Pizzas:
1. Pesto Garden - $15.0
2. Spicy Pepperoni Blaze - $16.0
3. Alfredo Chicken Melt - $17.0
4. Mediterranean Olive Twist - $16.0
5. Smoky Supreme - $17.0
Enter pizza number to add (0 to finish): 2
Added standard pizza: Spicy Pepperoni Blaze

Standard Pizzas:
1. Pesto Garden - $15.0
2. Spicy Pepperoni Blaze - $16.0
3. Alfredo Chicken Melt - $17.0
4. Mediterranean Olive Twist - $16.0
5. Smoky Supreme - $17.0
Enter pizza number to add (0 to finish): 0

Side Dishes:
1. Garlic Herb Wedges - $4.5
2. Cheesy Jalapeno Pops - $5.0
3. Mini Chocolate Tart - $6.5
4. Berry Yogurt Cup - $5.25
5. Mint Lemon Cooler - $2.5
6. Peach Iced Tea - $3.0
Enter side dish number to add (0 to finish): 2
Added side dish: Cheesy Jalapeno Pops

Side Dishes:
1. Garlic Herb Wedges - $4.5
2. Cheesy Jalapeno Pops - $5.0
3. Mini Chocolate Tart - $6.5
4. Berry Yogurt Cup - $5.25
5. Mint Lemon Cooler - $2.5
6. Peach Iced Tea - $3.0
Enter side dish number to add (0 to finish): 0

ORDER SUMMARY

Standard Pizzas:
- Spicy Pepperoni Blaze : $16.0

Customized Pizzas:
- Custom Pizza (Cheese Burst Crust, Pesto Sauce, Mushrooms, Cherry Tomatoes, Smoked Chicken, Extra Cheese) : $13.5

Side Dishes:
- Cheesy Jalapeno Pops : $5.0

TOTAL PRICE: $34.5
Order processed.
```

Test Case 12 — Exit Application

Test Case ID: TC012

Objective: Verify system exits safely.

Steps

1. Choose **11 – Exit**

Expected Result

Program prints “Exiting system. Goodbye!” and closes cleanly.

Actual Result

```
Main Menu:
1. Add Recipe
2. Edit Recipe
3. Delete Recipe
4. Categorize Recipes
5. Search Recipe
6. Display Ingredient Inventory
7. Display Standard Pizza Menu
8. Customize Pizza Order
9. Display Side Dish Menu
10. Process Order
11. Exit
Enter your choice (1-11): 11
Exiting system. Goodbye!
PS C:\Users\Aadi\OneDrive\Desktop\HW5>
```