Test Driven Development (TDD)

For “Horekkrokom” E-Commerce System

Test-Driven Development (TDD) is a software development approach where tests are written before the actual code. The process involves writing a failing test, then writing the minimum amount of code necessary to pass that test, and finally refactoring the code to improve its structure while ensuring all tests still pass. TDD promotes better code design, reduces bugs, and increases confidence in the codebase.

Stages of TDD:

1. **RED Stage:**
   In the Red Stage, tests are created, initially failing as code isn't written or features aren't implemented yet. Failures here aren't considered bugs.

2. **Green Stage:** Moving to the Green Stage, code is written to make the tests pass. Simplicity is key, even if the code quality isn't top-notch initially. This can be refined later.

3. **Refactor Stage:** Then comes the Refactor Stage, where code quality is enhanced without altering its behavior. Duplicate code is eliminated, hardcoded data is parameterized, and bad practices are rectified. Existing tests should still pass after refactoring.

This process is known as Red/Green Refactor, reflecting the unit testing framework's red and green bars for failure and success respectively. TDD tests are swift, typically under 10 minutes.

Prerequisites

Tools: Virtual Studio Code

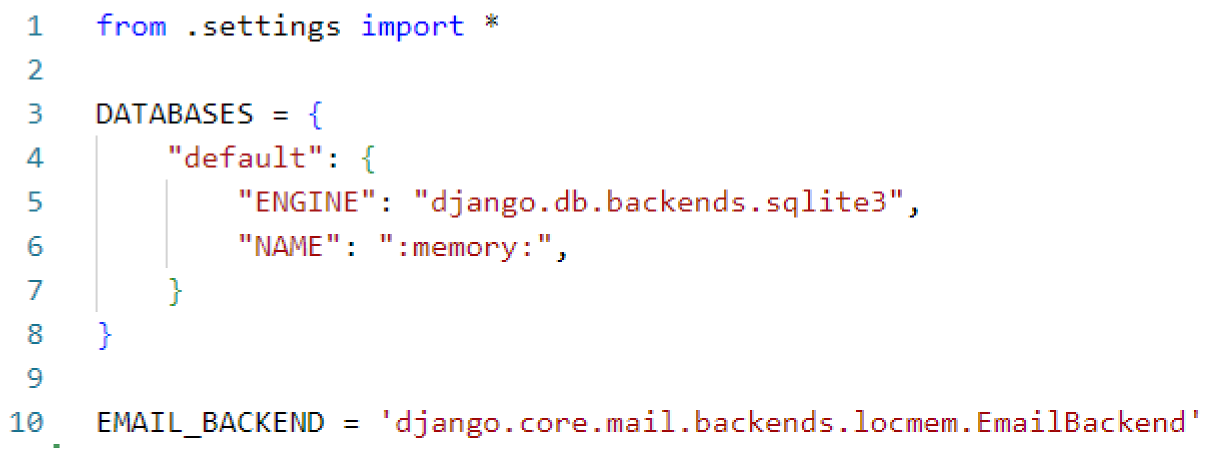
Framework: Python-Django

Required Installations:

i. For generating instances of Django models: `pip install mixer`
ii. For testing python core code: `pip install pytest`
iii. For testing Django-framework: `pip install pytest-django`
iv. For generating test report: `pip install pytest-cov`

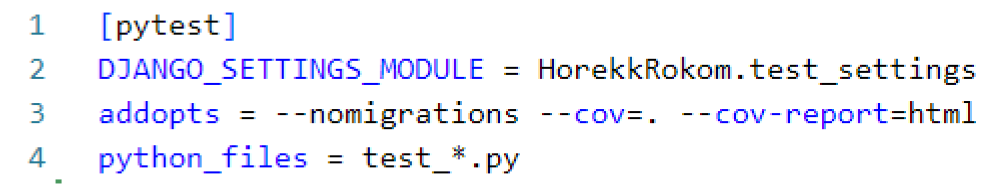
Flow of Process (FOP)

1. First, in base app “Horekkrokom”, we create **test_settings.py** as follows:



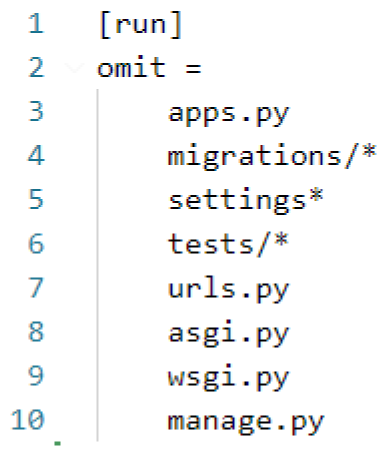
```python
from .settings import *

DATABASES = {
    "default": {
        "ENGINE": "django.db.backends.sqlite3",
        "NAME": ":memory:",
    }
}

EMAIL_BACKEND = 'django.core.mail.backends.locmem.EmailBackend'
```

2. In root project repo, create **pytest.ini**:



```ini
[pytest]
DJANGO_SETTINGS_MODULE = HorekkRokom.test_settings
addopts = --nomigrations --cov=. --cov-report=html
python_files = test_*.py
```

3. In root project repo, create **.coveragerc** filea;



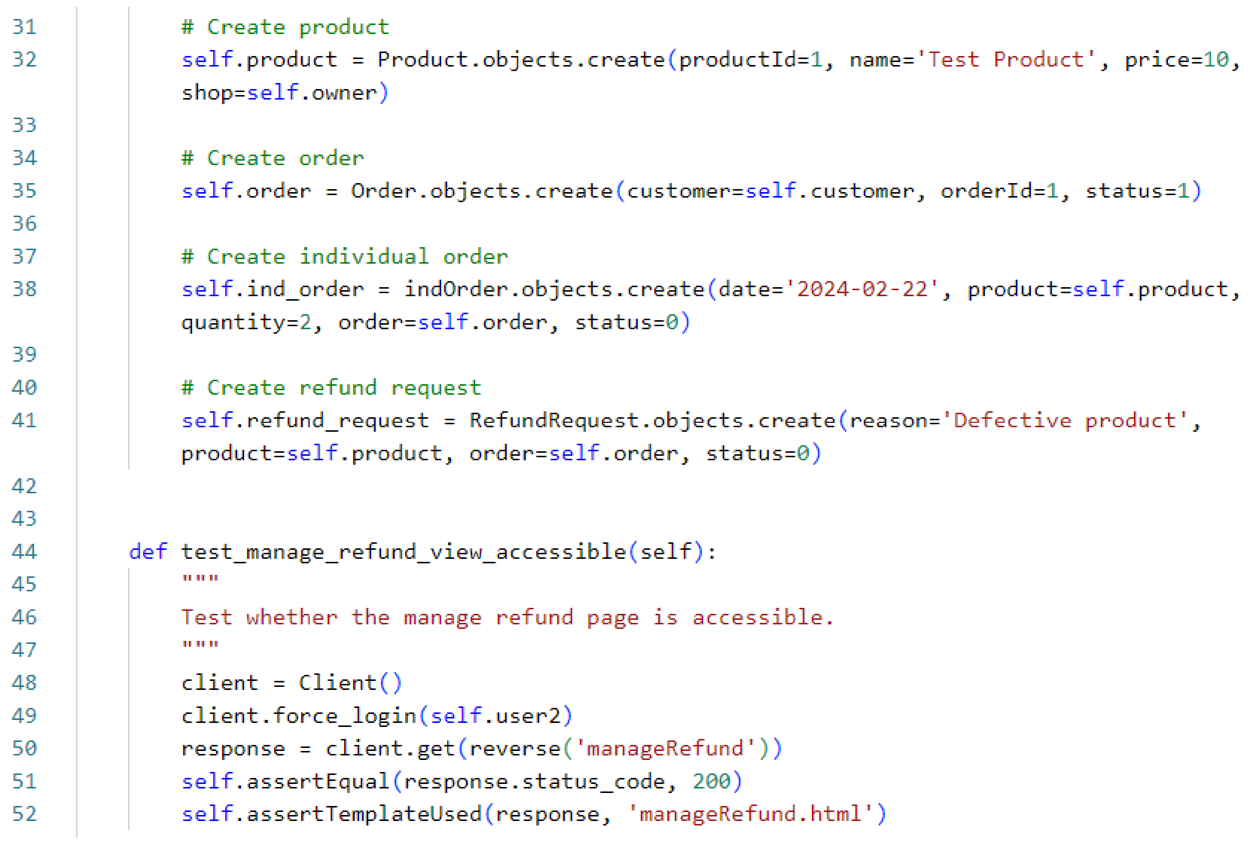
```ini
[run]
omit =
    apps.py
    migrations/*
    settings*
    tests/*
    urls.py
    asgi.py
    wsgi.py
    manage.py
```

4. Inside the project repo, create a folder **tests**:

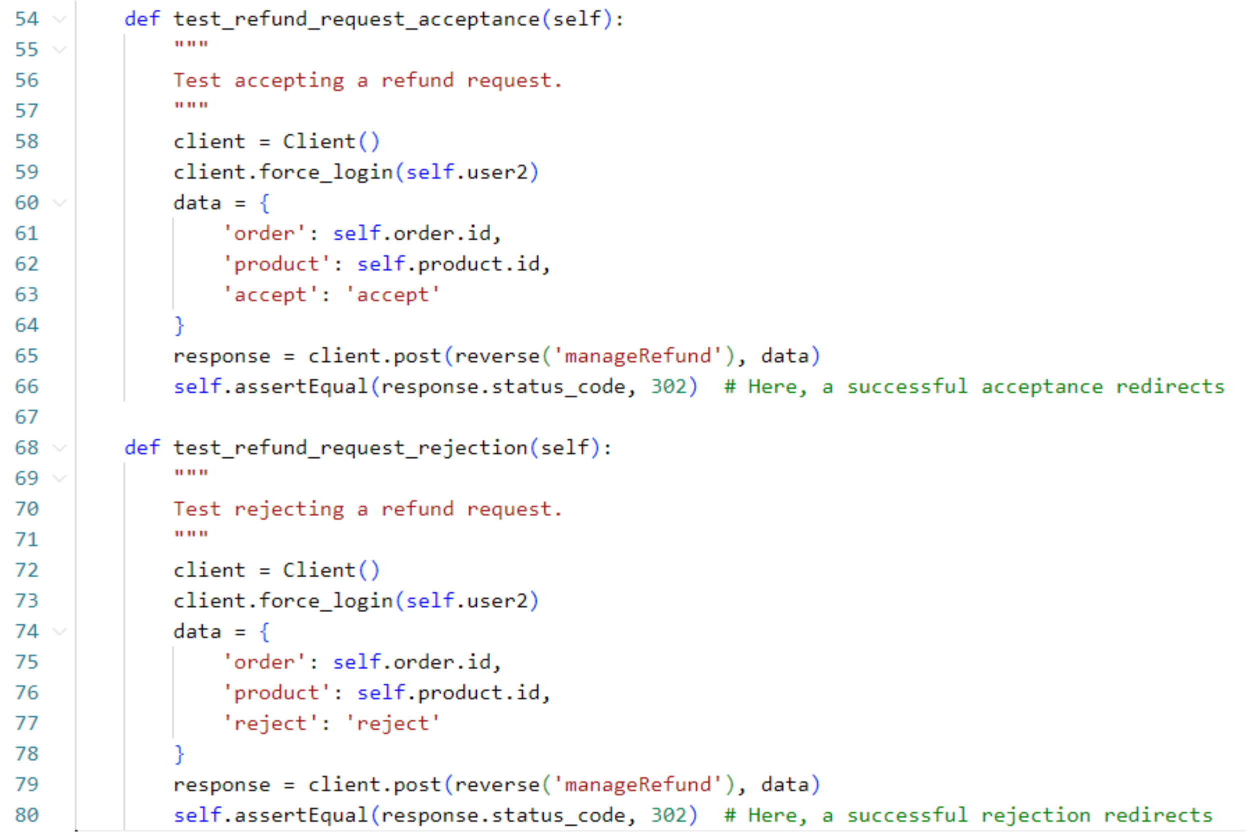
In this folder, create two files: **__init__.py** and **test_views.py**:

test_views.py:

```python
from django.test import TestCase, Client
from django.urls import reverse
from django.contrib.auth.models import User
from Refund.models import *
from Dashboard.models import *
from Search.models import *
from Cart.models import *
from Wishlist.models import *
from Admin.models import *


class ManageRefundViewTestCase(TestCase):
    """
    Test cases for the manageRefund view.
    """

    def setUp(self):
        """
        Set up test data.
        """
        # Create users
        self.user1 = User.objects.create_user(username='testuser1', email='test1@example.com', password='password1')
        self.user2 = User.objects.create_user(username='testuser2', email='test2@example.com', password='password2')
```



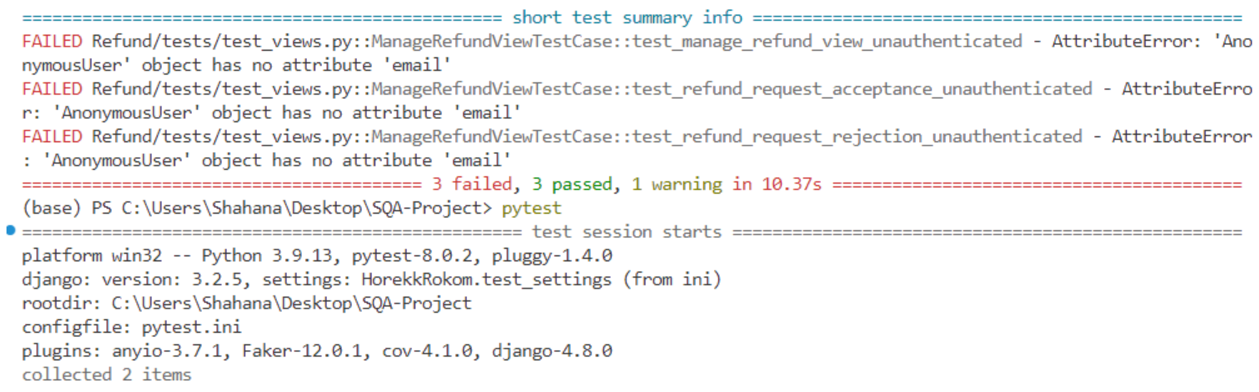
```python
        # Create product
        self.product = Product.objects.create(productId=1, name='Test Product', price=10, shop=self.owner)

        # Create order
        self.order = Order.objects.create(customer=self.customer, orderId=1, status=1)

        # Create individual order
        self.ind_order = indOrder.objects.create(date='2024-02-22', product=self.product, quantity=2, order=self.order, status=0)

        # Create refund request
        self.refund_request = RefundRequest.objects.create(reason='Defective product', product=self.product, order=self.order, status=0)


    def test_manage_refund_view_accessible(self):
        """
        Test whether the manage refund page is accessible.
        """
        client = Client()
        client.force_login(self.user2)
        response = client.get(reverse('manageRefund'))
        self.assertEqual(response.status_code, 200)
        self.assertTemplateUsed(response, 'manageRefund.html')
```



```python
    def test_refund_request_acceptance(self):
        """
        Test accepting a refund request.
        """
        client = Client()
        client.force_login(self.user2)
        data = {
            'order': self.order.id,
            'product': self.product.id,
            'accept': 'accept'
        }
        response = client.post(reverse('manageRefund'), data)
        self.assertEqual(response.status_code, 302)  # Here, a successful acceptance redirects

    def test_refund_request_rejection(self):
        """
        Test rejecting a refund request.
        """
        client = Client()
        client.force_login(self.user2)
        data = {
            'order': self.order.id,
            'product': self.product.id,
            'reject': 'reject'
        }
        response = client.post(reverse('manageRefund'), data)
        self.assertEqual(response.status_code, 302)  # Here, a successful rejection redirects
```

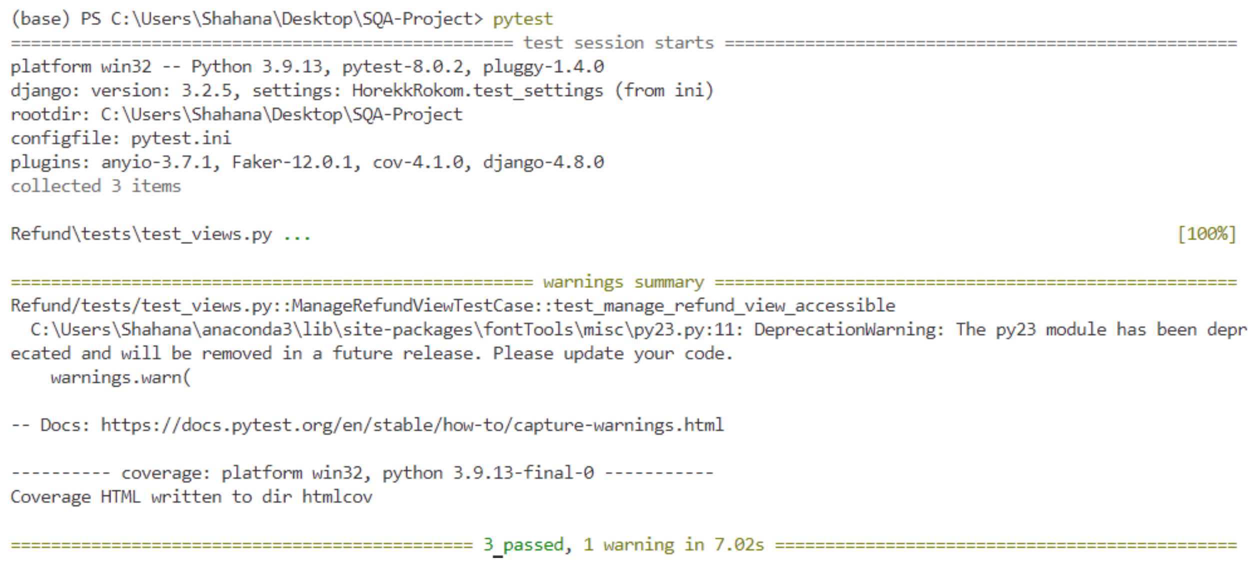
5. Run the test_views.py file in terminal: **pytest**

6. Test Case Fail: After running the test_views.py file for Refund, we faced three errors:



```
================================================ short test summary info =================================================
FAILED Refund/tests/test_views.py::ManageRefundViewTestCase::test_manage_refund_view_unauthenticated - AttributeError: 'Ano
nymousUser' object has no attribute 'email'
FAILED Refund/tests/test_views.py::ManageRefundViewTestCase::test_refund_request_acceptance_unauthenticated - AttributeErro
r: 'AnonymousUser' object has no attribute 'email'
FAILED Refund/tests/test_views.py::ManageRefundViewTestCase::test_refund_request_rejection_unauthenticated - AttributeError
: 'AnonymousUser' object has no attribute 'email'
======================================== 3 failed, 3 passed, 1 warning in 10.37s =========================================
(base) PS C:\Users\Shahana\Desktop\SQA-Project> pytest
================================================== test session starts ===================================================
platform win32 -- Python 3.9.13, pytest-8.0.2, pluggy-1.4.0
django: version: 3.2.5, settings: HorekkRokom.test_settings (from ini)
rootdir: C:\Users\Shahana\Desktop\SQA-Project
configfile: pytest.ini
plugins: anyio-3.7.1, Faker-12.0.1, cov-4.1.0, django-4.8.0
collected 2 items
```

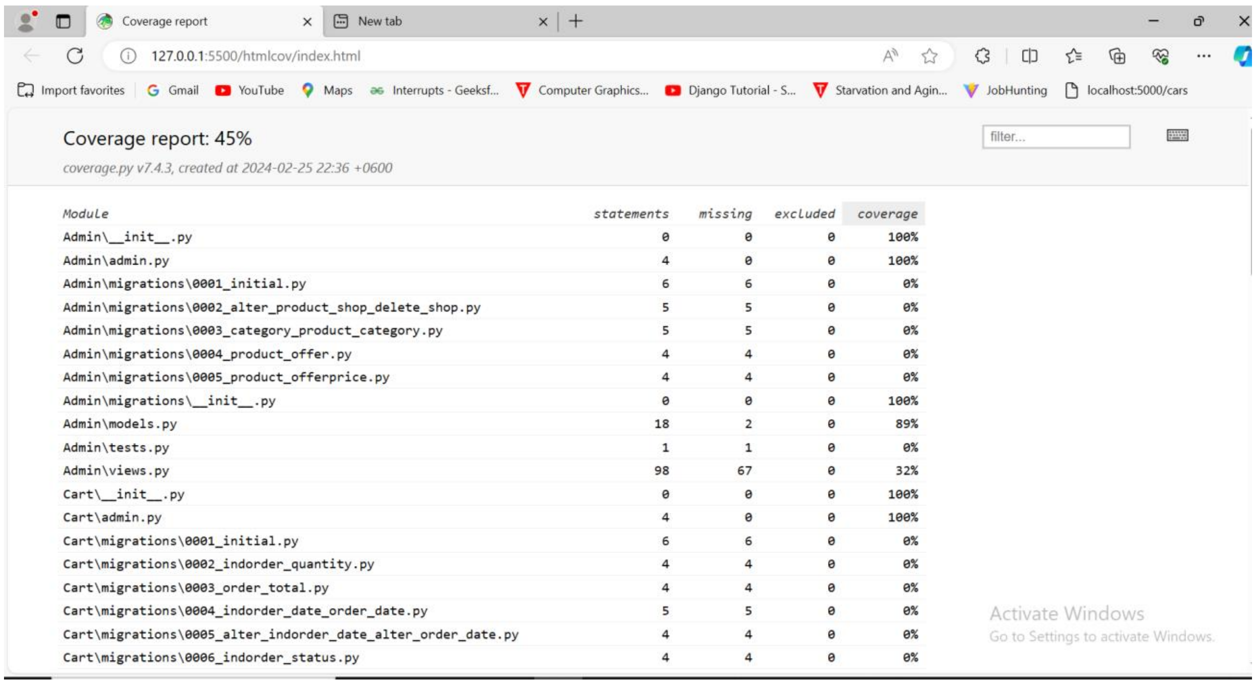
7. Test Case Pass: After resolving the errors, our test cases passed.



```
(base) PS C:\Users\Shahana\Desktop\SQA-Project> pytest
================================================== test session starts ===================================================
platform win32 -- Python 3.9.13, pytest-8.0.2, pluggy-1.4.0
django: version: 3.2.5, settings: HorekkRokom.test_settings (from ini)
rootdir: C:\Users\Shahana\Desktop\SQA-Project
configfile: pytest.ini
plugins: anyio-3.7.1, Faker-12.0.1, cov-4.1.0, django-4.8.0
collected 3 items

Refund\tests\test_views.py ...                                                                                     [100%]

==================================================== warnings summary ====================================================
Refund/tests/test_views.py::ManageRefundViewTestCase::test_manage_refund_view_accessible
  C:\Users\Shahana\anaconda3\lib\site-packages\fontTools\misc\py23.py:11: DeprecationWarning: The py23 module has been depr
ecated and will be removed in a future release. Please update your code.
    warnings.warn(

-- Docs: https://docs.pytest.org/en/stable/how-to/capture-warnings.html

---------- coverage: platform win32, python 3.9.13-final-0 -----------
Coverage HTML written to dir htmlcov

============================================= 3 passed, 1 warning in 7.02s ==============================================
```

Test Coverage Statistics

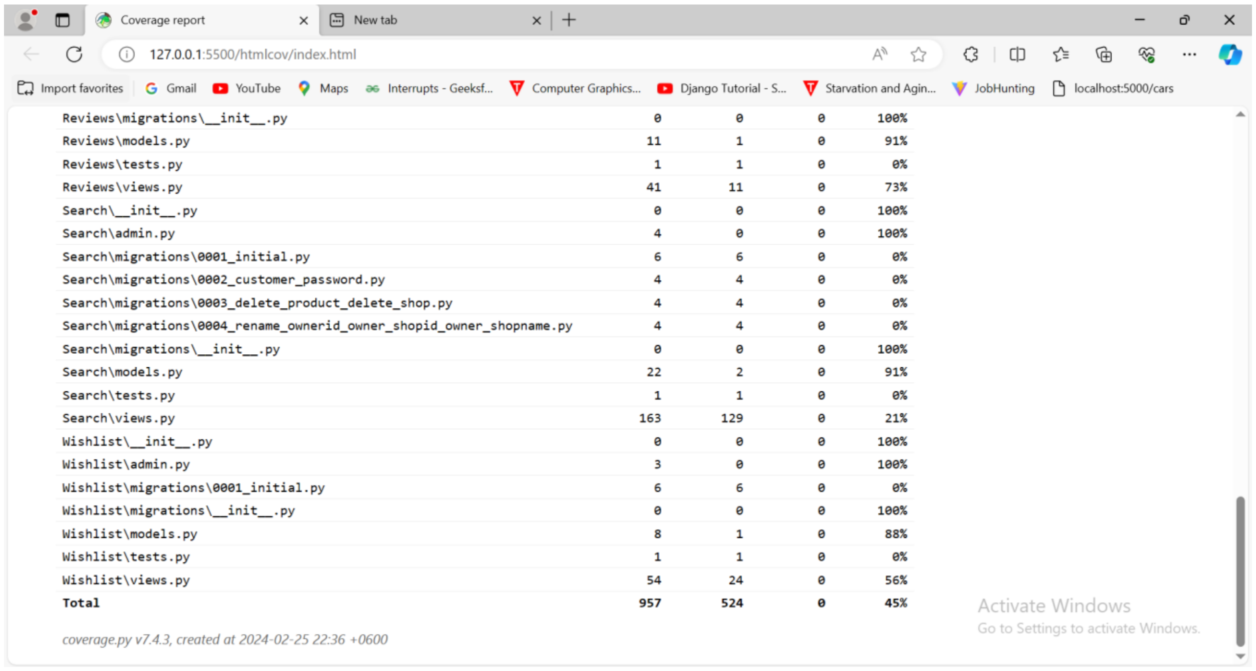
For Offers and Discount:



Coverage report: 45%

coverage.py v7.4.3, created at 2024-02-25 22:36 +0600

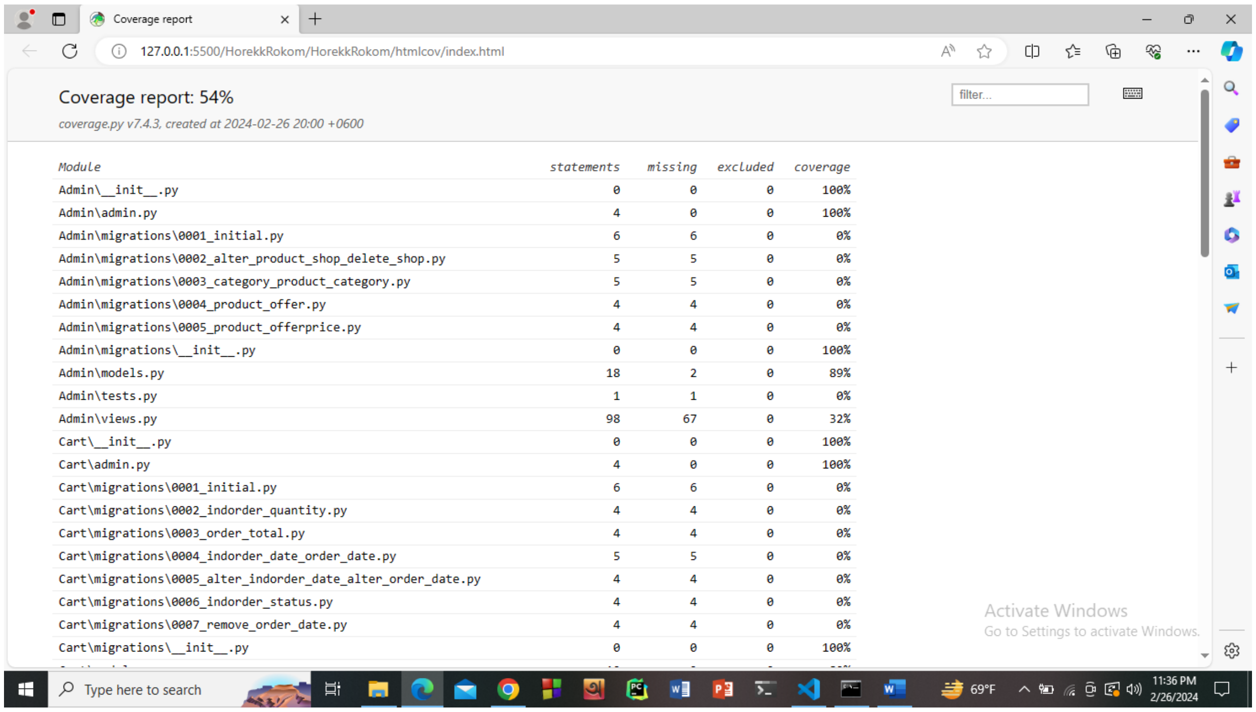
Module	statements	missing	excluded	coverage
Admin\__init__.py	0	0	0	100%
Admin\admin.py	4	0	0	100%
Admin\migrations\0001_initial.py	6	6	0	0%
Admin\migrations\0002_alter_product_shop_delete_shop.py	5	5	0	0%
Admin\migrations\0003_category_product_category.py	5	5	0	0%
Admin\migrations\0004_product_offer.py	4	4	0	0%
Admin\migrations\0005_product_offerprice.py	4	4	0	0%
Admin\migrations\__init__.py	0	0	0	100%
Admin\models.py	18	2	0	89%
Admin\tests.py	1	1	0	0%
Admin\views.py	98	67	0	32%
Cart\__init__.py	0	0	0	100%
Cart\admin.py	4	0	0	100%
Cart\migrations\0001_initial.py	6	6	0	0%
Cart\migrations\0002_indorder_quantity.py	4	4	0	0%
Cart\migrations\0003_order_total.py	4	4	0	0%
Cart\migrations\0004_indorder_date_order_date.py	5	5	0	0%
Cart\migrations\0005_alter_indorder_date_alter_order_date.py	4	4	0	0%
Cart\migrations\0006_indorder_status.py	4	4	0	0%



Module	statements	missing	excluded	coverage
Reviews\migrations\__init__.py	0	0	0	100%
Reviews\models.py	11	1	0	91%
Reviews\tests.py	1	1	0	0%
Reviews\views.py	41	11	0	73%
Search\__init__.py	0	0	0	100%
Search\admin.py	4	0	0	100%
Search\migrations\0001_initial.py	6	6	0	0%
Search\migrations\0002_customer_password.py	4	4	0	0%
Search\migrations\0003_delete_product_delete_shop.py	4	4	0	0%
Search\migrations\0004_rename_ownerid_owner_shopid_owner_shopname.py	4	4	0	0%
Search\migrations\__init__.py	0	0	0	100%
Search\models.py	22	2	0	91%
Search\tests.py	1	1	0	0%
Search\views.py	163	129	0	21%
Wishlist\__init__.py	0	0	0	100%
Wishlist\admin.py	3	0	0	100%
Wishlist\migrations\0001_initial.py	6	6	0	0%
Wishlist\migrations\__init__.py	0	0	0	100%
Wishlist\models.py	8	1	0	88%
Wishlist\tests.py	1	1	0	0%
Wishlist\views.py	54	24	0	56%
Total	957	524	0	45%

coverage.py v7.4.3, created at 2024-02-25 22:36 +0600

For Order History:


Coverage report
127.0.0.1:5500/HorekkRokom/HorekkRokom/htmlcov/index.html
filter...
Activate Windows
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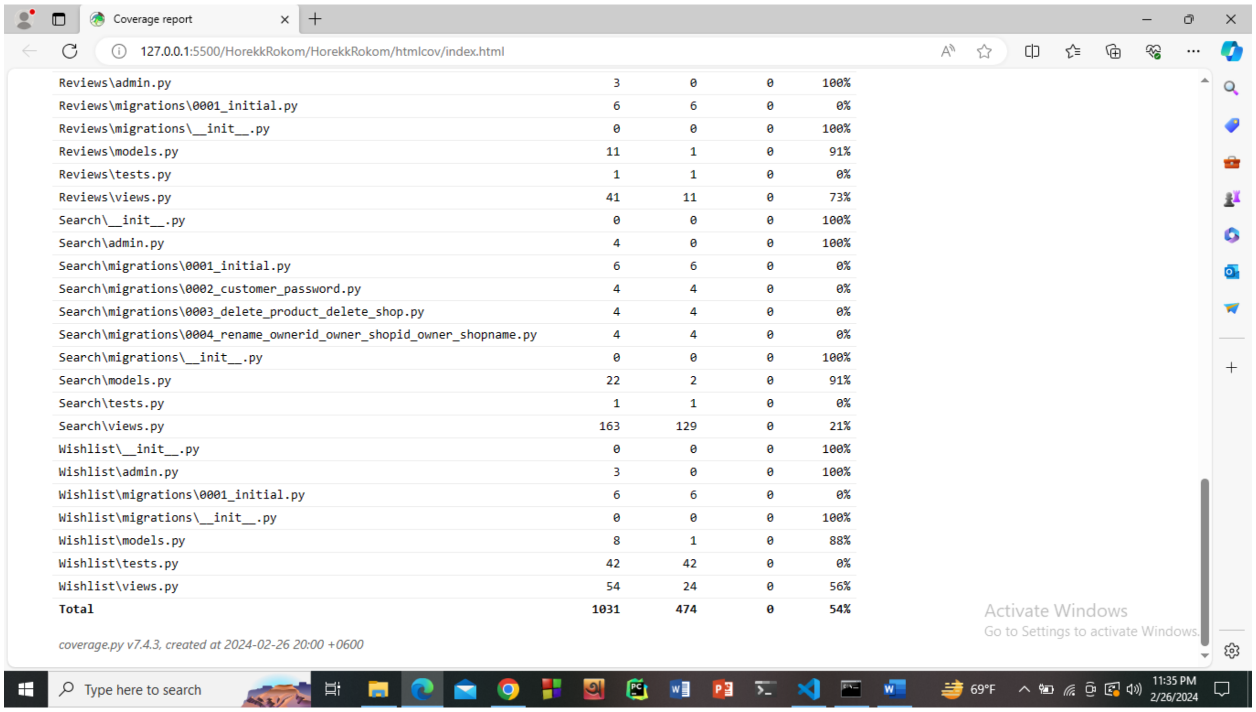
Type here to search
69°F
11:36 PM
2/26/2024

Coverage report: 54%

coverage.py v7.4.3, created at 2024-02-26 20:00 +0600

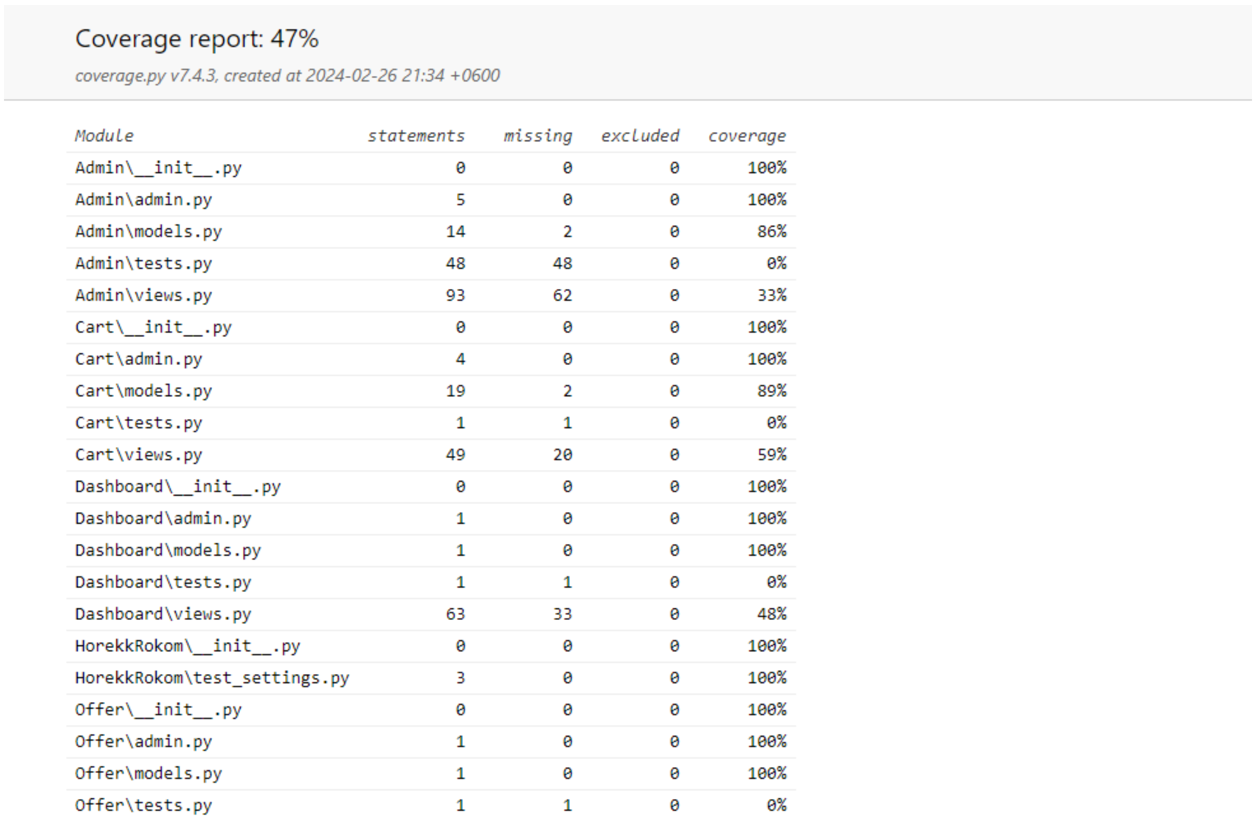
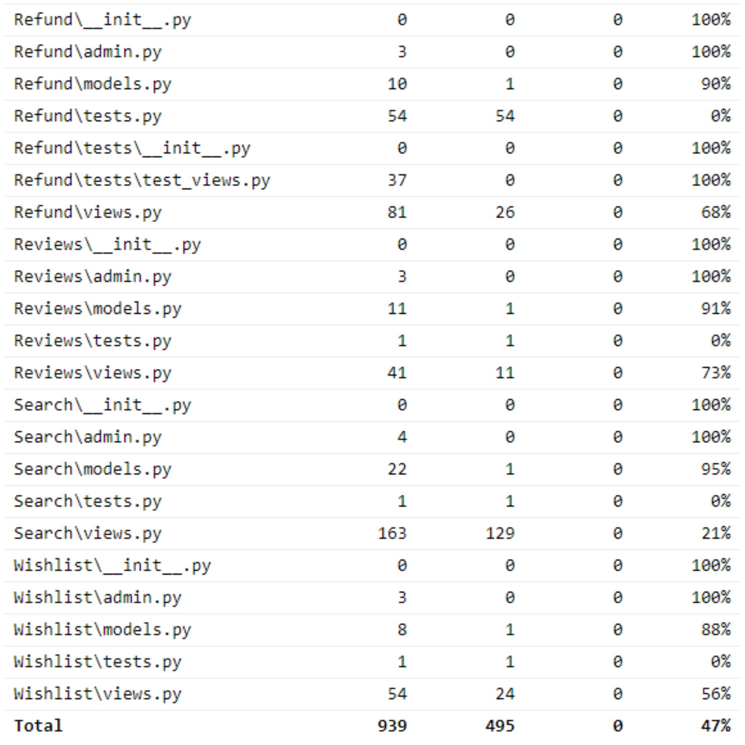
Module	statements	missing	excluded	coverage
Admin\__init__.py	0	0	0	100%
Admin\admin.py	4	0	0	100%
Admin\migrations\0001_initial.py	6	6	0	0%
Admin\migrations\0002_alter_product_shop_delete_shop.py	5	5	0	0%
Admin\migrations\0003_category_product_category.py	5	5	0	0%
Admin\migrations\0004_product_offer.py	4	4	0	0%
Admin\migrations\0005_product_offerprice.py	4	4	0	0%
Admin\migrations\__init__.py	0	0	0	100%
Admin\models.py	18	2	0	89%
Admin\tests.py	1	1	0	0%
Admin\views.py	98	67	0	32%
Cart\__init__.py	0	0	0	100%
Cart\admin.py	4	0	0	100%
Cart\migrations\0001_initial.py	6	6	0	0%
Cart\migrations\0002_indorder_quantity.py	4	4	0	0%
Cart\migrations\0003_order_total.py	4	4	0	0%
Cart\migrations\0004_indorder_date_order_date.py	5	5	0	0%
Cart\migrations\0005_alter_indorder_date_alter_order_date.py	4	4	0	0%
Cart\migrations\0006_indorder_status.py	4	4	0	0%
Cart\migrations\0007_remove_order_date.py	4	4	0	0%
Cart\migrations\__init__.py	0	0	0	100%


Coverage report
127.0.0.1:5500/HorekkRokom/HorekkRokom/htmlcov/index.html
Activate Windows
Go to Settings to activate Windows.
Type here to search
69°F
11:35 PM
2/26/2024

Module	statements	missing	excluded	coverage
Reviews\admin.py	3	0	0	100%
Reviews\migrations\0001_initial.py	6	6	0	0%
Reviews\migrations\__init__.py	0	0	0	100%
Reviews\models.py	11	1	0	91%
Reviews\tests.py	1	1	0	0%
Reviews\views.py	41	11	0	73%
Search\__init__.py	0	0	0	100%
Search\admin.py	4	0	0	100%
Search\migrations\0001_initial.py	6	6	0	0%
Search\migrations\0002_customer_password.py	4	4	0	0%
Search\migrations\0003_delete_product_delete_shop.py	4	4	0	0%
Search\migrations\0004_rename_ownerid_owner_shopid_owner_shopname.py	4	4	0	0%
Search\migrations\__init__.py	0	0	0	100%
Search\models.py	22	2	0	91%
Search\tests.py	1	1	0	0%
Search\views.py	163	129	0	21%
Wishlist\__init__.py	0	0	0	100%
Wishlist\admin.py	3	0	0	100%
Wishlist\migrations\0001_initial.py	6	6	0	0%
Wishlist\migrations\__init__.py	0	0	0	100%
Wishlist\models.py	8	1	0	88%
Wishlist\tests.py	42	42	0	0%
Wishlist\views.py	54	24	0	56%
Total	**1031**	**474**	**0**	**54%**

coverage.py v7.4.3, created at 2024-02-26 20:00 +0600

For Return and Refund:

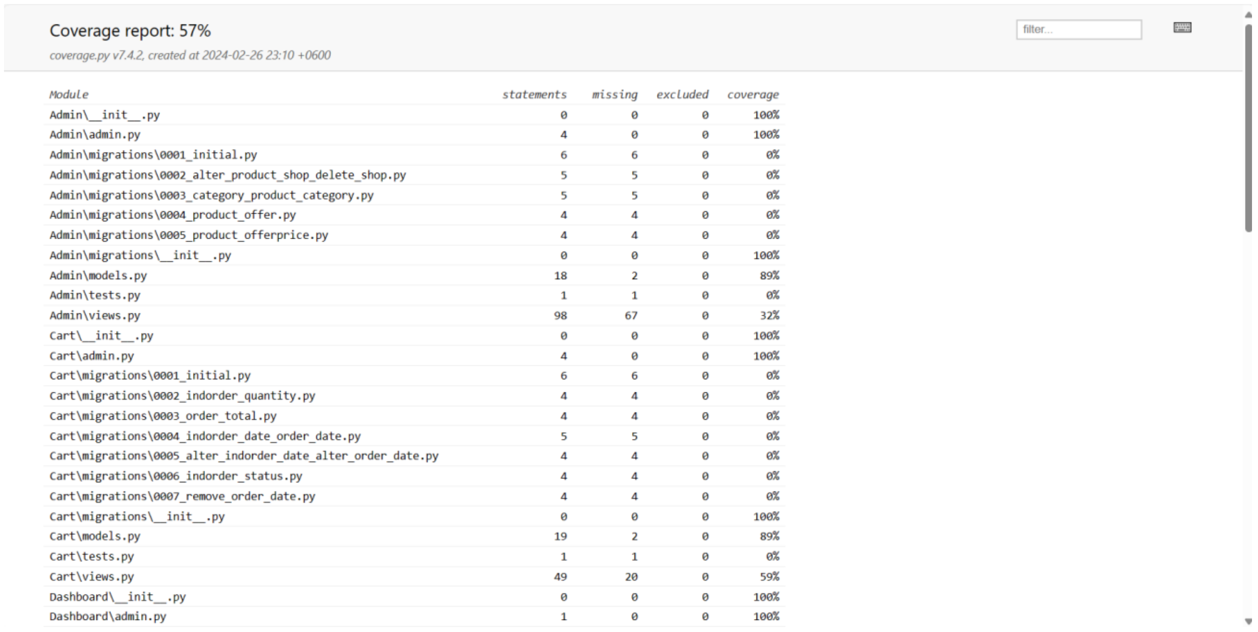



Coverage report: 47%

coverage.py v7.4.3, created at 2024-02-26 21:34 +0600

Module	*statements*	*missing*	*excluded*	*coverage*
Admin\__init__.py	0	0	0	100%
Admin\admin.py	5	0	0	100%
Admin\models.py	14	2	0	86%
Admin\tests.py	48	48	0	0%
Admin\views.py	93	62	0	33%
Cart\__init__.py	0	0	0	100%
Cart\admin.py	4	0	0	100%
Cart\models.py	19	2	0	89%
Cart\tests.py	1	1	0	0%
Cart\views.py	49	20	0	59%
Dashboard__init__.py	0	0	0	100%
Dashboard\admin.py	1	0	0	100%
Dashboard\models.py	1	0	0	100%
Dashboard\tests.py	1	1	0	0%
Dashboard\views.py	63	33	0	48%
HorekkRokom\__init__.py	0	0	0	100%
HorekkRokom\test_settings.py	3	0	0	100%
Offer\__init__.py	0	0	0	100%
Offer\admin.py	1	0	0	100%
Offer\models.py	1	0	0	100%
Offer\tests.py	1	1	0	0%
Refund\__init__.py	0	0	0	100%
Refund\admin.py	3	0	0	100%
Refund\models.py	10	1	0	90%
Refund\tests.py	54	54	0	0%
Refund\tests\__init__.py	0	0	0	100%
Refund\tests\test_views.py	37	0	0	100%
Refund\views.py	81	26	0	68%
Reviews\__init__.py	0	0	0	100%
Reviews\admin.py	3	0	0	100%
Reviews\models.py	11	1	0	91%
Reviews\tests.py	1	1	0	0%
Reviews\views.py	41	11	0	73%
Search\__init__.py	0	0	0	100%
Search\admin.py	4	0	0	100%
Search\models.py	22	1	0	95%
Search\tests.py	1	1	0	0%
Search\views.py	163	129	0	21%
Wishlist\__init__.py	0	0	0	100%
Wishlist\admin.py	3	0	0	100%
Wishlist\models.py	8	1	0	88%
Wishlist\tests.py	1	1	0	0%
Wishlist\views.py	54	24	0	56%
Total	**939**	**495**	**0**	**47%**

For Dashboard:



Coverage report: 57%

coverage.py v7.4.2, created at 2024-02-26 23:10 +0600

Module	statements	missing	excluded	coverage
Admin\__init__.py	0	0	0	100%
Admin\admin.py	4	0	0	100%
Admin\migrations\0001_initial.py	6	6	0	0%
Admin\migrations\0002_alter_product_shop_delete_shop.py	5	5	0	0%
Admin\migrations\0003_category_product_category.py	5	5	0	0%
Admin\migrations\0004_product_offer.py	4	4	0	0%
Admin\migrations\0005_product_offerprice.py	4	4	0	0%
Admin\migrations\__init__.py	0	0	0	100%
Admin\models.py	18	2	0	89%
Admin\tests.py	1	1	0	0%
Admin\views.py	98	67	0	32%
Cart\__init__.py	0	0	0	100%
Cart\admin.py	4	0	0	100%
Cart\migrations\0001_initial.py	6	6	0	0%
Cart\migrations\0002_indorder_quantity.py	4	4	0	0%
Cart\migrations\0003_order_total.py	4	4	0	0%
Cart\migrations\0004_indorder_date_order_date.py	5	5	0	0%
Cart\migrations\0005_alter_indorder_date_alter_order_date.py	4	4	0	0%
Cart\migrations\0006_indorder_status.py	4	4	0	0%
Cart\migrations\0007_remove_order_date.py	4	4	0	0%
Cart\migrations\__init__.py	0	0	0	100%
Cart\models.py	19	2	0	89%
Cart\tests.py	1	1	0	0%
Cart\views.py	49	20	0	59%
Dashboard\__init__.py	0	0	0	100%
Dashboard\admin.py	1	0	0	100%