Unit testing report

project Name: Student management system.

Tools: pytest, vscode.

Framework: Django

Required installation:

- **For testing python core code:** pip install pytest
- **For testing Django framework:** pip install pytest-django
- **For generating test report:** pip install pytest-cov
- **For helping to generate instances of Django models:** pip install mixer

Description:

We already know that Django has its own built-in testing framework called the Django test framework. This framework includes support for writing unit tests. For testing part we need to import

```
from django.test import TestCase
```

For unit testing we need to give command:
python manage.py test, or pytest/py.test

Flows of process:
1. In root project "SQA_SMS": creating a file test_settings.py

test_settings.py:

```
from .settings import *

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

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

2. In root project “base”: creating a folder “tests”

In this folder we creating a files like: “__init.py__”, “test_models.py”, “test_views.py” etc.
giving a file for example:
test_models.py:

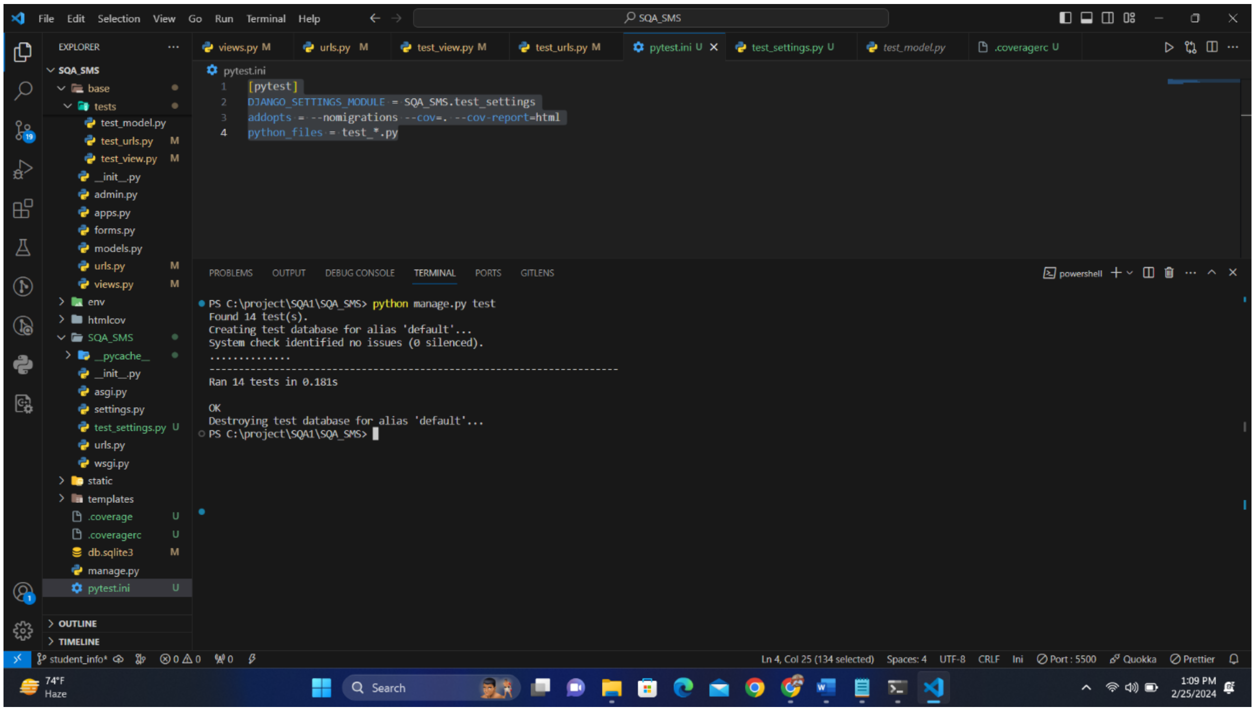
```python
from django.test import TestCase
from base.models import Student

class StudentModelTest(TestCase):
    """
        Test case to create a student instance and verify its attributes.
    """
    def test_create_student(self):
        student = Student.objects.create(
            name="Rafi Kibria",
            hsc_roll="12345",
            hsc_reg="ABCD1234",
            reg_no="XYZ12345",
            roll="12301",
            session="2018-2019",
            email="stu@gmail.com",
            phone="0158655554",
            dob='2000-01-01',
            address='123 Main St',
            fathers_name='John Doe Sr.',
            mothers_name='Jane Doe',
            guardian_phone='0987654321',
            description='keep doing hard work ',
            status='Regular',
            CGPA=3.5,
            result_description='Try best until your dreams come true. Best of luck.'
        )
    # Verify attributes of the created student instance
        self.assertEqual(student.name, "Rafi Kibria")
        self.assertEqual(student.hsc_roll, "12345")
        self.assertEqual(student.hsc_reg, "ABCD1234")
        self.assertEqual(student.reg_no, "XYZ12345")
        self.assertEqual(student.roll, "12301")
        self.assertEqual(student.session, "2018-2019")
        self.assertEqual(student.email, "stu@gmail.com")
        self.assertEqual(student.phone, "0158655554")
        self.assertEqual(student.dob, '2000-01-01')
        self.assertEqual(student.address, '123 Main St')
        self.assertEqual(student.fathers_name, 'John Doe Sr.')
        self.assertEqual(student.mothers_name, 'Jane Doe')
        self.assertEqual(student.guardian_phone, '0987654321')
        self.assertEqual(student.description, 'keep doing hard work ')
        self.assertEqual(student.status, 'Regular')
        self.assertEqual(student.CGPA, 3.5)
        self.assertEqual(student.result_description, 'Try best until your dreams come true. Best of luck.')
```

3. In root project creating a file “pytest.ini”:
pytest.ini

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

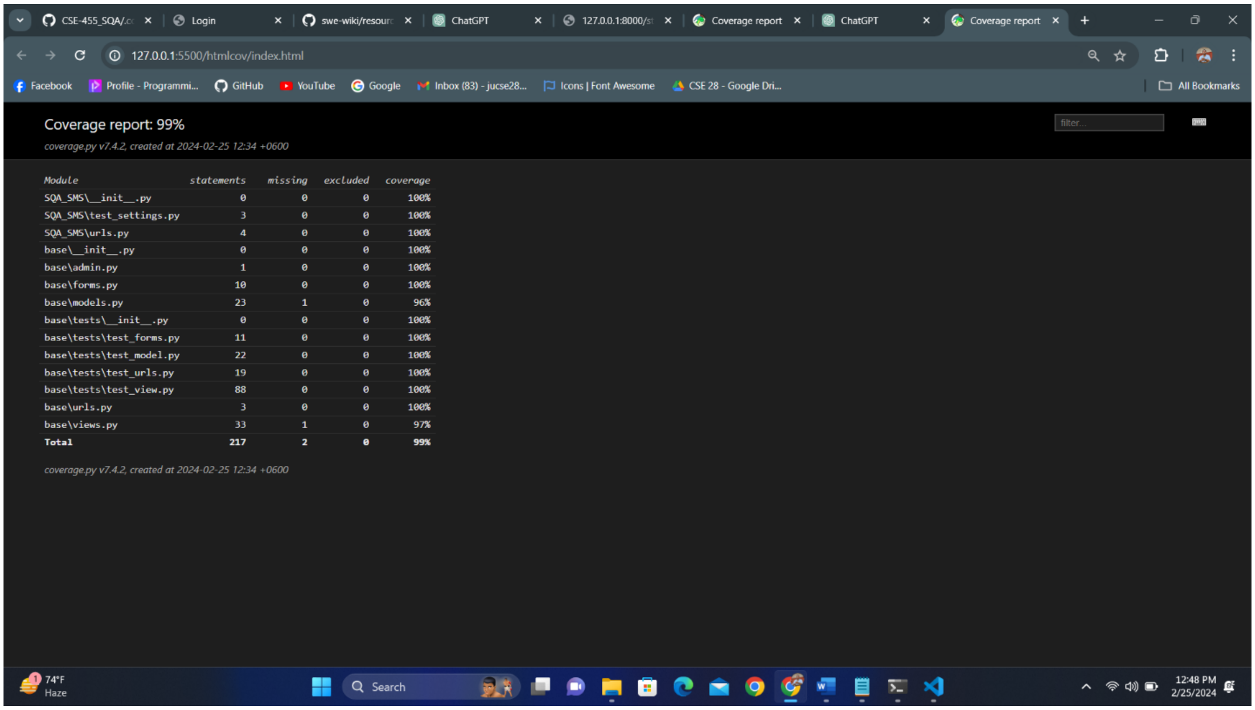
Now I am giving unit testing result for our project:

Unit test for create_student, update_student and student_info:



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

```
PS C:\project\SQA1\SQA_SMS> python manage.py test
Found 14 test(s).
Creating test database for alias 'default'...
System check identified no issues (0 silenced).
..............
----------------------------------------------------------------------
Ran 14 tests in 0.181s

OK
Destroying test database for alias 'default'...
PS C:\project\SQA1\SQA_SMS>
```



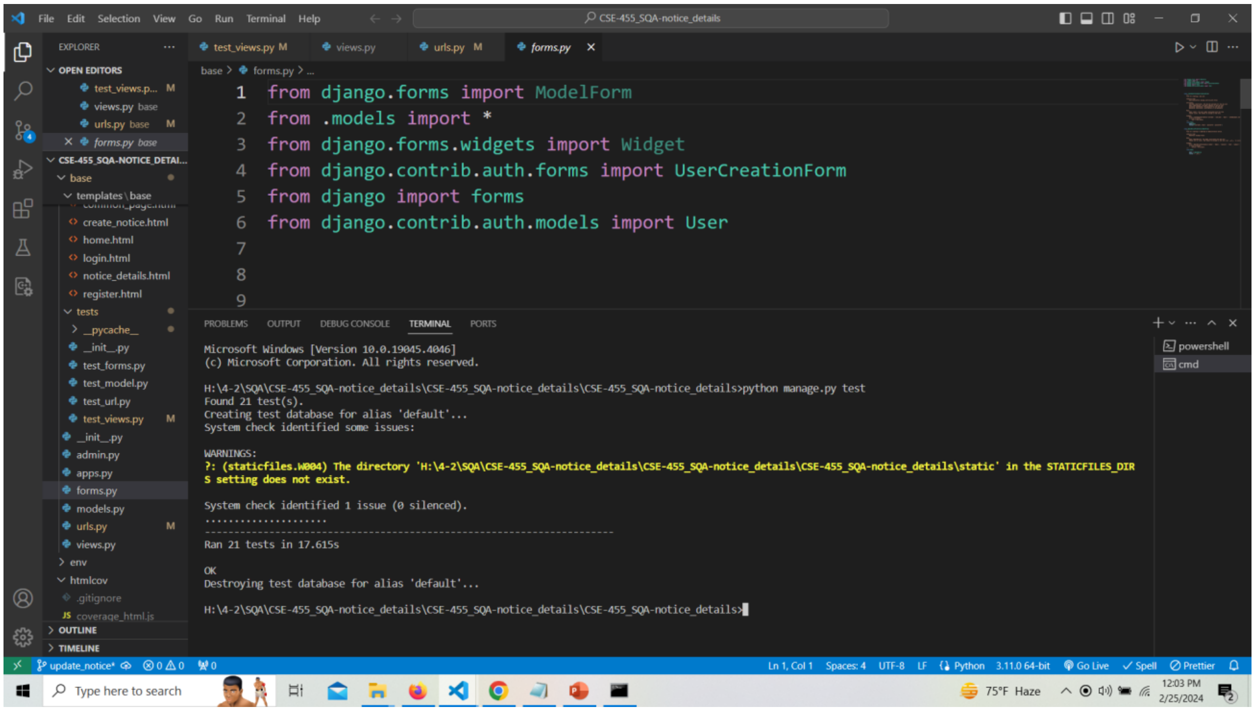
Coverage report: 99%

coverage.py v7.4.2, created at 2024-02-25 12:34 +0600

Module	statements	missing	excluded	coverage
SQA_SMS\__init__.py	0	0	0	100%
SQA_SMS\test_settings.py	3	0	0	100%
SQA_SMS\urls.py	4	0	0	100%
base\__init__.py	0	0	0	100%
base\admin.py	1	0	0	100%
base\forms.py	10	0	0	100%
base\models.py	23	1	0	96%
base\tests\__init__.py	0	0	0	100%
base\tests\test_forms.py	11	0	0	100%
base\tests\test_model.py	22	0	0	100%
base\tests\test_urls.py	19	0	0	100%
base\tests\test_view.py	88	0	0	100%
base\urls.py	3	0	0	100%
base\views.py	33	1	0	97%
Total	**217**	**2**	**0**	**99%**

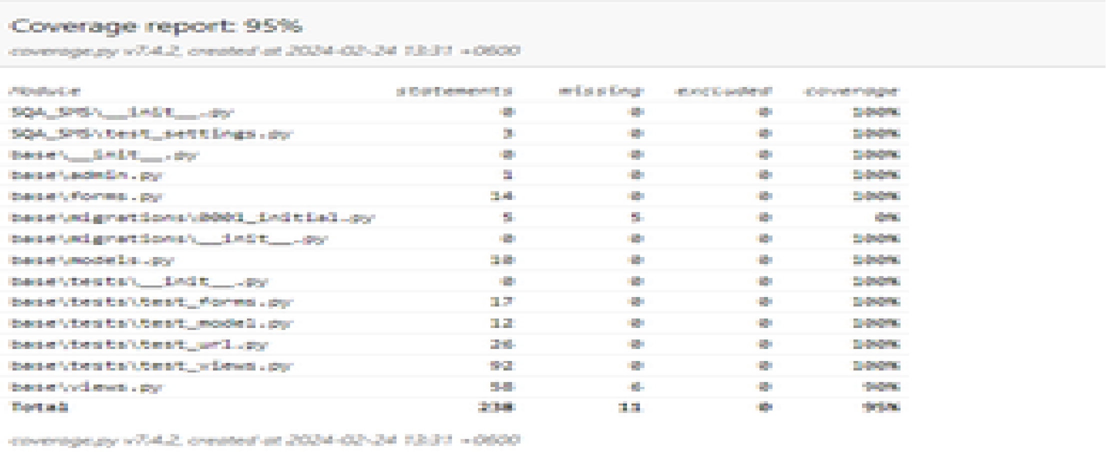
coverage.py v7.4.2, created at 2024-02-25 12:34 +0600

Unit test for create_notice, update_notice and notice_info:



```python
from django.forms import ModelForm
from .models import *
from django.forms.widgets import Widget
from django.contrib.auth.forms import UserCreationForm
from django import forms
from django.contrib.auth.models import User
```

```
Microsoft Windows [Version 10.0.19045.4046]
(c) Microsoft Corporation. All rights reserved.

H:\4-2\SQA\CSE-455_SQA-notice_details\CSE-455_SQA-notice_details\CSE-455_SQA-notice_details>python manage.py test
Found 21 test(s).
Creating test database for alias 'default'...
System check identified some issues:

WARNINGS:
?: (staticfiles.W004) The directory 'H:\4-2\SQA\CSE-455_SQA-notice_details\CSE-455_SQA-notice_details\CSE-455_SQA-notice_details\static' in the STATICFILES_DIR
S setting does not exist.

System check identified 1 issue (0 silenced).
.....................
----------------------------------------------------------------------
Ran 21 tests in 17.615s

OK
Destroying test database for alias 'default'...

H:\4-2\SQA\CSE-455_SQA-notice_details\CSE-455_SQA-notice_details\CSE-455_SQA-notice_details>
```



Coverage report: 95%

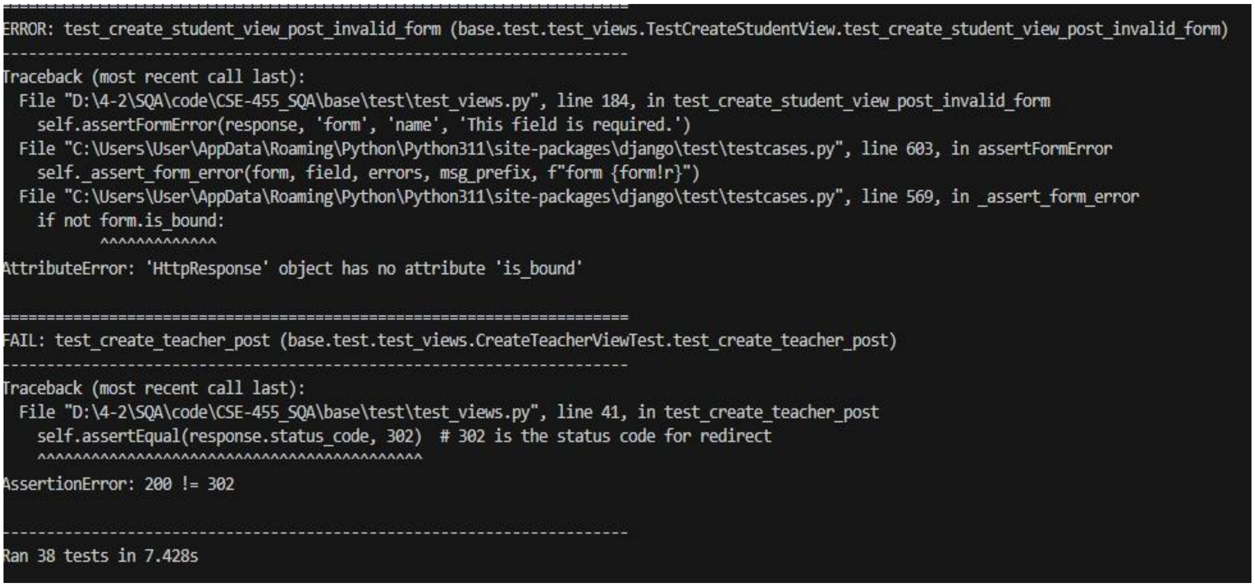
coverage.py v7.4.2, created at 2024-02-24 13:31 +0600

Module	statements	missing	excluded	coverage
SQA_SMS\__init__.py	0	0	0	100%
SQA_SMS\test_settings.py	3	0	0	100%
base\__init__.py	0	0	0	100%
base\admin.py	3	0	0	100%
base\forms.py	14	0	0	100%
base\migrations\0001_initial.py	5	5	0	0%
base\migrations\__init__.py	0	0	0	100%
base\models.py	18	0	0	100%
base\tests\__init__.py	0	0	0	100%
base\tests\test_forms.py	17	0	0	100%
base\tests\test_model.py	12	0	0	100%
base\tests\test_url.py	26	0	0	100%
base\tests\test_views.py	92	0	0	100%
base\views.py	58	6	0	90%
Total	238	11	0	95%

coverage.py v7.4.2, created at 2024-02-24 13:31 +0600

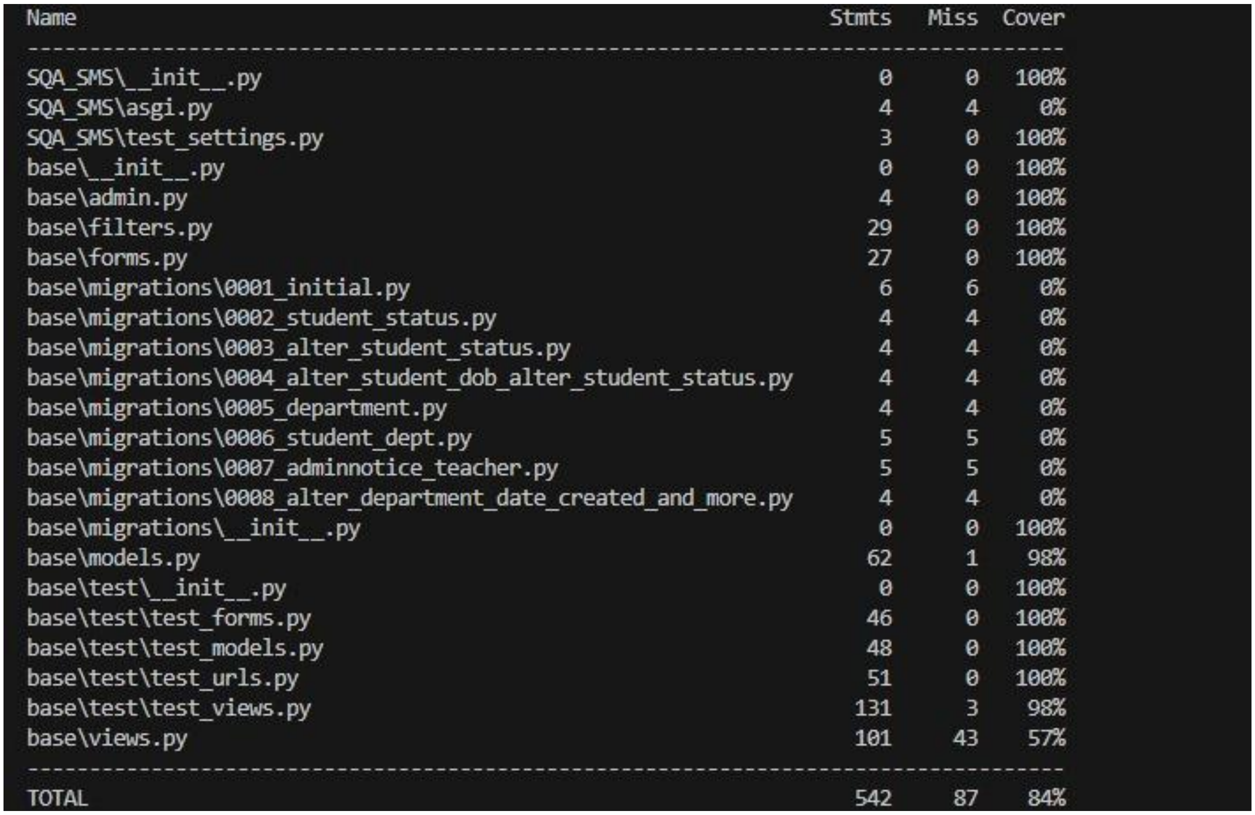
Unit test for create_teacher, update_teacher and teacher_info:

It has an error which was mentioned in discord



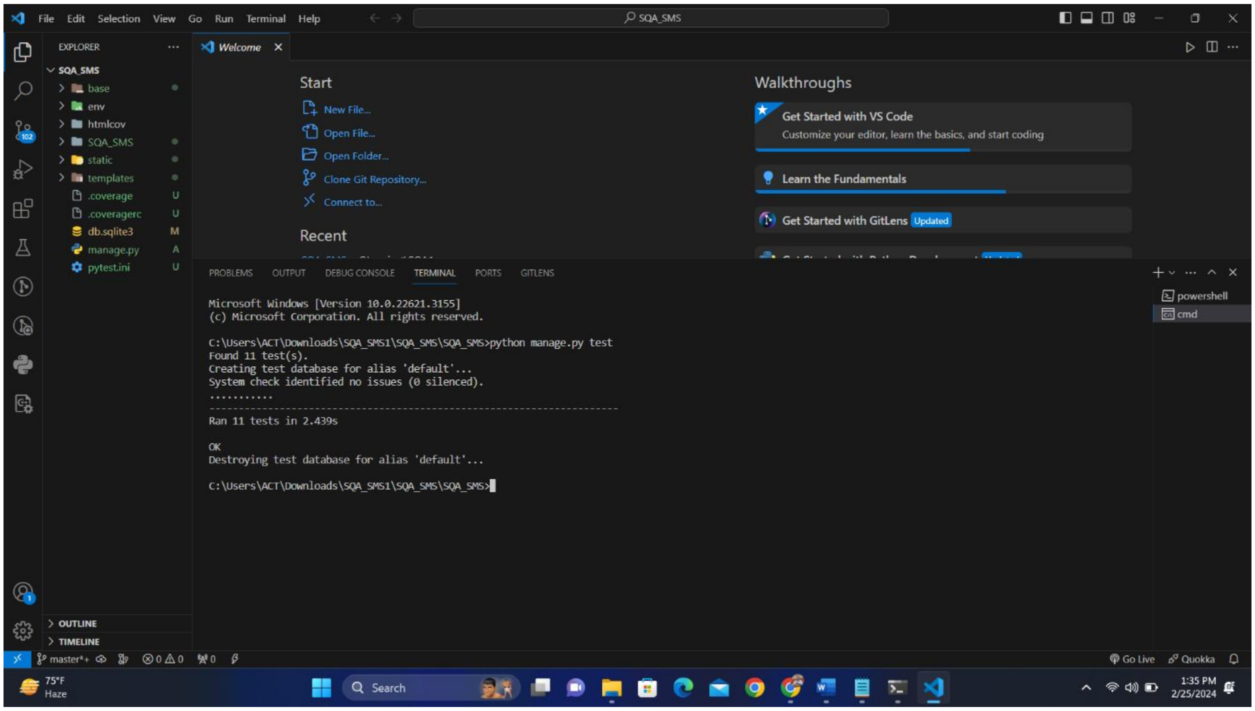
```
======================================================================
ERROR: test_create_student_view_post_invalid_form (base.test.test_views.TestCreateStudentView.test_create_student_view_post_invalid_form)
----------------------------------------------------------------------
Traceback (most recent call last):
  File "D:\4-2\SQA\code\CSE-455_SQA\base\test\test_views.py", line 184, in test_create_student_view_post_invalid_form
    self.assertFormError(response, 'form', 'name', 'This field is required.')
  File "C:\Users\User\AppData\Roaming\Python\Python311\site-packages\django\test\testcases.py", line 603, in assertFormError
    self._assert_form_error(form, field, errors, msg_prefix, f"form {form!r}")
  File "C:\Users\User\AppData\Roaming\Python\Python311\site-packages\django\test\testcases.py", line 569, in _assert_form_error
    if not form.is_bound:
           ^^^^^^^^^^^^^
AttributeError: 'HttpResponse' object has no attribute 'is_bound'

======================================================================
FAIL: test_create_teacher_post (base.test.test_views.CreateTeacherViewTest.test_create_teacher_post)
----------------------------------------------------------------------
Traceback (most recent call last):
  File "D:\4-2\SQA\code\CSE-455_SQA\base\test\test_views.py", line 41, in test_create_teacher_post
    self.assertEqual(response.status_code, 302)  # 302 is the status code for redirect
    ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
AssertionError: 200 != 302

----------------------------------------------------------------------
Ran 38 tests in 7.428s
```

Coverage:

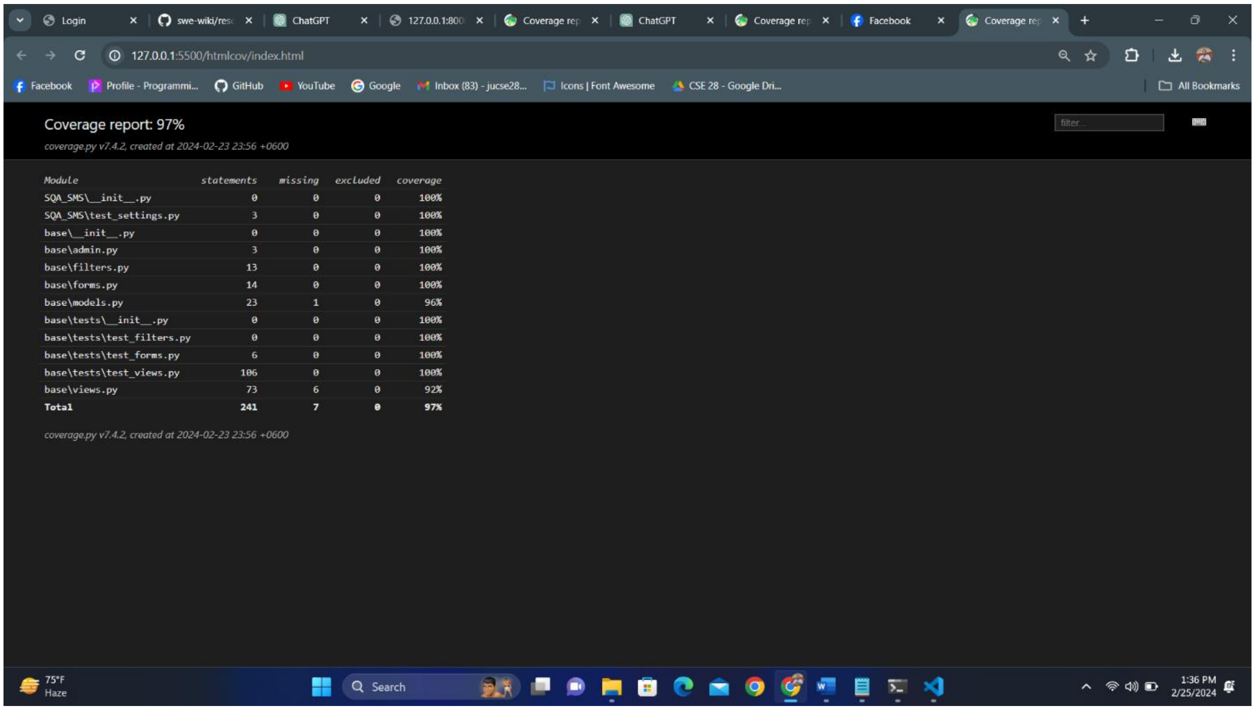


```
Name                                                         Stmts   Miss  Cover
--------------------------------------------------------------------------------
SQA_SMS\__init__.py                                              0      0   100%
SQA_SMS\asgi.py                                                  4      4     0%
SQA_SMS\test_settings.py                                         3      0   100%
base\__init__.py                                                 0      0   100%
base\admin.py                                                    4      0   100%
base\filters.py                                                 29      0   100%
base\forms.py                                                   27      0   100%
base\migrations\0001_initial.py                                  6      6     0%
base\migrations\0002_student_status.py                           4      4     0%
base\migrations\0003_alter_student_status.py                     4      4     0%
base\migrations\0004_alter_student_dob_alter_student_status.py   4      4     0%
base\migrations\0005_department.py                               4      4     0%
base\migrations\0006_student_dept.py                             5      5     0%
base\migrations\0007_adminnotice_teacher.py                      5      5     0%
base\migrations\0008_alter_department_date_created_and_more.py   4      4     0%
base\migrations\__init__.py                                      0      0   100%
base\models.py                                                  62      1    98%
base\test\__init__.py                                            0      0   100%
base\test\test_forms.py                                         46      0   100%
base\test\test_models.py                                        48      0   100%
base\test\test_urls.py                                          51      0   100%
base\test\test_views.py                                        131      3    98%
base\views.py                                                  101     43    57%
--------------------------------------------------------------------------------
TOTAL                                                          542     87    84%
```

Unit test for login, logout, registration, search and delete student:



```
Microsoft Windows [Version 10.0.22621.3155]
(c) Microsoft Corporation. All rights reserved.

C:\Users\ACT\Downloads\SQA_SMS1\SQA_SMS\SQA_SMS>python manage.py test
Found 11 test(s).
Creating test database for alias 'default'...
System check identified no issues (0 silenced).
...........
----------------------------------------------------------------------
Ran 11 tests in 2.439s

OK
Destroying test database for alias 'default'...

C:\Users\ACT\Downloads\SQA_SMS1\SQA_SMS\SQA_SMS>
```



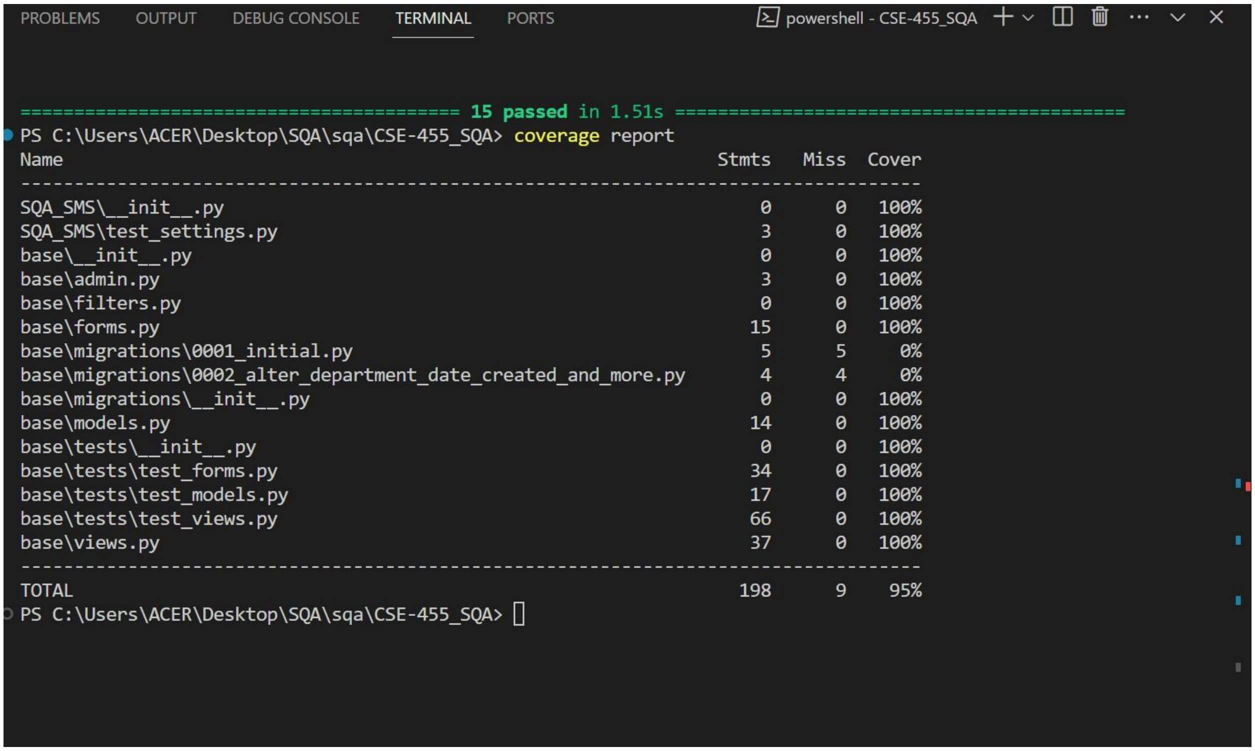
Coverage report: 97%

coverage.py v7.4.2, created at 2024-02-23 23:56 +0600

Module	statements	missing	excluded	coverage
SQA_SMS\__init__.py	0	0	0	100%
SQA_SMS\test_settings.py	3	0	0	100%
base\__init__.py	0	0	0	100%
base\admin.py	3	0	0	100%
base\filters.py	13	0	0	100%
base\forms.py	14	0	0	100%
base\models.py	23	1	0	96%
base\tests\__init__.py	0	0	0	100%
base\tests\test_filters.py	0	0	0	100%
base\tests\test_forms.py	6	0	0	100%
base\tests\test_views.py	106	0	0	100%
base\views.py	73	6	0	92%
Total	**241**	**7**	**0**	**97%**

coverage.py v7.4.2, created at 2024-02-23 23:56 +0600

Unit test for create_department, update_department and department_info:



```
========================================= 15 passed in 1.51s ==========================================
PS C:\Users\ACER\Desktop\SQA\sqa\CSE-455_SQA> coverage report
Name                                                      Stmts   Miss  Cover
-------------------------------------------------------------------------------
SQA_SMS\__init__.py                                           0      0   100%
SQA_SMS\test_settings.py                                      3      0   100%
base\__init__.py                                              0      0   100%
base\admin.py                                                 3      0   100%
base\filters.py                                               0      0   100%
base\forms.py                                                15      0   100%
base\migrations\0001_initial.py                               5      5     0%
base\migrations\0002_alter_department_date_created_and_more.py   4      4     0%
base\migrations\__init__.py                                   0      0   100%
base\models.py                                               14      0   100%
base\tests\__init__.py                                        0      0   100%
base\tests\test_forms.py                                     34      0   100%
base\tests\test_models.py                                    17      0   100%
base\tests\test_views.py                                     66      0   100%
base\views.py                                                37      0   100%
-------------------------------------------------------------------------------
TOTAL                                                       198      9    95%
PS C:\Users\ACER\Desktop\SQA\sqa\CSE-455_SQA> 
```