Effective Programming Practices for Economists

Software engineering

Writing simple (py)tests

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Reminder of the example

```
>>> raw = pd.read_csv("survey.csv")
>>> raw
```

	Q001	Q002	Q003
0	strongly disagree	agree	python
1	strongly agree	strongly agree	Python
2	-77	disagree	R
3	agree	-77	Python
4	-99	-99	Python
5	NaN	strongly agree	Python
6	neutral	strongly agree	Python
7	disagree	agree	python
8	strongly agree	-99	PYTHON
9	agree	-99	Ypthon

From the metadata you know

- Q001: I am a coding genius
- Q001: I learned a lot
- Q003: What is your favourite language

- -77 not readable
- -99 no reply

First function in clean_data.py

```python
def _clean_agreement_scale(sr):
    sr = sr.replace({"-77": pd.NA, "-99": pd.NA})
    categories = ["strongly disagree", "disagree", "neutral", "agree", "strongly agree"]
    dtype = pd.CategoricalDtype(categories=categories, ordered=True)
    return sr.astype(dtype)
```

A function in test_clean_data.py

Function’s properties:

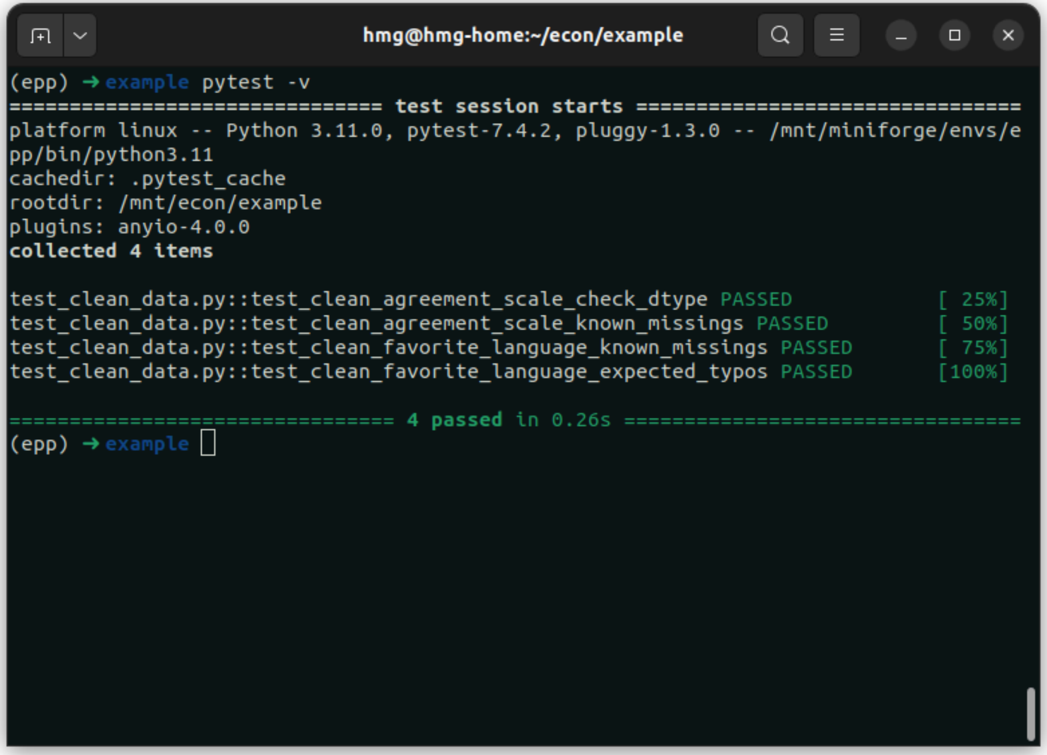
- starts with `test_`
- name explains what it does
- defines what we expect
- calls the function to be tested to calculate actual result
- asserts that actual and expected results coincide

```python
def test_clean_agreement_scale_check_dtype():
    expected = pd.CategoricalDtype(
        categories=[
            "strongly disagree",
            "disagree",
            "neutral",
            "agree",
            "strongly agree",
        ],
        ordered=True,
    )
    actual = _clean_agreement_scale(pd.Series([])).dtype
    assert expected == actual
```

Another function in test_clean_data.py

```python
def test_clean_agreement_scale_known_missings():
    result = _clean_agreement_scale(pd.Series(["-77", "-99"]))
    expected = pd.Series([pd.NA, pd.NA], dtype=result.dtype)
    pd.testing.assert_series_equal(result, expected)
```

Run pytest


hmg@hmg-home:~/econ/example

```
(epp) ➜ example pytest -v
================================= test session starts ==================================
platform linux -- Python 3.11.0, pytest-7.4.2, pluggy-1.3.0 -- /mnt/miniforge/envs/e
pp/bin/python3.11
cachedir: .pytest_cache
rootdir: /mnt/econ/example
plugins: anyio-4.0.0
collected 4 items

test_clean_data.py::test_clean_agreement_scale_check_dtype PASSED              [ 25%]
test_clean_data.py::test_clean_agreement_scale_known_missings PASSED           [ 50%]
test_clean_data.py::test_clean_favorite_language_known_missings PASSED         [ 75%]
test_clean_data.py::test_clean_favorite_language_expected_typos PASSED         [100%]

================================== 4 passed in 0.26s ===================================
(epp) ➜ example 
```

Basic rules

- Put tests in modules called `test_XXX.py` , with functions `test_YYY_ZZZ` , ...
  - `XXX` is the name of the module to be tested
  - `YYY` is the name of the function to be tested
  - `ZZZ` is a description of the behaviour being tested
- Inside these functions, keep structure clear:
  - Define expected result
  - Calculate actual result
  - Assert that they coincide
- Usually one assert statement per test function