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Факультет Информатика и системы управления  
Кафедра ИУ5 «Системы обработки информации и управления»

Дисциплина «Парадигмы и конструкции языков программирования»

Отчет по рубежному контролю №2

**«Модульное тестирование»**

Вариант №5

Запрос А.

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**Файл main.py:**

```
import requests

def main():
    print("Задача A1:")
    for item in requests.get_A1():
        print(item)
    print("\nЗадача A2:")
    for item in requests.get_A2():
        print(item)
    print("\nЗадача A3:")
    for key, value in requests.get_A3().items():
        print(f"{key}: {value}")

if __name__ == "__main__":
    main()
```

**Файл data.py:**

```
from classes import Orchestra, Musician, MusiciansOrchestras

orchestras = [
    #id оркестра, название оркестра
    Orchestra(1, 'симфонический оркестр'),
    Orchestra(2, 'джазовый оркестр'),
    Orchestra(3, 'камерный оркестр'),
    Orchestra(4, 'народных инструментов'),
    Orchestra(5, 'духовой оркестр'),]

musicians = [
    #id музыканта, имя, зарплата, id оркестра
    Musician(1, 'Алексей', 30000, 1),
    Musician(2, 'Николай', 35000, 2),
    Musician(3, 'Иван', 40000, 3),
    Musician(4, 'Анастасия', 27000, 1),
    Musician(5, 'Мария', 25000, 4),]

#список объектов класса MusiciansOrchestras со связью м:м
#один музыкант может играть в нескольких оркестрах, в одном оркестре могут
играть разные музыканты
musicians_orchestras = [
    #(оркестр-музыкант)
    MusiciansOrchestras(1, 1),
    MusiciansOrchestras(1, 4),
    MusiciansOrchestras(2, 2),
    MusiciansOrchestras(2, 4),
    MusiciansOrchestras(3, 3),
    MusiciansOrchestras(4, 5),
    MusiciansOrchestras(5, 5),]
```

**Файл classes.py:**

```
class Orchestra: #класс "оркестр"
    def __init__(self, id, name):
        self.id = id
        self.name = name

class Musician: #класс "музыкант"
```

```

def __init__(self, id, name, salary, orchestra_id):
    self.id = id
    self.name = name
    self.salary = salary
    self.orchestra_id = orchestra_id

class MusiciansOrchestras: #для множественной связи м:м
    def __init__(self, orchestra_id, musician_id):
        self.orchestra_id = orchestra_id
        self.musician_id = musician_id

```

**Файл test\_requests1.py:**

```

import unittest
from requests import get_A1, get_A2, get_A3

class TestRequests(unittest.TestCase):

    def test_A1(self):
        result = get_A1()
        self.assertIsInstance(result, list)
        self.assertTrue(result, "нужен не пустой список")
        self.assertIsInstance(result[0], tuple)
        self.assertEqual(len(result[0]), 3)

    def test_A2(self):
        result = get_A2()
        self.assertIsInstance(result, list)
        self.assertTrue(result, "нужен не пустой список")
        salaries = [item[1] for item in result]
        self.assertEqual(salaries, sorted(salaries, reverse=True))
        if len(salaries) > 1:
            self.assertGreaterEqual(salaries[0], salaries[-1])

    def test_A3(self):
        result = get_A3()
        self.assertIsInstance(result, dict)
        for key in result:
            self.assertIn('оркестр', key)
            self.assertIsInstance(result[key], list)

```

**Файл requests.py:**

**1. Случай ошибки:**

```

from operator import itemgetter
import data

def get_A1():
    return []

def get_A2():
    return []

def get_A3():
    return []

```

The screenshot shows the PyCharm IDE interface. The code editor on the left displays `test_requests1.py` with the following content:

```
from operator import itemgetter
import data

def get_A1():
    return []

def get_A2():
    return []

def get_A3():
    return []
```

The terminal window on the right shows the execution of the script:

```
PS D:\Мой диск\язык\программирование\семестр 3\рк2> python -m unittest test_requests1.py
FFF
=====
FAIL: test_A1 (test_requests1.TestRequests.test_A1)
-----
Traceback (most recent call last):
-----
Traceback (most recent call last):
  File "D:\Мой диск\язык\программирование\семестр 3\рк2\test_requests1.py", line 16, in test_A2
    self.assertTrue(result, "нужен не пустой список")
    ^^^^^^^^^^
AssertionError: [] is not true : нужен не пустой список
=====
AssertionError: [] is not true : нужен не пустой список

FAIL: test_A3 (test_requests1.TestRequests.test_A3)
-----
Traceback (most recent call last):
  File "D:\Мой диск\язык\программирование\семестр 3\рк2\test_requests1.py", line 24, in test_A3
```

The screenshot shows the PyCharm IDE interface. The top navigation bar has tabs for 'test\_requests1.py', 'main.py', 'data.py', 'classes.py', and 'requests.py'. The 'requests.py' tab is currently active. The code editor displays the following Python code:

```
from operator import itemgetter
import data

def get_A1():
    return []

def get_A2():
    return []

def get_A3():
    return []
```

Below the code editor is a 'Terminal' window. It shows the execution of a test script. The terminal output is as follows:

```
Terminal: Local + ▾
self.assertTrue(result, "нужен пустой список")
=====
AssertionError: [] is not true : нужен пустой список

=====
FAIL: test_A3 (test_requests1.TestRequests.test_A3)
-----
Traceback (most recent call last):
  File "D:\Мой диск\лабы\программирование\семестр 3\рк2\test_requests1.py", line 24, in test_A3
    self.assertIsInstance(result, dict)
    ^^^^^^^^^^^^^^
AssertionError: [] is not an instance of <class 'dict'>

=====
Ran 3 tests in 0.002s

FAILED (failures=3)
```

## 2. Нет ошибки:

```
from operator import itemgetter  
import data
```

```
def get_A1():
    one_to_many = [(m.name, m.salary, o.name)
                   for o in data.orchestras
                   for m in data.musicians
                   if m.orchestra_id == o.id]
    sorted_result = sorted(one_to_many, key=itemgetter(2))
    return sorted_result

def get_A2():
```

```

one_to_many = [(m.name, m.salary, o.name)
               for o in data.orchestras
               for m in data.musicians
               if m.orchestra_id == o.id]
res = []
for o in data.orchestras:
    orch_musicians = list(filter(lambda i: i[2] == o.name, one_to_many))
    if len(orch_musicians) > 0:
        total_salary = sum(m[1] for m in orch_musicians)
        res.append((o.name, total_salary))
sorted_res = sorted(res, key=itemgetter(1), reverse=True)
return sorted_res

def get_A3():
    many_to_many_temp = [
        (o.name, mo.orchestra_id, mo.musician_id)
        for o in data.orchestras
        for mo in data.musicians_orchestras
        if o.id == mo.orchestra_id
    ]
    many_to_many = [
        (m.name, m.salary, o_name)
        for o_name, o_id, m_id in many_to_many_temp
        for m in data.musicians
        if m.id == m_id
    ]
    filtered_orchestras = [name for name in set(d.name for d in data.orchestras) if 'оркестр' in
                           name]
    res = {}
    for orchestra_name in filtered_orchestras:
        musicians_in_orchestra = list(filter(lambda i: i[2] == orchestra_name, many_to_many))
        musician_names = [m[0] for m in musicians_in_orchestra]
        res[orchestra_name] = musician_names
    return res

```

The screenshot shows the PyCharm IDE interface. The code editor displays a Python file named `test_requests1.py`. The code implements a function `get_A30` that filters orchestras based on their name and then retrieves musicians from those orchestras. The terminal below shows the command `python -m unittest test_requests1.py` being run, followed by the output indicating 3 tests ran in 0.0001 seconds and the result was `OK`.

```
test_requests1.py x main.py x data.py x classes.py x requests.py x
+- 05
; 55
; 56
; 57
] 58 many_to_many = [
; 59     (m.name, m.salary, o_name)
; 60     for o_name, o_id, m_id in many_to_many_temp
; 61     for m in data.musicians
; 62     if m.id == m_id
; 63 ]
; 64 filtered_orchestras = [name for name in set(d.name for d in data.orchestras) if 'оркестр' in name]
; 65 res = {}
; 66 for orchestra_name in filtered_orchestras:
; 67     musicians_in_orchestra = list(filter(lambda i: i[2] == orchestra_name, many_to_many))
; 68     musician_names = [m[0] for m in musicians_in_orchestra]
; 69     res[orchestra_name] = musician_names
; 70
return res

> | get_A30
Terminal: Local + ▾
PS D:\Мой диск\вуз\программирование\семестр 3\рк2> python -m unittest test_requests1.py
...
-----
Ran 3 tests in 0.0001s

OK
```