

Код

```
main.py x
1  # вариант запроса Д
2  # вариант предметной области 19 : Деталь - Производитель
3  from operator import itemgetter
4
5
6  class Detail:
7      # Деталь
8      def __init__(self, id, type, weight, developer_id):
9          self.id = id
10         self.type = type
11         self.weight = weight
12         self.developer_id = developer_id
13
14
15  class Developer:
16      # Производитель
17      def __init__(self, id, name):
18          self.id = id
19          self.name = name
20
21
22  class DetDev:
23      # деталь производителя для реализации связи многие-ко-многим
24      def __init__(self, det_id, dev_id):
25          self.det_id = det_id
26          self.dev_id = dev_id
27
28      # Производители
29      developers = [
30          Developer(1, "Venta"),
31          Developer(2, "VentPremium"),
32          Developer(3, "SanKei"),
```

```
33     Developer(4, "DetalProm"),
34     Developer(5, "DetMos"),
35     Developer(6, "DetSPB")
36 ]
37
38 # Детали
39 details = [
40     Detail(1, "Motor", 300, 1),
41     Detail(2, "Brake disk", 10, 2),
42     Detail(3, "Bearing", 1, 2),
43     Detail(4, "Machine candles", 1, 3),
44     Detail(5, "Headlights", 9, 3),
45     Detail(6, "Battery", 15, 3),
46     Detail(7, "Exhaust pipes", 18, 4)
47 ]
48
49 details_developers = [
50     DetDev(1, 1),
51     DetDev(2, 2),
52     DetDev(2, 3),
53     DetDev(3, 4),
54     DetDev(3, 5),
55     DetDev(3, 6),
56     DetDev(4, 7),
57     DetDev(4, 1),
58     DetDev(5, 2),
59     DetDev(5, 3),
60     DetDev(5, 4),
61     DetDev(5, 5),
62     DetDev(6, 6),
63     DetDev(6, 7),
64 ]
```

```

86 def main():
87     # соединение данных один-ко-многим
88     one_to_many = [(dl.type, dl.weight, dr.name)
89                     for dr in developers
90                     for dl in details
91                     if dl.developer_id == dr.id]
92
93     # соединение данных многие-ко-многим
94
95     many_to_many_temp = [(dr.name, dldr.dev_id, dldr.det_id)
96                           for dr in developers
97                           for dldr in details_developers
98                           if dr.id == dldr.dev_id]
99
100    many_to_many = [(dl.type, dl.weight, dev_name)
101                    for dev_name, dev_id, det_id in many_to_many_temp
102                    for dl in details if dl.id == det_id]
103
104    print('Пункт Д1')
105    res1 = []
106    for i in one_to_many:
107        if i[0][-2:] == "es":
108            res1.append(i[0:3:2])
109    print(res1)
110
111    print('\nПункт Д2')
112    res2_unsorted = []
113    for dr in developers:
114        dr_details = list(filter(lambda i: i[2] == dr.name, one_to_many))
115        if len(dr_details) > 0:
116            dr_weight = [listeners for _, listeners, _ in dr_details]
117            dr_weight_sum = sum(dr_weight)
118
119            dr_weight_count = len(dr_weight)
120            dr_weight_average = dr_weight_sum / dr_weight_count
121            res2_unsorted.append((dr.name, int(dr_weight_average)))
122    res2 = sorted(res2_unsorted, key=itemgetter(1), reverse=True)
123    print(res2)
124
125    print('\nПункт Д3')
126    res3 = {}
127    for dr in developers:
128        if dr.name[0] == "V":
129            dr_details = list(filter(lambda i: i[2] == dr.name, many_to_many))
130            dr_details_types = [x for x, _, _ in dr_details]
131            res3[dr.name] = dr_details_types
132    print(res3)
133
134    if __name__ == '__main__':
135        main()

```

Результат выполнения:

```
main x
C:\Users\Fedor\Desktop\ШКОЛА\РИП_Д31\Scripts\python.exe C:/Users/Fedor/PycharmProjects/РИП_Д31/main.py
Пункт Д1
[('Machine candles', 'SanKei'), ('Exhaust pipes', 'DetaProm')]

Пункт Д2
[('Venta', 300), ('DetaProm', 18), ('SanKei', 8), ('VentPremium', 5)]

Пункт Д3
{'Venta': ['Motor', 'Machine candles'], 'VentPremium': ['Brake disk', 'Headlights']}

Process finished with exit code 0
```