**Код**

# вариант запроса Д  
# вариант предметной области 12 : язык программирования - средство разработки  
from operator import itemgetter  
  
  
class ProgramLanguage:  
 # язык программирования  
 def \_\_init\_\_(self, id, name, users, DT\_id):  
 self.id = id  
 self.name = name  
 self.users = users  
 self.DT\_id = DT\_id  
  
  
class DevelopmentTool:  
 # средство разарботки  
 def \_\_init\_\_(self, id, name):  
 self.id = id  
 self.name = name  
  
  
class PL\_DT:  
 # язык программирования средства разработки для реализации связи  
 # многие-ко-многим  
 def \_\_init\_\_(self, DT\_id, PL\_id):  
 self.DT\_id = DT\_id  
 self.PL\_id = PL\_id  
  
# средства разработки  
DT = [  
 DevelopmentTool(1, "Microsoft Visual Studio"),  
 DevelopmentTool(2, "NetBeans"),  
 DevelopmentTool(3, "PyCharm"),  
  
 DevelopmentTool(4, "IntelliJ IDEA"),  
 DevelopmentTool(5, "Eclipse"),  
 DevelopmentTool(6, "Aptana Studio 3")  
]  
  
# языки программирования  
PL = [  
 ProgramLanguage(1, "JavaScript", 1604219, 1),  
 ProgramLanguage(2, "C#", 229995, 1),  
 ProgramLanguage(3, "C++", 330259, 1),  
 ProgramLanguage(4, "C", 202295, 2),  
 ProgramLanguage(5, "Java", 763783, 2),  
 ProgramLanguage(6, "Python", 744045, 3),  
 ProgramLanguage(7, "CSS", 271782, 3),  
 ProgramLanguage(8, "Ruby", 740610, 3),  
 ProgramLanguage(9, "TypeScript", 55587, 3),  
 ProgramLanguage(10, "PHP", 478153, 4),  
 ProgramLanguage(11, "HTML", 120451, 4),  
]  
  
PL\_DT\_v = [  
 PL\_DT(1, 1),  
 PL\_DT(1, 2),  
 PL\_DT(1, 3),  
 PL\_DT(2, 4),  
 PL\_DT(2, 5),  
 PL\_DT(3, 6),  
 PL\_DT(3, 7),  
 PL\_DT(3, 8),  
 PL\_DT(3, 9),  
 PL\_DT(4, 10),  
 PL\_DT(4, 11),  
 PL\_DT(5, 3),  
 PL\_DT(5, 4),  
 PL\_DT(5, 5),  
 PL\_DT(5, 9),  
 PL\_DT(6, 1),  
 PL\_DT(6, 6),  
]  
  
def main():  
 # соединение данных один-ко-многим  
 one\_to\_many = [(p.name, p.users, d.name)  
 for d in DT  
 for p in PL  
 if p.DT\_id == d.id]  
  
 # соединение данных многие-ко-многим  
 many\_to\_many\_temp = [(d.name, pd.DT\_id, pd.PL\_id)  
 for d in DT  
 for pd in PL\_DT\_v  
 if d.id == pd.DT\_id]  
  
 many\_to\_many = [(p.name, p.users, DT\_name)  
 for DT\_name, DT\_id, PL\_id in many\_to\_many\_temp  
 for p in PL if p.id == PL\_id]  
  
 print('Задание Д1')  
 res1 = []  
 for i in one\_to\_many:  
 if i[0][-2:] == "pt":  
 res1.append(i[0:3:2])  
 print(res1)  
  
 print('\nЗадание Д2')  
 res2\_unsorted = []  
 for d in DT:  
 DT\_ProL = list(filter(lambda i: i[2] == d.name, one\_to\_many))  
 if len(DT\_ProL) > 0:  
 d\_users = [users for \_, users, \_ in DT\_ProL]  
 d\_users\_sum = sum(d\_users)  
 d\_users\_count = len(d\_users)  
 d\_users\_count\_average = d\_users\_sum / d\_users\_count  
 res2\_unsorted.append((d.name, int(d\_users\_count\_average)))  
 res2 = sorted(res2\_unsorted, key=itemgetter(1), reverse=True)  
 print(res2)  
  
 print('\nЗадание Д3')  
 res3 = {}  
 for d in DT:  
 if d.name[0] == "M":  
 DT\_ProL = list(filter(lambda i: i[2] == d.name, many\_to\_many))  
 DT\_ProL\_names = [x for x, \_, \_ in DT\_ProL]  
 res3[d.name] = DT\_ProL\_names  
 print(res3)  
  
  
if \_\_name\_\_ == '\_\_main\_\_':  
 main()

**Результат**

"D:\Ильягу\5 семестр\RK1\lab\Scripts\python.exe" "D:/Ильягу/5 семестр/RK1/RK1.py"

Задание Д1

[('JavaScript', 'Microsoft Visual Studio'), ('TypeScript', 'PyCharm')]

Задание Д2

[('Microsoft Visual Studio', 721491), ('NetBeans', 483039), ('PyCharm', 453006), ('IntelliJ IDEA', 299302)]

Задание Д3

{'Microsoft Visual Studio': ['JavaScript', 'C#', 'C++']}

Process finished with exit code 0

