Код программы

```
from operator import itemgetter

class Comp:
  def __init__(self, id, model):
    self.id = id
    self.model = model

class Browser:
  def __init__(self, id, name, visits, comp_id):
    self.id = id
    self.name = name
    self.visits = visits
    self.comp_id = comp_id

class Comp_Browser:
  def __init__(self, comp_id, browser_id):
    self.comp_id = comp_id
    self.browser_id = browser_id

#Computers

computers = [
  Comp(1, "Dell XPS 8960"),
  Comp(2, "Latitude 5440"),
  Comp(3, "Alienware Aurora R16"),
  Comp(4, "Latitude 8434"),
  Comp(5, "Latitude 9050"),
  Comp(6, "Origin Millennium 5000D")
]

#Browsers

browsers = [
  Browser(1, "Chrome", 700, 2),
  Browser(2, "Microsoft Edge", 600, 3),
  Browser(3, "Internet Explorer", 200, 4),
  Browser(4, "Avast Secure Browser", 350, 5),
  Browser(5, "Firefox", 550, 1),
  Browser(6, "Vivaldi", 620,  6),
  Browser(7, "Brave", 590, 2),
  Browser(8, "Opera", 330, 4),
  Browser(9, "Yandex Browser", 600, 3),
  Browser(10, "Apple Safari", 400, 5)
]

browsers_comps = [
  Comp_Browser(1,3),
  Comp_Browser(2,4),
  Comp_Browser(3,6),
```

```
  Comp_Browser(5,2),
  Comp_Browser(2,7),
  Comp_Browser(6,8),
  Comp_Browser(1,10),
  Comp_Browser(3,2),
  Comp_Browser(4,7),
  Comp_Browser(5,5),
  Comp_Browser(4,2),
  Comp_Browser(6,3)
]

def main():

# Соединение данных один-ко-многим
  one_to_many = [(b.name, b.visits, c.model)
      for c in computers
      for b in browsers
      if b.comp_id==c.id]

# Соединение данных многие-ко-многим
  many_to_many_temp = [(c.model, cb.comp_id, cb.browser_id)
      for c in computers
      for cb in browsers_comps
      if c.id==cb.comp_id]

  many_to_many = [(b.name, comp_model)
      for comp_model, comp_id, browser_id in many_to_many_temp
      for b in browsers if b.id==browser_id]

  print('Задание E1')
  print(list(filter(lambda i: i[2].find('Latitude') != -1, one_to_many)),
end='\n\n')

  print('Задание E2')
  res_unsorted = []

  for c in computers:
    comp_browsers = list(filter(lambda i: i[2] == c.model, one_to_many))
    if len(comp_browsers) > 0:
      c_visits = [visits for _, visits,_ in comp_browsers]
      c_visits_sum = round(sum(c_visits)/len(comp_browsers), 2)
      res_unsorted.append((c.model, c_visits_sum))

  res = sorted(res_unsorted, key=itemgetter(1), reverse=True)
  print(res, end='\n\n')

  print('Задание E3')
  print(list(filter(lambda i: i[0].find('A') != -1, many_to_many)))

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

Результат выполнения

Задание E1

```
[('Chrome', 700, 'Latitude 5440'),
('Brave', 590, 'Latitude 5440'),
('Internet Explorer', 200, 'Latitude 8434'),
('Opera', 330, 'Latitude 8434'),
('Avast Secure Browser', 350, 'Latitude 9050'),
('Apple Safari', 400, 'Latitude 9050')]
```

Задание E2

```
[('Latitude 5440', 645.0),
('Origin Millennium 5000D', 620.0),
('Alienware Aurora R16', 600.0),
('Dell XPS 8960', 550.0),
('Latitude 9050', 375.0),
('Latitude 8434', 265.0)]
```

Задание E3

```
[('Apple Safari', 'Dell XPS 8960'),
('Avast Secure Browser', 'Latitude 5440')]
```