Question 1

```
# Reading the sample data
import pandas as pd
data = pd.read_csv("/content/2019 Winter Data Science Intern Challenge Data Set - Sheet1.csv'
data.head()
```

	order_id	shop_id	user_id	order_amount	total_items	payment_method	created_at
0	1	53	746	224	2	cash	2017-03-13 12:36:56
1	2	92	925	90	1	cash	2017-03-03 17:38:52
2	3	44	861	144	1	cash	2017-03-14 4:23:56
							2017-03-26

```
# Data cleaning (handling missing data)
data.isna().any()
```

```
order_id          False
shop_id           False
user_id           False
order_amount      False
total_items       False
payment_method    False
created_at        False
dtype: bool
```

```
data.describe()
```

	order_id	shop_id	user_id	order_amount	total_items
count	5000.000000	5000.000000	5000.000000	5000.000000	5000.00000
mean	2500.500000	50.078800	849.092400	3145.128000	8.78720
std	1443.520003	29.006118	87.798982	41282.539349	116.32032
min	1.000000	1.000000	607.000000	90.000000	1.00000
25%	1250.750000	24.000000	775.000000	163.000000	1.00000
50%	2500.500000	50.000000	849.000000	284.000000	2.00000
75%	3750.250000	75.000000	925.000000	390.000000	3.00000
max	5000.000000	100.000000	999.000000	704000.000000	2000.00000

The mean of order_amount is 3145.128 which is provided in the question. Here we can see there is a huge difference between min max values of order_amount which means it is possible that data has outlier.

a. A Better Way to Evaluate Data.

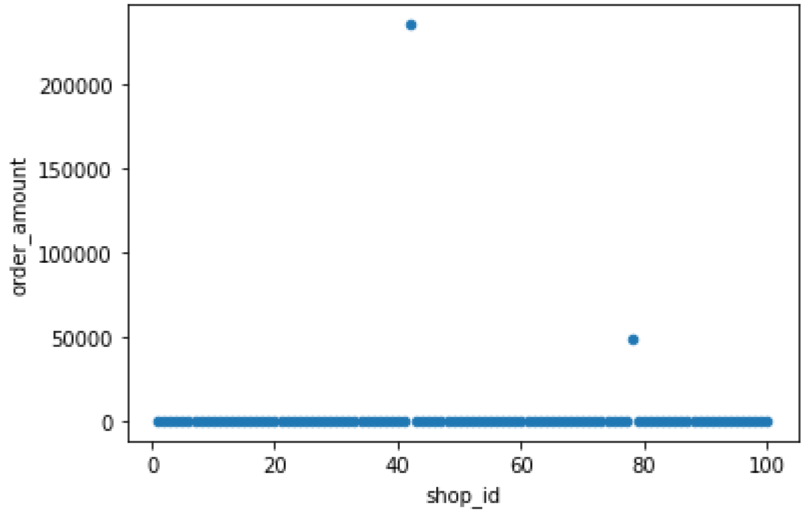
Let us calculate AOV by store(shop_id) first and visualize those values

```
store = data.groupby("shop_id").mean()
store.sort_values(by="order_amount",ascending=False).head()
```

shop_id	order_id	user_id	order_amount	total_items
42	2441.921569	758.588235	235101.490196	667.901961
78	2663.021739	867.739130	49213.043478	1.913043
50	2162.431818	834.500000	403.545455	2.090909
90	2694.163265	839.857143	403.224490	2.265306
38	2639.714286	837.800000	390.857143	2.057143

```
store.reset_index().plot.scatter(x='shop_id',y='order_amount')
```

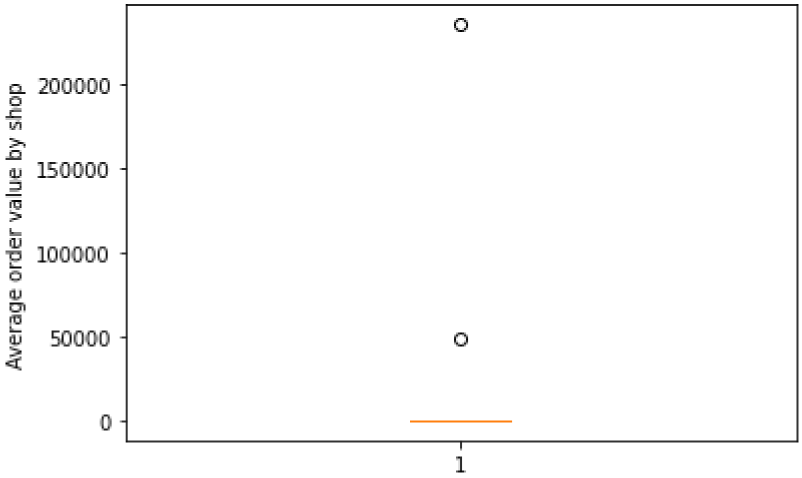
```
<matplotlib.axes._subplots.AxesSubplot at 0x7fb3155b62d0>
```



```
import matplotlib.pyplot as plt
```

```
plt.boxplot(store['order_amount'])
plt.ylabel("Average order value by shop")
```

```
Text(0, 0.5, 'Average order value by shop')
```



Here we can see there are two outliers which has impacted the mean. shop 42 and 78 have extreme average order values.

b. What metric can be used then.

If these two values were either errors we can remove them but if they aren't then we could use median instead of mean which will only provide the middle most value instead of average value.

c. What is the value.

```
data['order_amount'].median()
```

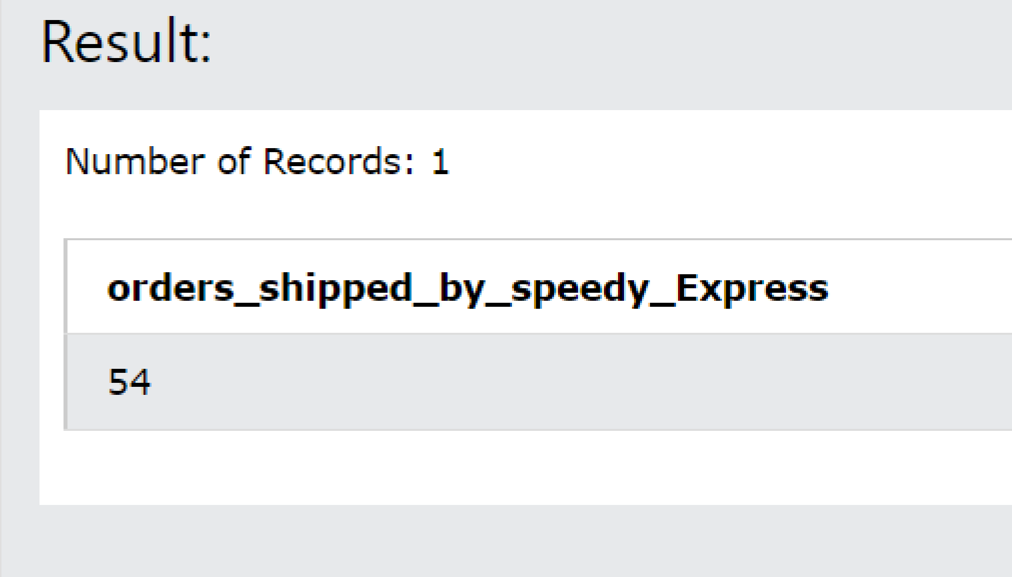
```
284.0
```

So $284 is the value that can be used instead of 3145.128

Question 2

a. How many orders were shipped by Speedy Express in total?

SELECT count(*) as orders_shipped_by_speedy_Express FROM Orders where ShipperID in (Select ShipperID from Shippers where ShipperName="Speedy Express")



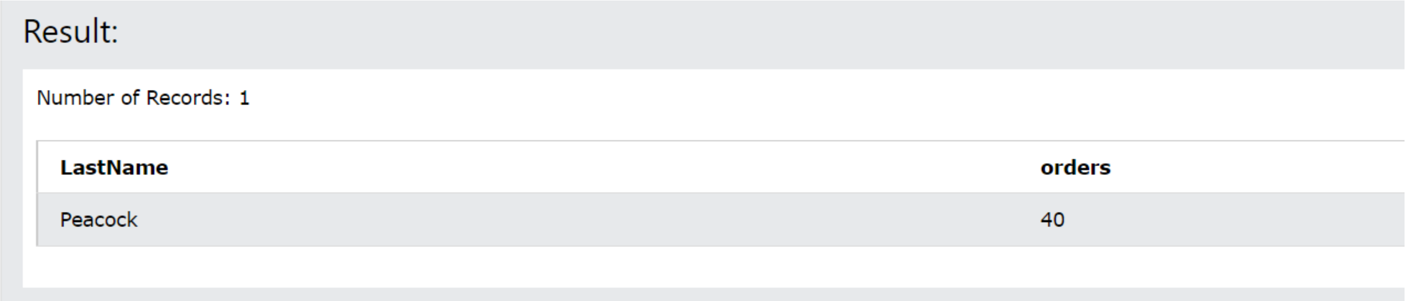
Result:

Number of Records: 1

orders_shipped_by_speedy_Express
54

b. What is the last name of the employee with the most orders?

select LastName, count() *as orders from Orders JOIN Employees on Orders.EmployeeID = Employees.EmployeeID group by LastName order by count*() desc limit(1);



Result:

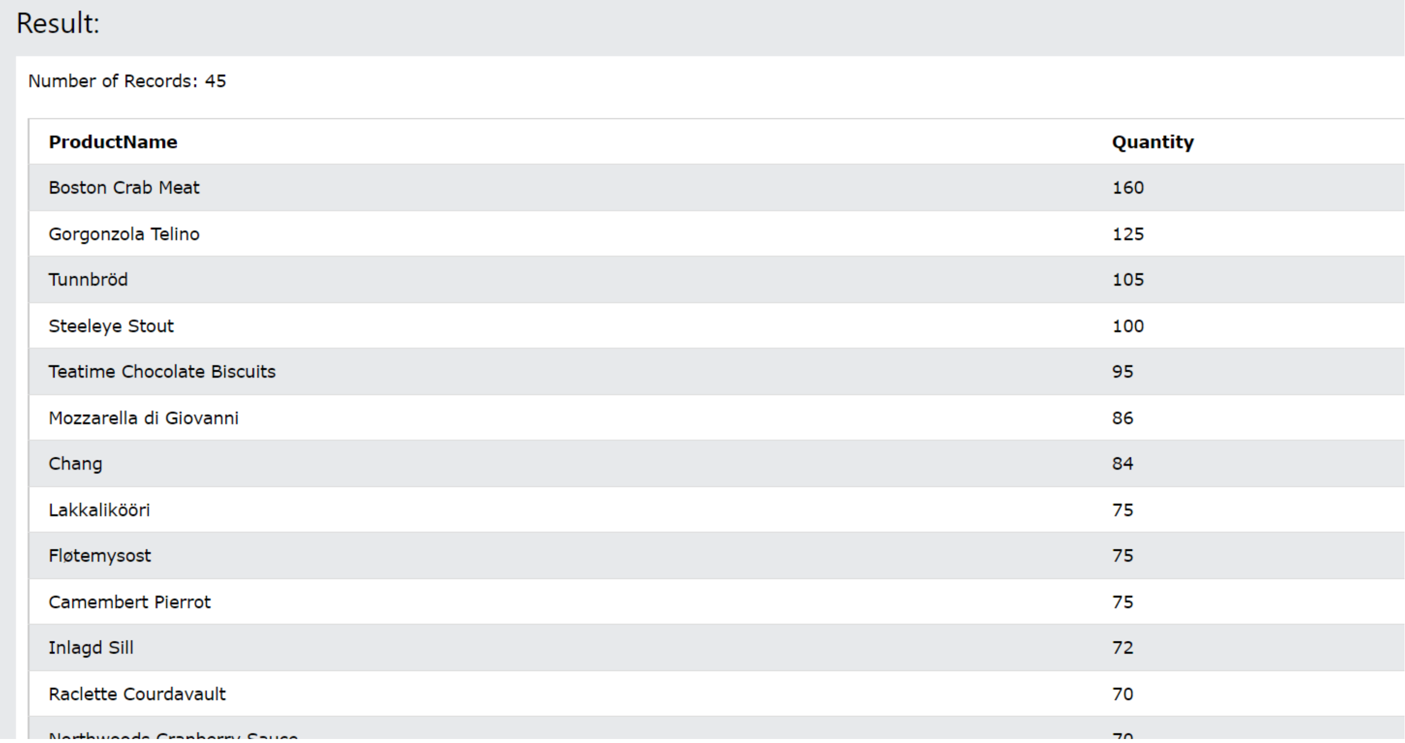
Number of Records: 1

LastName	orders
Peacock	40

Peacock is the lastname of the employee with most orders

c. What product was ordered the most by customers in Germany?

SELECT ProductName,sum(Quantity) as Quantity FROM OrderDetails Join Products on OrderDetails.ProductID = Products.ProductID where OrderID IN (Select Orders.OrderID from customers join Orders on Customers.CustomerID=Orders.CustomerID where Country='Germany' order by OrderID) group by Products.ProductID order by Quantity desc;



Result:

Number of Records: 45

ProductName	Quantity
Boston Crab Meat	160
Gorgonzola Telino	125
Tunnbröd	105
Steeleye Stout	100
Teatime Chocolate Biscuits	95
Mozzarella di Giovanni	86
Chang	84
Lakkalikööri	75
Fløtemysost	75
Camembert Pierrot	75
Inlagd Sill	72
Raclette Courdavault	70
Northwoods Cranberry Sauce	70

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