

Case Study 5 Homework: Exercises 1-4

Exercise 1

1/1 point (graded)

In Exercise 1, we will group the dataframe by `birdname` and then find the average `speed_2d` for each bird. `pandas` makes it easy to perform basic operations on groups within a dataframe without needing to loop through each value in the dataframe.

Instructions

Fill in the code to find the mean altitudes of each bird using the pre-loaded `birddata` dataframe.

Here is the code:

```
# First, use `groupby()` to group the data by  
"bird_name".
```

```
grouped_birds =
```

```
# Now calculate the mean of `speed_2d` using the  
`mean()` function.
```

```
mean_speeds =
```

```
# Find the mean `altitude` for each bird.
```

```
mean_altitudes =
```

What is the mean speed for Sanne?

Answer = [2.4504341163584806]

```
Code = [
grouped_birds = birddata.groupby("bird_name")
mean_speeds = grouped_birds.speed_2d.mean()
mean_altitudes = grouped_birds.altitude.mean()

mean_speeds
bird_name
Eric      2.300545
Nico      2.908726
Sanne     2.450434
Name: speed_2d, dtype: float64

]
```

Exercise 2

1/1 point (graded)

In Exercise 2, we will group the flight times by date and calculate the mean altitude within that day.

Instructions

Convert `birddata.date_time` to the `pd.datetime` format, and store as `birddata["date"]`.

Fill in the code below to find the mean altitudes for each day:

```
# Convert birddata.date_time to the `pd.datetime`
format.
```

```
birddata.date_time =
```

```
# Create a new column of day of observation
birddata["date"] =
```

```
# Use `groupby()` to group the data by date.
grouped_bydates =
```

```
# Find the mean `altitude` for each date.  
mean_altitudes_perday =
```

What is the mean altitude of the birds on 2013-09-12?

Answer = [75.64609053497942]

Code = [

```
birddata.date_time = pd.to_datetime(birddata.date_time)  
birddata["date"] = birddata.date_time.dt.date  
grouped_bydates = birddata.groupby("date")  
mean_altitudes_perday = grouped_bydates.altitude.mean()
```

```
mean_altitudes_perday  
date  
2013-08-15    134.092000  
2013-08-16    134.839506  
2013-08-17    147.439024  
2013-08-18    129.608163  
2013-08-19    180.174797  
2013-08-20    184.461224  
2013-08-21    171.546185  
2013-08-22    114.172691  
2013-08-23    144.716049  
2013-08-24    101.446721  
2013-08-25     93.162602  
2013-08-26     75.995951  
2013-08-27     84.591093  
2013-08-28    111.210526  
2013-08-29    177.421488  
2013-08-30     92.520161  
2013-08-31    160.975904  
2013-09-01     84.753086  
2013-09-02     88.128514  
2013-09-03     93.975709  
2013-09-04     90.717213  
2013-09-05     87.264000  
2013-09-06     89.020492  
2013-09-07    103.412955  
2013-09-08     76.566265  
2013-09-09     81.483471  
2013-09-10     90.618852  
2013-09-11     77.222672  
2013-09-12     75.646091  
2013-09-13     66.615079  
...  
2014-04-01    115.797571  
2014-04-02     13.589431  
2014-04-03     26.772727
```

```
2014-04-04    101.441667
2014-04-05     96.995536
2014-04-06     13.426540
2014-04-07     27.105000
2014-04-08      9.597087
2014-04-09     22.845411
2014-04-10     18.937500
2014-04-11      9.602871
2014-04-12     13.224390
2014-04-13     12.143564
2014-04-14     95.826087
2014-04-15    166.738095
2014-04-16    167.280193
2014-04-17     59.231527
2014-04-18     27.592233
2014-04-19     47.674641
2014-04-20    103.358586
2014-04-21    385.152709
2014-04-22    126.741627
2014-04-23     78.962963
2014-04-24     19.071038
2014-04-25     17.726316
2014-04-26     15.118012
2014-04-27     23.897297
2014-04-28     37.716867
2014-04-29     19.244792
2014-04-30     13.954545
Name: altitude, Length: 259, dtype: float64
```

]

Exercise 3

1/1 point (graded)

In Exercise 3, we will group the flight times by both bird and date, and calculate the mean altitude for each.

Instructions

Note that `birddata` already contains the `date` column. To find the average speed for each bird and day, create a new grouped dataframe called `grouped_birdday` that groups the data by both `bird_name` and date.

Fill in the following code for this exercise:

```
# Use `groupby()` to group the data by bird and date.  
grouped_birdday =
```

```
# Find the mean `altitude` for each bird and date.  
mean_altitudes_perday =
```

What is the mean altitude of the bird Eric on 2013-08-18?

Answer = [121.35365853658537]

Code = [

```
    grouped_birdday = birddata.groupby(["bird_name", "date"])  
    mean_altitudes_perday = grouped_birdday.altitude.mean()
```

```
mean_altitudes_perday.head()
```

bird_name	date	
Eric	2013-08-15	74.988095
	2013-08-16	127.773810
	2013-08-17	125.890244
	2013-08-18	121.353659
	2013-08-19	134.928571

```
Name: altitude, dtype: float64
```

]

Exercise 4

1 point possible (graded)

In Exercise 4, we will find the average speed for each bird and day.

Instructions

Store the average speeds for each bird and day as three `pandas Series` objects, one for each bird, then use the plotting code provided to plot the average speeds for each bird.

Here is the code to moldify for this exercise:

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

```
eric_daily_speed = # Enter your code here.  
sanne_daily_speed = # Enter your code here.  
nico_daily_speed = # Enter your code here.
```

```
eric_daily_speed.plot(label="Eric")  
sanne_daily_speed.plot(label="Sanne")  
nico_daily_speed.plot(label="Nico")  
plt.legend(loc="upper left")  
plt.show()
```

What is the mean speed of the bird Nico on 2014-04-04?

Answer = [2.832]

Code = [

```
import matplotlib.pyplot as plt  
  
eric_daily_speed = grouped_birdday.speed_2d.mean()["Eric"]  
sanne_daily_speed = grouped_birdday.speed_2d.mean()["Sanne"]  
nico_daily_speed = grouped_birdday.speed_2d.mean()["Nico"]  
  
eric_daily_speed.plot(label="Eric")  
sanne_daily_speed.plot(label="Sanne")  
nico_daily_speed.plot(label="Nico")  
plt.legend(loc="upper left")
```

```
plt.show()  
  
nico_daily_speed  
  
]
```