In [18]:

```
from IPython.display import HTML
from IPython.display import display
tag = HTML('''<script>
code_show=true;
function code_toggle() {
    if (code_show){
        $('div.cell.code_cell.rendered.selected div.input').hide();
    } else {
        $('div.cell.code_cell.rendered.selected div.input').show();
    }
    code_show = !code_show
}
$( document ).ready(code_toggle);
</script>
<style>
.border { border-width: 2px; border-color: black; border-style: solid; }
</style>
''')
display(tag)
```

Programming in Python II - Project¶

For this project, you have to provide the solutions for the following 3 questions. Code your answers directly into the cell after each question. Be sure to run them to ensure that your code works. After you have filled up the answers, proceed back to where you downloaded this file to submit your solutions!

All the best!

Question 1 - Advanced Python¶

Given the following statements containing a list with 3 tuples (each tuple describes a book title, pages, and price):¶

In [2]:

```
lst = [('Beginning iOS Programming', 534, 34.99),
       ('Beginning Android Programming', 484, 29.99),
       ('Python Machine Learning', 284, 39.99)]
```

Using a lambda function, write the statement to sort the list of tuples based on:¶

a. Book Title (alphabetical order)¶

In [3]:

```
#---type your answer here---
```

b. Number of Pages (ascending order)¶

In [4]:

```
#---type your answer here---
```

c. Price (descending order; i.e. most expensive to the cheapest)¶

In [5]:

```
#---type your answer here---
```

Question 2 - NumPy¶

Given the following code:

In [6]:

```
import numpy as np
a1 = np.round(20 * np.random.random((4,5)), 2)
```

a. Print out the `a1` array.¶

In [7]:

```
#---type your answer here---
```

b. Find and list out the mean of each row in the array¶

In [8]:

```
#---type your answer here---
```

c. In the `a1` array, find the number that is closest to the smallest mean.¶

Hint: You will need to use a combination of numpy functions such as flat, abs, and argmin)

In [9]:

```
#---type your answer here---
```

Question 3 - Pandas¶

For this question, you are given the following dataset - **Automobile_data.csv**.

In [10]:

```
import pandas as pd

df = pd.read_csv("Automobile_data.csv")
```

a. Print the first 5 rows and the last 7 rows of the dataset, like this:¶

	index	company	body-style	wheel-base	length	engine-type	num-of-cylinders	horsepower	average-mileage	price
0	0	alfa-romero	convertible	88.6	168.8	dohc	four	111	21	13495.0
1	1	alfa-romero	convertible	88.6	168.8	dohc	four	111	21	16500.0
2	2	alfa-romero	hatchback	94.5	171.2	ohcv	six	154	19	16500.0
3	3	audi	sedan	99.8	176.6	ohc	four	102	24	13950.0
4	4	audi	sedan	99.4	176.6	ohc	five	115	18	17450.0

	index	company	body-style	wheel-base	length	engine-type	num-of-cylinders	horsepower	average-mileage	price
54	79	toyota	wagon	104.5	187.8	dohc	six	156	19	15750.0
55	80	volkswagen	sedan	97.3	171.7	ohc	four	52	37	7775.0
56	81	volkswagen	sedan	97.3	171.7	ohc	four	85	27	7975.0
57	82	volkswagen	sedan	97.3	171.7	ohc	four	52	37	7995.0
58	86	volkswagen	sedan	97.3	171.7	ohc	four	100	26	9995.0
59	87	volvo	sedan	104.3	188.8	ohc	four	114	23	12940.0
60	88	volvo	wagon	104.3	188.8	ohc	four	114	23	13415.0

In [11]:

```
#---type your answer here---
```

In [12]:

```
#---type your answer here---
```

b. Find the company with the most expensive car:¶

	index	company	body-style	wheel-base	length	engine-type	num-of-cylinders	horsepower	average-mileage	price
0	0	alfa-romero	convertible	88.6	168.8	dohc	four	111	21	13495.0
1	1	alfa-romero	convertible	88.6	168.8	dohc	four	111	21	16500.0
2	2	alfa-romero	hatchback	94.5	171.2	ohcv	six	154	19	16500.0
3	3	audi	sedan	99.8	176.6	ohc	four	102	24	13950.0
4	4	audi	sedan	99.4	176.6	ohc	five	115	18	17450.0

In [13]:

```
#---type your answer here---
```

c. Write the statements to print out each company's most expensive car:¶

company	price
alfa-romero	16500.0
audi	18920.0
bmw	41315.0
chevrolet	6575.0
dodge	6377.0
honda	12945.0
isuzu	6785.0
jaguar	36000.0
mazda	18344.0
mercedes-benz	45400.0
mitsubishi	8189.0
nissan	13499.0
porsche	37028.0
toyota	15750.0
volkswagen	9995.0
volvo	13415.0

In [14]:

```
#---type your answer here---
```

d. Write the statements to print out the average mileage of each car maker:¶

	index	company	body-style	wheel-base	length	engine-type	num-of-cylinders	horsepower	average-mileage	price
0	0	alfa-romero	convertible	88.6	168.8	dohc	four	111	21	13495.0
1	1	alfa-romero	convertible	88.6	168.8	dohc	four	111	21	16500.0
2	2	alfa-romero	hatchback	94.5	171.2	ohcv	six	154	19	16500.0
3	3	audi	sedan	99.8	176.6	ohc	four	102	24	13950.0
4	4	audi	sedan	99.4	176.6	ohc	five	115	18	17450.0

In [15]:

```
#---type your answer here---
```

e. For each car maker, print out the car maker's name, and show the price of each car (from most expensive to cheapest), like this:¶

```
alfa-romero
-----------
hatchback $16500.0
convertible $16500.0
convertible $13495.0

audi
----
wagon $18920.0
sedan $17450.0
sedan $15250.0
sedan $13950.0

...

mercedes-benz
-------------
```

```
hardtop $45400.0
sedan $40960.0
wagon $28248.0
sedan $25552.0

mitsubishi
----------
sedan $8189.0
sedan $6989.0
hatchback $6189.0
hatchback $5389.0

...

volkswagen
----------
sedan $9995.0
sedan $7995.0
sedan $7975.0
sedan $7775.0

volvo
-----
wagon $13415.0
sedan $12940.0
```

In [16]:

```
#---type your answer here---
```

f. You are tasked to create a program to help a user quickly extract rows of interest, up to two column names and their values.¶

```
Hints:
1) Create a function that accepts variable number of parameters
2) Prompt the user to enter the first column name (e.g., company)
3) Prompt the user to enter the first column value (e.g., dodge)
4) Prompt the user to enter the second column name (e.g., num-of-cylinders)
(Note: if user enters 'exit', it indicates they only wish to search by the first column name and value)
5) Prompt the user to enter the second column value (e.g., six) (Only applicable if user doesn't enter 'exit'
6) Call the function you have created in part 1 to display the result.

Note: In the above example, no results will be returned i.e., there are no dodge cars with six cyclinders.
```

In [17]:

```
#---type your answer here---
```

End of Project
