

## BIOS 60318 Francisco Huizar Assignment 7

### *Assignment*

**1. Write a function that returns the odd (1, 3, 5, etc.) rows of any pandas dataframe passed as an argument.**

```
In [1]: # Import necessary packages and data
import csv
import numpy as np
import pandas as pd
import os.path

data = pd.read_csv('iris.csv', header = 0, sep=",")
```

```
In [2]: def getOddRows(dataFrame):
    # Check if we are working with a pandas data frame
    if (isinstance(dataFrame, pd.pandas.core.frame.DataFrame)):
        # Get the number of rows and columns
        nRows = len(dataFrame.index)
        nCols = len(dataFrame.columns)

        # Create a null data frame we will return later
        newDataFrame = pd.DataFrame()

        # Get the odd rows appended to the newDataFrame
        for i in range(0, nRows):
            if (i % 2) == 0:
                # Do nothing because row is even
                pass
            else:
                toAppend = pd.DataFrame(dataFrame.iloc[i:i+1], columns=list(dataFrame.columns))
                newDataFrame = newDataFrame.append(toAppend)
                print(dataFrame.iloc[i:i+1,0:])
        else:
            print('You passed in an argument that is not a pandas data frame')
        return newDataFrame
```

```
In [3]: oddRowIris = getOddRows(data)
```

	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
1	4.9	3.0	1.4	0.2	setosa
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
3	4.6	3.1	1.5	0.2	setosa
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
5	5.4	3.9	1.7	0.4	setosa
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
7	5.0	3.4	1.5	0.2	setosa
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
9	4.9	3.1	1.5	0.1	setosa
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
11	4.8	3.4	1.6	0.2	setosa
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
13	4.3	3.0	1.1	0.1	setosa
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
15	5.7	4.4	1.5	0.4	setosa
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
17	5.1	3.5	1.4	0.3	setosa
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
19	5.1	3.8	1.5	0.3	setosa
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
21	5.1	3.7	1.5	0.4	setosa
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
23	5.1	3.3	1.7	0.5	setosa
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
25	5.0	3.0	1.6	0.2	setosa
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
27	5.2	3.5	1.5	0.2	setosa
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
29	4.7	3.2	1.6	0.2	setosa
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
31	5.4	3.4	1.5	0.4	setosa
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
33	5.5	4.2	1.4	0.2	setosa
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
35	5.0	3.2	1.2	0.2	setosa
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
37	4.9	3.6	1.4	0.1	setosa
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
39	5.1	3.4	1.5	0.2	setosa
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
41	4.5	2.3	1.3	0.3	setosa
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
43	5.0	3.5	1.6	0.6	setosa
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
45	4.8	3.0	1.4	0.3	setosa
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
47	4.6	3.2	1.4	0.2	setosa
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
49	5.0	3.3	1.4	0.2	setosa
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
51	6.4	3.2	4.5	1.5	versicolor
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
53	5.5	2.3	4.0	1.3	versicolor
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
55	5.7	2.8	4.5	1.3	versicolor
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species

57	4.9	2.4	3.3	1.0	versicolor
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
59	5.2	2.7	3.9	1.4	versicolor
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
61	5.9	3.0	4.2	1.5	versicolor
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
63	6.1	2.9	4.7	1.4	versicolor
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
65	6.7	3.1	4.4	1.4	versicolor
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
67	5.8	2.7	4.1	1.0	versicolor
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
69	5.6	2.5	3.9	1.1	versicolor
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
71	6.1	2.8	4.0	1.3	versicolor
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
73	6.1	2.8	4.7	1.2	versicolor
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
75	6.6	3.0	4.4	1.4	versicolor
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
77	6.7	3.0	5.0	1.7	versicolor
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
79	5.7	2.6	3.5	1.0	versicolor
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
81	5.5	2.4	3.7	1.0	versicolor
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
83	6.0	2.7	5.1	1.6	versicolor
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
85	6.0	3.4	4.5	1.6	versicolor
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
87	6.3	2.3	4.4	1.3	versicolor
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
89	5.5	2.5	4.0	1.3	versicolor
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
91	6.1	3.0	4.6	1.4	versicolor
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
93	5.0	2.3	3.3	1.0	versicolor
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
95	5.7	3.0	4.2	1.2	versicolor
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
97	6.2	2.9	4.3	1.3	versicolor
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
99	5.7	2.8	4.1	1.3	versicolor
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
101	5.8	2.7	5.1	1.9	virginica
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
103	6.3	2.9	5.6	1.8	virginica
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
105	7.6	3.0	6.6	2.1	virginica
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
107	7.3	2.9	6.3	1.8	virginica
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
109	7.2	3.6	6.1	2.5	virginica
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
111	6.4	2.7	5.3	1.9	virginica
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
113	5.7	2.5	5.0	2.0	virginica

	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
115	6.4	3.2	5.3	2.3	virginica
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
117	7.7	3.8	6.7	2.2	virginica
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
119	6.0	2.2	5.0	1.5	virginica
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
121	5.6	2.8	4.9	2.0	virginica
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
123	6.3	2.7	4.9	1.8	virginica
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
125	7.2	3.2	6.0	1.8	virginica
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
127	6.1	3.0	4.9	1.8	virginica
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
129	7.2	3.0	5.8	1.6	virginica
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
131	7.9	3.8	6.4	2.0	virginica
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
133	6.3	2.8	5.1	1.5	virginica
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
135	7.7	3.0	6.1	2.3	virginica
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
137	6.4	3.1	5.5	1.8	virginica
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
139	6.9	3.1	5.4	2.1	virginica
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
141	6.9	3.1	5.1	2.3	virginica
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
143	6.8	3.2	5.9	2.3	virginica
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
145	6.7	3.0	5.2	2.3	virginica
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
147	6.5	3.0	5.2	2.0	virginica
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
149	5.9	3.0	5.1	1.8	virginica

In [4]: `print(oddRowIris)`

	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
1	4.9	3.0	1.4	0.2	setosa
3	4.6	3.1	1.5	0.2	setosa
5	5.4	3.9	1.7	0.4	setosa
7	5.0	3.4	1.5	0.2	setosa
9	4.9	3.1	1.5	0.1	setosa
11	4.8	3.4	1.6	0.2	setosa
13	4.3	3.0	1.1	0.1	setosa
15	5.7	4.4	1.5	0.4	setosa
17	5.1	3.5	1.4	0.3	setosa
19	5.1	3.8	1.5	0.3	setosa
21	5.1	3.7	1.5	0.4	setosa
23	5.1	3.3	1.7	0.5	setosa
25	5.0	3.0	1.6	0.2	setosa
27	5.2	3.5	1.5	0.2	setosa
29	4.7	3.2	1.6	0.2	setosa
31	5.4	3.4	1.5	0.4	setosa
33	5.5	4.2	1.4	0.2	setosa
35	5.0	3.2	1.2	0.2	setosa
37	4.9	3.6	1.4	0.1	setosa
39	5.1	3.4	1.5	0.2	setosa
41	4.5	2.3	1.3	0.3	setosa
43	5.0	3.5	1.6	0.6	setosa
45	4.8	3.0	1.4	0.3	setosa
47	4.6	3.2	1.4	0.2	setosa
49	5.0	3.3	1.4	0.2	setosa
51	6.4	3.2	4.5	1.5	versicolor
53	5.5	2.3	4.0	1.3	versicolor
55	5.7	2.8	4.5	1.3	versicolor
57	4.9	2.4	3.3	1.0	versicolor
59	5.2	2.7	3.9	1.4	versicolor
..	...	...	...	...	...
91	6.1	3.0	4.6	1.4	versicolor
93	5.0	2.3	3.3	1.0	versicolor
95	5.7	3.0	4.2	1.2	versicolor
97	6.2	2.9	4.3	1.3	versicolor
99	5.7	2.8	4.1	1.3	versicolor
101	5.8	2.7	5.1	1.9	virginica
103	6.3	2.9	5.6	1.8	virginica
105	7.6	3.0	6.6	2.1	virginica
107	7.3	2.9	6.3	1.8	virginica
109	7.2	3.6	6.1	2.5	virginica
111	6.4	2.7	5.3	1.9	virginica
113	5.7	2.5	5.0	2.0	virginica
115	6.4	3.2	5.3	2.3	virginica
117	7.7	3.8	6.7	2.2	virginica
119	6.0	2.2	5.0	1.5	virginica
121	5.6	2.8	4.9	2.0	virginica
123	6.3	2.7	4.9	1.8	virginica
125	7.2	3.2	6.0	1.8	virginica
127	6.1	3.0	4.9	1.8	virginica
129	7.2	3.0	5.8	1.6	virginica
131	7.9	3.8	6.4	2.0	virginica
133	6.3	2.8	5.1	1.5	virginica
135	7.7	3.0	6.1	2.3	virginica
137	6.4	3.1	5.5	1.8	virginica
139	6.9	3.1	5.4	2.1	virginica

141	6.9	3.1	5.1	2.3	virginica
143	6.8	3.2	5.9	2.3	virginica
145	6.7	3.0	5.2	2.3	virginica
147	6.5	3.0	5.2	2.0	virginica
149	5.9	3.0	5.1	1.8	virginica

[75 rows x 5 columns]

## 2. Repeat a subset of last week's exercise, but write functions to accomplish these tasks.

### Return the number of observations for a given species included in the data set

```
In [5]: def numObs(dataFrame, speciesName):
        # Check if we are working with a pandas data frame
        if (isinstance(dataFrame, pd.pandas.core.frame.DataFrame)):
            temp = len(data[data['Species'].str.contains(speciesName)])
            print('Number of', speciesName, 'observations: ', temp)
        else:
            print('You did not pass in a pandas data frame')
```

```
In [6]: numObs(data, 'setosa')

Number of setosa observations:  50
```

```
In [7]: numObs(data, 'versicolor')

Number of versicolor observations:  50
```

```
In [8]: numObs(data, 'virginica')

Number of virginica observations:  50
```

### Return a dataframe for flowers with Sepal.Width greater than a value specified by the function user

```
In [9]: def sepalWidthLargerThan(dataFrame, maxWidth = 3.5):
        # Check if we are working with a pandas data frame
        if (isinstance(dataFrame, pd.pandas.core.frame.DataFrame)):
            # Create a null data frame we will return later
            newDataFrame = pd.DataFrame()
            toAppend = pd.DataFrame(dataFrame[dataFrame['Sepal.Width'] > maxWidth],
                                   columns=list(dataFrame.columns))
            newDataFrame = newDataFrame.append(toAppend)
        else:
            print('You did not pass in a pandas data frame')

        return newDataFrame
```



```
In [11]: largerThanTest = sepalWidthLargerThan(data, 3.5)
print(largerThanTest)
```

	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
4	5.0	3.6	1.4	0.2	setosa
5	5.4	3.9	1.7	0.4	setosa
10	5.4	3.7	1.5	0.2	setosa
14	5.8	4.0	1.2	0.2	setosa
15	5.7	4.4	1.5	0.4	setosa
16	5.4	3.9	1.3	0.4	setosa
18	5.7	3.8	1.7	0.3	setosa
19	5.1	3.8	1.5	0.3	setosa
21	5.1	3.7	1.5	0.4	setosa
22	4.6	3.6	1.0	0.2	setosa
32	5.2	4.1	1.5	0.1	setosa
33	5.5	4.2	1.4	0.2	setosa
37	4.9	3.6	1.4	0.1	setosa
44	5.1	3.8	1.9	0.4	setosa
46	5.1	3.8	1.6	0.2	setosa
48	5.3	3.7	1.5	0.2	setosa
109	7.2	3.6	6.1	2.5	virginica
117	7.7	3.8	6.7	2.2	virginica
131	7.9	3.8	6.4	2.0	virginica

**Write the data for a given species to a comma-delimited file with the given species name as the file name; Hint: look at using + or % to concatenate your species name and “.csv”**

```
In [12]: def writeGivenSpecies(dataFrame, speciesName):
# Check if we are working with a pandas data frame
if (isinstance(dataFrame, pd.pandas.core.frame.DataFrame)):
    writeName = speciesName + '.csv'
    data[data['Species'].str.contains(speciesName)].to_csv(writeName)
else:
    print('You did not pass in a pandas data frame')

return
```

```
In [14]: # File does not yet exist
os.path.isfile('setosa.csv')
```

Out[14]: False

```
In [15]: writeGivenSpecies(data, 'setosa')
```

```
In [16]: # File does exist after running the function
os.path.isfile('setosa.csv')
```

Out[16]: True