Consider the following Python dictionary data and Python list labels:

data = {'birds': ['Cranes', 'Cranes', 'plovers', 'spoonbills', 'spoonbills', 'Cranes', 'plovers', 'Cranes', 'spoonbills', 'spoonbills'], 'age': [3.5, 4, 1.5, np.nan, 6, 3, 5.5, np.nan, 8, 4], 'visits': [2, 4, 3, 4, 3, 4, 2, 2, 3, 2], 'priority': ['yes', 'yes', 'no', 'yes', 'no', 'no', 'no', 'yes', 'no', 'no']}

labels = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j']

In [3]:

```
import pandas as pd
import numpy as np
```

In [4]:

```
data = {'birds': ['Cranes', 'Cranes', 'plovers', 'spoonbills', 'spoonbills', 'Cranes', 'plo

labels = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j']
```

1. Create a DataFrame birds from this dictionary data which has the index labels.

In [7]:

```
df = pd.DataFrame(data,index=labels)
df.head()
```

Out[7]:

	birds	age	visits	priority
a	Cranes	3.5	2	yes
b	Cranes	4.0	4	yes
c	plovers	1.5	3	no
d	spoonbills	NaN	4	yes
e	spoonbills	6.0	3	no

2. Display a summary of the basic information about birds DataFrame and its data.

In [8]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Index: 10 entries, a to j
Data columns (total 4 columns):
 #   Column    Non-Null Count  Dtype  
---  ------    --------------  -----  
 0   birds     10 non-null     object 
 1   age       8 non-null      float64
 2   visits    10 non-null     int64  
 3   priority  10 non-null     object 
dtypes: float64(1), int64(1), object(2)
memory usage: 400.0+ bytes
```

*3. Print the first 2 rows of the birds dataframe *

In [9]:

```
df.head(2)
```

Out[9]:

	birds	age	visits	priority
a	Cranes	3.5	2	yes
b	Cranes	4.0	4	yes

4. Print all the rows with only 'birds' and 'age' columns from the dataframe

In [13]:

```
df[['birds','age']]
```

Out[13]:

	birds	age
a	Cranes	3.5
b	Cranes	4.0
c	plovers	1.5
d	spoonbills	NaN
e	spoonbills	6.0
f	Cranes	3.0
g	plovers	5.5
h	Cranes	NaN
i	spoonbills	8.0
j	spoonbills	4.0

5. select [2, 3, 7] rows and in columns ['birds', 'age', 'visits']

In [18]:

```
df.iloc[[2,3,7]].drop('priority',axis=1)
```

Out[18]:

	birds	age	visits
c	plovers	1.5	3
d	spoonbills	NaN	4
h	Cranes	NaN	2

6. select the rows where the number of visits is less than 4

In [19]:

```
df[df['visits']<4]
```

Out[19]:

	birds	age	visits	priority
a	Cranes	3.5	2	yes
c	plovers	1.5	3	no
e	spoonbills	6.0	3	no
g	plovers	5.5	2	no
h	Cranes	NaN	2	yes
i	spoonbills	8.0	3	no
j	spoonbills	4.0	2	no

7. select the rows with columns ['birds', 'visits'] where the age is missing i.e NaN

In [39]:

```
df[pd.isnull(df.age)].drop(['age','priority'],axis=1)
```

Out[39]:

	birds	visits
d	spoonbills	4
h	Cranes	2

8. Select the rows where the birds is a Cranes and the age is less than 4

In [52]:

```
df.loc[(df['birds']== 'Cranes') & (df['age']<4)]
```

Out[52]:

	birds	age	visits	priority
a	Cranes	3.5	2	yes
f	Cranes	3.0	4	no

9. Select the rows the age is between 2 and 4(inclusive)

In [54]:

```
df[df.age.between(2,4)]
```

Out[54]:

	birds	age	visits	priority
a	Cranes	3.5	2	yes
b	Cranes	4.0	4	yes
f	Cranes	3.0	4	no
j	spoonbills	4.0	2	no

10. Find the total number of visits of the bird Cranes

In [64]:

```
df[df['birds']=='Cranes']['visits'].sum()
```

Out[64]:

```
12
```

11. Calculate the mean age for each different birds in dataframe.

In [67]:

```
df.groupby('birds', as_index=False).age.mean()
```

Out[67]:

	birds	age
0	Cranes	3.5
1	plovers	3.5
2	spoonbills	6.0

12. Append a new row 'k' to dataframe with your choice of values for each column. Then delete that row to return the original DataFrame.

In [86]:

```
new_col= pd.DataFrame({'birds':['crow'],'age':[4],'visits':[3],'priority':['No']},index=['k
new_col
df.append(new_col)
```

Out[86]:

	birds	age	visits	priority
a	Cranes	3.5	2	yes
b	Cranes	4.0	4	yes
c	plovers	1.5	3	no
d	spoonbills	NaN	4	yes
e	spoonbills	6.0	3	no
f	Cranes	3.0	4	no
g	plovers	5.5	2	no
h	Cranes	NaN	2	yes
i	spoonbills	8.0	3	no
j	spoonbills	4.0	2	no
k	crow	4.0	3	No

In [87]:

```
df
```

Out[87]:

	birds	age	visits	priority
a	Cranes	3.5	2	yes
b	Cranes	4.0	4	yes
c	plovers	1.5	3	no
d	spoonbills	NaN	4	yes
e	spoonbills	6.0	3	no
f	Cranes	3.0	4	no
g	plovers	5.5	2	no
h	Cranes	NaN	2	yes
i	spoonbills	8.0	3	no
j	spoonbills	4.0	2	no

****13. Find the number of each type of birds in dataframe (Counts)****

In [88]:

```
df['birds'].value_counts()
```

Out[88]:

```
Cranes        4
spoonbills    4
plovers       2
Name: birds, dtype: int64
```

14. Sort dataframe (birds) first by the values in the 'age' in decending order, then by the value in the 'visits' column in ascending order.

In [91]:

```
df.sort_values(['age', 'visits'], ascending=[False, True])
```

Out[91]:

	birds	age	visits	priority
i	spoonbills	8.0	3	no
e	spoonbills	6.0	3	no
g	plovers	5.5	2	no
j	spoonbills	4.0	2	no
b	Cranes	4.0	4	yes
a	Cranes	3.5	2	yes
f	Cranes	3.0	4	no
c	plovers	1.5	3	no
h	Cranes	NaN	2	yes
d	spoonbills	NaN	4	yes

15. Replace the priority column values with'yes' should be 1 and 'no' should be 0

In [94]:

```
df['priority'].replace({'yes':1,'no':0},inplace=True)
df
```

Out[94]:

	birds	age	visits	priority
a	Cranes	3.5	2	1
b	Cranes	4.0	4	1
c	plovers	1.5	3	0
d	spoonbills	NaN	4	1
e	spoonbills	6.0	3	0
f	Cranes	3.0	4	0
g	plovers	5.5	2	0
h	Cranes	NaN	2	1
i	spoonbills	8.0	3	0
j	spoonbills	4.0	2	0

****16. In the 'birds' column, change the 'Cranes' entries to 'trumpeters'.****

In [97]:

```
df['birds'].replace({'Cranes':'trumpeters'},inplace=True)
df
```

Out[97]:

	birds	age	visits	priority
a	trumpeters	3.5	2	1
b	trumpeters	4.0	4	1
c	plovers	1.5	3	0
d	spoonbills	NaN	4	1
e	spoonbills	6.0	3	0
f	trumpeters	3.0	4	0
g	plovers	5.5	2	0
h	trumpeters	NaN	2	1
i	spoonbills	8.0	3	0
j	spoonbills	4.0	2	0

In [ ]:

```

```