```
import pandas as pd
from google.colab import files

files.upload()
df = pd.read_csv('zoo.csv')
```

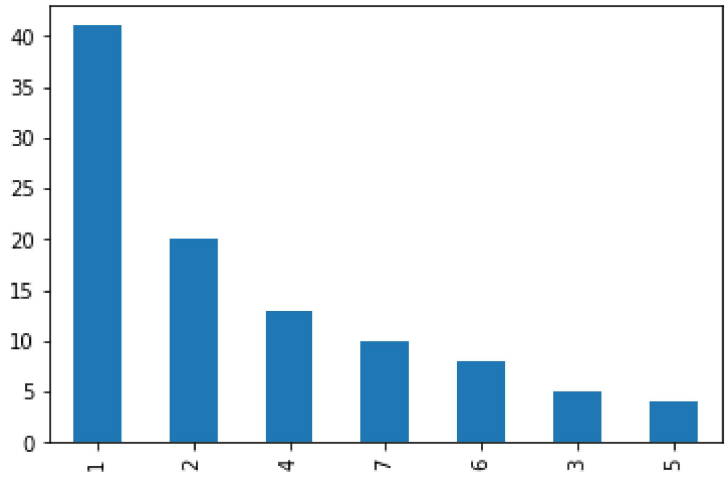
```
Choose Files No file chosen    Upload widget is only available when the cell has been executed in the current
browser session. Please rerun this cell to enable.
Saving zoo.csv to zoo.csv
```

```
import numpy as np
labels = df['class_type']
print(np.unique(labels.values))
```

```
[1 2 3 4 5 6 7]
```

```
from matplotlib import pyplot as plt
fig,ax = plt.subplots()
labels.value_counts().plot(kind = 'bar')
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f78c09c3cd0>
```




```
df.head()
```

	animal_name	hair	feathers	eggs	milk	airborne	aquatic	predator	toothed	bacl
0	aardvark	1	0	0	1	0	0	1	1	
1	antelope	1	0	0	1	0	0	0	1	
2	bass	0	0	1	0	0	1	1	1	
3	bear	1	0	0	1	0	0	1	1	
4	boar	1	0	0	1	0	0	1	1	

```
features = df.values[:,1:-1]
features.shape
```

```
(101, 16)
```

```
from sklearn.cluster import AgglomerativeClustering
from sklearn.metrics import pairwise_distances
model = AgglomerativeClustering(n_clusters = 7, linkage = "average",affinity = "cosine")
```

```
model.fit(features)
model.labels_
```

```
array([0, 0, 1, 0, 0, 0, 0, 1, 1, 0, 0, 0, 1, 6, 0, 0, 0, 0, 1, 2, 0, 0,
       0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 1, 0, 0, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 4, 0, 0, 0,
       2, 0, 0, 0, 0, 0, 0, 1, 2, 0, 1, 5, 0, 0, 4, 3, 1, 0, 0, 0, 1, 0,
       0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 3, 0])
```

```
print(np.unique(model.labels_))
```

```
[0 1 2 3 4 5 6]
```

```
labels = labels -1
from sklearn.metrics import mean_squared_error
score = mean_squared_error(labels,model.labels_)
abs_error = np.sqrt(score)
print(abs_error)
```

```
2.0416456185350014
```