**Slide 1:**

import codecademylib

import pandas as pd

from matplotlib import pyplot as plt

species = pd.read\_csv('species\_info.csv')

species\_count = species.scientific\_name.nunique()

species\_type = species.category.unique()

conservation\_statuses = species.conservation\_status.unique()

conservation\_counts = species.groupby('conservation\_status').scientific\_name.nunique().reset\_index()

print conservation\_counts

species.fillna('No Intervention', inplace = True)

conservation\_counts\_fixed = species.groupby('conservation\_status').scientific\_name.nunique().reset\_index()

**Slide 2:**

import codecademylib

import pandas as pd

from matplotlib import pyplot as plt

# Loading the Data

species = pd.read\_csv('species\_info.csv')

# print species.head()

# Inspecting the DataFrame

species\_count = species.scientific\_name.nunique()

species\_type = species.category.unique()

conservation\_statuses = species.conservation\_status.unique()

# Analyze Species Conservation Status

conservation\_counts = species.groupby('conservation\_status').scientific\_name.nunique().reset\_index()

print conservation\_counts

species.fillna('No Intervention', inplace = True)

conservation\_counts\_fixed = species.groupby('conservation\_status').scientific\_name.nunique().reset\_index()

**Slide 3:**

import codecademylib

import pandas as pd

from matplotlib import pyplot as plt

species = pd.read\_csv('species\_info.csv')

species\_count = species.scientific\_name.nunique()

species\_type = species.category.unique()

conservation\_statuses = species.conservation\_status.unique()

conservation\_counts = species.groupby('conservation\_status').scientific\_name.nunique().reset\_index()

print conservation\_counts

species.fillna('No Intervention', inplace = True)

conservation\_counts\_fixed = species.groupby('conservation\_status').scientific\_name.nunique().reset\_index()

**Slide 4:**

import codecademylib

import pandas as pd

from matplotlib import pyplot as plt

species = pd.read\_csv('species\_info.csv')

species\_count = species.scientific\_name.nunique()

species\_type = species.category.unique()

conservation\_statuses = species.conservation\_status.unique()

conservation\_counts = species.groupby('conservation\_status').scientific\_name.nunique().reset\_index()

print conservation\_counts

species.fillna('No Intervention', inplace = True)

conservation\_counts\_fixed = species.groupby('conservation\_status').scientific\_name.nunique().reset\_index()

**Slide 5:**

import codecademylib

import pandas as pd

from matplotlib import pyplot as plt

species = pd.read\_csv('species\_info.csv')

species.fillna('No Intervention', inplace = True)

protection\_counts = species.groupby('conservation\_status')\

.scientific\_name.nunique().reset\_index()\

.sort\_values(by='scientific\_name')

plt.figure(figsize=(10, 4))

ax = plt.subplot()

plt.bar(range(len(protection\_counts)),protection\_counts.scientific\_name.values)

ax.set\_xticks(range(len(protection\_counts)))

ax.set\_xticklabels(protection\_counts.conservation\_status.values)

plt.ylabel('Number of Species')

plt.title('Conservation Status by Species')

labels = [e.get\_text() for e in ax.get\_xticklabels()]

plt.show()

**Slide 6:**

import codecademylib

import pandas as pd

from matplotlib import pyplot as plt

species = pd.read\_csv('species\_info.csv')

species.fillna('No Intervention', inplace = True)

species['is\_protected'] = species.conservation\_status != 'No Intervention'

category\_counts = species.groupby(['category', 'is\_protected']).scientific\_name.nunique().reset\_index()

category\_pivot = category\_counts.pivot(columns='is\_protected',

index='category',

values='scientific\_name')\

.reset\_index()

category\_pivot.columns = ['category', 'not\_protected', 'protected']

print category\_pivot

**Slide 7:**

import codecademylib

import pandas as pd

from matplotlib import pyplot as plt

species = pd.read\_csv('species\_info.csv')

species.fillna('No Intervention', inplace = True)

species['is\_protected'] = species.conservation\_status != 'No Intervention'

category\_counts = species.groupby(['category', 'is\_protected']).scientific\_name.nunique().reset\_index()

category\_pivot = category\_counts.pivot(columns='is\_protected',

index='category',

values='scientific\_name')\

.reset\_index()

category\_pivot.columns = ['category', 'not\_protected', 'protected']

print category\_pivot

**Slide 8:**

import codecademylib

import pandas as pd

from matplotlib import pyplot as plt

from scipy.stats import chi2\_contingency

contingency = [[30, 146],

[75, 413]]

pval = chi2\_contingency(contingency)[1]

print(pval)

contingency\_reptile\_mammal = [[30, 146],

[5, 73]]

pval\_reptile\_mammal = chi2\_contingency(contingency\_reptile\_mammal)[1]

print(pval\_reptile\_mammal)

**Slide 9:**

import codecademylib

import pandas as pd

from matplotlib import pyplot as plt

from scipy.stats import chi2\_contingency

contingency = [[30, 146],

[75, 413]]

pval = chi2\_contingency(contingency)[1]

print(pval)

contingency\_reptile\_mammal = [[30, 146],

[5, 73]]

pval\_reptile\_mammal = chi2\_contingency(contingency\_reptile\_mammal)[1]

print(pval\_reptile\_mammal)

**Slide 10:**

import codecademylib

import pandas as pd

from matplotlib import pyplot as plt

species = pd.read\_csv('species\_info.csv')

species.fillna('No Intervention', inplace = True)

species['is\_protected'] = species.conservation\_status != 'No Intervention'

observations = pd.read\_csv('observations.csv')

species['is\_sheep'] = species.common\_names.apply(lambda x: 'Sheep' in x)

species\_is\_sheep = species[species.is\_sheep]

sheep\_species = species[(species.is\_sheep) & (species.category == 'Mammal')]

sheep\_observations = observations.merge(sheep\_species)

print sheep\_observations.head()

obs\_by\_park = sheep\_observations.groupby('park\_name').observations.sum().reset\_index()

print obs\_by\_park

**Slide 11:**

import codecademylib

import pandas as pd

from matplotlib import pyplot as plt

species = pd.read\_csv('species\_info.csv')

species.fillna('No Intervention', inplace = True)

species['is\_protected'] = species.conservation\_status != 'No Intervention'

observations = pd.read\_csv('observations.csv')

species['is\_sheep'] = species.common\_names.apply(lambda x: 'Sheep' in x)

species\_is\_sheep = species[species.is\_sheep]

sheep\_species = species[(species.is\_sheep) & (species.category == 'Mammal')]

sheep\_observations = observations.merge(sheep\_species)

print sheep\_observations.head()

obs\_by\_park = sheep\_observations.groupby('park\_name').observations.sum().reset\_index()

print obs\_by\_park

**Slide 12:**

import codecademylib

import pandas as pd

from matplotlib import pyplot as plt

species = pd.read\_csv('species\_info.csv')

species.fillna('No Intervention', inplace = True)

species['is\_protected'] = species.conservation\_status != 'No Intervention'

observations = pd.read\_csv('observations.csv')

species['is\_sheep'] = species.common\_names.apply(lambda x: 'Sheep' in x)

species\_is\_sheep = species[species.is\_sheep]

sheep\_species = species[(species.is\_sheep) & (species.category == 'Mammal')]

sheep\_observations = observations.merge(sheep\_species)

print sheep\_observations.head()

obs\_by\_park = sheep\_observations.groupby('park\_name').observations.sum().reset\_index()

print obs\_by\_park

**Slide 13:**

import codecademylib

import pandas as pd

from matplotlib import pyplot as plt

species = pd.read\_csv('species\_info.csv')

species['is\_sheep'] = species.common\_names.apply(lambda x: 'Sheep' in x)

sheep\_species = species[(species.is\_sheep) & (species.category == 'Mammal')]

observations = pd.read\_csv('observations.csv')

sheep\_observations = observations.merge(sheep\_species)

obs\_by\_park = sheep\_observations.groupby('park\_name').observations.sum().reset\_index()

plt.figure(figsize=(16, 4))

ax = plt.subplot()

plt.bar(range(len(obs\_by\_park)),

obs\_by\_park.observations.values)

ax.set\_xticks(range(len(obs\_by\_park)))

ax.set\_xticklabels(obs\_by\_park.park\_name.values)

plt.ylabel('Number of Observations')

plt.title('Observations of Sheep per Week')

plt.show()

**Slide 14:**

baseline = 15

print baseline

minimum\_detectable\_effect = 100\*5./15

print minimum\_detectable\_effect

sample\_size\_per\_variant = 870

print sample\_size\_per\_variant

yellowstone\_weeks\_observing = sample\_size\_per\_variant/507.

print yellowstone\_weeks\_observing

bryce\_weeks\_observing = sample\_size\_per\_variant/250.

print bryce\_weeks\_observing

**Slide 15:**

baseline = 15

print baseline

minimum\_detectable\_effect = 100\*5./15

print minimum\_detectable\_effect

sample\_size\_per\_variant = 870

print sample\_size\_per\_variant

yellowstone\_weeks\_observing = sample\_size\_per\_variant/507.

print yellowstone\_weeks\_observing

bryce\_weeks\_observing = sample\_size\_per\_variant/250.

print bryce\_weeks\_observing