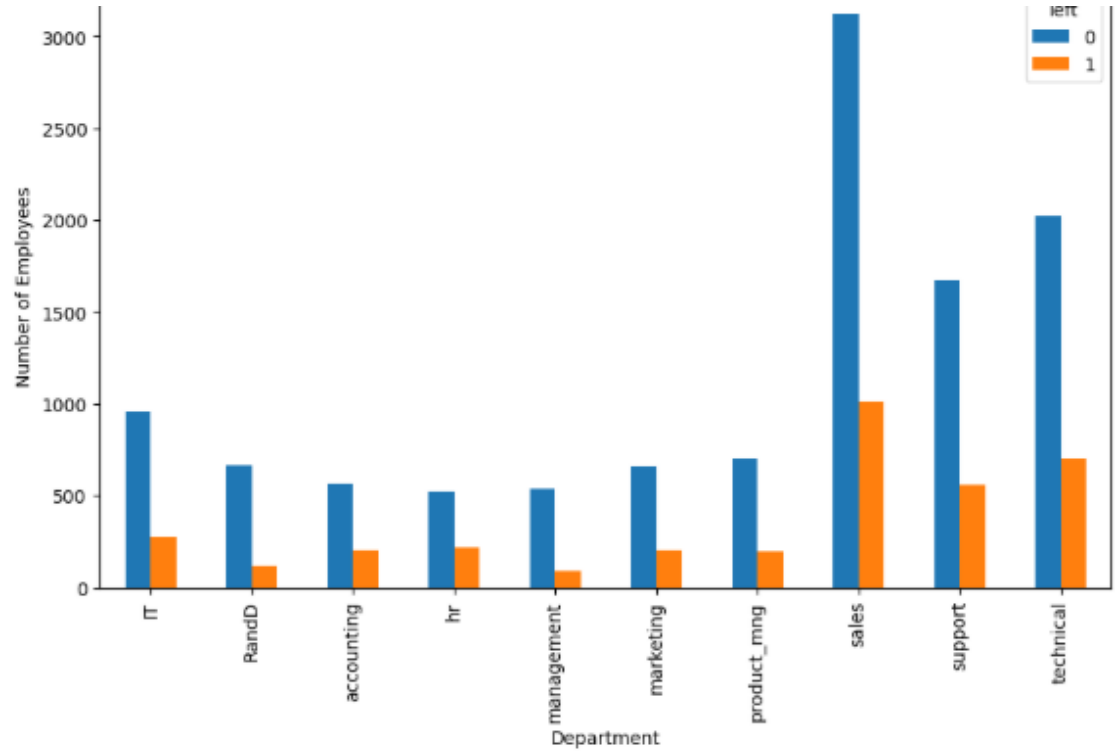
Write Python code to implement the following. Consider dataset file as “HR_comma_sep.csv”

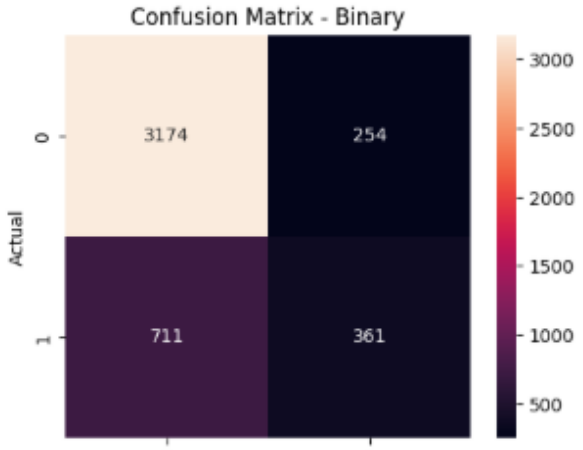
1. Do some exploratory data analysis to figure out which variables have direct and clear impact on employee retention (i.e. whether they leave the company or continue to work)
2. Plot bar charts showing impact of employee salaries on retention
3. Plot bar charts showing corelation between department and employee retention
4. Build logistic regression model using variables that were narrowed down in step 1
5. Measure the accuracy of the model

```python
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

from sklearn.model_selection import train_test_split
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import accuracy_score, confusion_matrix

from google.colab import files
uploaded = files.upload()   # Upload HR_comma_sep.csv


hr = pd.read_csv("HR_comma_sep.csv")

print("First 5 Rows:")
print(hr.head())


plt.figure(figsize=(10,6))
sns.heatmap(
    hr.select_dtypes(include=['int64','float64']).corr(),
    annot=True,
    cmap="coolwarm"
)
plt.title("Correlation Matrix")
plt.show()

pd.crosstab(hr.salary, hr.left).plot(kind='bar')
plt.title("Salary vs Employee Retention")
plt.xlabel("Salary")
plt.ylabel("Number of Employees")
plt.show()

pd.crosstab(hr.Department, hr.left).plot(kind='bar', figsize=(10,6))
plt.title("Department vs Employee Retention")
plt.xlabel("Department")
plt.ylabel("Number of Employees")
plt.show()
```

```
hr = pd.get_dummies(hr, columns=['salary','Department'], drop_first=True)

X = hr.drop("left", axis=1)
y = hr["left"]

X_train, X_test, y_train, y_test = train_test_split(
    X, y, test_size=0.3, random_state=42)


model = LogisticRegression(max_iter=1000)
model.fit(X_train, y_train)


y_pred = model.predict(X_test)


accuracy = accuracy_score(y_test, y_pred)
print("Binary Classification Accuracy:", accuracy)


cm = confusion_matrix(y_test, y_pred)

plt.figure(figsize=(5,4))
sns.heatmap(cm, annot=True, fmt='d')
plt.title("Confusion Matrix - Binary")
plt.xlabel("Predicted")
plt.ylabel("Actual")
plt.show()
```




```
Binary Classification Accuracy: 0.7855555555555556
```



Write Python code to implement the following. Consider dataset file “zoo-data.csv” to predi . Details of class type is provided in “zoo-class_type .csv”

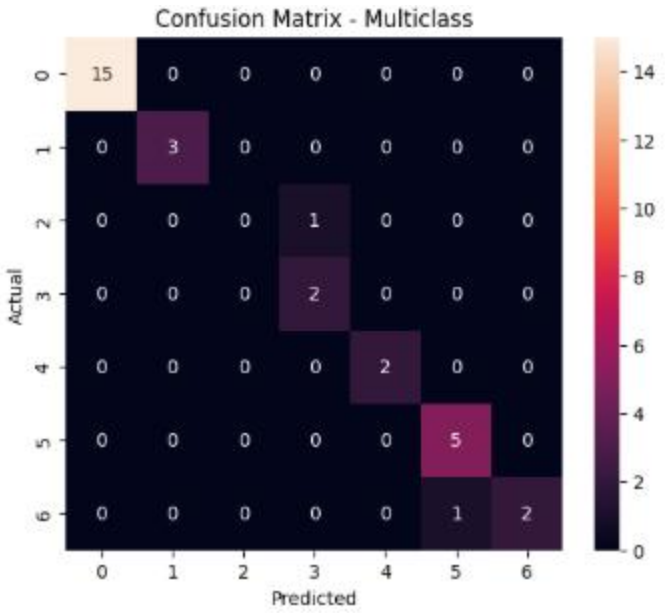
1. If require apply necessary data preprocessing.
2. Build logistic regression model to predict “class_type”
3. Measure the accuracy of the model
4. Plot the confusion matrix

```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

from sklearn.model_selection import train_test_split
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import accuracy_score, confusion_matrix

from google.colab import files
uploaded = files.upload()   # Upload zoo-data.csv


zoo = pd.read_csv("zoo-data.csv")

print("First 5 Rows:")
print(zoo.head())

zoo = zoo.drop("animal_name", axis=1)

X = zoo.drop("class_type", axis=1)
y = zoo["class_type"]

X_train, X_test, y_train, y_test = train_test_split(
    X, y, test_size=0.3, random_state=42)

model = LogisticRegression(max_iter=1000, multi_class='multinomial')
model.fit(X_train, y_train)

y_pred = model.predict(X_test)

print("Multiclass Classification Accuracy:",
      accuracy_score(y_test, y_pred))

cm = confusion_matrix(y_test, y_pred)

plt.figure(figsize=(6,5))
sns.heatmap(cm, annot=True, fmt='d')
plt.title("Confusion Matrix - Multiclass")
plt.xlabel("Predicted")
plt.ylabel("Actual")
plt.show()
```

Choose files zoo-data.csv

zoo-data.csv(text/csv) - 4368 bytes, last modified: 25/02/2026 - 100% done

```
Saving zoo-data.csv to zoo-data.csv
First 5 Rows:
  animal_name  hair  feathers  eggs  milk  airborne  aquatic  predator  \
0    aardvark     1         0     0     1         0        0         1
1    antelope     1         0     0     1         0        0         0
2        bass     0         0     1     0         0        1         1
3        bear     1         0     0     1         0        0         1
4        boar     1         0     0     1         0        0         1

   toothed  backbone  breathes  venomous  fins  legs  tail  domestic  catsize  \
0        1         1         1         0     0     4     0         0        1
1        1         1         1         0     0     4     1         0        1
2        1         1         0         0     1     0     1         0        0
3        1         1         1         0     0     4     0         0        1
4        1         1         1         0     0     4     1         0        1

   class_type
0           1
1           1
2           4
3           1
4           1
```


Confusion Matrix - Multiclass
Actual
Predicted
0 1 2 3 4 5 6
15 0 0 0 0 0 0
0 3 0 0 0 0 0
0 0 0 1 0 0 0
0 0 0 2 0 0 0
0 0 0 0 2 0 0
0 0 0 0 0 5 0
0 0 0 0 0 1 2
14 12 10 8 6 4 2 0