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import numpy as np import matplotlib.pyplot as
plt from sklearn import datasets from
sklearn.linear_model import LogisticRegression

iris = datasets.load_iris()
print(iris)

x = iris.data[:, :2] y =
np.where(iris.target == 0, 0, 1)

x_0 = x[y == 0]
x_1 = x[y == 1]

plt.scatter(x_0[:, 0], x_0[:, 1], color='green', label='Classe
0') plt.scatter(x_1[:, 0], x_1[:, 1], color='yellow',
label='Classe 1') plt.xlabel('Sepal length') plt.ylabel('Sepal
width') plt.legend()
plt.title('Visualisation des données
Iris') plt.show()

model = LogisticRegression(C=1e20)
model.fit(x,
y)

new_observations = np.array([
[5.5, 2.5],
[7, 3],
[3, 2],
[5,
3] ]) predictions =
model.predict(new_observations)

plt.scatter(x_0[:, 0], x_0[:, 1], color='green',
label='Classe 0') plt.scatter(x_1[:, 0], x_1[:, 1],
color='yellow', label='Classe 1')
plt.scatter(new_observations[:, 0],
new_observations[:, 1], color='blue', label='Nouvelles
observations') plt.xlabel('Sepal length')
plt.ylabel('Sepal width') plt.legend()
plt.title('Visualisation des nouvelles observations')
plt.show()

print("Prédictions pour les nouvelles
observations:") print(predictions)

y_0_2 = np.where(iris.target == 0, 0, np.where(iris.target
== 2, 0, 1)) y_0_1 = np.where(iris.target == 0, 1,
np.where(iris.target == 1, 1, 0))

model_0_2 = LogisticRegression(C=1e20)
model_0_2.fit(x, y_0_2)

model_0_1 =
LogisticRegression(C=1e20)
model_0_1.fit(x, y_0_1)
predictions_0_2 =
model_0_2.predict(new_observations)
predictions_0_1 =
model_0_1.predict(new_observations)

final_predictions = np.zeros(len(new_observations))
for i in range(len(new_observations)):
    if predictions_0_2[i] == 0 and predictions_0_1[i] ==
1:        final_predictions[i] = 0    elif
predictions_0_2[i] == 1 and predictions_0_1[i] == 0:
final_predictions[i] = 2    elif predictions_0_2[i] ==
1 and predictions_0_1[i] == 1:
final_predictions[i] = 1

print("Prédictions finales pour
les nouvelles observations:")
print(final_predictions)

# A quelle classe appartiennent les nouvelles observations de l'exercice 4? # Les
nouvelles observations appartiennent à la classe 0 si predictions_0_2[i] == 0 et

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predictions_0_1[i] == 1, # à la classe 1 si predictions_0_2[i] == 1 et  
predictions_0_1[i] == 1, # et à la classe 2 si predictions_0_2[i] == 1 et  
predictions_0_1[i] == 0.
```

Prédictions pour les nouvelles observations:

[1 1 0 0]

Prédictions finales pour les nouvelles observations:

[1. 0. 1. 0.]

Figure 1

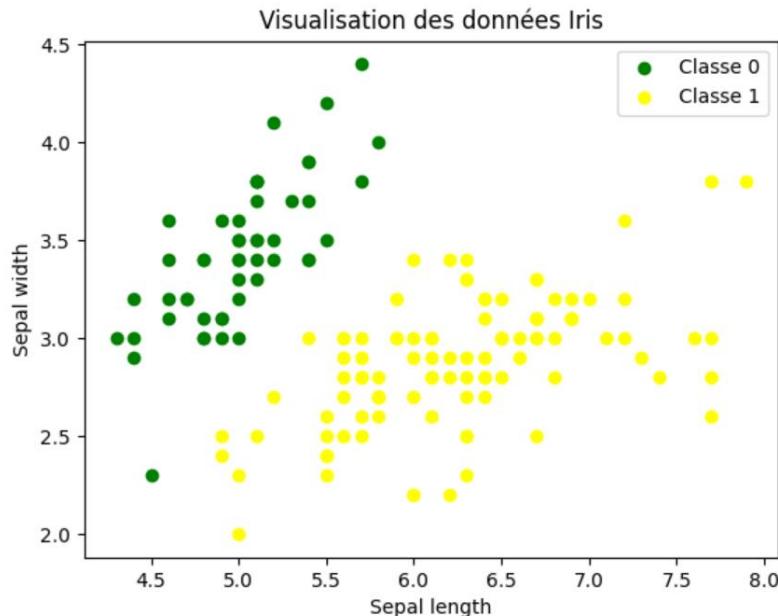


Figure 1

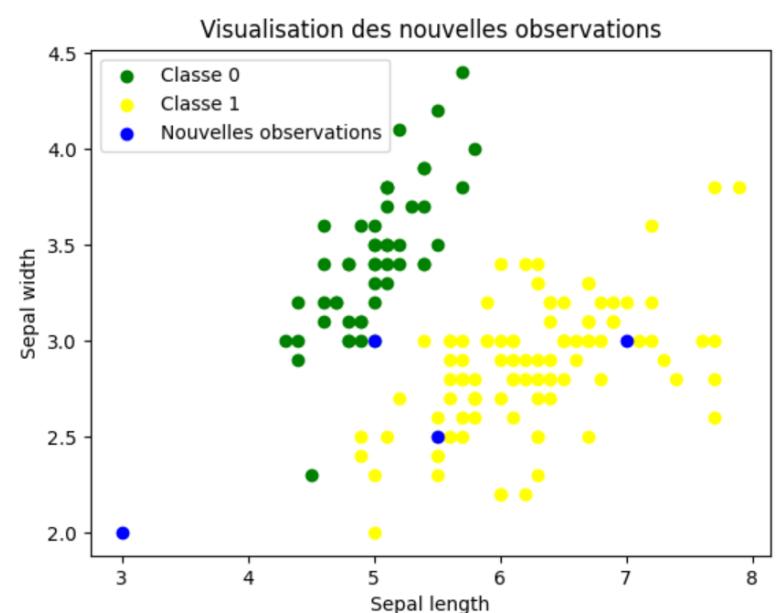


Figure 1