**RIPHAH INTERNATIONAL UNIVERSITY, ISLAMABAD**

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**Lab 10**

**Bachelors of Computer science – 6th semester**

**Subject:** Artificial Intelligence Lab

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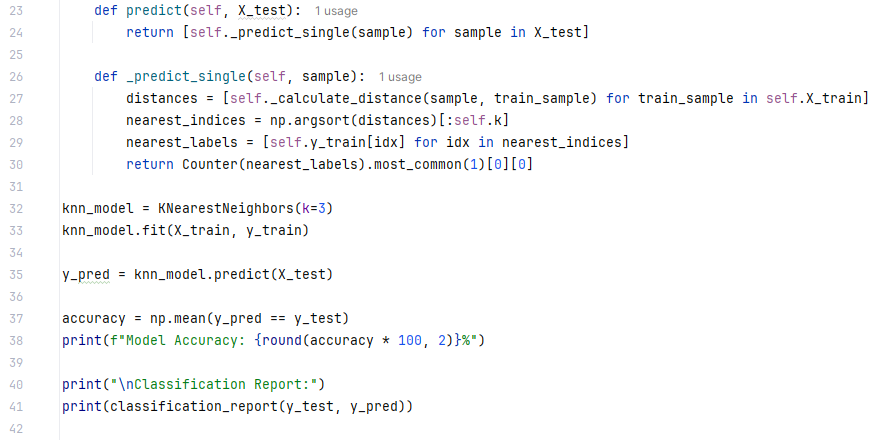
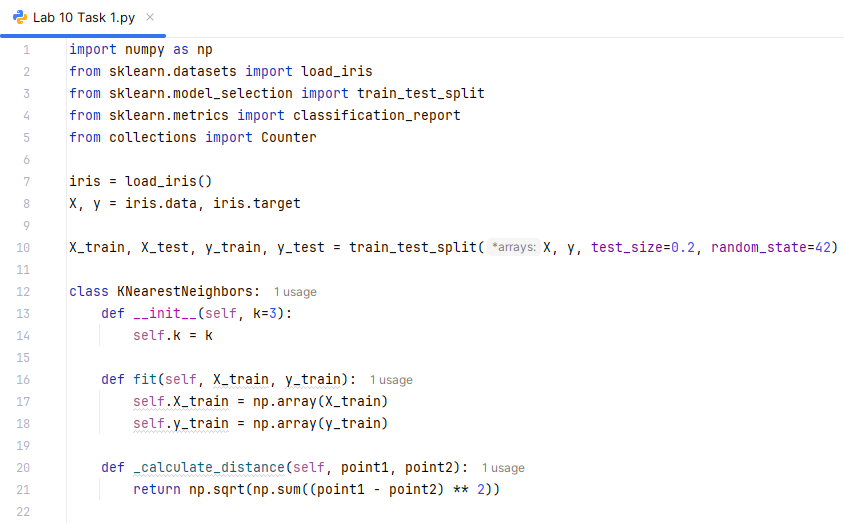
**LAB TASKS**

**Task 1:**

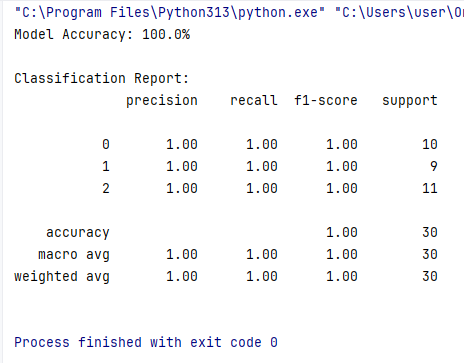
Implement KNN classifier with Iris dataset.

**Code:**

import numpy as np  
from sklearn.datasets import load\_iris  
from sklearn.model\_selection import train\_test\_split  
from sklearn.metrics import classification\_report  
from collections import Counter  
  
iris = load\_iris()  
X, y = iris.data, iris.target  
  
X\_train, X\_test, y\_train, y\_test = train\_test\_split(X, y, test\_size=0.2, random\_state=42)  
  
class KNearestNeighbors:  
 def \_\_init\_\_(self, k=3):  
 self.k = k  
  
 def fit(self, X\_train, y\_train):  
 self.X\_train = np.array(X\_train)  
 self.y\_train = np.array(y\_train)  
  
 def \_calculate\_distance(self, point1, point2):  
 return np.sqrt(np.sum((point1 - point2) \*\* 2))  
  
 def predict(self, X\_test):  
 return [self.\_predict\_single(sample) for sample in X\_test]  
  
 def \_predict\_single(self, sample):  
 distances = [self.\_calculate\_distance(sample, train\_sample) for train\_sample in self.X\_train]  
 nearest\_indices = np.argsort(distances)[:self.k]  
 nearest\_labels = [self.y\_train[idx] for idx in nearest\_indices]  
 return Counter(nearest\_labels).most\_common(1)[0][0]  
  
knn\_model = KNearestNeighbors(k=3)  
knn\_model.fit(X\_train, y\_train)  
  
y\_pred = knn\_model.predict(X\_test)  
  
accuracy = np.mean(y\_pred == y\_test)  
print(f"Model Accuracy: {round(accuracy \* 100, 2)}%")  
  
print("\nClassification Report:")  
print(classification\_report(y\_test, y\_pred))



**Output:**



| **sepal length** | **sepal width** | **petal length** | **petal width** | **target** |
| --- | --- | --- | --- | --- |
| 5.1 | 3.5 | 1.4 | 0.2 | 0 |
| 4.9 | 3.0 | 1.4 | 0.2 | 0 |
| 4.7 | 3.2 | 1.3 | 0.2 | 0 |
| 4.6 | 3.1 | 1.5 | 0.2 | 0 |
| 5.0 | 3.6 | 1.4 | 0.2 | 0 |
| ... | ... | ... | ... | ... |
| 6.7 | 3.0 | 5.2 | 2.3 | 2 |