**ML-Assignment-5**

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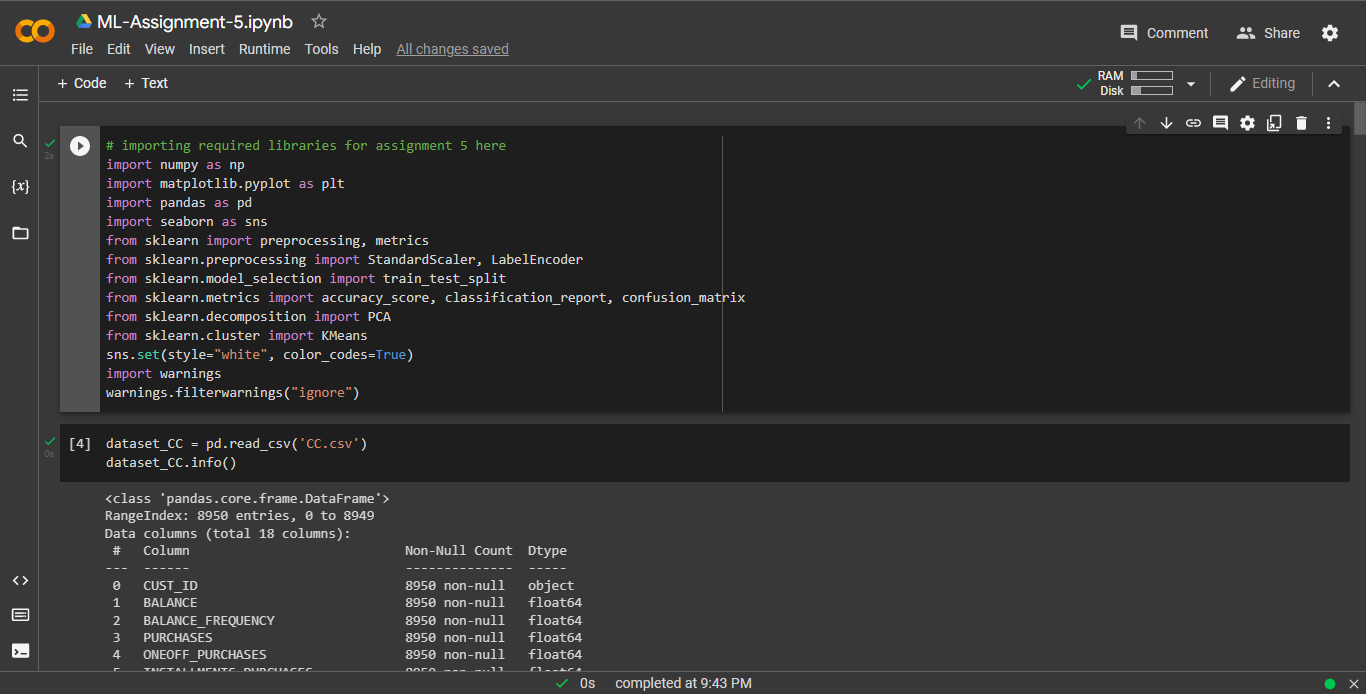
**#Question 1:**

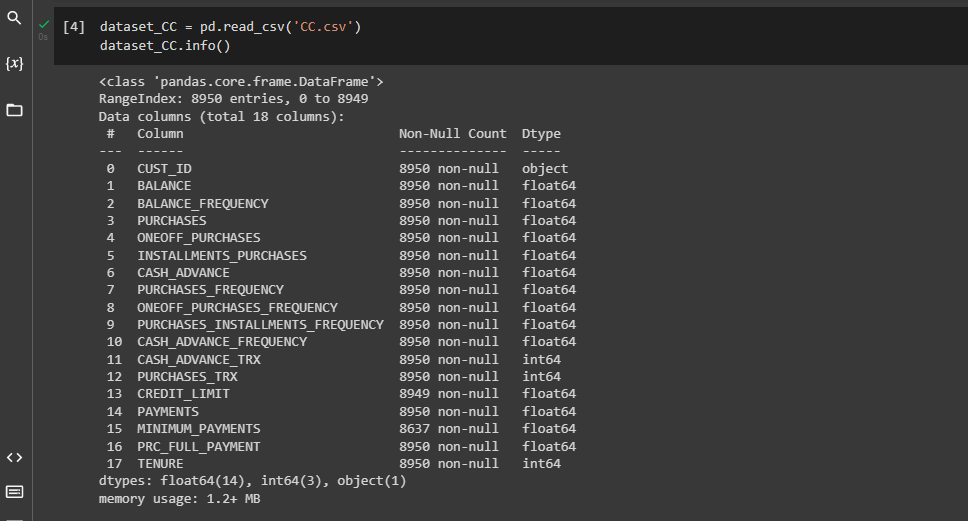
Principal Component Analysis

a. Applied PCA on CC dataset.

b. Applied k-means algorithm on the PCA result.

c. Perform Scaling+PCA+K-Means.

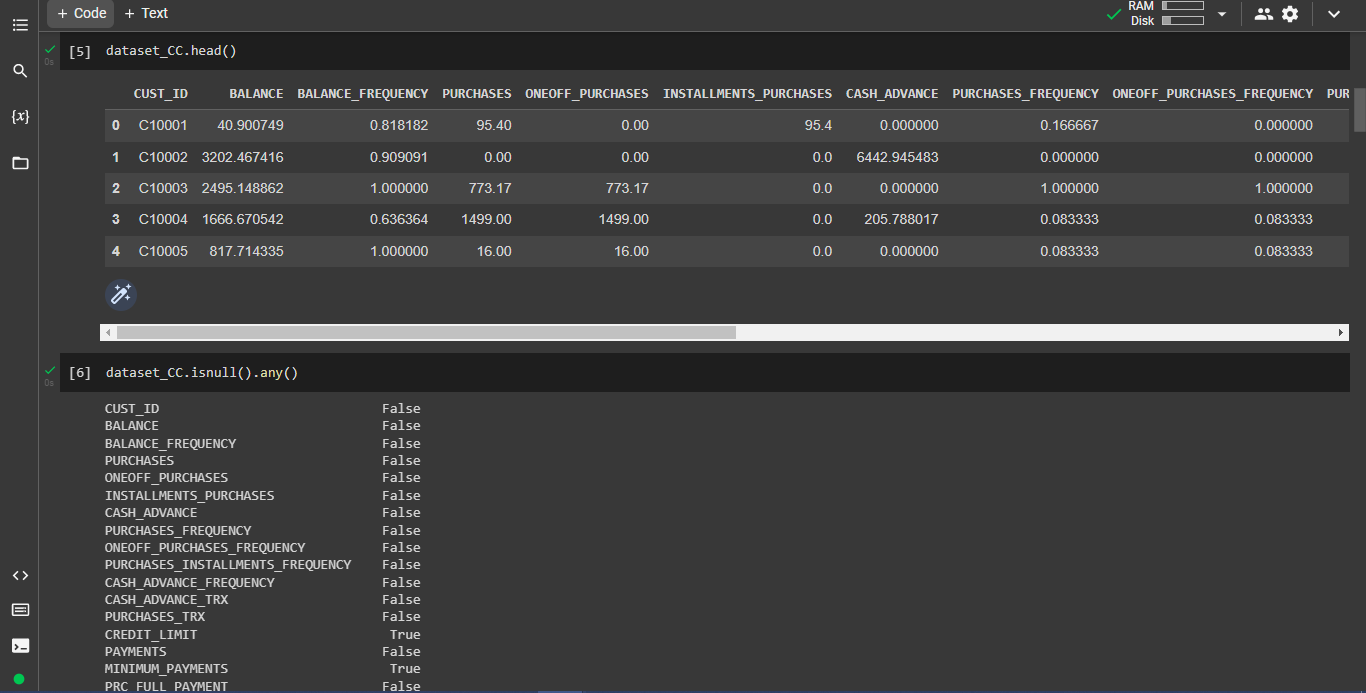
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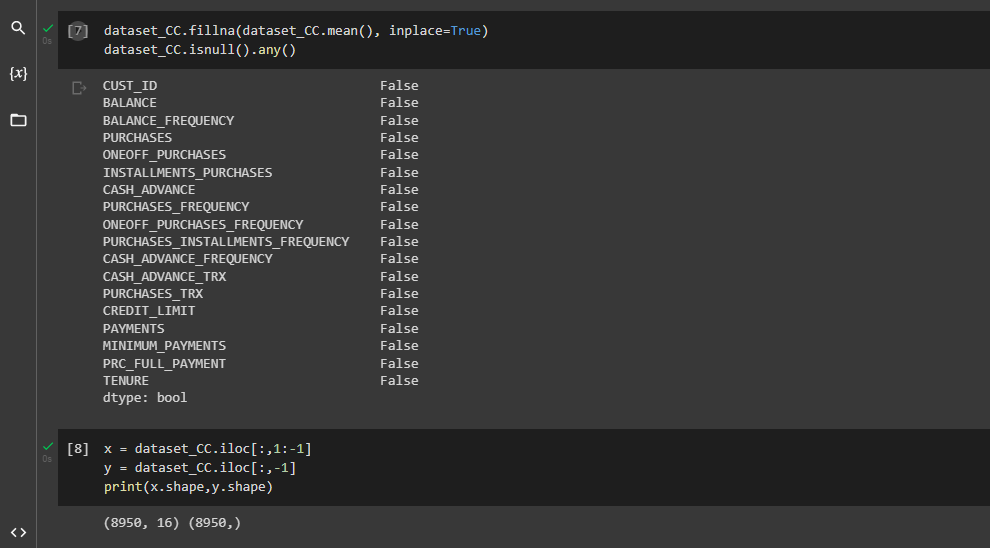
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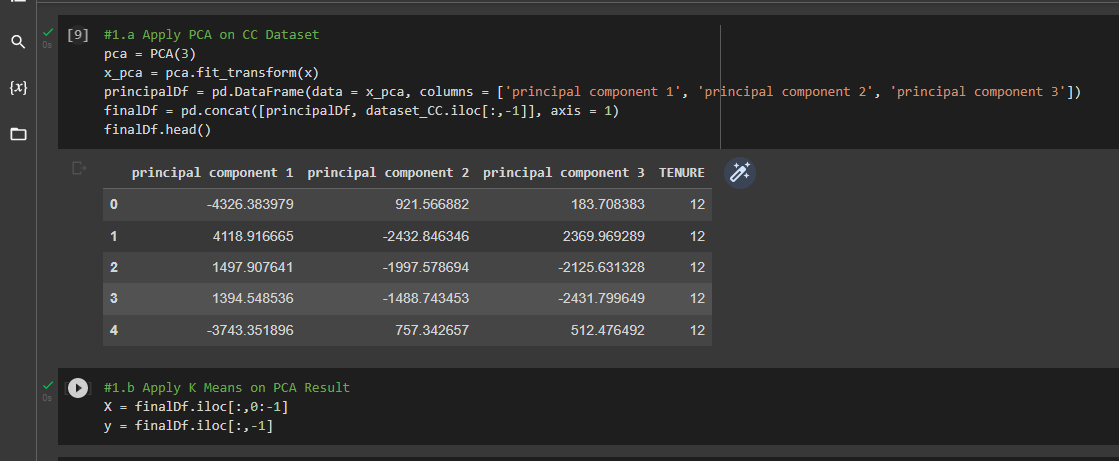
Applying PCA on CC Dataset.

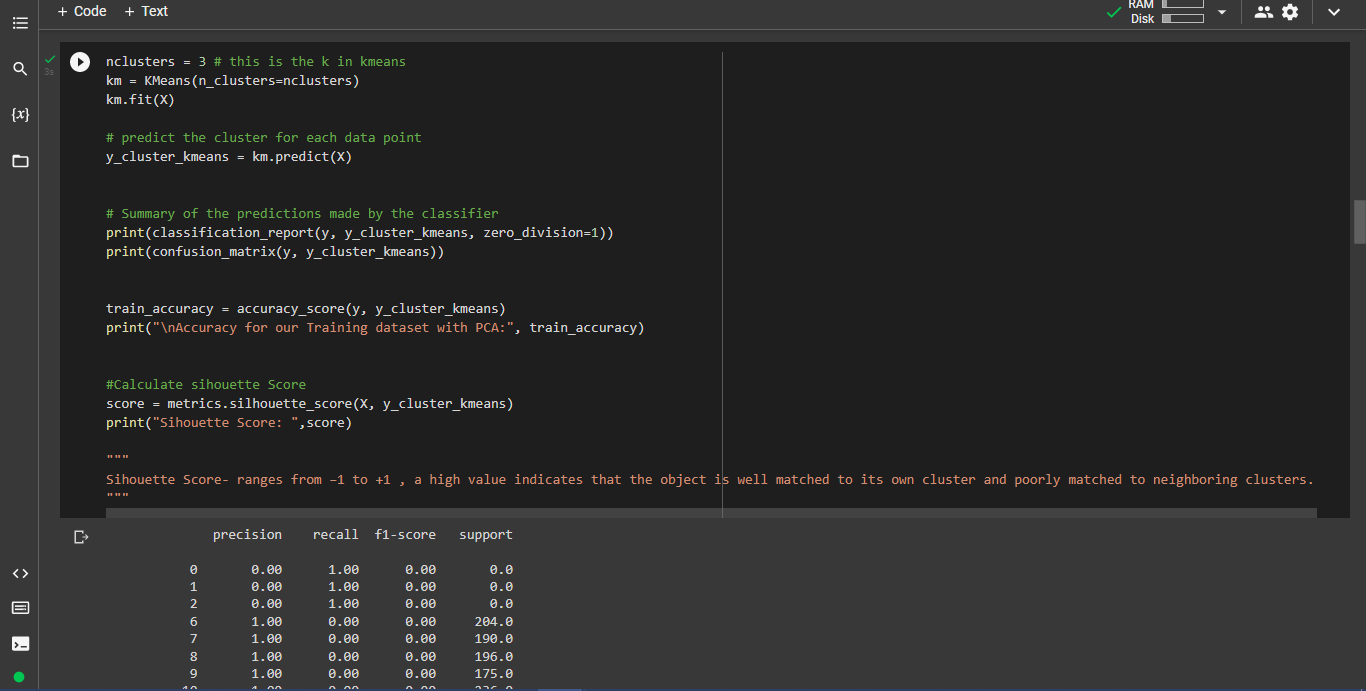
Applying K means on PCA Result.

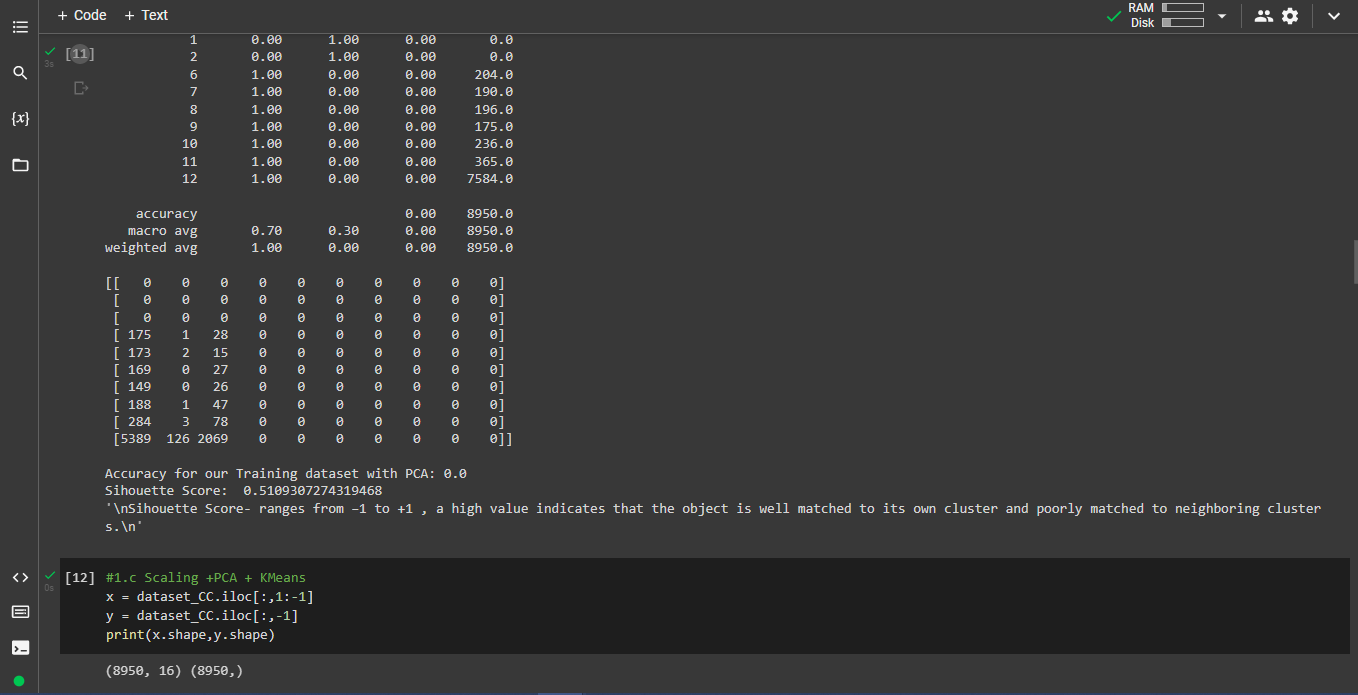
Predicting the cluster for each data point.

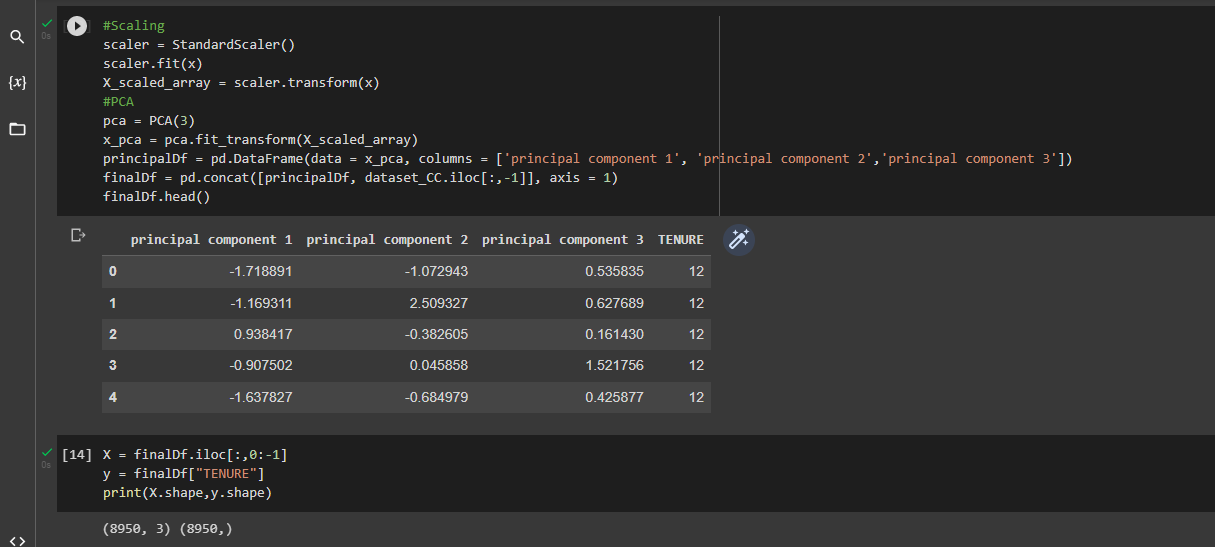
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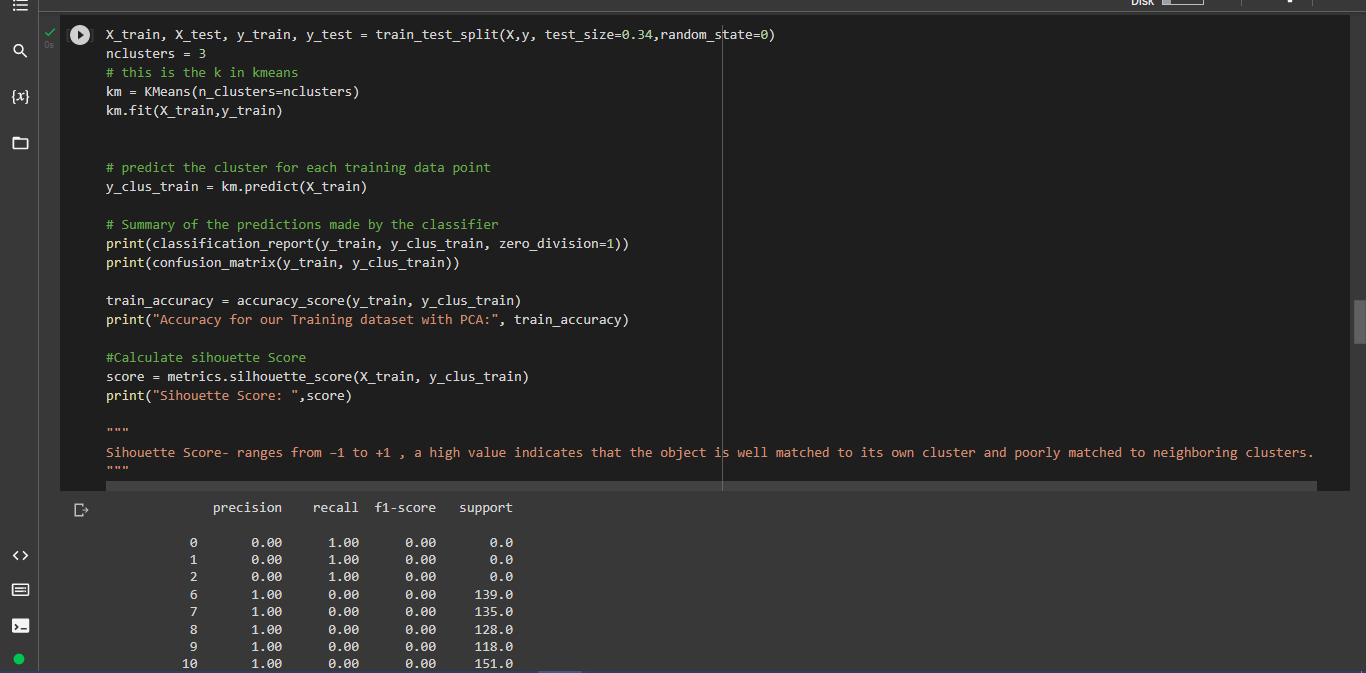
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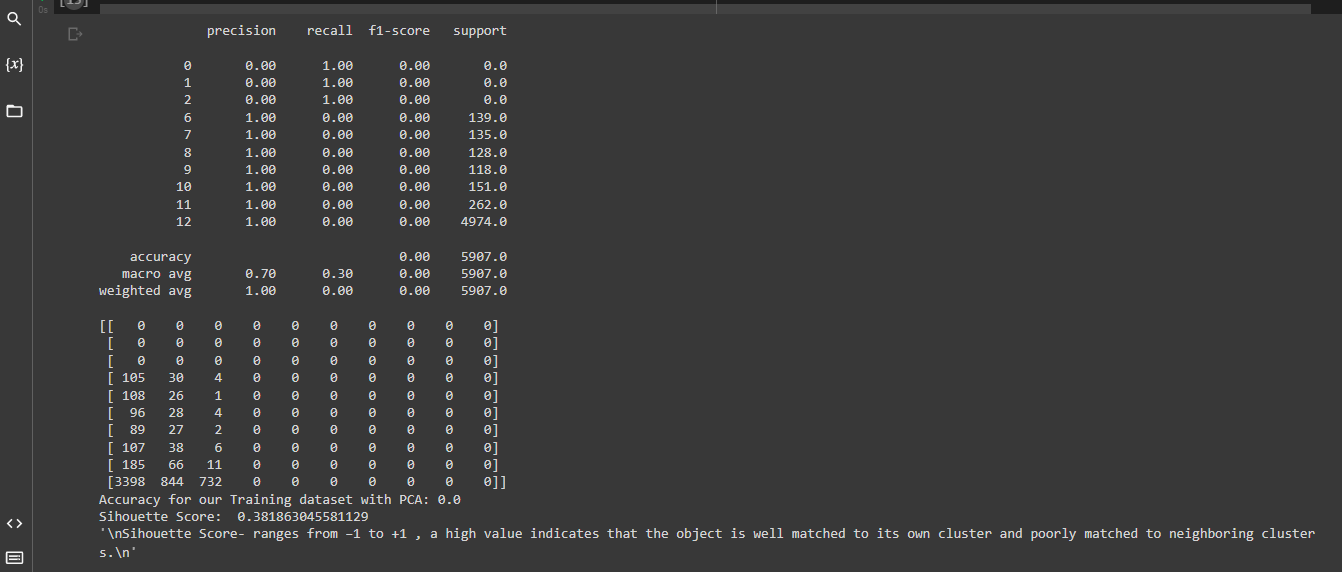
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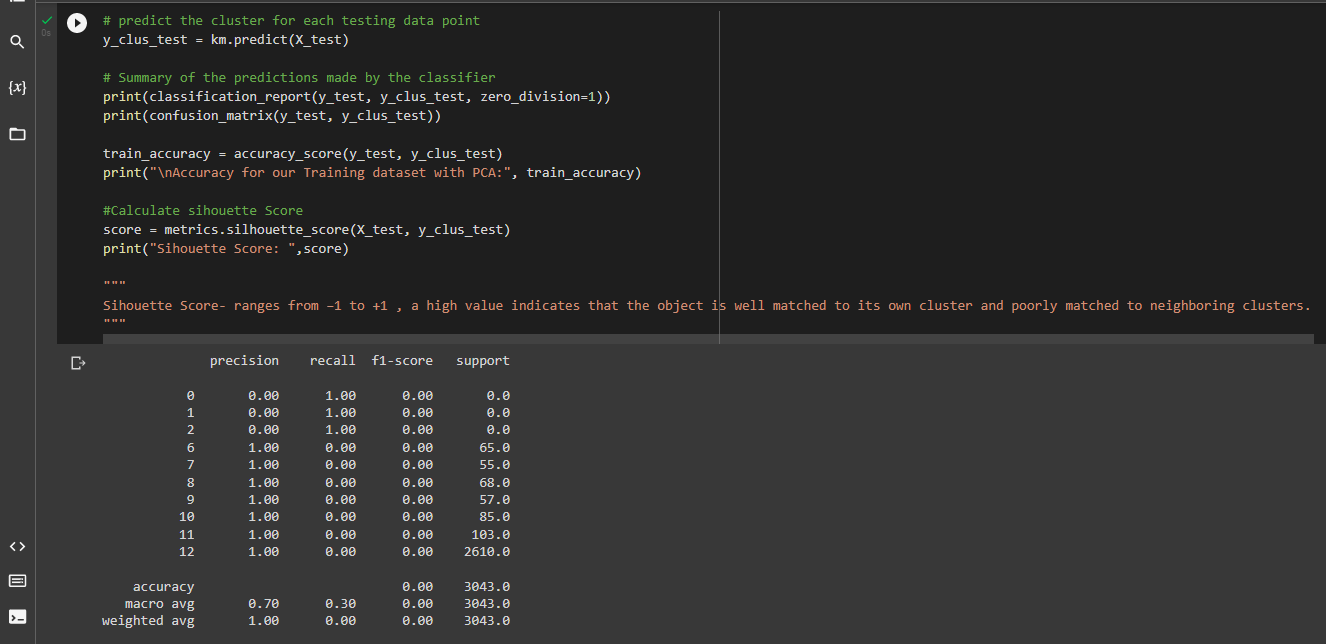
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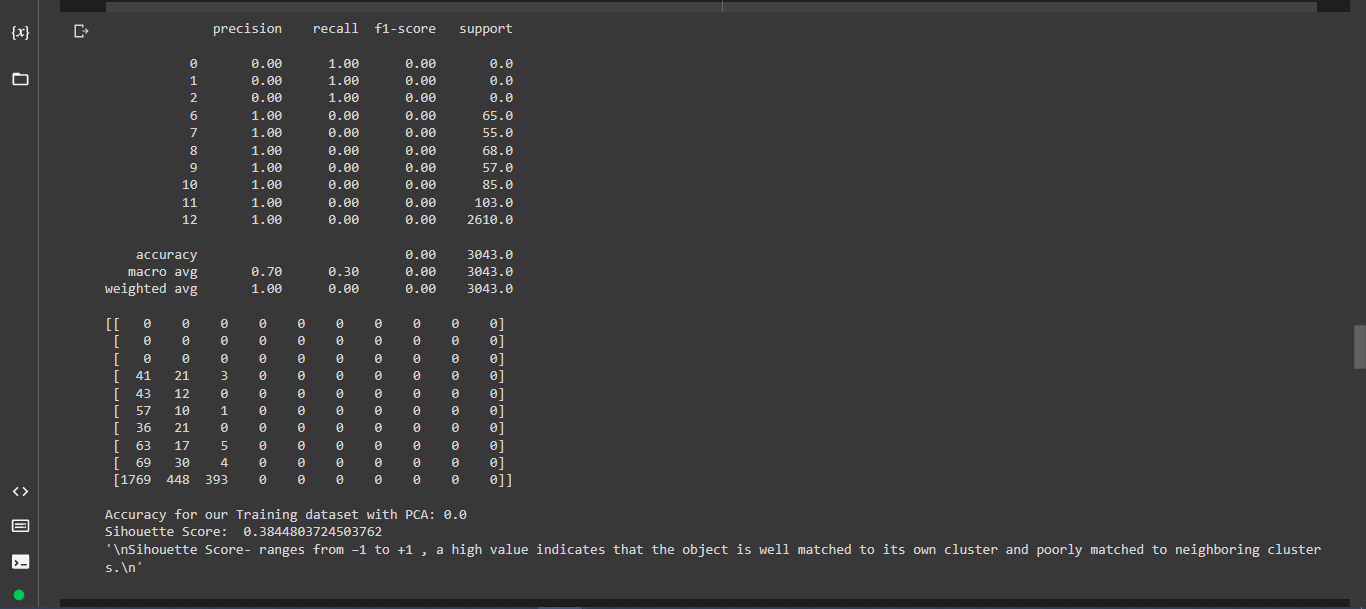
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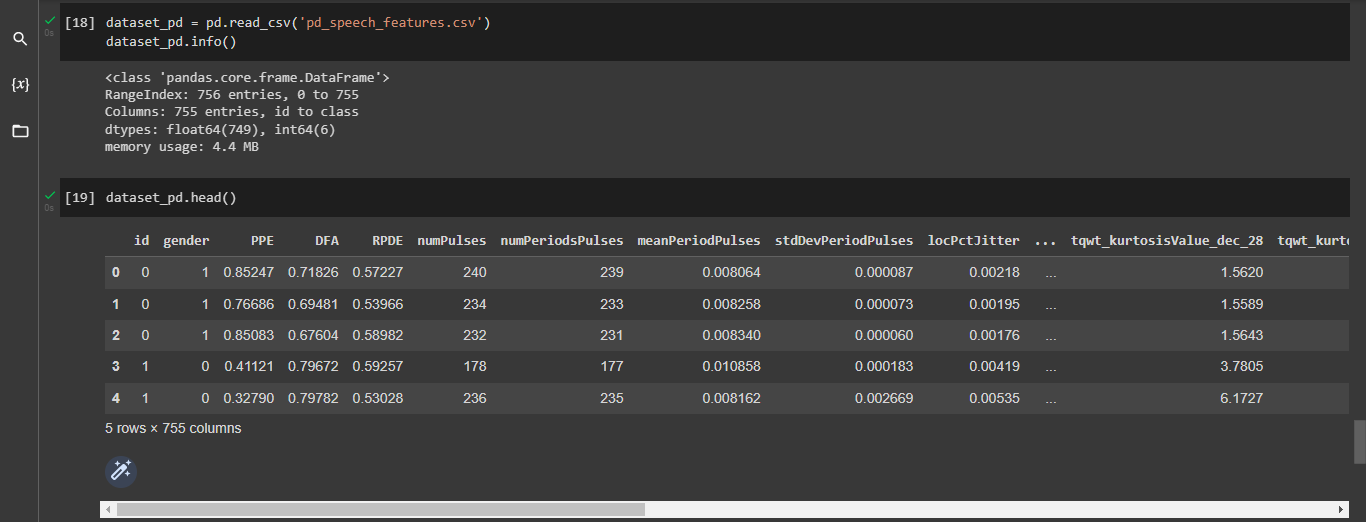
**#Question-2**

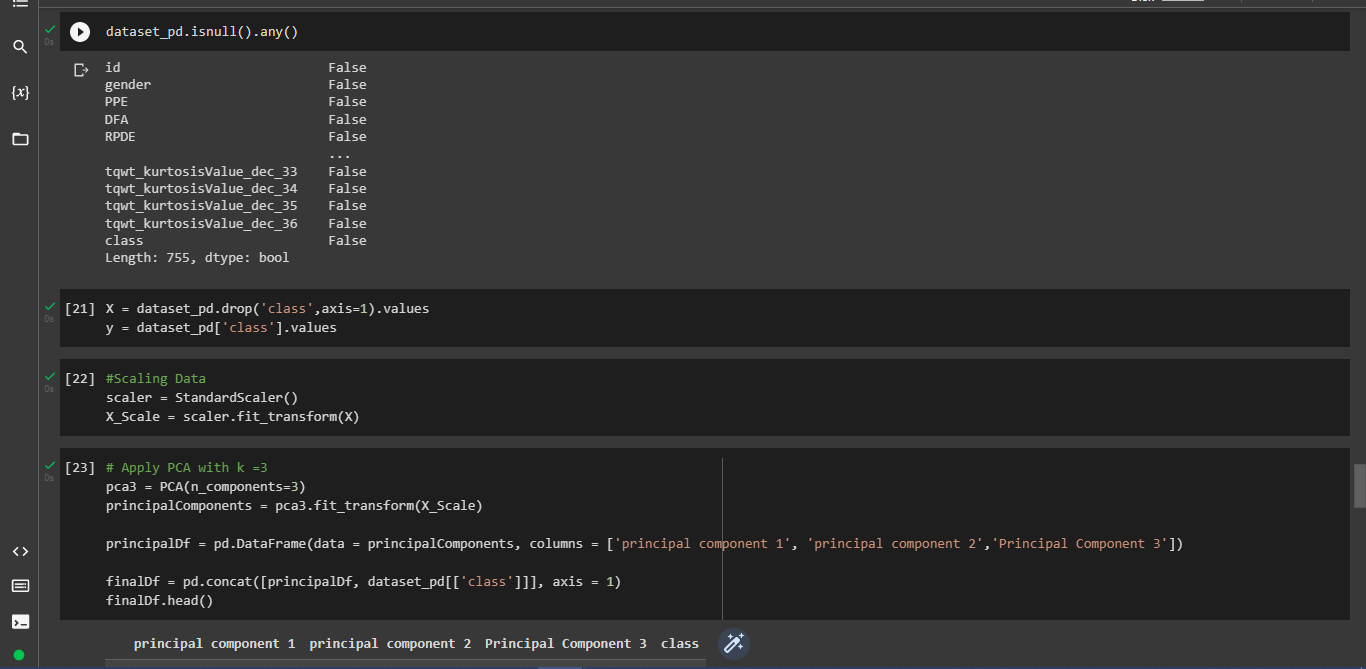
Used pd\_speech\_features.csv

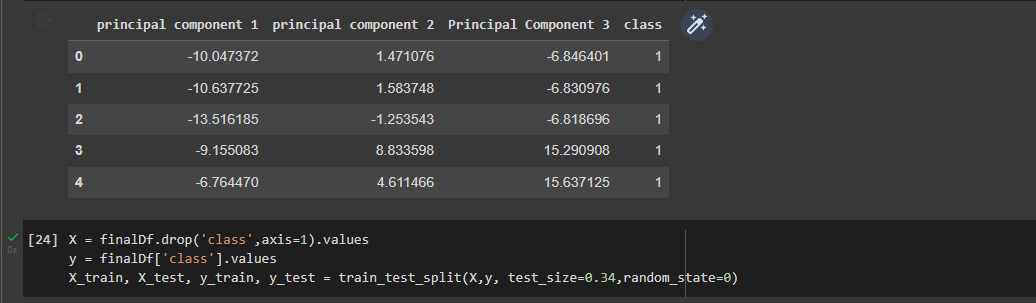
a. performing scaling on the data.

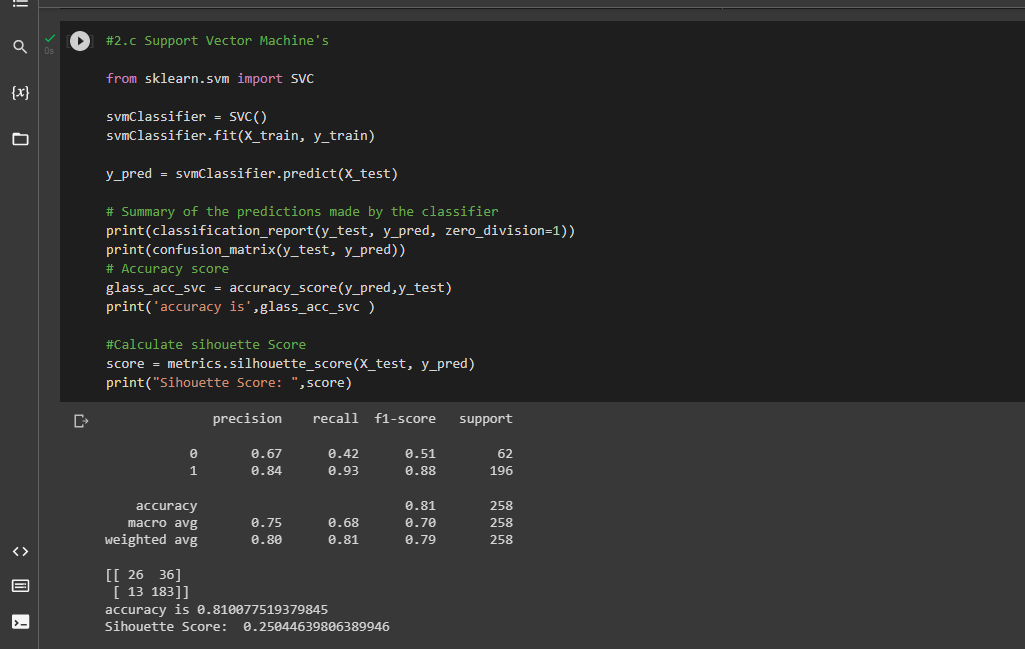
b. Applying PCA (k=3)

c. Using SVM to report performance

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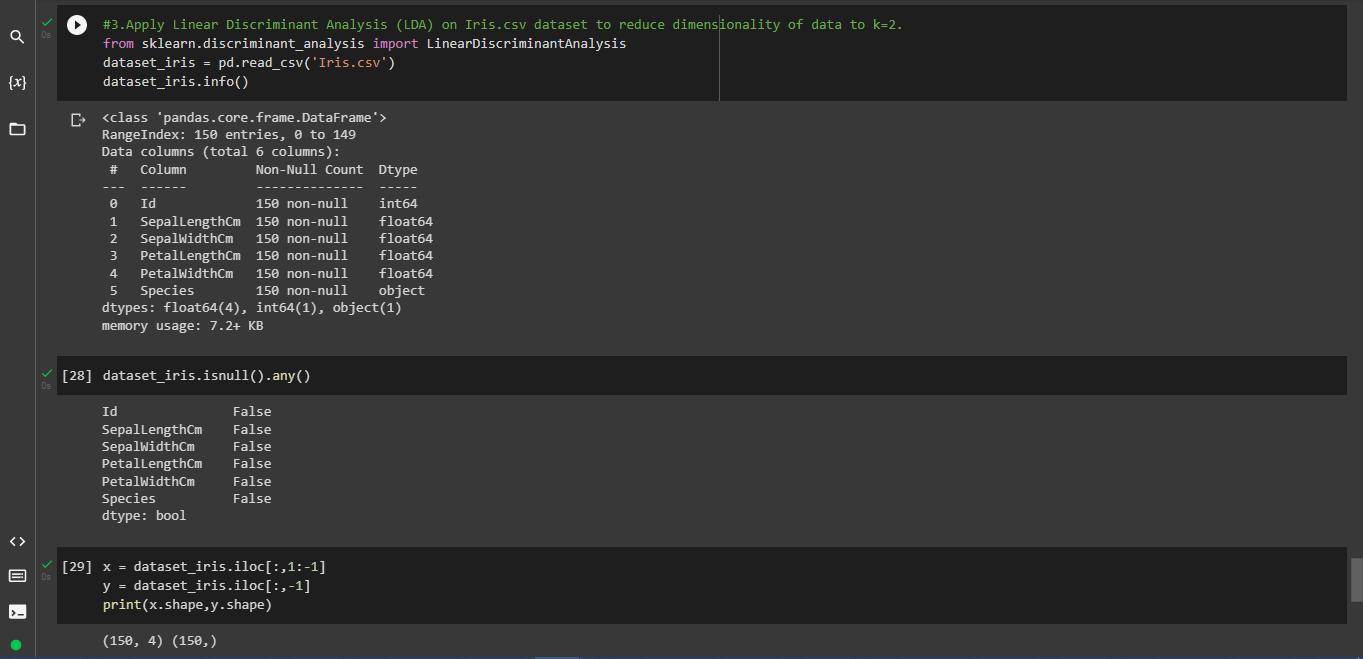
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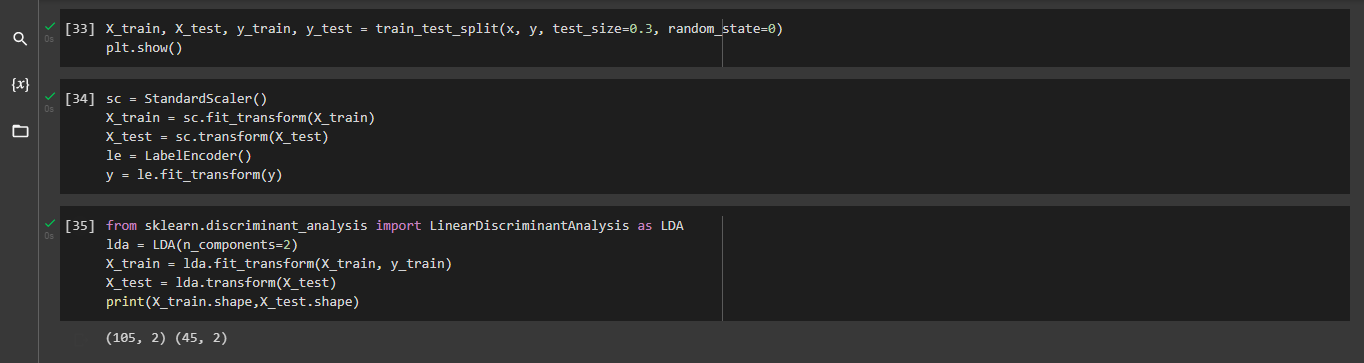
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**#Question-3**

Applying Linear Discriminant Analysis (LDA) on Iris.csv dataset to reduce dimensionality of data to k=2.

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**#Question-4**

Difference between PCA & LDA:

1.Both LDA and PCA rely on linear transformations and aim to maximize the variance in a lower dimension. PCA is an unsupervised learning algorithm while LDA is a supervised learning algorithm. This means that PCA finds directions of maximum variance regardless of class labels while LDA finds directions of maximum class separability.

PCA: It reduces the features into a smaller subset of orthogonal variables, called principal components – linear combinations of the original variables. The first component captures the largest variability of the data, while the second captures the second largest, and so on.

LDA: LDA finds the linear discriminants in order to maximize the variance between the different categories while minimizing the variance within the class.