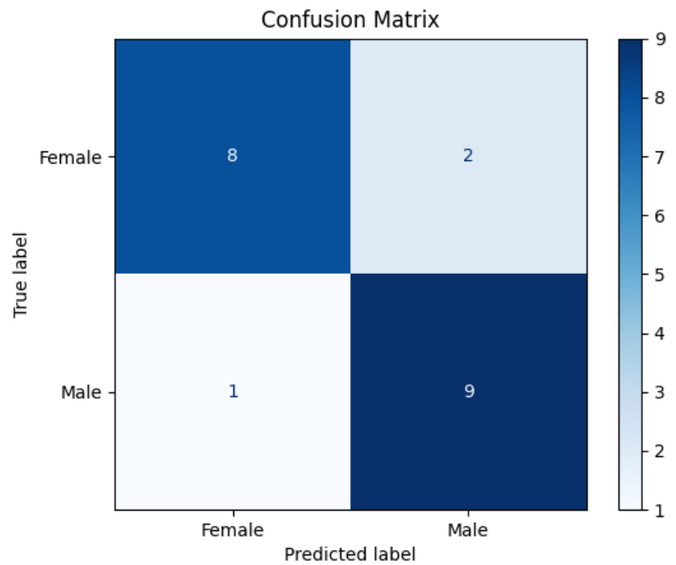
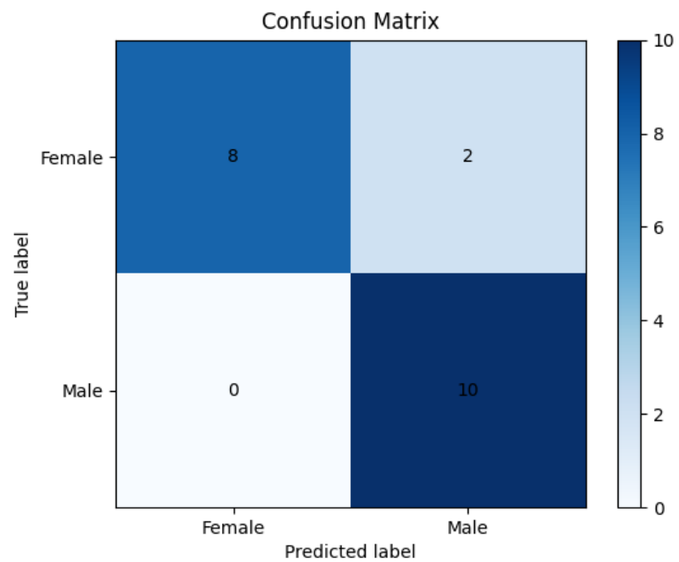
Q3. Give the comparative study for the above results w.r.t to classification accuracy in terms of the confusion matrix.

Confusion Matrix for 2 class classification (Male and Female) using PCA



Confusion Matrix for 2 class classification (Male and Female) using LDA



From the above confusion matrix, we can see that LDA gives more accuracy when compared to PCA. This is because LDA focuses mainly on finding a feature space that maximizes class separability and minimizes the variation/scatter within each category whereas PCA focuses mainly on finding the direction of maximum variance. Since it's a large dataset, LDA works better as the reduced dimensionality is one less than the number of classes in the dataset.

PCA

$$Number\ of\ Correct\ Samples\ Classified\ =\ 8\ +\ 9\ =\ 17$$
$$Total\ Number\ of\ Samples\ in\ Test\ Dataset\ =20$$
$$Accuracy\ of\ PCA\ =\ \frac{17}{20}\ =\ 85\%$$

LDA

$$Number\ of\ Correct\ Samples\ Classified\ =\ 8\ +\ 10\ =\ 18$$
$$Total\ Number\ of\ Samples\ in\ Test\ Dataset\ =20$$
$$Accuracy\ of\ LDA\ =\ \frac{18}{20}\ =\ 90\%$$