Project 2

For this project, we will be using the `CustomerChurn.csv` dataset. This data consist of information on 10,000 customers at a European Bank. The goal is to predict whether the customer will leave the bank. The variables are

- `CustomerId`: ID for the customer
- `Surname`: Last name of the customer
- `CreditScore`: Credit score of the customer
- `Geography`: Country where teh customer lived (France, Germany, Spain)
- `Gender`: Gender of the Customer
- `Age`: Age of the customer
- `Tenure`: How many years this customer is at the bank
- `Balance`: The balance in that respective customer's account
- `NumOfProducts`: Number of different products the customer has at the bank
- `HasCrCard`: The customer has bank credit card (1) or not (0)
- `IsActiveMember`: The customer is active (1) or not (0)
- `EstimatedSalary`: Salary of the customer
- `Exited`: The customer left the bank (1) or not (0)

1. Pick any machine learning method we have covered to predict 'Exited' based on the other variables (except `CustomerId` and `Surname`). Be sure to do a training and testing split. Whatever method you choose to use, be sure to tune the model. Comment on the accuracy and confusion matrix for both the training set and the testing set.
2. Use Principal Component Analysis to reduce the number of features (again, do not use `CustomerId` or `Surname`). Choose only the number of PCs that capture 75% of the variability.
3. Redo the method you used in part 1 but this time use the PCs found in part 2 (only the PCs that account for 75% of the variability). Again, comment on the accuracy and confusion matrix for both the training and testing sets.

Your project need to be typed in a document (word, Rmarkdown, latex, etc.) and submitted to the assignment page on Canvas. All plots generated need to be included in your document. All code also needs to be included. You can include the code in the document as you go or you can include all the code in an Appendix. Only one person in your group needs to submit the document. Make sure everyone's name is on it.