Mia Rodgers: https://github.com/miamrodgers/4310-ML/blob/main/ME4_DecisionTrees/decision_trees.ipynb
Alex Larsen: https://github.com/alarsen123/ML-HW/blob/main/ME4_DecisionTrees/ME4_DecisionTrees/decision_trees.ipynb
ME4

In this assignment, we compared the performance of decision trees using information and the gini index.

First, we applied 10-fold cross-validation on the entropy model. The weighted averages for recall, accuracy, and F1 score all had a minimum of .73 and a maximum of 1.0, and for precision, the minimum was .75, and the maximum was 1.0. However, the overall performance across all folds was much better, with 5 folds having 1.0 for all metrics. The other folds had performance metrics in the high .80s to mid .90s range, with one outlier having weighted averages in the .70s.

We compared this to the model using the gini index, which had the weighted averages for Precision, Recall, Accuracy, and F1 score; all had a minimum of .94 and a maximum of .98. Across both models, the accuracy for the setosa species was 1.00, so the weighted averages depended on the number of setosa irises in each fold.

Then, we compared each model's performance when using 5, 7, and 10 splits for our k-fold cross-validation and depths of 3, 4, and 5.

For the models using the entropy measure, the performance was about the same for depths of 4 and 5, both of which were better than depth 3; the accuracy decreased as the number of folds increased. The results were pretty much the same for the gini index model.

Since this data set is pretty small, I think 10 folds is a bit too many since the classes were not evenly distributed throughout the folds. This could lead to inaccurate performance metrics and therefore result in us not choosing the best model. So, I would select a depth of 5 and 5 folds for cross-validation since those performed the best across the two models, and the models using the gini index measure seemed better overall.