

Exercise 8.4:**Problem #2.**

The boosting model is as below:

$$f(x) = \sum_{b=1}^P \lambda f^b(x)$$

When using boosting with depth=1, the tree only has one variable as node. So the number of tree = the number of variable. So in model $B = P$, that means the model will add the residual of each individual model. If we use another predictors to maximize the fit to residual, we got

$$f(x) = \sum_{j=1}^p f_j(X_j)$$

Thus the final model is additive.

Problem #5.

If we use majority voting for classification, there are 6 $P(\text{Class is Red} | X) > 0.5$ and 4 $P(\text{Class is Red} | X) < 0.5$, so the final classification is red;

If we use average probability, the $P(\text{Class is Red} | X) = \text{sum}(0.1, 0.15, 0.2, 0.2, 0.55, 0.6, 0.6, 0.65, 0.7, 0.75) / 10 = 0.45 < 0.5$, so the final classification is green.