CS 520 Final: Question 2 - Classification

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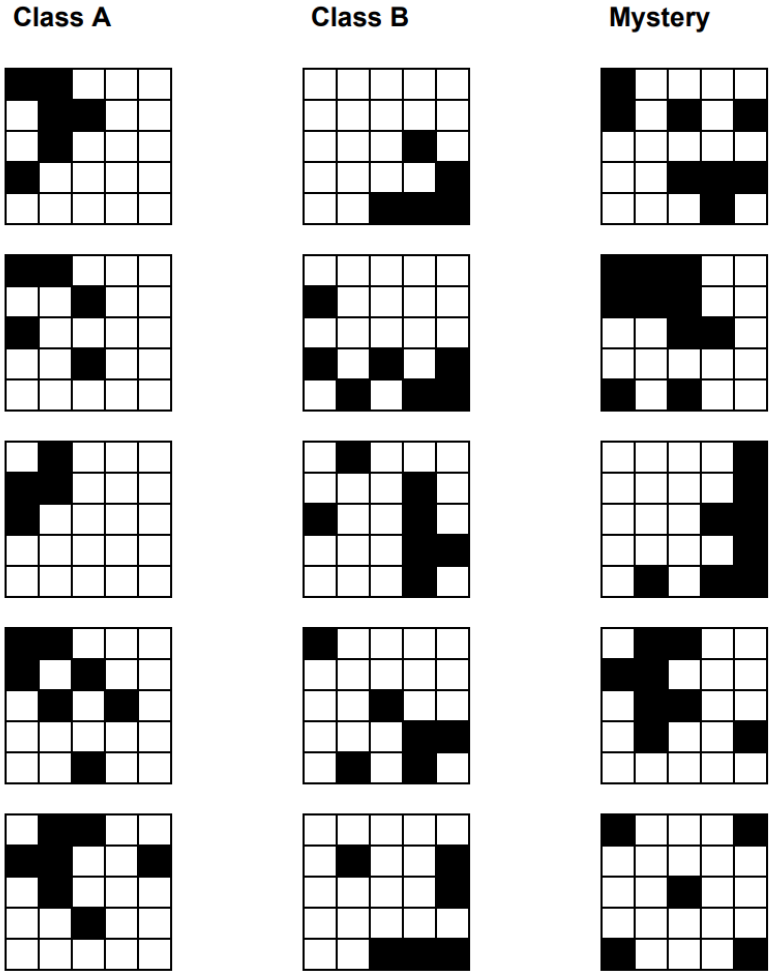
You cannot be graded on what you don't write down. This problem is to be completed individually, without any coordination with others. Complete each question to the best of your ability. If you write code to solve one of the problems, you must submit that code along with your final answers. Explain your process and algorithms. Be explicit. Answers, without evidence of the thought and process that led to them, will not earn credit.

The following gives five instances of Class A images, five instances of Class B images, and five instances of unlabeled images. (Each image is a 5x5 grid of black or white cells.)



a) Construct a model to classify images as Class A or B, and train it on the indicated data. You must code your own model from scratch. Specify your trained model. What does your model predict for each of the unlabeled images? Give the details of your model, its training, and the final result. Do the predictions make sense, to you?

b) The data provided is quite small, and overfitting is a serious risk. What steps can you take to avoid it?

c) Construct and train a second type of model (again from scratch). Specify its details. How do its predictions compare to the first model? Are there any differences, and what about the two models caused the differences?