Question 1. What are the advantages of formulating probability distributions in terms of graphs? For what class of problems does dynamic programming apply? For these problems, how does it reduce the complexity of computation. Briefly describe the stereo problem. What is the disparity and how does it relate to depth? How can be computed from two images by defining a Markov Random Field (MRF), and what are the properties of that MRF? What is the epipolar line constraint, and how does it simplify the correspondence problem? What inference algorithm can be used to solve it?

Question. 2. Describe model selection? How can it be used to select between two, or more, models for describing the data? What is the entropy? And how does the entropy of a probability distribution relate to its Maximum Likelihood estimate from the data? What is feature pursuit? How does it allow us to search over an exponentially large set of probability models.

Question 3. What are the main properties of Hidden Markov Models? Why can we use dynamic programming to perform inference for this model? How can dynamic programming enable us to use the Expectation Maximization algorithm to estimate the model parameters. Sketch how HMMs can be applied to baseball.

Question 4. What is the goal of Support Vector Machines (SVM)’s? What is the margin? What is the max-margin criterion. What are the support vectors?

Question 5. How does the AdaBoost algorithm combine weak classifiers into a strong classifier? What types of image features are used by AdaBoost to perform face detection?