1. (3 points) Which of the following option is true about k-NN algorithm?
   (a) It can be used for classification.
   (b) It can be used for regression.
   (c) It can be used for clustering.
   (d) (a) and (b)
   (e) (a) and (c)
   (f) (a), (b) and (c)
   (d) None of the above

2. (3 points) Which of the following statement is true about k-NN algorithm?
   (a) k-NN performs much better if all of the data have the same scale.
   (b) k-NN works well with a small number of input variables, but struggles when the number of inputs is very large.
   (c) k-NN makes no assumptions about the distribution of the data.
   (d) All of the above.
   (e) None of the above.

3. Imagine that you work for the marketing department of a company that sells different types of wine to customers. Your marketing team launched 32 initiatives over the past one year to increase the sales of wine (data for which is presented in the `offer_info.csv` file). Your team also acquired data that tells you which customers have responded to which of the 32 marketing initiatives recently (this data is presented in the `customer_offers.csv` file). Your marketing team now wants to begin targeting their initiatives more precisely, so they can provide offers customized to groups that tend to respond to similar offers. Your task is to use k-NN clustering to discover a few groups of customers and explore what those groupings are and the types of offers that customers in those groups tend to respond to. **In Python**, answer the following:
   (a) (3 points) Using the pandas library, read the csv file and create a data-frame called `offers`.
   (b) (4 points) Using the appropriate Python commands, report a quick summary of each of the variables in `customer_offers`.
   (c) (3 points) Remove the `customer_name` variable.
   (d) (4 points) Let's assume that you are planning to use all the 32 variables in your clustering analysis. Do we need to standardize the data? Explain. If so, use the min-max transformation.
   (e) (6 points) Using the brute-force approach, find the 10 nearest neighbors of observation 15. Describe these observations.