1. (3 points) Decision trees can be applied on regression and classification tasks.

   (a) True

   (b) False

   (c) It depends

   (d) All of the above

   (e) None of the above

2. (3 points) A decision tree is built in _____ fashion

   (a) Top-bottom

   (b) Bottom-up

   (c) It depends

   (d) All of the above

   (d) None of the above

3. (3 points) If a decision tree grows large, we can overfit the data.

   (a) True

   (b) False

   (c) It depends

   (d) None of the above

Consider the `Customer_Churn.csv` datafile. Each row represents a customer, each column contains customer's attributes described on the column Metadata. The data set includes information about:

- Customers who left within the last month, the column is called Churn.

- Services that each customer has signed up for phone, multiple lines, internet, online security, online backup, device protection, tech support, and streaming TV and movies.

- Customer account information: how long they've been a customer, contract, payment method, paperless billing, monthly charges, and total charges.

- Demographic info about customers: gender, age range, and if they have partners and dependent

4. **In Python**, answer the following:

   (a) (3 points) Using the `pandas` library, read the csv file and create a data-frame called `churn`.

   (b) (3 points) Using the `numpy` library, create a variable called `Churn_numb` that takes the value of 1 when `Churn = Yes` and 0 when `Churn = No`.

   (c) (5 points) Using the `sklearn.tree` library, build a decision tree model, in which `Churn_numb` is the target variable, and `tenure` and `MonthlyCharges` are the input variables. Predict the likelihood of churn of a customer with `tenure` equal to 20, and `MonthlyCharges` equal to 80.