ISMET OKAN CELIK CWID: 10472265

Question 1:

1. **Supervised Learning:** Machine Learning model is trained with training data which includes desired solutions and labels. After training the model, the model can perform certain task such as classification. For example, if we train a model with pictures of cats and dogs along with their classes, the model will be able to classify a picture of cat or dog which haven't been seen before by model.

   Supervised Learning Models:
   - K-Nearest Neighbor
   - Linear Regression
   - Logistic Regression
   - Support Vector Machines
   - Decision Trees and Random Forests
   - Neural Networks, etc.

2. **Unsupervised Learning:** Machine Learning model learns from unlabeled data by identifying patterns and similarities

   Unsupervised Learning Models:
   - Clustering (K-Means)
   - PCA (Dimensionality Reduction)
   - Association Rule Learning, etc.

3. **Online Learning:** In this method, system is trained incrementally by feeding it sequential data. It is a good system if the data is a continuous flow and once system learn about new data, it does not need them anymore. This approach is also greate for saving space, system can learn about new data on the fly, where huge data set can not fit in the memory of server.

4. **Batch Learning:** In this method, system can not learn incrementally. It need to be trained by using all the available data. It is also called offline learning, when system is trained and launched into production, it just applies what it has learned. If there is new available data then system need to train from scratch by using the full dataset

5. **Model-Based Learning:** Uses the training examples to create a model that has parameters learned from training data. The model will be used to make predictions for new examples

   Model Based Learning:
   - Linear Regression
   - Neural Network
   - Decision Trees etc.

6. **Instance-Based Learning:** The system learns the examples, then generalizes to new cases by comparing them to the learned examples

   Instance Based Learning:
   - K-Nearest Neighbor etc.