1. What does one mean by the term "machine learning"?

* **Machine learning is a branch of** [**artificial intelligence (AI)**](https://www.ibm.com/cloud/learn/what-is-artificial-intelligence) **and computer science which focuses on the use of data and algorithms to imitate the way that humans learn, gradually improving its accuracy.**

2.Can you think of 4 distinct types of issues where it shines?

* **Recommendations**
* **banking software to detect unusual transactions**
* **voice recognition**
* **email filters to sort out spam**

3.What is a labeled training set, and how does it work?

* **It is used to train the algorithm**
* **And you then use trained model to predict the outcome**
* **Final step is to compare the both observed and predicted sets**

4.What are the two most important tasks that are supervised?

* **classification and regression.**

5.Can you think of four examples of unsupervised tasks?

* **image recognition**
* **Exclusive and Overlapping Clustering**

#### Hierarchical clustering

#### Probabilistic clustering

6.State the machine learning model that would be best to make a robot walk through various unfamiliar terrains?

**Reinforcement learning**

7.Which algorithm will you use to divide your customers into different groups?

**K-means clustring**

8.Will you consider the problem of spam detection to be a supervised or unsupervised learning problem?

unsupervised learning (we use **Naive Bayes to filter the spam mails)**

9.What is the concept of an online learning system?

**A learning system based on formalised teaching but with the help of electronic resources**

10.What is out-of-core learning, and how does it differ from core learning?

11.What kind of learning algorithm makes predictions using a similarity measure?

**instance-based algorithm.**

12.What's the difference between a model parameter and a hyperparameter in a learning algorithm?

1. **Model Parameters:** These are the parameters in the model that must be determined using the training data set. These are the fitted parameters.
2. **Hyperparameters:** These are adjustable parameters that must be tuned in order to obtain a model with optimal performance.

13.What are the criteria that model-based learning algorithms look for? What is the most popular method they use to achieve success? What method do they use to make predictions?

* **The goal for a model-based algorithm is to be able to generalize to new examples.**
* **To do this, model based algorithms search for optimal values for the model's parameters, often called theta**

14.Can you name four of the most important Machine Learning challenges?

* **Null values**
* **Poor Quality of Data.**
* **Underfitting of Training Data.**
* **Overfitting of Training Data.**
* **Lack of Training Data.**

15.What happens if the model performs well on the training data but fails to generalize the results to new situations? Can you think of three different options?

1. **Increase training data.**
2. **Reduce model complexity.**
3. **Early stopping during the training phase (have an eye over the loss over the training period as soon as loss begins to increase stop training).**
4. **Ridge Regularization and Lasso Regularization**
5. **Use dropout for neural networks to tackle overfitting.**

16.What exactly is a test set, and why would you need one?

**Test set is used to compare the trained set against the final outcome of the mode to check the accuracy of the model**

17.What is a validation set's purpose?

**finding and optimizing the best model to solve a given problem.**

18.What precisely is the train-dev kit, when will you need it, how do you put it to use?

19.What could go wrong if you use the test set to tune hyperparameters?