# * Ensemble Learning

- It is combination of several machine learning models.
- These models are known as weak learners.
- Intution: When we combine several weak learners, they become strong learner.

- Each weak learner is fitted on training sets and gives prediction.
- Final prediction obtained by computing the combined output of each weak learner.
- This final prediction can be computed using some simple ensemble techniques.

## 1. Max Voting:
- Used for classification problem.
- Prediction of each model is a vote.
- Final prediction comes from prediction with max votes.

## 2. Averaging:
- Used for regression problem.
- Final prediction is average of predictions of all model.

## 3. Weighted average:
- Weight is assigned to prediction of each model based on their power of prediction or individual accuracy.
- Sum of weights assigned to each model is 1.
- Its same as saying, "this model contributes this much to the final prediction".

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- Some advance ensemble learning techniques are also their like,

## 1. Bagging: (Bootstrap Aggregation)
- Create multiple subsets from training set with policy of random selection with replacement (RSR)
- Build base models and supply each one with one subset for fitting.
- If classification model use concept of Max voting, if regression models use concept of Avraging to get final prediction.

→ Models function in parallel fashion.
→ Their can be 'n' number of models.
→ Some data points are never selected while using RSR, we use these data points to do Cross validation.
→ All the models are strong learner.
→ All the models can be same or different (homogenous or hetrogenous)