**Overfitting**

Overfitting occurs when a model is excessively complex, capturing noise and outliers in the training data, leading to excellent performance on training data but poor generalization to new, unseen data. For example, a highly flexible polynomial regression might fit training data points perfectly but fail to predict accurately on test data.

**Under fitting**

Under fitting happens when a model is too simplistic to capture the underlying patterns in the data, resulting in poor performance on both training and test data. For instance, using a linear model for data that exhibits a clear non-linear relationship will lead to inadequate fitting and high errors.

**Bias**

Bias refers to the error introduced by approximating a complex problem with an overly simple model that is the difference between the actual and predicted value. For example, applying linear regression to non-linear data results in systematic errors and consistently poor predictions, as the model cannot capture the true relationship between features and target.