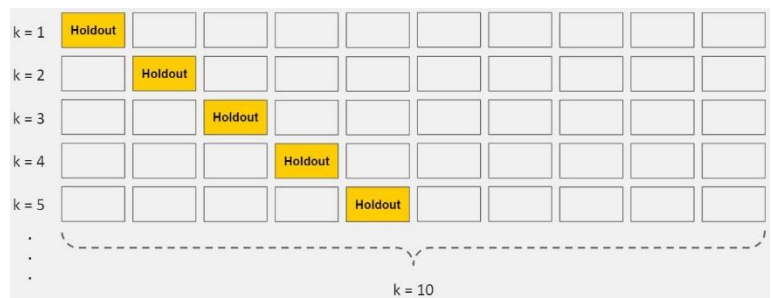
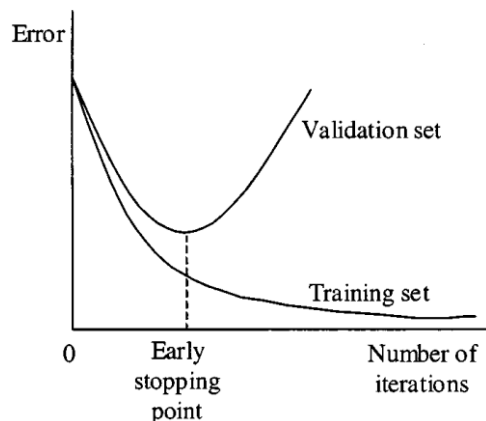

2ND EXERCISE SESSION

Exercise 1:

1. What is overfitting? **Overfitting is the lack of the ability of generalization from training data to new or “unseen” data. When the model has learned too well leaning data and performs worse with testing data and has loosen its ability to generalize.**
2. Explain how we can determine the best number of training iterations to avoid overfitting. **Early stop + Cross validation**



Use your initial training data to generate multiple mini train-test splits. Use these splits to tune your model.

In standard k-fold cross-validation, we partition the data into k subsets, called folds. Then, we iteratively train the algorithm on k-1 folds while using the remaining fold as the test set (called the “holdout fold”). For each iteration, we remember the early stopping point.

The number of iterations is the **average of the early stopping points**.

3. What are the methods used to prevent a neural network from overfitting?
 - Cross validation
 - Early stopping
 - Diversifying data
 - Dropout
4. Is it possible to represent a XOR Boolean function with a single layer perceptron? Why/Why not?
 - Not possible because XOR inputs are not linearly separable. Read more in: <https://medium.com/@jayeshbahire/the-xor-problem-in-neural-networks-50006411840b>
5. What is the advantage of multi-layer neural networks over single layer neural networks?
 - Multi-layer neural networks are capable of achieving non-linear separation and can generate arbitrarily complex boundaries. (See lecture3 slides)