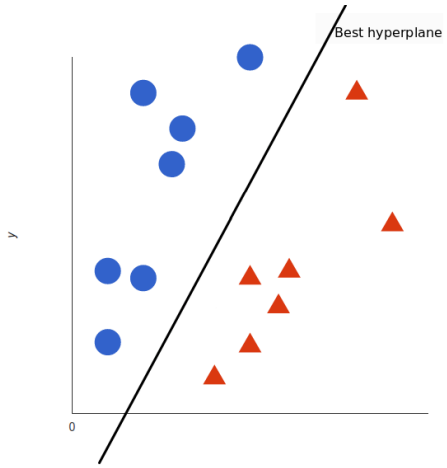
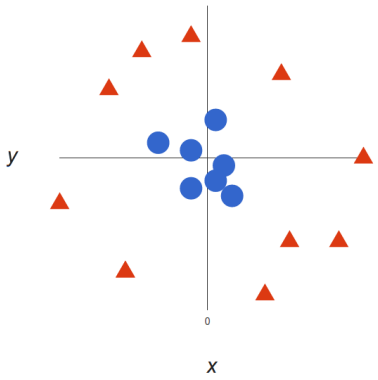
A **support vector machine (SVM)** is a supervised machine learning model used to classify data between two groups.. After giving an SVM model sets of labeled training data for each category, they can be used to classify new data.



A support vector machine takes these data points and outputs the hyperplane (which in two dimensions it's simply a line) that best separates the tags. For SVM the best hyperplane is the one whose distance to the nearest element of each category is the largest. This line is the **decision boundary**: anything that falls to one side of it is classified as *blue*, and anything that falls to the other as *red*.

SVM can be used where the decision boundary is not a straight line by transforming the data into a 3rd dimension (for example by creating a variable $z^2 = x^2 + y2$). This is extendable into higher dimensions.



Advantages:

- SVM works relatively well when there is a clear margin of separation between classes.
- SVM is more effective in high dimensional spaces.
- SVM is effective in cases where the number of dimensions is greater than the number of samples.
- SVM is relatively memory efficient

Disadvantages:

- SVM algorithm is not suitable for large data sets.
- SVM does not perform very well when the data set has more noise i.e. target classes are overlapping.
- In cases where the number of features for each data point exceeds the number of training data samples, the SVM will underperform.
- As the support vector classifier works by putting data points above and below the classifying hyperplane there is no probabilistic explanation for the classification.