**SVM**

The SVM method is based on measuring the similarity between all pairs of training examples,

then selecting a subset of them that will define the support vectors -

that is, the vectors which provide the largest margin available for the given constraints.

The programming exercises uses the SMO (sequential minimial optimization) method,

which is provided for you in the exercise scripts as the "svmTrain()" and "svmPredict()" functions.

These use a data structure called the "model" that represents the factors used in the SMO method.

**Q3) How do we know that the theta is perpendicular to the decision boundary?**

(thanks to Mentor Chirag for this derivation)

We know that θ′∗x=0 for any x on the boundary since the boundary is where sigmoid = 0.5.

1/1+e−z = 1/2=>e−z = 1=> −z = 0=> θ′∗x=0

So pick two random points on the boundary a and b, then

θ′∗a=0 and θ′∗b=0

=> θ′∗(a−b)=0 => θ′⋅(a−b)=0

and we know that when the dot product of two vectors is 0, the angle between them is 90 degrees. And since the vector (a-b) is on the decision boundary, θ is perpendicular to the decision boundary.