CS691 Quiz 11 Name _____

1. What is the "kernel trick"? And why is it useful? (3 points)

2. What does α replace in the kernelized perceptron algorithm? (2 points)

3. I have N training samples with D features. How many dimensions is w? What about α? (2 points)

4. I have 10 training samples, $s_1, \ldots, s_{10}$. $s_i = (x_i, y_i)$, so s_i has a feature vector x_i and a label y_i. If while running the kernelized perceptron algorithm, I get s_3, s_5, and s_{10} wrong in the first epoch, then s_4, and s_{10} wrong in the second epoch, and then nothing wrong in the third epoch, what is α? (3 points)

   If you understand the kernelized perceptron, you do not need the following equations. They are provided for you so you can answer the question even if you do not quite understand the algorithm. The first equation is w in terms of α, and the second equation is the update rule for the original perceptron algorithm.

$$w = \sum_n^N \alpha_n \phi(x_n)$$
$$w = w + y_n x_n$$

CS491 Quiz 11   Name _____

1. What is the "kernel trick"? And why is it useful? (3 points)

2. I have N training samples with D features. How many dimensions is w? What about α? (2 points)

3. If $w = (0, 0, \ldots, 0)$, what is α? (2 points)

4. I have 10 training samples, $s_1, \ldots, s_{10}$. $s_i = (x_i, y_i)$, so s_i has a feature vector x_i and a label y_i. If while running the kernelized perceptron algorithm, I get s_3, s_5, and s_{10} wrong in the first epoch, then s_4, and s_{10} wrong in the second epoch, and then nothing wrong in the third epoch, what is α? (3 points)
   If you understand the kernelized perceptron, you do not need the following equations. They are provided for you so you can answer the question even if you do not quite understand the algorithm. The first equation is w in terms of α, and the second equation is the update rule for the original perceptron algorithm.

$$w = \sum_n^N \alpha_n \phi(x_n)$$
$$w = w + y_n x_n$$