**CMPUT - 566**

**Introduction to Machine Learning**

**Assignment – 2**

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**Answer to the Question: 2(a)**

If we run the linear regression with full feature set, we get singular matrix error due to the singularity of (XTX). This error generally occurs when there are redundant features in the feature set and there is lack of linear independence between columns of the feature set. Also, if there is near linear dependence between the columns, this error generally occurs. The determinant of the matrix will become zero in that case. Here, we are trying to get a closed form solution and in that case, we need the calculate inverse of the feature matrix which is not possible for singular matrix.

We can easily solve this problem by using pseudo-inverse of the feature matrix. We can also add regularization term to the regression algorithm such as Laplace or Ridge regularizer, which will shift or truncate the small singular values which cause numerical stabilities. Another way is to use iterative approaches such as Batch or stochastic gradient descent.

**Answer to the Question: 2(b)**