

# CSCI 6020/ DASC 6020 - Machine Learning

## Written Assignment: 01

The overarching goal for this assignment is to assess your understanding of basic machine learning concepts.

Type the answers in the space provided. Use Adobe Acrobat Reader DC to enter your answers. Adobe Acrobat Reader DC is downloadable for free from [www.adobe.com](http://www.adobe.com).

1. What is artificial intelligence (AI)?
2. What is machine learning (ML)? How is ML different from artificial intelligence (AI)? Also, how are ML solutions different from the programs you have developed in the past?
3. In general, any machine learning problem can be solved by using one of the two approaches: supervised learning, and unsupervised learning. Give an example of a problem that can be solved using supervised learning, and another example for unsupervised learning.

4. One type of supervised machine learning is referred to as regression? What is regression?

5. Another type of supervised machine learning is referred to as classification? What is classification?

6. Clustering and classification are two general approaches to solving machine learning problems. How are they different? Give a concrete example for each approach.

7. We discussed two types of variables: input/predictor variables, and output/response variables. Provide a concrete example to illustrate each of these two variable types.
  
  
  
  
  
  
  
  
  
  
8. R is a language and environment for statistical computing, graphics, and visualization. In what ways is R similar to Java or any other programming language that you are familiar with?
  
  
  
  
  
  
  
  
  
  
9. We briefly mentioned about principle component analysis (PCA) as a dimensionality reduction technique. What is the significance/role of PCA in machine learning. Illustrate with a concrete example.
  
  
  
  
  
  
  
  
  
  
10. Consider the domain of Natural Language Processing (NLP) and limit the scope to written language. Some of the tasks/problems in NLP include Language Modeling, Word Segmentation, Part-of-Speech (POS) Tagging, Named Entity Recognition, and Parsing. Select any one of these problem and explain how machine learning can be used to solve the problem.

