

# Problem Set 1

1. **Supervised versus Unsupervised Learning [7 points]:** In your own words, define each learning approach, describe the difference between them, and name two commercial applications learned using each approach (i.e., 4 applications in total).
2. **Supervised Learning: Regression versus Classification [7 points]:** In your own words, define each learning problem, describe the difference between them, and name two commercial applications learned using each approach (i.e., 4 applications in total).
3. **Supervised Learning: Generalization [5 points]:**
  - (a) Describe the motivation for splitting a dataset into a training partition and a test partition.
  - (b) If your model performs well on the training data and generalizes poorly to new instances, is the model overfitting or underfitting?
  - (c) If your model performs poorly on the training data and poorly on new instances, is the model overfitting or underfitting?
4. **Offline versus Online Learning [6 points]:** In your own words, define each learning approach, describe the difference between them, and describe at least one advantage for using each approach.