## HOMEWORK 2

**Problem 1.** Obtain the parameter estimates for a linear regression model with an L1 loss function using the advertising dataset. Use Gurobi to solve the associated linear program. Compare these parameter estimates with that obtained in the previous homework (a linear regression model with an L2 loss function).

**Problem 2.** It is, in general, a good idea to test a machine learning model on a simple simulated test dataset to ensure the model works as intended. The make_blobs function in scikit-learn can be used to generate data-points simulated from multivariate normal distributions. Your first task is to use the make_blobs function to generate 500[1] observations $(x, y)$ with two predictor variables and one outcome variable. Set centers = 2. For each observation $i$, $y_i$ denotes the class of observations it belongs to.

Visualize the data and visually identify whether the observations can be separated with a linear classifier.

Implement a linear classifier by formulating and solving the optimization problem discussed in the lecture using Gurobi. Verify whether your implementation correctly predicts whether the dataset simulated in the previous step can be classified using a linear classifier.

[1] You can choose any large arbitrary number.