In this lab session, we will show how MLE can be used in the context of a binary choice model, specifically, the logit.

To this end, first generate 1,000 observations from the logit model:

$$
Pr(y_i = 1|x_i, \beta) = \frac{1}{1 + \exp(-[.5 + 2x_i])},
$$

where

$$
x_i \sim U(0, 1).
$$

Perform the following:

1. Write a program that calculates the MLE estimator numerically, given your generated data. Note that there are two parameters in this problem: an intercept and a slope coefficient. Compare the MLE estimate to the actual values used to generate this data. Note: The program will make use of the MATLAB optimization routine `fminsearch`, which finds parameters’ values to minimize a given objective function.

2. Calculate numerical standard errors using the BHHH estimator. Compare these standard errors to the analytical standard errors discussed in class (evaluated at the true parameters’ values).