Exercises 02612 – Lecture 04

1. **Use fmincon in Matlab's Optimization Toolbox**
   Use fmincon in Matlab's optimization toolbox to solve constrained optimization problems. Read the documentation for fmincon.

   See slides lecture 1B

   a. Solve Himmelblau's optimization constrained optimization problem (the nonlinear constrained problem presented in e.g. lecture 01)
   b. You should supply the first and second derivatives. Test the performance of the algorithm when you only supply the first derivatives compared to when you supply the first and second derivatives.
   c. Vary the tolerance options and investigate the effect on the number of iterations.
   d. Set the option for using different algorithms. Which algorithm requires the least number of iterations.

2. **Quadprog**
   Read the documentation for quadprog. You should be able to use quadprog to solve quadratic programs. Solve some of the problems from lecture 01
   a. Solve the test problem in the documentation
   b. Try various options – i.e. to select different algorithms
   c. Print the Lagrange multipliers and various statistics about the iterations (see documentation)

3. **Linprog**
   Read the documentation for linprog. You should be able to use linprog to solve linear programs. Solve some of the problems from lecture 01.
   a. Solve the test problem in the documentation
   b. Try various options – i.e. to select different algorithms
   c. Print the Lagrange multipliers and various statistics about the iterations (see documentation)