NUMERICAL OPTIMISATION
TUTORIAL 2

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EXERCISE 1

(a) Code backtracking line search, steepest descent and Newton's algorithms. See Cody Courseworks for more guidance.
Submit your implementation via **Cody Coursework**. **[30pt]**

(b) Apply steepest descent and Newton's algorithms (with backtracking line search) to minimise the Rosenbrock function

$$f(x) = 100(y - x^2)^2 + (1 - x)^2.$$

Set the initial point $x_0 = (1.2, 1.2)^T$ and the initial step length $\alpha_0 = 1$. Plot the step sizes used by each method over the iterations as well as the trajectories traced by the iterates in $\mathbb{R}^2$. Try explaining the trajectories.
Submit solution via **TurnitIn**. **[40pt]**

(c) Redo the simulations in b) with the more difficult starting point $x_0 = (-1.2, 1)^T$ and explain the trajectories.
Submit solution via **[10pt]**

(d) Repeat the calculation
This line search pro
mentation provided in Moodle: `lineSearch.m`, `zoomInt.m`. Compare the new step lengths with those obtained with backtracking.
Submit solution via **TurnitIn**. **[20pt]**

Remark. The submission to `TurnitIn` should not be longer than 4 pages. Avoid submitting more code than needed (if any) and focus on explaining your results.