Exam #1 Topics

* Chapters 1-5 of Nocedal & Wright.
* Homeworks #1, #2, #3 ⇐ know what you did!
* Given any of the algorithms, must be able:
  - to identify the key algorithms and provide a short-justification of any step.
  - given initial values of the program variables, must be able to trace the execution for a few steps (especially for programs that were assigned as homeworks!)
  - must be able to draw contours to justify the algorithm step (e.g. for Algorithm 4.1), also see drawings in lecture notes.

Δ by "Given...", we mean given a listing in pseudocode, as given by your text, or better!

* Suggest new line-search and trust-region algorithms:
  - don't forget the Armijo, Goldstein, and Wolfe conditions for line-search, and the cauchy-point for sufficient reduction in trust-region methods

*Theory:

- given any of the theorems, must be able to briefly explain the conditions, and the significance of the conclusions of the theorem.
- must know the definitions of modes of convergence (see homework)
- must be able to apply Taylor's theorem 2.1 and know.
- must know and be able to apply all the theorems in chapter #2 (read proofs also).
- must know theorem 3.2 and be able to use it to prove convergence (read p. 43-46 carefully).
- must be able to prove convergence for Newton's algorithm (theorem 4.7, must know <u>everything</u> about the conditions and proof).
- must be able to prove theorem 5.1 (p. 102-103).