Advanced Analysis of Algorithms

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September 5, 2013

- 1. Average-case analysis.
- 2. Analysis of correctness. (Induction and loopinvariance).
- 3. Loop invariance. Break up a statement S into S_0 , S_1 , etc. The initial claim S_0 is true before the start of the loop. If S_{i-1} is true before the i^{th} iteration commences, then S_i is true, after the i^{th} iteration. The final statement S_k implies S. Use array-max. Pascal array. $S_i : x$ is not equal to the first i 1 elements of **A**.
- 4. Comparing real numbers. Law of trichotomy.
- 5. Comparing functions.
- 6. Proper complexity function $\mathbf{N} \rightarrow \mathbf{N}$, nondecreasing, Turing computable.
- 7. The notion of order.
- 8. Which one grows faster? n^2 or n 10.
- 9. Define, O(f(n)). Notion of $\in O(f(n))$. Examples from book.
- 10. Define $\Omega(f(n))$.
- 11. Define $\Theta(f(n))$.
- 12. Show that $n \notin \Omega(n^2)$.
- 13. Define o(f(n)).
- 14. Show that $n \in o(n^2)$.