CSE-250 Recitation

September 9~10: PA1 Testing, Inequalities

Introduction/Questions?

- Java?
- PA1?
- Summations?
- Asymptotic Analysis?

PA1: Getting Started

- **PA1** will revolve around linked lists and how to implement them
- We will start **PA1** by writing tests
- Why Test Driven Development?
  - Deepens your understanding of the problem
  - Enables you to test your code without submitting to Autolab
  - Writing code before thinking about the problem will lead to disaster

PA1: Getting Started

- Remember, **understanding the expected behavior** of each method is more important than how to make your implementation when writing tests
- Some of the best tests are going to be written by asking “What situations could break my code”
- Let's try to come up with some good linked lists for testing
    - **Side note:** how can we make these lists without relying on methods like insert

Inequalities Cheat Sheet

1. $f(n) \geq g(n)$ is true if $f(n)/a \geq g(n)/a$ (for any $a > 0$)
2. $f(n) \geq g(n)$ is true if $f(n)*a \geq g(n)*a$ (for any $a > 0$)
3. $x + a \geq y + b$ is true if $x \geq y$ and $a \geq b$ (for any a, b)
4. $x \geq y$ is true if $x \geq a$ and $a \geq y$ (for any a)

Examples

Prove $3n + n^2 \in O(n^2)$

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$$3n + n^2 \leq c\, n^2$$

for some c > 0 and all n greater than some non-negative n_0

Now prove that inequality using the tricks we just mentioned

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More Examples

Prove the following:

$12 \log(10 \times 2^n) \in O(n)$

$n^2 + n \log(n) \in O(2^n)$

$n^2 + 15n^3 \in \Omega(n)$

$$\sum_{i=1}^{n} i \in \Omega(n^2)$$