CSC 165

lastBounds

virtual monday

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key counterexample

Let $\mathcal{F} = \{f : \mathbb{N} \mapsto \mathbb{R}^{\geq 0}\}$, and consider the claim

$\forall f, g \in \mathcal{F}, f \in \mathcal{O}(g) \vee g \in \mathcal{O}(f)$

The claim is false, as the following counterexample shows:

$$f(n) = \begin{cases} 0 & \text{if } n \text{ is odd} \\ 1 & \text{if } n \text{ is even} \end{cases} \qquad g(n) = \begin{cases} 1 & \text{if } n \text{ is odd} \\ 0 & \text{if } n \text{ is even} \end{cases}$$

$\forall c \in \mathbb{R}^+, \forall B \in \mathbb{N}, \exists n \in \mathbb{N}, n \geq B \wedge f(n) > cg(n)$

$$\forall c \in \mathbb{R}^+, \forall B \in \mathbb{N}, \exists n \in \mathbb{N}, n \geq B \wedge f(n) > cg(n)$$

How about $n \notin \mathcal{O}(\log n)$?

Statement: $\forall c \in \mathbb{R}^+, \forall B \in \mathbb{N}, \exists n \in \mathbb{N}, n \geq B \wedge n > c \log(n)$

Can you modify the last result to show that $2^n \notin \mathcal{O}(n^3)$?

You could transform it from $n \notin \mathcal{O}(3 \log n)$

test 2

coverage: proofs of the style of chapter 4 and 5

preparation: assignment 2, lecture slides, tutorial exercises

form: 50 minutes, no prove/disprove conumdrums

I owe you: today's annotated slides