

CSC 165

non-boolean functions

week 7, lecture 2

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coursework modifications

- three imminent pieces of coursework aren't ready for your attention yet
I propose using a multi-node, biologically-based computer to vote on the following proposals
- A: Replace exercises 5 and 6 by exercises 3 and 4, delay assignment 2
rationale: the original exercises 3 and 4 were due yesterday,
and assignment 2 next week, and you need reasonable time to do them.
- B (if A passes): spread the 6% weight of the missing two exercises uniformly
over all other pieces of course work (2 tests, 4 exercises, 3 assignments, tutorials),
increasing each weight by 0.6%
- C (compare to B): spread the 6% weight of the two missing exercises
uniformly over all future term work (1 test, 2 assignments, 2 exercises)
increasing each weight by $\frac{6}{7}\%$

careful quantifying non-booleans

- we're used to functions and conditions such as “odd,” “even”, $>$ returning boolean (true, false) results, and combining them with quantifiers such as \forall or \exists
- what about functions that return other values
 - natural numbers, real numbers, for example?
- computer scientists often use an innocent-looking function $\lfloor x \rfloor$, meaning:
 $y = \lfloor x \rfloor$ if and only if $y \in \mathbb{Z} \wedge y \leq x \wedge (\forall z \in \mathbb{Z}, z \leq x \Rightarrow z \leq y)$
- as a warm-up, use the definition to prove that $\lfloor x \rfloor$ is always less than $x + 1$.

$$\forall x \in \mathbb{R}, \lfloor x \rfloor < x + 1$$

NOT! $\forall \lfloor x \rfloor \in \mathbb{R} \dots$

how many parts of the definition of $\lfloor x \rfloor$ did you need in previous proof? For more challenge, try:

$$\forall x \in \mathbb{R}, \lfloor x \rfloor > x - 1$$