CS10 Fall 2016 Midterm 2 Answers

Question 1: If 75% of a program's code is parallel, what is the maximum speedup with ∞ helpers? Amdahl's Law states that the maximum speedup of a piece of code = 1 / S, where S is the % of the code that's serial. If 75% of a program's code is parallel, then 25% = ¼ is serial, so the maximum speedup is 1 / (¼) = 4x.

Question 2: What do researchers believe might happen after *the singularity*? The singularity is the point where AI systems will be written by other AI systems, leading to them potentially showing general intelligence, growing beyond human control, and perceiving that humans are threats to them. So, ALL of them.

Question 3: How would Judah Schwartz classify the Snap*!* programming environment? Tool

Question 4: Which of the following is a fallacy, with regard to internet privacy? You can avoid having an information footprint by staying offline. (others will write about and take photos of you, surveillance cameras will capture you, etc)

Question 5: What are some implications of Internet Sovereignty? Governments could control cyberspace based on their physical borders. YEP! Governments could control the flow of money flowing into their country through cyberspace. YEP! Governments could dictate that only websites in their native language could be viewed in their country. YEP! Governments could force their countries' websites to be viewable globally. NOPE! (for reason #1 above)

Question 6: If the expression 

is false, which can you say *for sure*? A is false (since then the outer OR would just be the value of the inner AND which would already be false if A is false, so B could be anything).

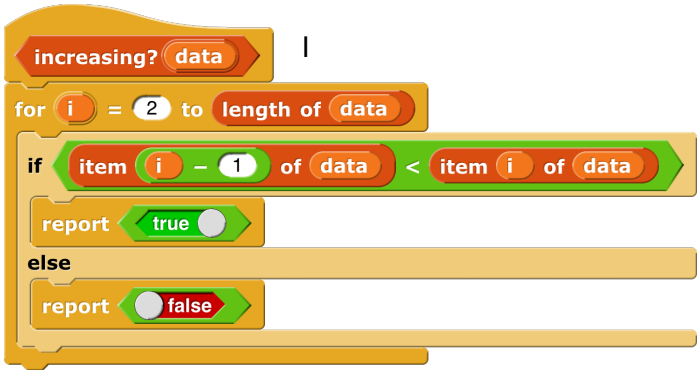
Question 7: What are the different possible values of NAME at the end? *Note that the "set" blocks happen instantaneously and atomically (i.e., they aren't interrupted by the other script)* This "forced non-determinism" yields four different answers – if the left one finished completely (both random numbers 0.1) before the right one started (first random number 0.9). Then copy would be CALIFORNIA, which is what NAME would be, then the right would join BEARS and it'd be "CALIFORNIA BEARS". If the opposite happened, it would be "CAL BEARSIFORNIA". If neither block can finish completely before the other sets "my copy", then each will grab an independent copy, and set NAME accordingly to "CAL BEARS" or "CALIFORNIA" but the one that finishes last will overwrite the earlier one. Guess it pays to finish last!

Question 8: Consider the problem of wanting to determine if the numbers of a list (of at least two items) are all *increasing* (i.e., *every* element after the first one is larger than the one before). Note: the input will always have ≥ 2 items. What's wrong (if anything) with each of the following three boxed attempts? I This reports after the first iteration, with i set to 2. So it only returns the test of the first two elements, E. II calculates the minimum value, and only reports whether the first element is equal to the minimum number, G. III is an error, since on the first example, it evaluates to (1 < (99 < (10 < 100))) ➔ (1 < (99 < TRUE)) and you shouldn't be able to compare 99 and TRUE. Turns out Snap*!* doesn't actually cause an error here (it treats TRUE as 1, and FALSE as 0), but in any case that's a logical problem. We accepted B or H.

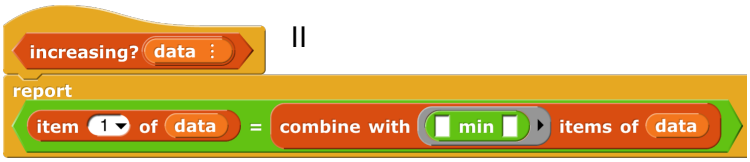
Complete the code so the expression would work as the reported value of **`increasing?`**, if data is our list of numbers. See code below.

Finally, let's see if you can write the block yourself. See code below.

I



II



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