Review

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(image courtesy of clipartguide.com)

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These slides, the course material, and course web site are based on work by Douglas W. Harder

Review

Standard reminder to set phones to silent/vibrate mode, please!

Review

- Plan for today:
  - Administrivia
    - Dates / times / locations
    - Conditions / rules for the exam
    - Resources
  - Tips for the exam
  - Review of the material

Review – Administrivia

- Exam date and time:

  Tuesday, February 28, 5:30PM to 6:50PM

  RCH-302 / RCH-306

Review – Administrivia

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Review – Administrivia

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- And yes, you may — you'd have to be escorted by one of the T.A.s (we only have one female TA for the two sections, so the ladies may be subject to a small delay, unfortunately)
- In any case, the emphasis here is: no questions *about the exam* (if something is not clear, state your assumptions and answer according to those assumptions)

Review – Administrivia

- You will not be allowed to leave until the very end of the exam (the standard rule is that you're not allowed to leave during the first 60 minutes or the last 30 ... but this one is an 80 minutes exam, so...)

Review – Administrivia

- Additional “standard practices” and “common sense” applies — not allowed to talk, not allowed to look in any direction other than your own exam, not allowed to continue writing after one of the proctors announces that the exam period is over, etc.

Review – Administrivia

- Resources before the exam:
  - During the reading week (except Monday, which is Family Day, and thus the University is closed), the TAs will be available to assist you and answer questions.
  - I will post the schedule and their offices on the course web site, on the main section, under the *Announcements* sub-section.
    - Mehdi is the TA that has done your tutorial sessions, and Mahsa has graded your assignments, so they are the ones most familiar with what we've covered in class.

Review – Administrivia

- Resources before the exam:
  - I may not be available until Thursday (I'll get back to you on that — email?)
  - At the very least, I will be available Friday (Feb 24) afternoon (1PM to whatever time you let me go :-)), and Monday (Feb 27) the whole day (hopefully you will let me have lunch? :-))
    - I will NOT be available (nor will I answer any e-mails) the same day of the exam — there is no way that you will be able to make anything useful out of asking questions or asking for clarifications in such a “last minute” manner.

Review – Administrivia

- Resources before the exam:
  - I will post some practice questions (like an assignment, only it's not due), with emphasis on the topics that were not covered in the three assignments so far.
    - Notice that the midterm covers everything that we have covered in class (that's from Day 1 until and including AVL trees)

Review – Tips

- Show hands: who recognizes the following phrase? (and by "recognize" I mean anything from "it rings a bell" to being fully familiar with what it is)

  Getting it Wrong: Surprising Tips on How to Learn

Review – Tips

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  Getting it Wrong: Surprising Tips on How to Learn

- Follow-up question (show hands):
  - Who read that article?

Review – Tips

- Offer: I can put a, say, 2-points bonus marks question on the contents of that article, if you want ... (and, again, I'm not joking!)

Review – Tips

- Additional tips:
  - Read all the questions first, and start by answering the ones that are (or at least look) easy for you!
  - If you get stuck with a question, *move on* to the other questions, and come back to that one after you've answered as many of the other “easier” questions as possible!

Review – Tips

- Perhaps the most important of all tips:
  - You will want to justify all of your answers!!
  - Remember, a correct answer without a justification of *why* that is the answer, is worth zero points!!

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Review – Tips

- Examples of unacceptable answers due to lack of justification:
  - Your're shown a tree where the root node is, say, 42, and are asked what the root node is. If your answer is: “42” or “the root node is 42”, that answer would not be acceptable (and it would be worth 0 marks).
    - At the very least, you have to say something like “the root node is the one with no parent, and we see that it is node 42” — or even something more informal, such as “the root node is the one at the top, which in this tree is the node 42” or something like that

Review – Tips

- Examples of unacceptable answers due to lack of justification:
  - You're shown a tree and are asked what would be the order in which the elements are visited by a breadth-first traversal.
  - Clearly, an answer such as the following would not be accepted:

    5, 11, 2, 7, 9

    (that is, assuming that this one *is* the correct answer)

Review – Tips

- Notice that in this example, something as simple as drawing an arrow highlighting the traversal strategy could suffice.
- Or something as simple as: "breadth-first visits the elements left-to-right first, then down" ... something simple like that would suffice.

Review of the Material

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Review of the Material

- A couple of key points with AVL trees:
  - To fix an imbalance, there are two aspects to consider:
    - Have to identify the deepest node (as in, the node with largest depth) for which there is imbalance.
    - Have to determine the type of imbalance — “aligned” or “zig-zag” (this is possibly my own personal terminology; I don't guarantee that you'll find these terms if you check your textbook or any other references).

Review of the Material

- A couple of key points with AVL trees:
  - In fact, many references talk about four cases to consider: left-left, left-right, right-right, and right-left.
    - In my view, there are only two cases: left-left and right-right are essentially the same case; as are left-right and right-left.

Review of the Material

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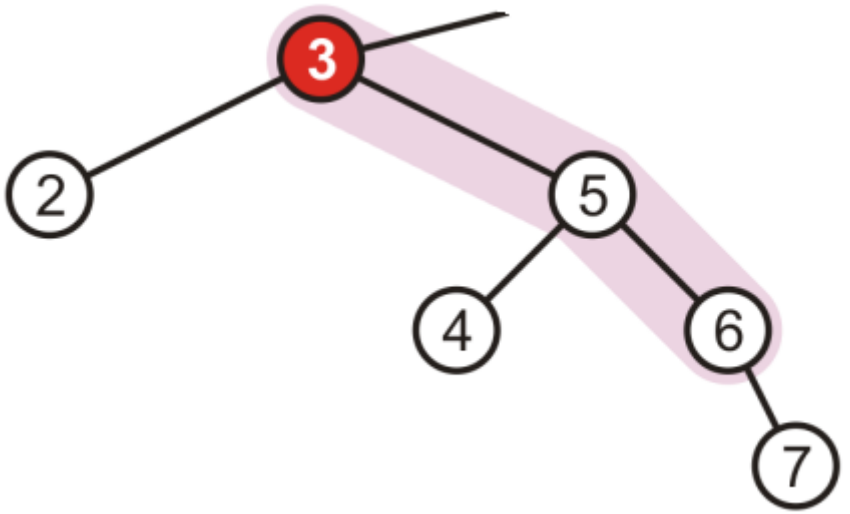
  - Examples:



Aligned imbalance

Review of the Material

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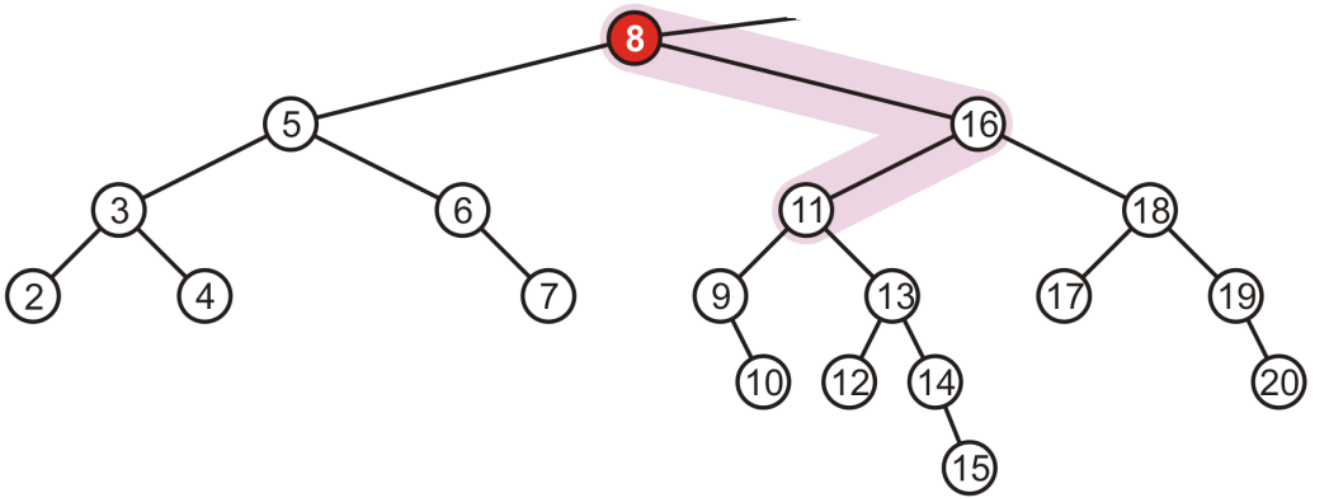

“Zig-zag” imbalance

Review of the Material

- A couple of key points with AVL trees:
  - Of course, in the drawings it is trivial to tell, since the “shape” is highlighted.
    - To identify it, you need to identify the path to the deepest leaf node responsible for the imbalance (the one that has a depth of two more than the depth on the other side)
    - With insertions, this is trivial, since that can only be the node that was added.
    - With removals is less trivial — you simply need to follow the path towards the deepest node, the one responsible for the imbalance.

Review of the Material

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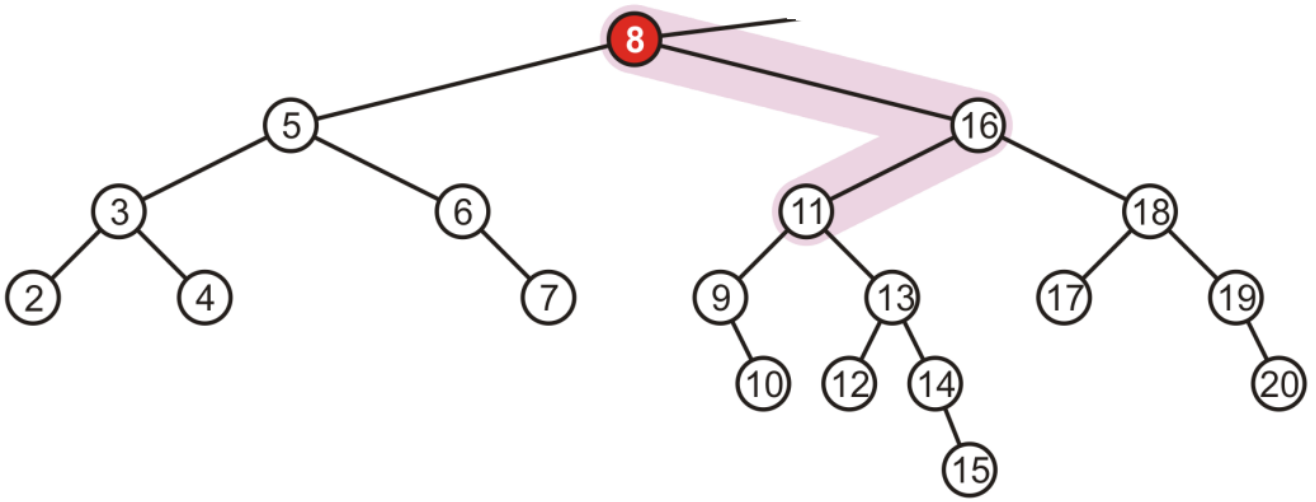

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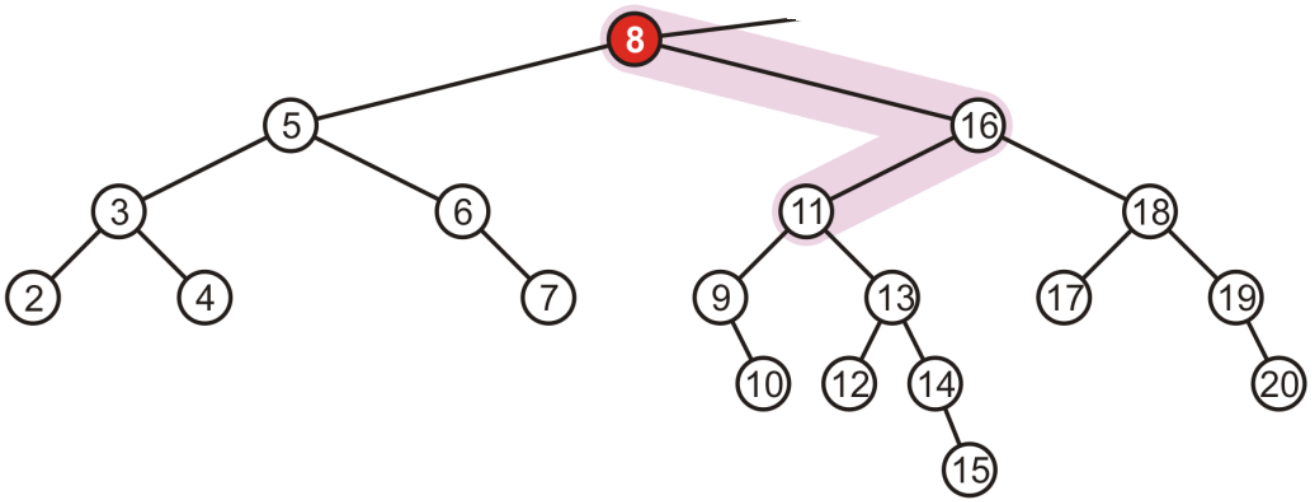

Review of the Material

- Going back to Algorithm and Asymptotic analysis:
  - I will put the emphasis on getting the run time from the description (or actual C++ code) of an algorithm.
  - If it is a recursive function, the emphasis will be on obtaining the correct recurrence relation.
    - Of course, you could be asked to solve it — but perhaps it would be like part (a) and (b) of a question, with solving the recurrence relation being 1/3 of the marks, and obtaining the recurrence relation being 2/3 of the marks.

Review of the Material

- About what material to expect for the exam:
  - General rule: if it appears on the slides, you should not be surprised that it appears in any of the exams (midterm or final).
    - Even less surprising if it is one of the items in the introductory slide (the one with the outline of what's going to be covered in the lesson)

Review of the Material

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- About what material to expect for the exam:
  - As for proofs — you should not be surprised to be asked to do a proof by induction (either algebraic or other sort of argument).
    - BTW, anyone ever figured out what the problem with that proof that in a group of n values, every value is the same?
  - Maybe an algorithmic proof? (to be proved perhaps by contradiction, or by reduction?)
    - If I decide to include one, most likely it would be a bonus marks question.

Review of the Material

- About what material to expect for the exam:
  - Of course, you should not be surprised to see a general type of proof, if the proof is really easy.
    - For example: wouldn't you all like me to ask you to prove that a number is odd if and only if the LSB in its binary representation is 1 ?

Review of the Material

- Another general guideline:
  - If at some point during answering one question you feel like without a calculator you can not continue, then you definitely are doing something wrong!

Review – Questions?

- Any other questions or comments regarding the midterm?