General rules for solving exercises

• This is a theory course, which means: if an exercise does not explicitly say "you do not need to prove your answer" or "justify intuitively", then a formal proof is always required.

• All exercises and their solutions, no matter whether they are graded or regular/optional ones, are part of the material relevant for the two exams.

• The tasks marked with the symbol * are more difficult than usual exercises, either because they require a non-standard idea or involve some non-trivial calculation. This is merely a help for you to decide which exercises you would like to spend how much of your time on. Note that all exercises and their solutions count as part of the material relevant for the two exams.

The following exercises will be solved in the second exercise class on September 28/30, 2011.

Exercise 1 - A Random Tree? How random?
Solve Exercise 1.7 from the lecture notes.

Exercise 2 - Very Deep Nodes
Solve Exercise 1.9 from the lecture notes.

Exercise 3 - High Trees
Solve Exercise 1.10 from the lecture notes.

Exercise 4 - Solving Recurrences
Solve Exercise 1.14 from the lecture notes.

Exercise 5 - Descendants of the Smallest Key
Let $S_n$ denote the number of keys that are descendants of the smallest key. For example, in the tree below, $S_n = 5$, because the elements 1, 2, 3, 4, 6 are descendants of 1. Compute $E[S_n]$.

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7
/   \
1     8
/ \
4   3
/ \
2   6
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