CS 350
Spring 2010
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Course Summary

This list is subject to changes, additions, and deletions during the course of the semester.

Automata

1. The following are equivalent for a language L:
    (a) There is a (deterministic) finite automaton (DFA) which recognizes L (i.e., L is regular).
    (b) There is a non-deterministic finite automaton (NFA) which recognizes L.
    (c) L is described by a regular expression.

2. The pumping lemma for regular languages provides a way of showing that languages are not regular.

3. The following are equivalent for a language L:
    (a) There is a pushdown automaton (PDA) which recognizes L.
    (b) L has a context-free grammar (CFG).

4. The pumping lemma for context-free languages provides a way of showing that languages are not context-free.

Computability

5. The following are equivalent for a language L:
    (a) There is a Turing machine which recognizes L (i.e., L is Turing-recognizable).
    (b) There is a multi-tape Turing machine which recognizes L.
    (c) There is a non-deterministic Turing machine which recognizes L.
    (d) Some enumerator enumerates L.

6. The following are equivalent for a language L:
    (a) There is a Turing machine which decides L (i.e., L is Turing-decidable).
    (b) There is a multi-tape Turing machine which decides L.
    (c) There is a non-deterministic Turing machine which decides L.
    (d) Both L and its complement are Turing-recognizable.

7. The Church-Turing thesis says that Turing decidability correctly captures the intuitive notion of algorithmic solvability.

8. The acceptance problems for DFAs, NFAs, and CFGs are decidable.

9. The halting problem for Turing machines is undecidable.

Complexity

10. No one knows whether P = NP.

11. If any NP-complete problem is in P, then all problems in NP are in P (i.e., then P = NP).