CS 422 - Automata Theory

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1 General Information

1. Meeting Times: Tu-Th 03:30 pm - 4:45 pm
   Location: 207 ESB
2. Contact Information: 749 ESB, ksmani@csee.wvu.edu
3. Office Hours: MW 09:00 am -10:00 am
4. Teaching Assistant: Lisa Kovalchick
5. Contact Information: lynn@csee.wvu.edu
6. Office Hours: WF 08:00 am -08:50 am
7. Textbook - [HMU01]
8. URL - `http://www.csee.wvu.edu/~ksmani/courses/sp03/at/at.html`
9. Assessment:
   (a) Homeworks (2) - You will be handed a homework on January 30, due on February 6 and a second homework on April 1, due on April 8. Each homework is worth 10%, for a total of 20% of your grade.
   (b) Quizzes (2) - The first quiz will be held on February 13 while the second quiz will be held on April 10. Each quiz is worth 10% (for a total of 20%) of your grade and is closed-book.
   (c) Midterm - The midterm will be held on March 6 (in-class, closed book) and is worth 30% of your grade.
   (d) Final - The final will be held on May 8 (in-class, closed book, $08:00 - 10:00$ am) and is worth 30% of your grade.
10. Grade Boundaries
    (a) **A**: 85 and up
    (b) **B**: $70 - 84$
    (c) **C**: $60 - 69$
    (d) **D**: $45 - 59$
    (e) **F**: $0 - 44$
11. Makeup Policy - If for some reason, you are unable to attend a test or an exam, please meet me at the earliest and I will set an alternate date.

2 Syllabus Sketch

2.1 Introduction to Automata

Formal Proofs, Additional Forms of Proofs, Inductive Proofs, Central Concepts. These topics will be covered from Chapter 1 of [HMU01] (2 Lectures).

2.2 Finite Automata

An Informal picture, Deterministic Finite Automata, Nondeterministic Finite Automata, Finite Automata with ϵ-transitions. These topics will be covered from Chapter 2 of [HMU01] (5 Lectures).

2.3 Regular Expressions and Languages

Regular Expressions, Finite Automata and Regular Expressions, Applications of Regular Expressions, Algebraic Laws for Regular Expressions. These topics will be covered from Chapter 3 of [HMU01] (4 Lectures).

2.4 Properties of Regular Languages

Proving Languages not to be Regular, Closure Properties of Regular Languages, Decision Properties of Regular Languages, Equivalence and Minimization of Automata. These topics will be covered from Chapter 4 of [HMU01] (5 Lectures).

2.5 Context-Free Grammars and Languages

Context-Free Grammars, Parsers, Ambiguity in Grammars and Languages. These topics will be covered from Chapter 5 of [HMU01] (5 Lectures).

2.6 Pushdown Automata

Definition of the Pushdown Automaton, The Languages of a PDA, Equivalence of PDAs and CFGs, Deterministic Pushdown Automata. These topics will be covered from Chapter 6 of [HMU01] (5 Lectures).

2.7 Properties of CFLs

Normal Forms for CFGs, The Pumping Lemma for CFGs, Closure Properties of CFGs, Decision Properties of CFLs. These topics will be covered from Chapter 7 of [HMU01] (2 Lectures).

I would like to reiterate that this is a sketch of the topics that we will be covering. For various reasons, I may choose to drop a mentioned topic or cover a new topic. In such cases, advance notice will be given.

3 Social Justice Statement

West Virginia University is committed to social justice. I concur with that commitment and expect to foster a nurturing learning environment, based upon open communication, mutual respect and non-discrimination. Our University does not discriminate on the basis of race, sex, age, disability, veteran status, religon, sexual orientation, color or national origin. Any suggestions to further such a positive and open environment in this class will be appreciated and given serious consideration. If you are a person with a disability and anticipate needing any type accommodation, in order to participate in this class, please advis me of the same and make appropriate arrangments with Disability Services $(293 - 6700)$.

If you feel that you are being treated inappropriately or unfairly in any way, please feel free to bring your concerns to my attention; rest assured that doing so will not prejudice the grading process. In return, I expect you to behave professionally and ethically.

References

[HMU01] J. E. Hopcroft, R. Motwani, and J. D. Ullman. *"Introduction to Automata Theory, Language, and Computation"*. Addison–Wesley, 2nd edition edition, 2001.