Assignment 7

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Assignment 7 consists of two problems. You must write your solutions to the problems using LaTeX.

Please submit Assignment 7 as two files, `Assignment_7_YourMacID.tex` and `Assignment_7_YourMacID.pdf`, to the Assignment 7 folder on Avenue under Assessments/Assignments. *YourMacID* must be your personal MacID (written without capitalization). The `Assignment_7_YourMacID.tex` file is a copy of the LaTeX source file for this assignment (`Assignment_7.tex` found on Avenue under Contents/Assignments) with your solution entered after each problem. The `Assignment_7_YourMacID.pdf` is the PDF output produced by executing

```
pdflatex Assignment_7_YourMacID
```

This assignment is due **Sunday, March 17, 2019 before midnight.** You are allow to submit the assignment multiple times, but only the last submission will be marked. **Late submissions and files that are not named exactly as specified above will not be accepted!** It is suggested that you submit your preliminary `Assignment_7_YourMacID.tex` and `Assignment_7_YourMacID.pdf` files well before the deadline so that your mark is not zero if, e.g., your computer fails at 11:50 PM on March 17.

Although you are allowed to receive help from the instructional staff and other students, your submission must be your own work. Copying will be treated as academic dishonesty! If any of the ideas used in your submission were obtained from other students or sources outside of the lectures and tutorials, you must acknowledge where or from whom these ideas were obtained.

Problems

1. **[10 points]** Let Σ be the set of lower and uppercase letters in the Roman alphabet plus the set $\{[,], \_, .\}$ of special symbols. Let a *word* be a nonempty string of lower case letters in Σ, a *capitalized word* be an uppercase letter in Σ or an upper case letter in Σ followed by a word, a *parenthesized word* be a string of the form $[x]$ where x is a word or capitalized word, and a *sentence* be a string of the form $x.$ or $x\_y.$ (note the occurrences of ".") where x is a capitalized word, and y is a nonempty string of words, capitalized words, and parenthesized words separated by the symbol "$\_$". Write a regular expression that matches the set of sentences (as defined here).

   Yunbing Weng, wengy12, 03/17/2019

   $set_{of}sentences = ((CapWord)(\_(Word + CapWord + ParWord))^*.)^*$

2. **[10 points]** Construct an NFA (possibly with ϵ-transitions) that is equivalent to the regular expression

   $$0(00 + 1^*)^*1.$$

   Present the NFA as both a transition table (with a column for ϵ transitions) and a transition diagram.

   Yunbing Weng, wengy12, 03/17/2019

Q \ Σ	0	1	ϵ
start $\rightarrow$ p_0	p_1		
p_1			p_2, p_9
p_2			p_3, p_6, p_8
p_3	p_4		
p_4	p_5		
p_5			p_8
p_6		p_7	
p_7			p_6, p_8
p_8			p_2, p_9
p_9		p_{10}	
final $\rightarrow$ p_{10}			