

CSE 3341 Midterm 1 Review

Midterm 1 is **Tuesday, May 30th**.

The midterm covers all material discussed in class, up to and including the May 26th lecture.

Here are some sample problems from past midterms and homeworks:

1. Let $\Sigma = \{0, 1\}$. Let $L \subseteq \Sigma^+$ be the language of all strings where the first and last character are equal. Write a regular expression that recognizes all strings from L .
2. Is every finite language a regular language? Explain your answer.
3. Write a regular grammar for the language of all strings composed of 'a', 'b', 'c' but each string uses at most two of the three letters. For example, this language contains strings like "aabbba", "cacacaca", "bbbbbb", but does not contain strings like "abc".
4. Suppose we try to solve the "dangling else" problem with this grammar:

```
<statement> ::= <if> | <assign>
<if>         ::= if <condition> then <statement> <if-end>
<if-end>     ::=  $\epsilon$ 
               | else <statement>
```

Does this solve the problem? You can assume $\langle \text{assign} \rangle$ and $\langle \text{condition} \rangle$ do the obvious thing and have no effect on the question.

5. Consider the following grammar of expressions:
 $\langle \text{exp} \rangle ::= \text{id} \mid \text{hex_literal} \mid \langle \text{exp} \rangle + \langle \text{exp} \rangle \mid \langle \text{exp} \rangle * \langle \text{exp} \rangle$
In this grammar, `id` and `hex_literal` are terminal symbols; that is, tokens that will be produced by the scanner and consumed by the parser.
Change this grammar (by adding new non-terminals and new productions) to achieve these goals:
First, make the precedence of operator `+` lower than the precedence of operator `*`.
Second, make operators `+` and `*` left-associative.
Third, add a pre-increment operator `++` to represent expressions of the form `++A`. The pre-increment operator applies only to identifiers, and has higher precedence than `+` and `*`.