

## 1syntax-and-parsing-lab

CST 334 (Operating Systems)  
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## Lab: syntax and parsing

Try to answer these problems without referring to the lecture slides.

1. In your own words, define what a syntax error is.
2. Define syntax.
3. For each of the following AWK programs, is there a syntax error in the program?

```
{ print }  
{ print } BEGIN { print $1 }  
END { print $1 } BEGIN { print $2 }  
/foo/, /bar/ { print "baz" }  
BEGIN { print $0 } BEGIN { print $1 }
```

You may want to check the AWK man page, or to try running the commands.

4. Here is a BNF grammar:

```
A ::= ( A ) | B  
B ::= 0 | 1
```

A is the start symbol. Can you describe the language of this grammar?

5. Using the grammar of the last problem, can you derive the string "0"? Write out the derivation, starting with A, and ending with "0", using the method we used in lecture.
6. Using the same grammar, can you derive the string "((1)(0))"? Can you derive the string "((1))"?
7. Are BNF grammars recursive?
8. Here's a BNF grammar for a very simplified AWK:

```
prog ::= action_stmt  
action_stmt ::= { stmt }  
stmt ::= print | stmt; stmt
```

Can you derive "{ print }" from this grammar?

9. Referring to the last problem, is every string in the grammar a legal AWK program?
10. Can you modify the simple AWK grammar so that allows programs that have more than one action statement? From your grammar it should be possible to derive the string "{ print } { print }".
11. Can you modify the awk grammar of the last problem so that it allows BEGIN in front of any action statement? From your grammar it should be possible to derive the string "{ print } BEGIN { print }".
12. Look at the awk man page and find how the syntax of awk is defined. Start with the syntax for "PATTERNS AND ACTIONS".
13. If you still have time, extend the AWK grammar above so that from it you can derive all (and only) legal AWK programs.

14. If you still have time, can you find a reference that gives the syntax of C?

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