

## Plan for Today

### Homework and slides on class schedule

#### nextChar() problem

- what DFA does nextChar() force you to implement?
- how could you fix it?

#### Context Free Grammars

- model for specifying programming languages
- why not just use regular expressions?
- example grammar
- derivations
- parse trees
- syntax-directed translation
- ambiguity

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## SVG Grammar

svg -> SVG\_START elem\_list SVG\_END

elem\_list -> elem\_list elem | epsilon

elem -> RECT\_START KW\_X EQ NUM KW\_Y EQ NUM KW\_WIDTH EQ NUM KW\_HEIGHT EQ NUM KW\_FILL EQ COLOR ELEM\_END

| CIRCLE\_START KW\_CX EQ NUM KW\_CY EQ NUM KW\_R EQ NUM KW\_FILL EQ COLOR ELEM\_END

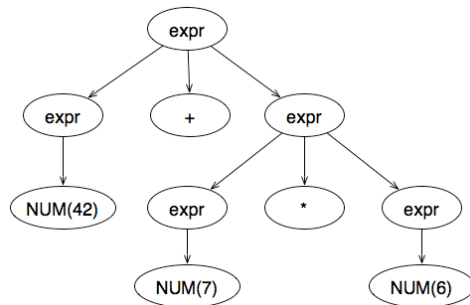
| LINE\_START KW\_X1 EQ NUM KW\_Y1 EQ NUM KW\_X2 EQ NUM KW\_Y2 EQ NUM KW\_STROKE EQ COLOR ELEM\_END

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## Parse Tree Example



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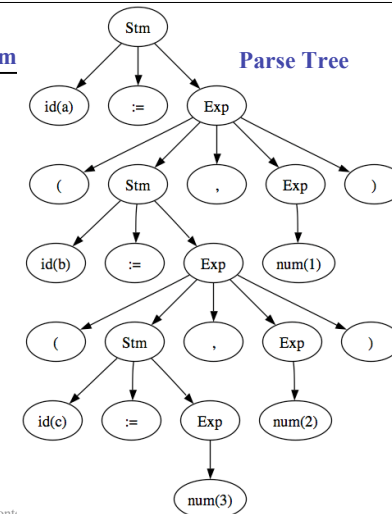
## Another Parse Tree Exam

### Grammar

Stm --> id := Exp  
Exp --> num  
Exp --> ( Stm, Exp )

### String

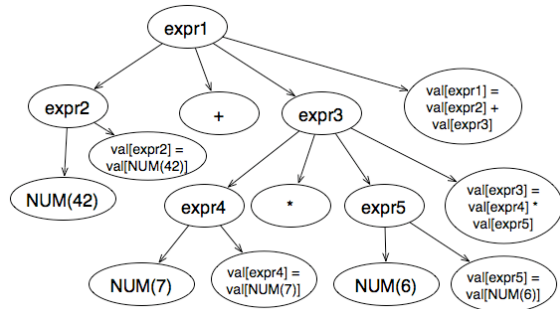
a := ( b := ( c := 3, 2 ), 1 )



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### Semantic Rules for Expression Example

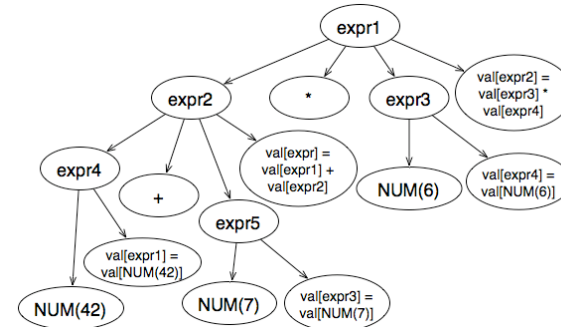


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### Another valid parse tree

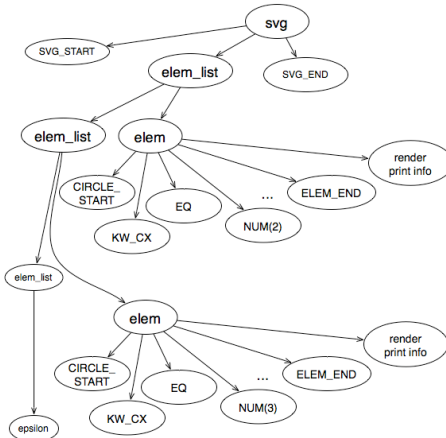


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### Example Parse Tree for MiniSVG



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