Lecture 4

Lexical Analysis

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tokens	id	ASSIGN	id	ADDOP	ID
lexeme	a	=	b	+	c

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- Use high-level languages like C
  Efficient but difficult to implement
- Use tools like `lex`, `flex`
  Easy to implement but not as efficient as the first two cases

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Allow white spaces, numbers, and arithmetic operators in an expression

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int lineno = 1;
int tokenval = NONE;
int lex() {
  int t;
  while (1) {
    t = getchar ();
    if (t ==' ' || t == 't');
    else if (t == '\n')
      lineno = lineno + 1;
    else if (isdigit (t) ) {
      tokenval = t -'0'
      t = getchar ();
      while (isdigit(t)) {
        tokenval=tokenval * 10 + t - '0'
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- Check for the whitespace
- Check for the new line
- Check for digit
- Else return the scanned character

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- The first character cannot determine what kind of token we are going to read

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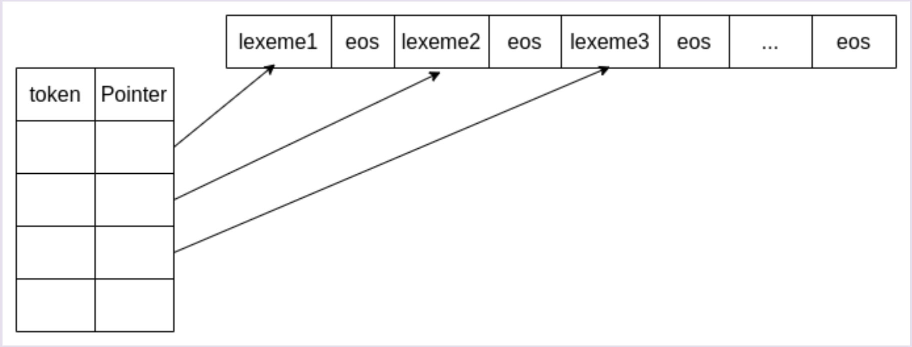

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- Not an error at lexical analysis phase.

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- Even today `Foo<Bar<Bazz>>`

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  - Tokens may have similar prefixes.
  - Each character should be looked at only once.

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- Where each r_i is a regular expression over $\sum \cup d_1 \cup d_2 \cup \ldots \cup d_{i-1}$

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4. Remove $x_1 \ldots x_i$ from input; go to (2)

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- Regular expressions provide a concise and useful notation for string patterns
- Good algorithms require a single pass over the input