Lex, Continued

EECS 665 Compiler Construction

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Lex Program Structure

```
{ definitions }
%%
{ rules }
%%
{ user subroutines }
----
int main() {
     yylex();
    return 0;
}
```

Common Lex Variables

- (char *) yytext
- int yyleng
- int yylineno

Debugging Lex

- Include debugging statements as output of lexical analyzer
  - “-d” flag
  - Output includes the rule applied and the corresponding matched text
- yylineno

Definitions

Declarations of variables, constants, and regular definitions

%{...%}

- Enclosed C code copied to the beginning of the resulting C file
- C declarations and includes
- Example:

```
%{
#include <stdio.h>
#include <string.h>

int var;
int func( int a );
%}
```

Inclusive and Exclusive State Conditions

- Exclusive
  - No other patterns are applied, except those with the appropriate start condition
  - Example definition:

    %x state_ex
- Inclusive
  - The rule is applied together with any other rules which are not constrained by start conditions
  - Example definition:

    %s state_in

State Condition

- Syntax of a rule associated with a state:

  <state_name>regular_expression action

- Action to enter a particular state:

  BEGIN state_name;

- Action to resume the normal or default/initial state:

  BEGIN INITIAL;

  or

  BEGIN 0;

State Condition Example

```
%s      state_one

%x      state_two

%%

abc                 BEGIN state_one;

<state_one>def      BEGIN state_two;

<state_two>ghi      {   printf( “%s”, yytext );
                        BEGIN 0;
                    }
```

“Special” Lex Actions

- BEGIN
- ECHO
  - Print the matched text to output

    printf(“%s”, yytext);

    =

    ECHO;
- REJECT
  - Continue to the next expression that matches the current input
  - Allows for multiple rules to be applied for the same input string

Lex References

- The Lex man page

  http://plan9.bell-labs.com/magic/man2html/1/lex
- A Lex Online Manual

  http://dinosaur.compilertools.net/lex/index.html
- Google

LaTeX References

- Open-Content LaTeX Book

  http://en.wikibooks.org/wiki/LaTeX
- Google