

Lex, Continued

EECS 665 Compiler Construction

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