Compiler Course Lab 1

CSE 440

Reference Books

- lex & yacc, 2nd Edition
  - by John R.Levine, Tony Mason & Doug Brown
  - O'Reilly
  - ISBN: 1-56592-000-7

- Mastering Regular Expressions
  - by Jeffrey E.F. Friedl
  - O'Reilly
  - ISBN: 1-56592-257-3

Task 1: Generating Assembly and Relocatable Machine Code (Object) file

1. Add gcc path to env var: C:\Program Files (x86)\CodeBlocks\MinGW\bin\
2. Write a C code for printing "Hello World" in HelloWorld.c file
3. Then run following commands:
4. gcc HelloWorld.c -o HelloWorld.exe ← creates directly .exe file
5. gcc -S HelloWorld.c ← creates assembly .s file
6. gcc -c HelloWorld.s ← creates object .o file
7. gcc HelloWorld.o -o HelloWorld.exe

Task 2: Write a C code to detect following pattern

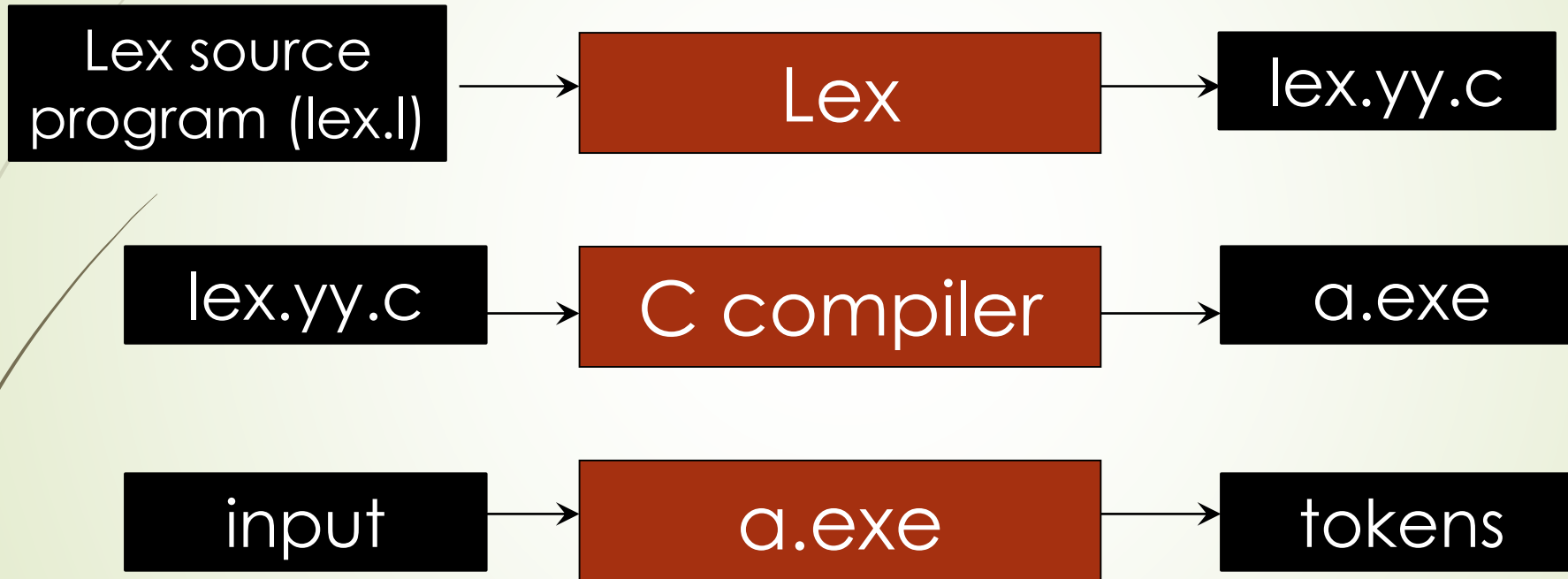| Patterns	Outputs
if	IF
123423	N
CSE	Computer Science & Engineering
Alpha-numeric	ID
=,+,-,*,/	OP
White-space or new line	As it is

What is Lex?

- The main job of a *lexical analyzer (scanner)* is to break up an input stream into more usable elements (*tokens*)

  a = b + c * d;

  ID ASSIGN ID PLUS ID MULT ID SEMI

- Lex is an utility to help you rapidly generate your scanners given a lex specification (*.l file)

An Overview of Lex

Lex source program (lex.l)	→	Lex	→	lex.yy.c
lex.yy.c	→	C compiler	→	a.exe
input	→	a.exe	→	tokens

Lex Source *.l file

- Lex source is separated into three sections by %% delimiters
- The general format of Lex source is

```
{definitions}
%%
{transition rules}
%%
{user subroutines}
```

Task 3: Run a Simple Flex Program named Lex1.l

```
%option noyywrap
%%
%%
int main(int argc, char *argv[]) {
}
```

```
Command:

flex –oLex1.c Lex1.l
gcc Lex1.c -o Lex1.exe
```

Task 4: Run a Flex program Lex2.l that will echo everything except "CSE"

```
%{
/* comments */
%}

%option noyywrap
%%
CSE printf("Computer Science & Engineering");
. ECHO;
\n ECHO;
%%
int main(int argc, char *argv[]) {
    yylex();
    return 0;
}
```

Task 5: Run a Flex program Lex3.I that will detect patterns from Task 2

Patterns	Outputs
if	IF
123423	N
CSE	Computer Science & Engineering
Alpha-numeric	ID
=,+,-,*,/	OP
White-space or new line	As it is