

Name: _____

Student# _____

1) Lexical Analyzers:

- a) Name and define the disambiguation rules used by automatic lexical analyzer generators and give one example for the application of each rule.

- b) Order the below regular expressions as you would input them into the JFlex lexer generator.

“==”

“=”

“!=”

“!”

“+”

“-”

“++”

“_”

“if”

“while”

[a-z][0-9a-z]*

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2) Construct a CFG for the following languages:

- a) Statement blocks where a “;” is used to separate statements inside a statement block. Assume this language only allows perfectly nested statement blocks.

Examples are:

```
{  
{stmt { stmt ; stmt } stmt }
```

- b) Statement blocks where a “;” is used to terminate statements inside a statement block. Assume this language only allows perfectly nested statement blocks. Examples are:

```
{  
{stmt ; {stmt ; stmt ;} stmt; }
```

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3) Answer the following questions:

a) Give two examples of lexical errors

b) Give two examples of syntactic errors

c) Define what synchronizing tokens are and give an example to their usage in parser generators.

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4) Consider the following grammar:

$$E \rightarrow E B E$$
$$E \rightarrow \mathbf{id}$$
$$B \rightarrow +$$
$$B \rightarrow -$$
$$B \rightarrow *$$
$$B \rightarrow /$$

Eliminate the ambiguities by transforming the above grammar.

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5) Consider the following grammar:

$$\begin{aligned} S &\rightarrow V \$ \\ V &\rightarrow T L ; V \\ V &\rightarrow \\ L &\rightarrow L , \mathbf{id} \\ L &\rightarrow \mathbf{id} \\ T &\rightarrow \mathbf{int} \\ T &\rightarrow \mathbf{float} \end{aligned}$$

Eliminate the left recursion from the above grammar and show if the transformed grammar is LL(1)?

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6) Consider the following grammar:

$$S \rightarrow E\$$$
$$E \rightarrow CC$$
$$C \rightarrow aC$$
$$C \rightarrow d$$

- a) Construct the LR(1) parsing table for this grammar?
- b) By studying the LR(1) parsing table alone, could you tell if this grammar be classified as SLR? LR(0)? Support your claim.

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