Homework 3

Abhi Agarwal

1 Grammars

1.1 Question 1.1

Explain why the following statement does not parse with a given grammar.

In the *matchedstmt* part of the grammar - specifically in the *other* there is nothing that follows it. In our statement we have a *if* following the *other*, which is not permitted by the given grammar.

In more detail: *if e then* would be parsed by the *matchedstmt* part of grammar, and would follow another *matchedstmt* - it would mean that if we have *other* then it will stop. In the case of the test grammar it doesn't so it would not be able to be parsed, and therefore is incorrect.

1.2 Question 1.2

Show the grammar converted to right recursion?
The grammar being:

$lVal \rightarrow id \quad | \quad lVal \quad (lVal) \quad | \quad lVal \quad . \quad id$

Becomes:

$lVal \rightarrow id \quad lVal'$

$lVal' \rightarrow empty \quad | \quad (lVal) \quad lVal' \quad | \quad . \quad id \quad lVal'$

1.3 Question 1.3

Compute the FIRST and FOLLOW sets of this grammar.
FIRST:

It is simpler to start from letter then move towards trail for FIRST.

We will do this by: FIRST of trail is grade, FIRST of grade is letter, etc.

FIRST(letter) is the set of $\{A, B, C, F\}$

FIRST(sign) is the set of $\{+, -, \epsilon\}$

If the Production grade $\rightarrow$ letter sign then add everything from FIRST(letter), but not from FIRST(sign) as we are looking for the FIRST. Therefore FIRST(grade) is the set of $\{A, B, C, F\}$

The same applies for trail, and so the FIRST(trail) is the set of $\{A, B, C, F\}$.

FOLLOW:

For FOLLOW we should move from the top down.

We put $ in FOLLOW(trail) as it is the start symbol, and is not followed after anything.

The set for FOLLOW(trail) is $\{\$\}$

FOLLOW(grade) is $\{\$, \text{COMMA}\}$

FOLLOW(sign) is $\{\$, \text{COMMA}\}$

FOLLOW(letter) is $\{\$, -, +, \text{COMMA}\}$ - no epsilon