CSE 401 - LL Parsing and FIRST/FOLLOW/nullable Worksheet - Week 4

1. Compute the FIRST, FOLLOW, and nullable sets for each non-terminal in the following grammar:

```
A ::= x C B y
B ::= z | ε
C ::= y | B x
```

Non-Terminal	FIRST	FOLLOW	nullable
A			
B			
C			

2. For each of the following grammars, identify whether or not the grammar satisfies the LL(1) condition. If the grammar is not LL(1), explain the problem. *Hint*: Although you are not required to follow the formal algorithm, you may find it helpful to examine the grammar in terms of the FIRST, FOLLOW, and nullable sets.

```
a) X ::= a Y | Z
   Y ::= a | c
   Z ::= b Y
```

```
b) P ::= d R
   R ::= o | S
   S ::= g | o g
```

```
c) J ::= a K L
   K ::= c | ε
   L ::= c
```

```
d) J ::= a K L
   K ::= c | ε
   L ::= b
```

3. The following grammar is not LL(1). Use the process described in lecture to change the grammar so that it generates an equivalent language but satisfies the LL(1) property. Remember that you should first remove indirect left recursion, then use the canonical process to deal with any remaining direct left recursion.

```
A ::= B! | x
B ::= C
C ::= A? | y
```