Exercise 1.

Compute the **FIRST** and **FOLLOW** sets for the non-terminals **A** and **B** in the following productions:

P: $A \rightarrow BAa \mid \varepsilon$

$B \rightarrow bBc \mid AA$

Exercise 2.

We define the following grammar G = <N,T,P,S> :

P : $S \rightarrow A\ a\ A\ b \mid B\ b\ B\ a$

$A \rightarrow \varepsilon$

$B \rightarrow \varepsilon$

a) Construct the LL(1) parsing table for grammar G. Is this grammar LL(1)?

b) If yes, analyze the following strings: **abb** and **ab**

Exercise 3.

Consider the following grammar G :

$S \rightarrow a \mid b \mid (T)$

$T \rightarrow T,S \mid S$

1. Is the grammar **LL(1)**?

2. **Eliminate left recursion** and **factorize** if necessary.

3. **Prove** that the grammar obtained in step 2 is **LL(1)**, and **construct its parsing table**.

4. **Explain** the behavior of the parser on the input string **(a,(b,a),a)**

Exercice 4.

We define the following grammar G = <N,T,P,S> :

P :

$S \rightarrow (A) \mid a$

$A \rightarrow SB$

$B \rightarrow ,S \mid Sa)$

1. Is the grammar **G** LL(1)? Justify your answer.

2. Write the **recursive descent parsing algorithm** that recognizes the words of the language **L(G)**.

3. Parse the following string: **((a,a))**