Homework 10

Consider the grammar with productions:
S -> AB [1]
A -> (S) [2] | int C [3]
B -> + S [4] | ε [5]
C -> *A [6] | ε [7]
Construct FIRST, FOLLOW, LL(1) table and perform LL(1) parsing for w = **(int) + int**

	F_0	F_1	First
S	Ø	(, int	(, int
A	(, int	(, int	(, int
B	+ , ε	+ , ε	+ , ε
C	* , ε	* , ε	* , ε

F_0 – we consider:
A -> (S); A -> int C
B -> +; B -> ε
C -> *; C -> ε

F_1 – we consider:
S -> AB => $F_1(S) = F_0(A)$

F_2 – all productions were considered = First

	L_0	L_1	L_2	L_3	Follow
S	ε	ε ,)	ε ,)	ε ,)	ε ,)
A	Ø	+ , ε	+, ε ,)	+, ε ,)	+, ε ,)
B	Ø	ε	ε ,)	ε ,)	ε ,)
C	Ø	Ø	+ , ε	+, ε ,)	+, ε ,)

L_0 – initialize with ε for S and with empty set for the others

L_1 – we consider:
S: A -> (S) ->)
B -> + S -> $L_0(B)$
A: S -> AB -> First(B)
ε in First(B) -> $L_0(S)$
C -> *A -> $L_0(C)$
B: S -> AB -> $L_0(S)$
C: A -> int C -> $L_0(A)$

L_2 – new changes:
A: $L_1(S)$
B: $L_1(S)$
C: $L_1(A)$

L_3 – new changes:
C: $L_2(A)$

Nonterminals: S A B C
Terminals: ( ) int + *

	(	)	int	+	*	$
S	AB, 1		AB, 1			
A	(S), 2		Int C, 3			
B		ε, 5		+ S, 4		ε, 5
C		ε, 7		ε, 7	* A, 6	ε, 7
(	pop					
)		pop				
Int			pop			
+				pop		
*					pop	
$						Acc

1: **S -> AB**; First(AB) = **(, int**
2: **A -> (S)**; First((S)) = **(**
3: **A -> int C**; First(int C) = **int**
4: **B -> + S**; First(+ S) = **+**
5: **B -> ε**; Follow(B) =), ε = **), $**
6: **C -> * A**; First(* A) = *****
7: **C -> ε**; Follow(C) = +, ε ,) = **+, $,)**

w = **(int) + int**

(int)+int$, **S$, ε) |- (**(int)+int$, **AB$, 1) |- (**(int)+int$, **(S)B$, 12) |- (**int)+int$, **S)B$, 12)**

|- (int)+int$, **AB)B$, 121) |- (**int)+int$, **intCB)B$, 1213) |- (**)+int$, **CB)B$, 1213)**

|- (**)+int$, **εB)B$, 12137) |- (**)+int$, **B)B$, 12137) |- (**)+int$, **ε)B$, 121375) |- (**)+int$, **)B$, 121375)

|- (+int$, **B$, 121375) |- (**+int$, **+S$, 1213754) |- (**int$, **S$, 1213754) |- (**int$, **AB$, 12137541)**

|- (int$, **intCB$, 121375413) |- (**$, **CB$, 121375413) |- (**$, **εB$, 1213754137) |- (**$, **B$, 1213754137)**

|- ($, **ε$, 12137541375) |- (**$, **$, 12137541375) |- acc**

Productions: 12137541375

S -> AB -> (S)B -> (AB)B -> (int C B)B -> (int ε B)B -> (int ε) B -> (int) + S -> (int) + AB

-> (int) + int C B -> (int) + int ε B -> (int) + int ε -> **(int) + int**