



# Group Project Part II

## (Non-recursive Predictive Parser)

**Made by:**

- Mahmued Alardawi – 2135209 – CS1

**Submitting Date:**

- April/23/2024

# Questions

$E \rightarrow E + T \mid T$

$T \rightarrow T * F \mid F$

$F \rightarrow (E) \mid id$

- I. Remove left recursion from the above grammar. (Manually).
- II. Find FIRST and FOLLOW sets for all non-terminals of the resultant grammar (Manually).
- III. Construct non-recursive predictive parse table with “Synch” entries (programmatically using the algorithm given at the end).
- IV. Finally Write a complete Java program (Using the algorithm given in Lab notes as well as shown below) show the actions of non-recursive predictive parser on the inputs given in the input file “input.txt”.

## Question I

Remove left recursion from the above grammar. (Manually).

CFG)

- $E \rightarrow E + T \mid T$
- $T \rightarrow T * F \mid F$
- $F \rightarrow ( E ) \mid \text{id}$

Transfer into a non-left recursive grammar)

- $E \rightarrow TE'$
- $E' \rightarrow +TE' \mid \epsilon$
- $T \rightarrow FT'$
- $T' \rightarrow *FT' \mid \epsilon$
- $F \rightarrow (E) \mid \text{id}$

## Question II

Find FIRST and FOLLOW sets for all non-terminals of the resultant grammar (Manually).

CFG	FIRST	FOLLOW
$E \rightarrow TE'$	$\{ (, id \}$	$\{ ), \$ \}$
$E' \rightarrow +TE' \mid \epsilon$	$\{ +, \epsilon \}$	$\{ ), \$ \}$
$T \rightarrow FT'$	$\{ (, id \}$	$\{ +, ), \$ \}$
$T' \rightarrow *FT' \mid \epsilon$	$\{ *, \epsilon \}$	$\{ +, ), \$ \}$
$F \rightarrow (E) \mid id$	$\{ (, id \}$	$\{ *, +, ), \$ \}$

## Question III

Construct non-recursive predictive parse table with “Synch” entries (programmatically using the algorithm given at the end).

	id	+	*	(	)	\$
E	TE'			TE'		
E'		+TE'			€	€
T	FT'			FT'		
T'		€	*FT'		€	€
F	id			(E)		