

Assignment 9 – 25 - May - 2023

1 Implementation of shift reduce parser

Shift : This involves moving symbols from the input buffer onto the stack.

Reduce : If the handle appears on top of the stack then, its reduction by using appropriate production rule is done i.e. RHS of a production rule is popped out of a stack and LHS of a production rule is pushed onto the stack.

Accept : If only the start symbol is present in the stack and the input buffer is empty then, the parsing action is called accept. When accepted action is obtained, it means successful parsing is done.

Error : This is the situation in which the parser can neither perform shift action nor reduce action and not even accept action.

EXAMPLE

Production Rules :

$E \rightarrow E + E \mid E * E$

$E \rightarrow id \mid (E)$

$E \rightarrow E / E$

Input :

id1+id2*id3

Output :

Grammar are

$E \rightarrow E + E \mid E * E$

$E \rightarrow id \mid (E)$

$E \rightarrow E / E$

Stack	Input	Action
\$	id ₁ + id ₂ * id ₃ \$	shift
\$id ₁	+ id ₂ * id ₃ \$	reduce by $E \rightarrow id$
\$E	+ id ₂ * id ₃ \$	shift
\$E +	id ₂ * id ₃ \$	shift
\$E + id ₂	* id ₃ \$	reduce by $E \rightarrow id$
\$E + E	* id ₃ \$	shift
\$E + E *	id ₃ \$	shift
\$E + E * id ₃	\$	reduce by $E \rightarrow id$
\$E + E * E	\$	reduce by $E \rightarrow E * E$
\$E + E	\$	reduce by $E \rightarrow E + E$
\$E	\$	accept

String id1+id2*id3 is accepted

Implement the following using of shift reduce parser

Roll_No: 2110342211IT001 - 2110972211IT016

Production Rules :

$E \rightarrow E + E$

$E \rightarrow E * E$

$E \rightarrow id$

$E \rightarrow (E)$

$E \rightarrow a \mid b$

$E \rightarrow E / E$

Input : 1) if(a*b) 2) ((id+id) *id)/id

Roll_No:2110491211IT017 - 2110491211IT033

Production Rules :

$E \rightarrow E + E$

$E \rightarrow E * E$

$E \rightarrow (E)$

$E \rightarrow id$

$E \rightarrow a \mid b$

$E \rightarrow E - E$

Input : 1) (a*b)+(a)-b 2) if(a- (c+b))

Roll_No: 2110491211IT034 - 2110491211IT049

Production Rules :

$S \rightarrow S+S$

$S \rightarrow S*S$

$S \rightarrow (S)$

$S \rightarrow x$

$S \rightarrow y$

Input : 1) (x+x)*a 2) +x*y+(x)

Roll_No:2110491211IT050 - 2110491211IT069

Production Rules :

$P \rightarrow Q R ;$

$R \rightarrow int$

$R \rightarrow float$

$S \rightarrow R , id$

$S \rightarrow id$

$S \rightarrow (P)$

Input : 1) int id , id ;

2) float id R , id ;

Roll_No : 2110491211IT070 - 2110491211IT87

Production Rules :

$M \rightarrow N \mid M+M \mid M*M \mid (M)$

$N \rightarrow x \mid y \mid Nx \mid Ny \mid N5 \mid N6$

Input : 1) (x656 * y6)

2) N55 + (x6 * y)