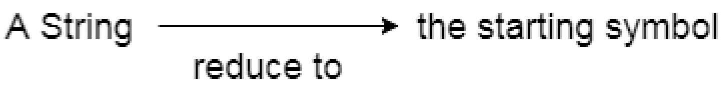
Shift reduce parsing

- Shift reduce parsing is a process of reducing a string to the start symbol of a grammar.
- Shift reduce parsing uses a stack to hold the grammar and an input tape to hold the string.



- Sift reduce parsing performs the two actions: shift and reduce. That's why it is known as shift reduces parsing.
- At the shift action, the current symbol in the input string is pushed to a stack.
- At each reduction, the symbols will replaced by the non-terminals. The symbol is the right side of the production and non-terminal is the left side of the production.

Example:

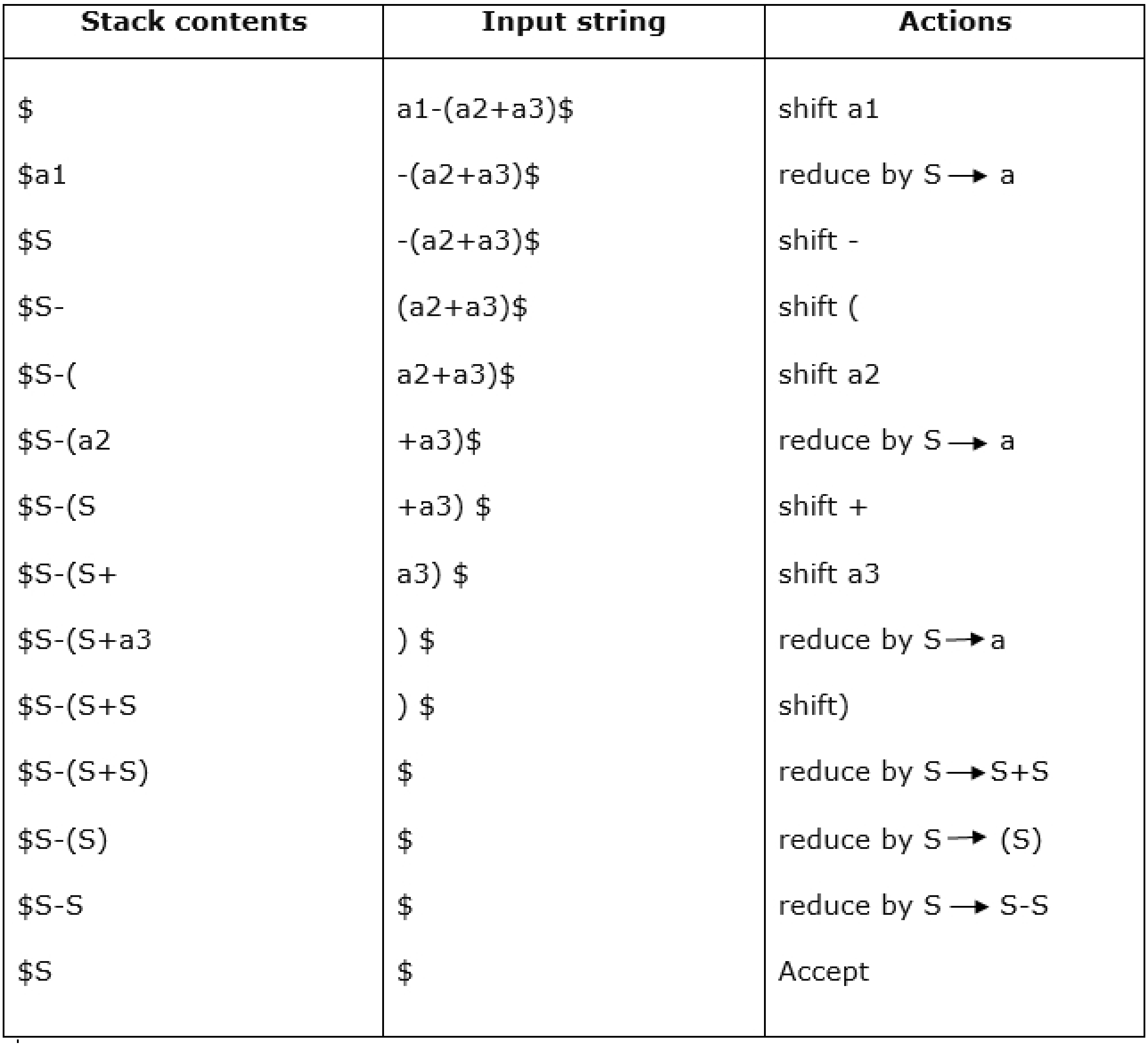
Grammar:

1. S → S+S
2. S → S-S
3. S → (S)
4. S → a

Input string:

1. a1-(a2+a3)

Parsing table:



Stack contents	Input string	Actions
$	a1-(a2+a3)$	shift a1
$a1	-(a2+a3)$	reduce by S → a
$S	-(a2+a3)$	shift -
$S-	(a2+a3)$	shift (
$S-(	a2+a3)$	shift a2
$S-(a2	+a3)$	reduce by S → a
$S-(S	+a3) $	shift +
$S-(S+	a3) $	shift a3
$S-(S+a3	) $	reduce by S→a
$S-(S+S	) $	shift)
$S-(S+S)	$	reduce by S→S+S
$S-(S)	$	reduce by S→ (S)
$S-S	$	reduce by S → S-S
$S	$	Accept

There are two main categories of shift reduce parsing as follows:

1. Operator-Precedence Parsing
2. LR-Parser