BIL395: Programming Languages
Programming Assignment 2: Bottom-up LR Parser

Deadline: Feb 27 at 8:00pm

The task of this homework assignment is to construct a bottom-up LR parser by writing a Java program. You'll be using the following grammar and its LR parsing table:

Grammar:

1. $E \rightarrow E + T$
2. $E \rightarrow T$
3. $T \rightarrow T * F$
4. $T \rightarrow F$
5. $F \rightarrow (E)$
6. $F \rightarrow id$

LR Parsing Table:

	Action						Goto		
State	id	+	*	(	)	$	E	T	F
0	S5		S4				1	2	3
1		S6				accept			
2		R2	S7		R2	R2			
3		R4	R4		R4	R4			
4	S5			S4			8	2	3
5		R6	R6		R6	R6			
6	S5			S4				9	3
7	S5			S4					10
8		S6			S11				
9		R1	S7		R1	R1			
10		R3	R3		R3	R3			
11		R5	R5		R5	R5			

Your program will take one string ending with $ as an input and will create the output file with the contents of the Stack, Input, and Action as explained in the lecture.

Sample Run:

Your code will take the input from the console and will output the contents of Stack, Input, and Action to an output file as in the following example where the source code, input string and output file are named `hw2_firstname_lastname.java`, `id+id*id$`, and `output.txt`, respectively:

```
java hw2_firstname_lastname.java id+id*id$ output.txt

The input has been parsed successfully.
```

The output file "output.txt" consists of the following content:

Stack	Input	Action
0	id + id * id $	Shift 5
0id5	+ id * id $	Reduce 6
0F3	+ id * id $	Reduce 4
0T2	+ id * id $	Reduce 2
0E1	+ id * id $	Shift 6
0E1+6	id * id $	Shift 5
0E1+6id5	* id $	Reduce 6
0E1+6F3	* id $	Reduce 4
0E1+6T9	* id $	Shift 7
0E1+6T9*7	id $	Shift 5
0E1+6T9*7id5	$	Reduce 6
0E1+6T9*7F10	$	Reduce 3
0E1+6T9	$	Reduce 1
0E1	$	Accept

Another Run:

```
java hw2_firstname_lastname.java id++*id$ output.txt

Error occurred.
```

The content of output.txt:

Stack	Input	Action
0	id + + * id $	Shift 5
0id5	+ + * id $	Reduce 6
0F3	+ + * id $	Reduce 4
0T2	+ + * id $	Reduce 2
0E1	+ + * id $	Shift 6
0E1+6	+ * id $	ERROR

Submission:

- This assignment must be done individually (No groups).
- Use the submission link on uzak.etu.edu.tr to send your assignment.
- DON'T compress your submissions.
- Only *.java files will be accepted.
- Submissions sent in different formats (e.g., TXT, ZIP, RAR, etc) will lose 10 points.
- Assignments submitted after the due date will receive 25 point deduction for each day following the due date.
- We'll use an online tool to compute the similarity between all submissions.
- Please see the Ethical Rules section on the syllabus before starting to implement the homework.