

EECS 233 HW4

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1 Question 1

1.1 A

The Big-O time complexity of the *isBalanced()* method in *isBalancedDemonstration.java* is $O(n)$. This is because the algorithm has only one loop, going through all numbers n times.

1.2 B

The new counting algorithm is also $O(n)$, because it also goes through a single loop n times. Although it conducts multiple operations per loop, these operations only cause the time complexity to be multiplied by a constant, which is ignored in Big-O notation.

1.3 C

No, the new counting algorithm could not evaluate expressions with all three parentheses without an array or stack. This is because the program could not keep tracking of multiple types of nested parentheses without some way to “hold” them like a stack.

2 Question 2

2.1 A

Character	Numbers	Operators
(
(
(
1	1	
+	1	+
2	1,2	+
)	3	
+	3	+
3	3,3	+
)	6	
+	6	+
4	6,4	+
)	10	

2.2 B

Character	Numbers	Operators
(
1	1	
+	1	+
(1	+
2	1,2	+
+	1,2	+,+
(1,2	+,+
3	1,2,3	+
+	1,2,3	+,+
4	1,2,3,4	+,+,+
)	1,2,7	+,+
)	1,9	+
)	10	

2.3 C

Character	Numbers	Operators
(
(
(
2	2	
*	2	*
(2	*
3	2,3	*
+	2,3	*,+
4	2,3,4	*,+
)	2,4	*
)	14	
-	14	-
5	14,5	-
)	9	
/	9	/
3	9,3	/
)	3	

3 Question 3

Please type an arithmetic expression made from unsigned numbers and the operations $+$ $-$ $*$ $/$.

The expression must be fully parenthesized.

Your expression: (((1+2)+3)+4)

Numbers: Operations:

Numbers: Operations:

Numbers: Operations:

Numbers: 1.0 Operations:

Numbers: 1.0 2.0 Operations: +

Numbers: 3.0 Operations:

Numbers: 3.0 3.0 Operations: +

Numbers: 6.0 Operations:

Numbers: 6.0 4.0 Operations: +

The value is 10.0

Another string? [Y or N]: y

Your expression: (1+(2+(3+4)))

Numbers: Operations:

Numbers: 1.0 Operations:
 Numbers: 1.0 Operations: +
 Numbers: 1.0 2.0 Operations: +
 Numbers: 1.0 2.0 Operations: ++
 Numbers: 1.0 2.0 3.0 Operations: ++
 Numbers: 1.0 2.0 3.0 4.0 Operations: +++
 Numbers: 1.0 2.0 7.0 Operations: ++
 Numbers: 1.0 9.0 Operations: +
 The value is 10.0
 Another string? [Y or N]: y
 Your expression: (((2*(3+4))-5)/3)
 Numbers: Operations:
 Numbers: Operations:
 Numbers: Operations:
 Numbers: 2.0 Operations:
 Numbers: 2.0 Operations: *
 Numbers: 2.0 3.0 Operations: *
 Numbers: 2.0 3.0 4.0 Operations: * +
 Numbers: 2.0 7.0 Operations: *
 Numbers: 14.0 Operations:
 Numbers: 14.0 5.0 Operations: -
 Numbers: 9.0 Operations:
 Numbers: 9.0 3.0 Operations: /
 The value is 3.0

4 Question 4

- a) $((3-7)/8)-3$
- b) $((5-8)-(3/7))$

5 Question 5

- a) $4\ 6\ 2 - 8\ /\ -$
- b) $4\ 6\ 2\ /\ 8\ -\ -$