# 726. Number of Atoms

## SOLUTION IN JAVA

class Solution {

public String countOfAtoms(String formula) {

StringBuilder sb = new StringBuilder();

Map<String, Integer> count = parse(formula);

for (final String elem : count.keySet())

sb.append(elem + (count.get(elem) == 1 ? "" : String.valueOf(count.get(elem))));

return sb.toString();

}

private int i = 0;

private Map<String, Integer> parse(String s) {

Map<String, Integer> count = new TreeMap<>();

while (i < s.length())

if (s.charAt(i) == '(') {

++i; // Skip '('

for (Map.Entry<String, Integer> entry : parse(s).entrySet()) {

final String elem = entry.getKey();

final int freq = entry.getValue();

count.merge(elem, freq, Integer::sum);

}

} else if (s.charAt(i) == ')') {

++i; // Skip ')'

final int num = getNum(s);

for (final String elem : count.keySet()) {

final int freq = count.get(elem);

count.put(elem, freq \* num);

}

return count; // Return back to the previous scope.

} else {

final String elem = getElem(s);

final int num = getNum(s);

count.merge(elem, num, Integer::sum);

}

return count;

}

private String getElem(final String s) {

final int elemStart = i++; // `s[elemStart]` is uppercased.

while (i < s.length() && Character.isLowerCase(s.charAt(i)))

++i;

return s.substring(elemStart, i);

}

private int getNum(final String s) {

final int numStart = i;

while (i < s.length() && Character.isDigit(s.charAt(i)))

++i;

final String numString = s.substring(numStart, i);

return numString.isEmpty() ? 1 : Integer.parseInt(numString);

}

}