Question - 3

```
import java.util.Scanner;
import java.util.ArrayList;
import java.util.Arrays;
import java.util.Map;
import java.util.HashMap;
import java.util.Set;

class ChemicalEquation {
    private String equation;

    ChemicalEquation(String equation) {
        String[] molecules = sumOfMolecules.split("\\+");
        return molecules;
    }

    public ArrayList<ArrayList<String>> getMolecules() {
        String[] splittedEquation = this.equation.split("->");
        String lhs = splittedEquation[0];
        String rhs = splittedEquation[1];
        String[] lhsMolecules = this.extractMolecules(lhs);
        " rhs " = this.extractMolecules(rhs);

    ArrayList<String> lhsMoleculeArray = new ArrayList<String>
                                         (Arrays.asList(lhsMolecules));

    ArrayList<String> rhsMoleculeArray = " (" (rhsMolecules);

    ArrayList<ArrayList<String>> allMolecules = new ArrayList
                                                <ArrayList<String>>();
```

```
allMolecules.add(lhsMoleculeArray);
allMolecules.add(rhsMoleculeArray);
return allMolecules;
}

public void printNumOfMolecules(ArrayList<String> molecules,
                                 String side) {
    String molecule;
    char firstChar;
    int isDigit;
    System.out.println("Num of molecules " + side + ": ");
    for (int i=0; i<molecules.size(); i++){
        molecule = molecules.get(i);
        firstChar = molecule.charAt(0);
        if (firstChar >='0' && firstChar<='9')
            System.out.println(molecule.substring(1, molecule.
                               length())
                               + "_" +
                               firstChar);
        else
            System.out.println("1" + molecule + "_" + 1);
    }
}

public ArrayList<Map<String, Integer>> getElementCount(
    ArrayList<String> lhsMolecules, ArrayList<String> rhsMolecules)
{
    String molecule;
    String element = "";
    Map<String, Integer> lhsElements = new HashMap<String, Integer>
                                       ();
    Map<String, Integer> rhsElements = "" "" ";
```

```
char firstChar, ch;
int isDigit;

ArrayList<Map<String, Integer>> returnMapList = new ArrayList<Map
                                                <String, Integer>>();

for(int i=0; i<lhsMolecules.get(
for(int i=0; i<lhsMolecules.size(); i++){
    molecule = lhsMolecules.get(i);
    System.out.println(molecule + "g
    firstChar = molecule.charAt(0);
    if(firstChar>='0' && firstChar<='9')
        molecule = molecule.substring(1, molecule.length());
    System.out.println(molecule + "g

    for(int j=0; j<molecule.length(); j++){
    if(molecule.charAt(j)>='0' && molecule.charAt(j)<='9'){
        lhsElements.put(element, lhsElements.get(element)+Character.
                        getNumericValue(molecule.charAt(j)));
        continue;
    }
    if(Character.isLowerCase(molecule.charAt(j))){
        element = molecule.substring(0-1, j+1);
        if(lhsElements.containsKey(element))
            lhsElements.put(element, lhsElements.get(element)
                            +Character.getNumericValue(firstChar));
        else
            lhsElements.put(element, lhsElements.get(element)+1
                            Character.getNumericValue(firstChar));
    }
```

```
else {
    element = molecule.substring(j, j+1);
    if (lhsElements.containsKey(element))
        lhsElements.put(element, lhsElements.get(element) +
                        Character.getNumericValue(firstChar));
    else
        lhsElements.put(element, Character.getNumericValue(
    }
}
}
returnMapList.add(lhsElements)

for(int i=0; i<rhsMolecules.size(); i++) {
    molecule = rhsMolecules.get(i);
    firstChar = molecule.charAt(0);
    if(firstChar >='0' && firstChar <='9')
        molecule = molecule.substring(1);

    for(int j=0; j<molecule.length(); j++) {
        if(Character.isLowerCase(molecule.charAt(j))) {
            element = molecule.substring(j-1, j+1);
            if(rhsElements.containsKey(element))
                rhsElements.put(element, rhsElements.get
                    (element) + Character.getNumericValue
                    (firstChar));
            else
                rhsElements.put(element, Character.getNumericValue
                    (firstChar));
        }
    }
}
```

```
        return MapList.add(rhsElements);
        return returnMapList;
    }
}
public class Generalized {
    public static void main(String args[]) {
        Scanner keyboard = new Scanner(System.in);
        String eqn;
        eqn = keyboard.nextLine();
        ChemicalEquation equation = new ChemicalEquation(eqn);
        ArrayList<ArrayList<String>> allMolecules
                = equation.getMolecules();
        equation.printNumOfMolecules(allMolecules.get(0), "LHS");
        equation.printNumOfMolecules(allMolecules.get(1), "RHS");
        ArrayList<Map<String, Integer>> countList = equation.
                getElementCount(allMolecu-
        les.get(0), allMolecules.get(1));
        Map<String, Integer> lhsCount = countList.get(0);
                // rhsCount = countList.get(1);
        Set<String> keys = lhsCount.keySet();
        System.out.println("LHS elements");
        for (String key: lhsCount.keySet()) {
            System.out.println(key + " " + lhsCount.get(key));
        }
```

```
System.out.println("RHS elements");
for (String key : thisCond.keySet()) {
        System.out.println(key + " " + thisCond.getKey());
    }
}
}
```