```
import java.util.ArrayList;
import java.util.Scanner;
/* imports the Scanner and the Arraylist from the java.util.package
*/

public class Calculator {

   public ArrayList<Double> numbers;
   public ArrayList<String> operators;

    public Calculator() {
        this.numbers = new ArrayList<Double>();//creates empty arraylists
        this.operators = new ArrayList<String>() ;
    }
    public void getNumsAndOps(String equation)//breaking apart user input into operator and
number to do math
    {
        String fullnum = ""; //empty string to store and build a number
        for (int i = 0; i < equation.length(); i++) {
            char letter = equation.charAt(i);
            if (Character.isDigit(letter) || letter == '.')//sees if the letter equals a number or a decimal
point
            {
                fullnum += letter;//adds  that number or decimal point to the empty string
            } else {// if the letter is not at a number then it will check to see if the fullnum has
something or not and it will empty fullnum again after extracting that number and storing it into
the numbers array list
                if (!fullnum.isEmpty())

                {
                    numbers.add(Double.parseDouble(fullnum));
                    fullnum = "";
                }
                if (letter == 's' && equation.startsWith("sqrt", i))
                {
                    operators.add("sqrt");
                    i += 3;//skips the "qrt" in sqrt
                } else {
                    operators.add(String.valueOf(letter));//adds the other operators as they are since
they are only one letter
                }
            }
        }
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        if (!fullnum.isEmpty()) //adds the number at the end of the expression to the array list after checking if fullnum not empty
        {
            numbers.add(Double.parseDouble(fullnum));
        }
    }

    public void operate()//does the math
    {
        for (int i = 0; i < operators.size(); i++)//exponant
        {
            if (operators.get(i).equals("^")) {
                numbers.set(i, Math.pow(numbers.get(i), numbers.get(i + 1)));
                numbers.remove(i + 1);
                operators.remove(i);
                i--;//make sure an operator is not skipped and the current postion is checked again since the lists are being adjusted
            }
        }

        for (int i = operators.size() - 1; i >= 0; i--)//square root
        {
            if (operators.get(i).equals("sqrt")) {
                numbers.set(i, Math.sqrt(numbers.get(i)));
                if (i + 1 < numbers.size()) {
                    numbers.remove(i + 1);
                }
                operators.remove(i);
            }
        }

        for (int i = 0; i < operators.size(); i++)//multiplication
        {
            if (operators.get(i).equals("*")) {
                numbers.set(i, numbers.get(i) * numbers.get(i + 1));
                numbers.remove(i + 1);
                operators.remove(i);
                i--;
            } else if (operators.get(i).equals("/"))//division
            {
                numbers.set(i, numbers.get(i) / numbers.get(i + 1));
                numbers.remove(i + 1);
                operators.remove(i);
                i--;
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            }
        }

        for (int i = 0; i < operators.size(); i++)//addition
        {
            if (operators.get(i).equals("+")) {
                numbers.set(i, numbers.get(i) + numbers.get(i + 1));
                numbers.remove(i + 1);
                operators.remove(i);
                i--;
            } else if (operators.get(i).equals("-"))//subtraction
            {
                numbers.set(i, numbers.get(i) - numbers.get(i + 1));
                numbers.remove(i + 1);
                operators.remove(i);
                i--;
            }
        }
    }
    public double calculate(String equation)// returns the result after the math
    {
        getNumsAndOps(equation);
        operate();
        return numbers.get(0);
    }

    public static void main(String[] args) {
        Scanner kbReader = new Scanner(System.in);
        System.out.println("Enter an equation(spaces are fine):");
        String equation = kbReader.nextLine().replaceAll("\\s+", "");//remove spaces from the
userinput
        Calculator calculator = new Calculator();
        double result = calculator.calculate(equation);
        System.out.println("The Result is " + result);
    }
}
```