```java

public class LexAnalyzer
{
    private String str;
    private char curr;
    private int index;

    /*|||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
    ||                                                                                       ||
    |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||*/

    public LexAnalyzer (String s)
    {
        str = s;
    }

    /*|||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
    ||                                                                                       ||
    |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||*/

    public void printTokenList()
    {
        index = 0;
        String sub = str.trim();
        if(sub.matches(""))
            System.out.println("EMPTY TOKEN LIST");
        else
        {
            curr = str.charAt(index);
            while(index < str.length())
                print_next_token();
        }
    }

    /*|||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
    ||                                                                                       ||
    |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||*/

    private void print_next_token()
    {
        int beg = index;
        char next;
        if(index == str.length() - 1)
            next = str.charAt(index);
        else
            next = str.charAt(index + 1);

    //If in the set {( , ) , + , - , / , ; , =}
    ///////////////////////////////////////////
        if(curr == '(' || curr == ')' || curr == '+' || curr == '-' || curr == '*' || curr == '/' || curr == ';' || curr == '=' || curr == ' ')
            switch(curr)
            {
                case '(':   System.out.println("LEFTPAREN");
                            if(index <= str.length() - 1)
                            {
                                index++;
                                if(index == str.length())
```

```
                            break;
                        curr = str.charAt(index);
                    }
                    break;
            case ')':   System.out.println("RIGHTPAREN");
                    if(index <= str.length() - 1)
                    {
                        index++;
                        if(index == str.length())
                            break;
                        curr = str.charAt(index);
                    }
                    break;
            case '+':   System.out.println("PLUS");
                    if(index <= str.length() - 1)
                    {
                        index++;
                        if(index == str.length())
                            break;
                        curr = str.charAt(index);
                    }
                    break;
            case '-':   System.out.println("MINUS");
                    if(index <= str.length() - 1)
                    {
                        index++;
                        if(index == str.length())
                            break;
                        curr = str.charAt(index);
                    }
                    break;
            case '*':   System.out.println("TIMES");
                    if(index <= str.length() - 1)
                    {
                        index++;
                        if(index == str.length())
                            break;
                        curr = str.charAt(index);
                    }
                    break;
            case '/':   System.out.println("DIVIDE");
                    if(index <= str.length() - 1)
                    {
                        index++;
                        if(index == str.length())
                            break;
                        curr = str.charAt(index);
                    }
                    break;
            case ';':   System.out.println("SEMICOLON");
                    if(index <= str.length() - 1)
                    {
                        index++;
                        if(index == str.length())
                            break;
                        curr = str.charAt(index);
                    }
```

```
                        break;
                case '=':   System.out.println("ASSIGNMENT");
                        if(index <= str.length() - 1)
                        {
                            index++;
                            if(index == str.length())
                                break;
                            curr = str.charAt(index);
                        }
                        break;
                case ' ':   if(index <= str.length() - 1)
                        {
                            index++;
                            if(index == str.length())
                                break;
                            curr = str.charAt(index);
                        }
                        break;
            }//end switch
        //end if


    //if current character is a digit
    ////////////////////////////////
        else if(curr >= '0' && curr <= '9')
        {

            do
            {
                //read for more digits or one decimal point
                if(Character.isDigit(next))
                {
                    index++;
                    if(index == str.length())
                    {
                        System.out.println("INTEGER " + str.substring(beg, index));
                        break;
                    }

                    curr = str.charAt(index);

                    if(index == str.length() - 1)
                    {
                        System.out.println("INTEGER " + str.substring(beg, index + 1));
                        index++;
                        break;
                    }

                    next = str.charAt(index + 1);

                    if(!Character.isDigit(next) && next != '.')
                    {
                        System.out.println("INTEGER " + str.substring(beg, index + 1));
                        index++;
                        curr = str.charAt(index);
                        break;
                    }
```

```
172
173                 else if(next == '.')
174                 {
175                     index++;
176                     curr = str.charAt(index);
177                     next = str.charAt(index + 1);
178                     while(index < str.length())
179                     {
180                         if(Character.isDigit(next))
181                         {
182                             index++;
183                             curr = str.charAt(index);
184                             if(index == str.length() - 1)
185                             {
186                                 System.out.println("FLOAT " + str.substring(beg, index + 1));
187                                 index++;
188                                 break;
189                             }
190                             next = str.charAt(index + 1);
191                             if(!Character.isDigit(next) && next != '.')
192                             {
193                                 System.out.println("FLOAT " + str.substring(beg, index + 1));
194                                 index++;
195                                 curr = str.charAt(index);
196                                 break;
197                             }
198                         }
199
200                         else
201                         {
202                             System.out.println("Error at index " + (index));
203                             System.exit(0);
204                         }
205                     }
206                 }
207             }//end if
208
209             else if(next == '.')
210             {
211                 index++;
212                 curr = str.charAt(index);
213                 next = str.charAt(index + 1);
214                 while(index < str.length())
215                 {
216                     if(Character.isDigit(next))
217                     {
218                         index++;
219                         curr = str.charAt(index);
220                         next = str.charAt(index + 1);
221                         if(!Character.isDigit(next) && next != '.')
222                         {
223                             System.out.println("FLOAT " + str.substring(beg, index + 1));
224                             index++;
225                             curr = str.charAt(index);
226                             break;
227                         }
228                     }
```

```
                    else
                    {
                        System.out.println("Error at index " + (index + 1));
                        System.exit(0);
                    }
                }
            }

            else
            {
                if(curr >= '0' && curr <= '9')
                    System.out.println("INTEGER " + curr);
                if(index == str.length() - 1)
                    break;
                index++;
                curr = str.charAt(index);
                break;
            }
        }while(index < str.length());
    }//end if


//if current character is a letter
//////////////////////////////////
    else if(curr >= 'a' && curr <= 'z')
    {
        do
        {
            //read for more letters and digits
            if(Character.isLetter(next))
            {
                index++;
                if(index == str.length())
                {
                    String sub = str.substring(beg, index);
                    if(sub.matches("read") || sub.matches("write"))
                        System.out.println("KEYWORD " + sub);
                    else
                        System.out.println("IDENTIFIER " + sub);
                    break;
                }
                curr = str.charAt(index);
                if(index == str.length() - 1)
                {
                    String sub = str.substring(beg, index + 1);
                    if(sub.matches("read") || sub.matches("write"))
                        System.out.println("KEYWORD " + sub);
                    else
                        System.out.println("IDENTIFIER " + sub);
                    index++;
                    break;
                }
                next = str.charAt(index + 1);
                if(Character.isDigit(next))
                {
                    index++;
```

```
                curr = str.charAt(index);
                next = str.charAt(index + 1);
                if(next == '(' || next == ')' || next == '+' || next == '-' || next == '*' || next == '/' || next == ';' || next == '=' || next == ' ')
                {
                    System.out.println("IDENTIFIER " + str.substring(beg, index + 1));
                    index++;
                    curr = str.charAt(index);
                    break;
                }

                else if (Character.isLetter(next))
                {
                    index++;
                    curr = str.charAt(index);
                    next = str.charAt(index + 1);
                }

                else
                {
                    String sub = str.substring(beg, index + 1);
                    if(sub.matches("read") || sub.matches("write"))
                        System.out.println("KEYWORD " + sub);
                    else
                        System.out.println("IDENTIFIER " + sub);
                    index++;
                    System.out.println("Error at index " + (index));
                        System.exit(0);
                    }
                }
                else if(!Character.isDigit(next) && !Character.isLetter(next) && next != '.')
                {
                    String sub = str.substring(beg, index + 1);
                    if(sub.matches("read") || sub.matches("write"))
                        System.out.println("KEYWORD " + sub);
                    else
                        System.out.println("IDENTIFIER " + sub);
                    index++;
                    curr = str.charAt(index);
                    break;
                }
                else if(next == '.')
                {
                    String sub = str.substring(beg, index + 1);
                    if(sub.matches("read") || sub.matches("write"))
                        System.out.println("KEYWORD " + sub);
                    else
                        System.out.println("IDENTIFIER " + sub);
                    index++;
                    System.out.println("Error at index " + (index));
                    System.exit(0);
                }
            }

            else if(Character.isDigit(next))
            {
                index++;
                curr = str.charAt(index);
```

```
                next = str.charAt(index + 1);
                if(next == '(' || next == ')' || next == '+' || next == '-' || next == '*' || next == '/' || next == ';' || next == '=' || next == ' ')
                {
                    System.out.println("IDENTIFIER " + str.substring(beg, index + 1));
                    index++;
                    curr = str.charAt(index);
                    break;
                }

                else if (Character.isLetter(next))
                {
                    index++;
                    curr = str.charAt(index);
                    next = str.charAt(index + 1);
                }

                else
                {
                    String sub = str.substring(beg, index + 1);
                    if(sub.matches("read") || sub.matches("write"))
                        System.out.println("KEYWORD " + sub);
                    else
                        System.out.println("IDENTIFIER " + sub);
                    index++;
                    System.out.println("Error at index " + (index + 1));
                    System.exit(0);
                    }
                }//end if

                else if(!Character.isDigit(next) && !Character.isLetter(next) && next != '.')
                {
                    System.out.println("IDENTIFIER " + str.substring(beg, index + 1));
                    index++;
                    curr = str.charAt(index);
                    break;
                }

                else
                {
                    System.out.println("Error at index " + (index));
                    System.exit(0);
                }
            }while(index < str.length());
        }//end if


    //if the current character is invalid
    ////////////////////////////////////
        else
        {
            System.out.println("Error at index " + (index));
            System.exit(0);
        }

    }//end print_next_token

    /*||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
```

```
400     ||                                                                                                  ||
401     ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||*/
402
403     public static void main(String[] args)
404     {
405         String s = "x = 12.78 ; y = apple + 5 * orange;z=3*(4 * y)  ";
406         //String s = "read write 34 +5.678 -789.001 goodread+-*  ";
407         //String s = " int y = 7 ; double z = 78.01  ";
408         //String s = " qwerty := 1234";
409         //String s = " total is 23. dollars ";
410         //String s = "x = art2.1b";
411         //String s = "   ";
412         System.out.printf("Input String: '%s'\n", s);
413         LexAnalyzer lex = new LexAnalyzer(s.toLowerCase());
414         System.out.println("\nToken List\n" + "----------\n");
415         lex.printTokenList();
416     }
417
418 }
```