

```

1
2 public class LexAnalyzer
3 {
4     private String str;
5     private char curr;
6     private int index;
7
8     /*|||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
9     |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
10    |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||*/
11
12    public LexAnalyzer (String s)
13    {
14        str = s;
15    }
16
17    /*|||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
18    |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
19    |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||*/
20
21    public void printTokenList()
22    {
23        index = 0;
24        String sub = str.trim();
25        if(sub.matches(""))
26            System.out.println("EMPTY TOKEN LIST");
27        else
28        {
29            curr = str.charAt(index);
30            while(index < str.length())
31                print_next_token();
32        }
33    }
34
35    /*|||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
36    |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
37    |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||*/
38
39    private void print_next_token()
40    {
41        int beg = index;
42        char next;
43        if(index == str.length() - 1)
44            next = str.charAt(index);
45        else
46            next = str.charAt(index + 1);
47
48        //If in the set {( , ) , + , - , / , ; , =}
49        ///////////////////////////////////
50        if(curr == '(' || curr == ')' || curr == '+' || curr == '-' || curr == '*' || curr == '/' || curr == ';' || curr == '=' || curr == ' ')
51            switch(curr)
52            {
53                case '(': System.out.println("LEFTPAREN");
54                        if(index <= str.length() - 1)
55                        {
56                            index++;
57                            if(index == str.length())

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58         break;
59         curr = str.charAt(index);
60     }
61     break;
62     case ')': System.out.println("RIGHTPAREN");
63     if(index <= str.length() - 1)
64     {
65         index++;
66         if(index == str.length())
67             break;
68         curr = str.charAt(index);
69     }
70     break;
71     case '+': System.out.println("PLUS");
72     if(index <= str.length() - 1)
73     {
74         index++;
75         if(index == str.length())
76             break;
77         curr = str.charAt(index);
78     }
79     break;
80     case '-': System.out.println("MINUS");
81     if(index <= str.length() - 1)
82     {
83         index++;
84         if(index == str.length())
85             break;
86         curr = str.charAt(index);
87     }
88     break;
89     case '*': System.out.println("TIMES");
90     if(index <= str.length() - 1)
91     {
92         index++;
93         if(index == str.length())
94             break;
95         curr = str.charAt(index);
96     }
97     break;
98     case '/': System.out.println("DIVIDE");
99     if(index <= str.length() - 1)
100    {
101        index++;
102        if(index == str.length())
103            break;
104        curr = str.charAt(index);
105    }
106    break;
107    case ';': System.out.println("SEMICOLON");
108    if(index <= str.length() - 1)
109    {
110        index++;
111        if(index == str.length())
112            break;
113        curr = str.charAt(index);
114    }

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115         break;
116     case '=': System.out.println("ASSIGNMENT");
117         if(index <= str.length() - 1)
118         {
119             index++;
120             if(index == str.length())
121                 break;
122             curr = str.charAt(index);
123         }
124         break;
125     case ' ': if(index <= str.length() - 1)
126     {
127         index++;
128         if(index == str.length())
129             break;
130         curr = str.charAt(index);
131     }
132     break;
133 } //end switch
134 //end if
135
136
137 //if current character is a digit
138 ///////////////////////////////////////////////////
139 else if(curr >= '0' && curr <= '9')
140 {
141
142     do
143     {
144         //read for more digits or one decimal point
145         if(Character.isDigit(next))
146         {
147             index++;
148             if(index == str.length())
149             {
150                 System.out.println("INTEGER " + str.substring(beg, index));
151                 break;
152             }
153
154             curr = str.charAt(index);
155
156             if(index == str.length() - 1)
157             {
158                 System.out.println("INTEGER " + str.substring(beg, index + 1));
159                 index++;
160                 break;
161             }
162
163             next = str.charAt(index + 1);
164
165             if(!Character.isDigit(next) && next != '.')
166             {
167                 System.out.println("INTEGER " + str.substring(beg, index + 1));
168                 index++;
169                 curr = str.charAt(index);
170                 break;
171             }

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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         }

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229
230         else
231         {
232             System.out.println("Error at index " + (index + 1));
233             System.exit(0);
234         }
235     }
236 }
237
238 else
239 {
240     if(curr >= '0' && curr <= '9')
241         System.out.println("INTEGER " + curr);
242     if(index == str.length() - 1)
243         break;
244     index++;
245     curr = str.charAt(index);
246     break;
247 }
248 }while(index < str.length());
249 }//end if
250
251
252 //if current character is a letter
253 ///////////////////////////////////////////////////
254 else if(curr >= 'a' && curr <= 'z')
255 {
256     do
257     {
258         //read for more letters and digits
259         if(Character.isLetter(next))
260         {
261             index++;
262             if(index == str.length())
263             {
264                 String sub = str.substring(beg, index);
265                 if(sub.matches("read") || sub.matches("write"))
266                     System.out.println("KEYWORD " + sub);
267                 else
268                     System.out.println("IDENTIFIER " + sub);
269                 break;
270             }
271             curr = str.charAt(index);
272             if(index == str.length() - 1)
273             {
274                 String sub = str.substring(beg, index + 1);
275                 if(sub.matches("read") || sub.matches("write"))
276                     System.out.println("KEYWORD " + sub);
277                 else
278                     System.out.println("IDENTIFIER " + sub);
279                 index++;
280                 break;
281             }
282             next = str.charAt(index + 1);
283             if(Character.isDigit(next))
284             {
285                 index++;

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286     curr = str.charAt(index);
287     next = str.charAt(index + 1);
288     if(next == '(' || next == ')' || next == '+' || next == '-' || next == '*' || next == '/' || next == ';' || next == '=' || next == ' ')
289     {
290         System.out.println("IDENTIFIER " + str.substring(beg, index + 1));
291         index++;
292         curr = str.charAt(index);
293         break;
294     }
295
296     else if (Character.isLetter(next))
297     {
298         index++;
299         curr = str.charAt(index);
300         next = str.charAt(index + 1);
301     }
302
303     else
304     {
305         String sub = str.substring(beg, index + 1);
306         if(sub.matches("read") || sub.matches("write"))
307             System.out.println("KEYWORD " + sub);
308         else
309             System.out.println("IDENTIFIER " + sub);
310         index++;
311         System.out.println("Error at index " + (index));
312         System.exit(0);
313     }
314 }
315 else if(!Character.isDigit(next) && !Character.isLetter(next) && next != '.')
316 {
317     String sub = str.substring(beg, index + 1);
318     if(sub.matches("read") || sub.matches("write"))
319         System.out.println("KEYWORD " + sub);
320     else
321         System.out.println("IDENTIFIER " + sub);
322     index++;
323     curr = str.charAt(index);
324     break;
325 }
326 else if(next == '.')
327 {
328     String sub = str.substring(beg, index + 1);
329     if(sub.matches("read") || sub.matches("write"))
330         System.out.println("KEYWORD " + sub);
331     else
332         System.out.println("IDENTIFIER " + sub);
333     index++;
334     System.out.println("Error at index " + (index));
335     System.exit(0);
336 }
337 }
338
339 else if(Character.isDigit(next))
340 {
341     index++;
342     curr = str.charAt(index);

```

```

343     next = str.charAt(index + 1);
344     if(next == '(' || next == ')' || next == '+' || next == '-' || next == '*' || next == '/' || next == ';' || next == '=' || next == ' ')
345     {
346         System.out.println("IDENTIFIER " + str.substring(beg, index + 1));
347         index++;
348         curr = str.charAt(index);
349         break;
350     }
351
352     else if (Character.isLetter(next))
353     {
354         index++;
355         curr = str.charAt(index);
356         next = str.charAt(index + 1);
357     }
358
359     else
360     {
361         String sub = str.substring(beg, index + 1);
362         if(sub.matches("read") || sub.matches("write"))
363             System.out.println("KEYWORD " + sub);
364         else
365             System.out.println("IDENTIFIER " + sub);
366         index++;
367         System.out.println("Error at index " + (index + 1));
368         System.exit(0);
369     }
370 } //end if
371
372 else if(!Character.isDigit(next) && !Character.isLetter(next) && next != '.')
373 {
374     System.out.println("IDENTIFIER " + str.substring(beg, index + 1));
375     index++;
376     curr = str.charAt(index);
377     break;
378 }
379
380 else
381 {
382     System.out.println("Error at index " + (index));
383     System.exit(0);
384 }
385 } while(index < str.length());
386 } //end if
387
388
389 //if the current character is invalid
390 ///////////////////////////////////////////////////
391 else
392 {
393     System.out.println("Error at index " + (index));
394     System.exit(0);
395 }
396
397 } //end print_next_token
398
399 /*|

```

```

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 }

```