

```

package Lexer;

import java.io.BufferedReader;
import java.io.File;
import java.io.FileInputStream;
import java.io.InputStreamReader;
import java.nio.charset.Charset;
import java.util.ArrayList;
import java.util.LinkedList;
import java.util.regex.Matcher;
import java.util.regex.Pattern;

/**
 * Created by rubenspeessoa on 04/09/16.
 */
public class Lexer {

    /**
     * Internal class holding the information of a token type.
     */
    private class TokenInfo {

        public final Pattern regex;
        public final Token.TokenCategory tokenCategory;

        /**
         * Construct TokenInfo within its values.
         * @param regex Lexer.Token Regex Pattern
         * @param tokenCategory Lexer.Token Category.
         */
        public TokenInfo(Pattern regex,
                        Token.TokenCategory tokenCategory) {
            super();
            this.regex = regex;
            this.tokenCategory = tokenCategory;
        }
    }

    private LinkedList<TokenInfo> tokenInfos;
    private LinkedList<Token> tokens;
    private static Lexer lexer = null;

    private Lexer() {
        this.tokenInfos = new LinkedList<TokenInfo>();
        this.tokens = new LinkedList<Token>();
    }

    /**
     * @return the lexer for Nova programming language.
     */
    public static Lexer getLexer() throws Exception {
        if (lexer == null) {
            lexer = createLexer();
        }
        return lexer;
    }

    private static Lexer createLexer() throws Exception {
        Lexer lexer = new Lexer();
    }
}

```

```
/**
 * Add a regular expression and a token id to the internal list of
 *   recognized tokens
 * @param regex regular expression to match against
 * @param tokenCategory tokenCategory that the regular expression is
 *   linked to
 */
public void add(String regex, Token.TokenCategory tokenCategory) throws
    Exception {
    tokenInfos.add(
        new TokenInfo(
```

```

        Pattern.compile("^(" + regex+"),",
            tokenCategory
        )
    );
}

/**
 * Tokenize an input File.
 * Calls private method lex(String inputString)
 * @param file with the code to be tokenized.
 */
public void lex(File file) throws Exception {
    tokens.clear();

    FileInputStream in;
    String line;
    InputStreamReader isr;
    BufferedReader br;

    ArrayList<String> lines = new ArrayList<String>();
    in = new FileInputStream(file);
    isr = new InputStreamReader(in, Charset.forName("UTF-8"));
    br = new BufferedReader(isr);

    while ((line = br.readLine()) != null) {
        lines.add(line);
    }

    for (int i = 0; i < lines.size(); i++) {
        lex(lines.get(i), i);
    }
}

/**
 * Tokenize an input string.
 * The result can be accessed via getTokens().
 * @param inputString
 */
private void lex(String inputString, int line) throws Exception {

    String s = inputString.replace(" ", "");
    int totalLength = s.length();

    while (!s.equals("")) {
        int remaining = s.length();
        boolean match = false;

        for (TokenInfo info : tokenInfos) {
            Matcher m = info.regex.matcher(s);

            if (m.find()) {
                match = true;
                String token = m.group().trim();
                s = m.replaceFirst("").trim();
                tokens.add(
                    new Token(
                        info.tokenCategory,
                        token,
                        line,

```

```
                                totalLength - remaining
                                ));
                                break;
                            }
                        }

                    if (!match) {
                        throw new LexerException("Unexpected character in input: " +
                                                s);
                    }
                }
            }

        }

/**
 * Get the tokens generated in the last call of tokenize.
 * @return a list of tokens to be fed to Parser
 */
public LinkedList<Token> getTokens() {
    return this.tokens;
}

}
```