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Tracing.java

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1 //=====
2 //      * Letsch Informatik *      www.LetsInfo.ch      CH-8636 Wald
3 //      Beratung, Ausbildung und Realisation in Software-Engineering
4 //=====
5 // Project   : Master of Advanced Studies in Software-Engineering / 2008
6 // Modul    : Java - Advanced Concepts
7 // Title    : Übung 2 / "Annotations und Reflection"
8 // Author   : Thomas Letsch
9 // Tab-Width : 2
10 //*///=====
11 * Description: Einsatz von Annotation und Reflection am Beispiel von Traceability.
12 * History   : 17.03.07: Initial Version.
13 *          : 18.01.08: bin-Dir, Kosmetik.
14 *          : 21.01.08: filenames sortiert (es ist keine Ordnung spezifiziert
15 *                    für File.list()).
16 * CVS      : $Revision: 1.6 $ $Date: 2008/01/24 13:51:17 $
17 //*///=====
18 //      1      2      3      4      5      6      7      8
19 //34567890123456789012345678901234567890123456789012345678901234567890
20 //=====
21
22
23 import static java.lang.System.out;
24
25 import java.lang.annotation.Retention;
26 import java.lang.annotation.RetentionPolicy;
27 import java.io.File;
28 import java.util.ArrayList;
29 import java.util.Arrays;
30 import java.util.List;
31
32
33 // Annotations:
34
35 @Retention(RetentionPolicy.RUNTIME)
36 @interface Tracing {
37     Ident ident();
38     Ident[] refs();
39     String contact() default "-";
40 }
41
42 @interface Ident {
43     IdentType type();
44     int nr();
45 }
46
47 enum IdentType {UC, DE, IM}
48
49

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50
51 // Test-Sceanario:
52
53 @Tracing(ident=@Ident(type=IdentType.DE, nr=1),
54          refs=@Ident(type=IdentType.UC, nr=1), @Ident(type=IdentType.UC, nr=2))
55 class DesignClass1 {
56 }
57
58 @Tracing(ident=@Ident(type=IdentType.DE, nr=2),
59          refs=@Ident(type=IdentType.UC, nr=2)),
60          contact="John Smith")
61 class DesignClass2 {
62 }
63
64 @Tracing(ident=@Ident(type=IdentType.DE, nr=3),
65          refs=@Ident(type=IdentType.UC, nr=1))
66 class DesignClass3 {
67 }
68
69 @Tracing(ident=@Ident(type=IdentType.IM, nr=1),
70          refs=@Ident(type=IdentType.DE, nr=1))
71 class ImplClass1 {
72 }
73
74 @Tracing(ident=@Ident(type=IdentType.IM, nr=2),
75          refs=@Ident(type=IdentType.DE, nr=1), @Ident(type=IdentType.DE, nr=2))
76 class ImplClass2 {
77 }
78
79 @Tracing(ident=@Ident(type=IdentType.IM, nr=3),
80          refs=@Ident(type=IdentType.DE, nr=2))
81 class ImplClass3 {
82 }
83
84 @Tracing(ident=@Ident(type=IdentType.IM, nr=9),
85          refs=@Ident(type=IdentType.IM, nr=3)),
86          contact="Tom Miller")
87 class ImplClass9 {
88 }
89
90

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91 |
92 | class TracingTest {
93 |
94 |
95 |
96 |     private static void printAnnotations(List<Class<?>> pTracingTypes) {
97 |         for (Class<?> actualClass: pTracingTypes) {
98 |             print("", actualClass);
99 |         }
100 |     }
101 |
102 |
103 |
104 |     private static void print(String pPrefix, Class<?> pActualClass) {
105 |         out.print(pPrefix);
106 |         out.printf("%-13s: ", pActualClass.getName());
107 |         Tracing t = pActualClass.getAnnotation(Tracing.class);
108 |         out.printf("Ident: %s:%-4d: ", t.ident().type(), t.ident().nr());
109 |         String allIdentsStr = "";
110 |         for (Ident ident: t.refs()) {
111 |             allIdentsStr = allIdentsStr + getIdentString(ident)+",";
112 |         }
113 |         allIdentsStr = allIdentsStr.substring(0, allIdentsStr.length()-1);
114 |         out.printf("Refs: %s:-12s: ", allIdentsStr);
115 |         out.println("Contact: " + t.contact());
116 |     }
117 |
118 |
119 |
120 |     private static String getIdentString(Ident pIdent) {
121 |         return String.format("%s:%d", pIdent.type(), pIdent.nr());
122 |     }
123 |
124 |
125 |
126 |     private static void searchFor(List<Class<?>> pTracingTypes, IdentType pIT,
127 |                                  int pNr, String pPrefix) {
128 |         for (Class<?> actualClass: pTracingTypes) {
129 |             Tracing t = (Tracing) actualClass.getAnnotation(Tracing.class);
130 |             for (Ident id: t.refs()) {
131 |                 if ((id.type() == pIT) && (id.nr() == pNr)) {
132 |                     print(pPrefix, actualClass);
133 |                     searchFor(pTracingTypes, t.ident().type(), t.ident().nr(), pPrefix+"
134 |
135 |         }
136 |     }
137 | }
138 |
139 |

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140 |
141 |     public static void main(String[] pArgs) {
142 |         if (pArgs.length == 0) {
143 |             System.err.println("ERROR: no Argument ! (e.g. \"\nUC:2\n)\");
144 |             System.exit(1);
145 |         }
146 |         File binDir = new File("bin"); // Class-Directory
147 |         List<Class<?>> tracingTypes = new ArrayList<Class<?>>();
148 |         out.print("\nTesting all Files in the bin-Directory: ");
149 |         String[] filenames = binDir.list();
150 |         Arrays.sort(filenames);
151 |         for (String filename: filenames) {
152 |             out.print("\nFile: "+filename);
153 |             try {
154 |                 if ( ! filename.matches(".*\\.class$")) // ".class" at End of Filename ?
155 |                     continue; // this is not a Classfile
156 |                 filename = filename.substring(0, filename.lastIndexOf(".class"));
157 |                 out.print(" - loading...");
158 |                 Class<?> c = Class.forName(filename);
159 |                 Tracing t = (Tracing) c.getAnnotation(Tracing.class);
160 |                 if (t != null) {
161 |                     out.print(" found Tracing-Annotation!");
162 |                     tracingTypes.add(c);
163 |                 }
164 |             } catch (ClassNotFoundException e) {
165 |                 e.printStackTrace();
166 |             }
167 |         }
168 |
169 |         out.println("\n\nPrinting all Tracing-Annotations:");
170 |         printAnnotations(tracingTypes);
171 |
172 |         out.println("\n\nSearching for: \""+pArgs[0]+"\"");
173 |         String[] x = pArgs[0].split(":");
174 |         String type = x[0];
175 |         IdentType identType = IdentType.valueOf(type);
176 |         int nr= Integer.valueOf(x[1]);
177 |         searchFor(tracingTypes, identType, nr, "");
178 |
179 |     } // End of main()
180 |
181 |
182 |
183 | } // End of class TracingTest
184 |

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185
186 /* Session-Log:
187
188 $ java -cp bin TracingTest UC:2
189
190 Testing all Files in the bin-Directory:
191 File: DesignClass1.class - loading... found Tracing-Annotation!
192 File: DesignClass2.class - loading... found Tracing-Annotation!
193 File: DesignClass3.class - loading... found Tracing-Annotation!
194 File: Ident.class - loading...
195 File: IdentType.class - loading...
196 File: ImplClass1.class - loading... found Tracing-Annotation!
197 File: ImplClass2.class - loading... found Tracing-Annotation!
198 File: ImplClass3.class - loading... found Tracing-Annotation!
199 File: ImplClass9.class - loading... found Tracing-Annotation!
200 File: Tracing.class - loading...
201 File: TracingTest.class - loading...
202
203 Printing all Tracing-Annotations:
204 DesignClass1 : Ident: DE:1 : Refs: UC:1,UC:2 : Contact: -
205 DesignClass2 : Ident: DE:2 : Refs: UC:2 : Contact: John Smith
206 DesignClass3 : Ident: DE:3 : Refs: UC:1 : Contact: -
207 ImplClass1 : Ident: IM:1 : Refs: DE:1 : Contact: -
208 ImplClass2 : Ident: IM:2 : Refs: DE:1,DE:2 : Contact: -
209 ImplClass3 : Ident: IM:3 : Refs: DE:2 : Contact: -
210 ImplClass9 : Ident: IM:9 : Refs: IM:3 : Contact: Tom Miller
211
212
213 Searching for: "UC:2"
214 DesignClass1 : Ident: DE:1 : Refs: UC:1,UC:2 : Contact: -
215 ImplClass1 : Ident: IM:1 : Refs: DE:1 : Contact: -
216 ImplClass2 : Ident: IM:2 : Refs: DE:1,DE:2 : Contact: -
217 DesignClass2 : Ident: DE:2 : Refs: UC:2 : Contact: John Smith
218 ImplClass2 : Ident: IM:2 : Refs: DE:1,DE:2 : Contact: -
219 ImplClass3 : Ident: IM:3 : Refs: DE:2 : Contact: -
220 ImplClass9 : Ident: IM:9 : Refs: IM:3 : Contact: Tom Miller
221
222 */
223

```