

1.1 ./csharp/Platform.RegularExpressions.Transformer.CSharpToCpp/CSharpToCppTransformer.cs

```

1  using System;
2  using System.Collections.Generic;
3  using System.Linq;
4  using System.Text.RegularExpressions;
5
6  #pragma warning disable CS1591 // Missing XML comment for publicly visible type or member
7
8  namespace Platform.RegularExpressions.Transformer.CSharpToCpp
9  {
10     /// <summary>
11     /// <para>
12     /// Represents the sharp to cpp transformer.
13     /// </para>
14     /// <para></para>
15     /// </summary>
16     /// <seealso cref="TextTransformer"/>
17     public class CSharpToCppTransformer : TextTransformer
18     {
19         /// <summary>
20         /// <para>
21         /// The to list.
22         /// </para>
23         /// <para></para>
24         /// </summary>
25         public static readonly IList<ISubstitutionRule> FirstStage = new List<SubstitutionRule>
26         {
27             // // ...
28             //
29             (new Regex(@"(\r?\n)?[ \t]+//+.+"), "", 0),
30             // #pragma warning disable CS1591 // Missing XML comment for publicly visible type
31             // or member
32             //
33             (new Regex(@"^~\s*?#pragma[ \sa-zA-Z0-9]+$"), "", 0),
34             // { \n \n \n
35             // {
36             (new Regex(@"{\s+[\r\n]+") , "{" + Environment.NewLine, 0),
37             // Platform.Collections.Methods.Lists
38             // Platform::Collections::Methods::Lists
39             (new Regex(@"(namespace[^\r\n]+?)\.([^\r\n]+?)") , "$1::$2", 20),
40             // nameof(numbers)
41             // "numbers"
42             (new
43             → Regex(@"(?<before>\W)nameof\((([^\n]+\.)?(?<name>[a-zA-Z0-9_]+)([^\n]+\+)?\)") ,
44             → "${before}\${name}\", 0),
45             // Insert markers
46             // EqualityComparer<T> _equalityComparer = EqualityComparer<T>.Default;
47             // EqualityComparer<T> _equalityComparer =
48             → EqualityComparer<T>.Default; /*~_comparer~*/
49             (new Regex(@"(?<declaration>EqualityComparer<(?<type>[^\n]+\+)>
50             → (?<comparer>[a-zA-Z0-9_]+\+) = EqualityComparer<\k<type>>\.Default;)") ,
51             → "${declaration}/*~${comparer}~*/", 0),
52             // /*~_equalityComparer~*/..._equalityComparer.Equals(Minimum, value)
53             // /*~_equalityComparer~*/...Minimum == value
54             (new Regex(@"(?<before>/\~(?<comparer>[a-zA-Z0-9_]+\+)\~*/(.[^\n]+\W)\k<comparer>\.Equ
55             → als\((?<left>[^\n]+\), (?<right>[^\n]+\+)\)") , "${before}${left} == ${right}",
56             → 50),
57             // Remove markers
58             // /*~_equalityComparer~*/
59             //
60             (new Regex(@"\r?\n[^\n]+\~/*[a-zA-Z0-9_]+\~*/") , "", 10),
61             // Insert markers
62             // Comparer<T> _comparer = Comparer<T>.Default;
63             // Comparer<T> _comparer = Comparer<T>.Default; /*~_comparer~*/
64             (new Regex(@"(?<declaration>Comparer<(?<type>[^\n]+\+)> (?<comparer>[a-zA-Z0-9_]+\+) =
65             → Comparer<\k<type>>\.Default;)") , "${declaration}/*~${comparer}~*/", 0),
66             // /*~_comparer~*/..._comparer.Compare(Minimum, value) <= 0
67             // /*~_comparer~*/...Minimum <= value
68             (new Regex(@"(?<before>/\~(?<comparer>[a-zA-Z0-9_]+\+)\~*/(.[^\n]+\W)\k<comparer>\.Com
69             → pare\((?<left>[^\n]+\),
70             → (?<right>[^\n]+\+)\)\s*(?<comparison>[<=>]=?)\s*(?<after>\D)") ,
71             → "${before}${left} ${comparison} ${right}${after}", 50),
72             // Remove markers
73             // private static readonly Comparer<T> _comparer =
74             → Comparer<T>.Default; /*~_comparer~*/
75             //
76             //
77             //
78             //
79             //
80             //
81             //
82             //
83             //
84             //
85             //
86             //
87             //
88             //
89             //
90             //
91             //
92             //
93             //
94             //
95             //
96             //
97             //
98             //
99             //
100            //
101            //
102            //
103            //
104            //
105            //
106            //
107            //
108            //
109            //
110            //
111            //
112            //
113            //
114            //
115            //
116            //
117            //
118            //
119            //
120            //
121            //
122            //
123            //
124            //
125            //
126            //
127            //
128            //
129            //
130            //
131            //
132            //
133            //
134            //
135            //
136            //
137            //
138            //
139            //
140            //
141            //
142            //
143            //
144            //
145            //
146            //
147            //
148            //
149            //
150            //
151            //
152            //
153            //
154            //
155            //
156            //
157            //
158            //
159            //
160            //
161            //
162            //
163            //
164            //
165            //
166            //
167            //
168            //
169            //
170            //
171            //
172            //
173            //
174            //
175            //
176            //
177            //
178            //
179            //
180            //
181            //
182            //
183            //
184            //
185            //
186            //
187            //
188            //
189            //
190            //
191            //
192            //
193            //
194            //
195            //
196            //
197            //
198            //
199            //
200            //
201            //
202            //
203            //
204            //
205            //
206            //
207            //
208            //
209            //
210            //
211            //
212            //
213            //
214            //
215            //
216            //
217            //
218            //
219            //
220            //
221            //
222            //
223            //
224            //
225            //
226            //
227            //
228            //
229            //
230            //
231            //
232            //
233            //
234            //
235            //
236            //
237            //
238            //
239            //
240            //
241            //
242            //
243            //
244            //
245            //
246            //
247            //
248            //
249            //
250            //
251            //
252            //
253            //
254            //
255            //
256            //
257            //
258            //
259            //
260            //
261            //
262            //
263            //
264            //
265            //
266            //
267            //
268            //
269            //
270            //
271            //
272            //
273            //
274            //
275            //
276            //
277            //
278            //
279            //
280            //
281            //
282            //
283            //
284            //
285            //
286            //
287            //
288            //
289            //
290            //
291            //
292            //
293            //
294            //
295            //
296            //
297            //
298            //
299            //
300            //
301            //
302            //
303            //
304            //
305            //
306            //
307            //
308            //
309            //
310            //
311            //
312            //
313            //
314            //
315            //
316            //
317            //
318            //
319            //
320            //
321            //
322            //
323            //
324            //
325            //
326            //
327            //
328            //
329            //
330            //
331            //
332            //
333            //
334            //
335            //
336            //
337            //
338            //
339            //
340            //
341            //
342            //
343            //
344            //
345            //
346            //
347            //
348            //
349            //
350            //
351            //
352            //
353            //
354            //
355            //
356            //
357            //
358            //
359            //
360            //
361            //
362            //
363            //
364            //
365            //
366            //
367            //
368            //
369            //
370            //
371            //
372            //
373            //
374            //
375            //
376            //
377            //
378            //
379            //
380            //
381            //
382            //
383            //
384            //
385            //
386            //
387            //
388            //
389            //
390            //
391            //
392            //
393            //
394            //
395            //
396            //
397            //
398            //
399            //
400            //
401            //
402            //
403            //
404            //
405            //
406            //
407            //
408            //
409            //
410            //
411            //
412            //
413            //
414            //
415            //
416            //
417            //
418            //
419            //
420            //
421            //
422            //
423            //
424            //
425            //
426            //
427            //
428            //
429            //
430            //
431            //
432            //
433            //
434            //
435            //
436            //
437            //
438            //
439            //
440            //
441            //
442            //
443            //
444            //
445            //
446            //
447            //
448            //
449            //
450            //
451            //
452            //
453            //
454            //
455            //
456            //
457            //
458            //
459            //
460            //
461            //
462            //
463            //
464            //
465            //
466            //
467            //
468            //
469            //
470            //
471            //
472            //
473            //
474            //
475            //
476            //
477            //
478            //
479            //
480            //
481            //
482            //
483            //
484            //
485            //
486            //
487            //
488            //
489            //
490            //
491            //
492            //
493            //
494            //
495            //
496            //
497            //
498            //
499            //
500            //
501            //
502            //
503            //
504            //
505            //
506            //
507            //
508            //
509            //
510            //
511            //
512            //
513            //
514            //
515            //
516            //
517            //
518            //
519            //
520            //
521            //
522            //
523            //
524            //
525            //
526            //
527            //
528            //
529            //
530            //
531            //
532            //
533            //
534            //
535            //
536            //
537            //
538            //
539            //
540            //
541            //
542            //
543            //
544            //
545            //
546            //
547            //
548            //
549            //
550            //
551            //
552            //
553            //
554            //
555            //
556            //
557            //
558            //
559            //
560            //
561            //
562            //
563            //
564            //
565            //
566            //
567            //
568            //
569            //
570            //
571            //
572            //
573            //
574            //
575            //
576            //
577            //
578            //
579            //
580            //
581            //
582            //
583            //
584            //
585            //
586            //
587            //
588            //
589            //
590            //
591            //
592            //
593            //
594            //
595            //
596            //
597            //
598            //
599            //
600            //
601            //
602            //
603            //
604            //
605            //
606            //
607            //
608            //
609            //
610            //
611            //
612            //
613            //
614            //
615            //
616            //
617            //
618            //
619            //
620            //
621            //
622            //
623            //
624            //
625            //
626            //
627            //
628            //
629            //
630            //
631            //
632            //
633            //
634            //
635            //
636            //
637            //
638            //
639            //
640            //
641            //
642            //
643            //
644            //
645            //
646            //
647            //
648            //
649            //
650            //
651            //
652            //
653            //
654            //
655            //
656            //
657            //
658            //
659            //
660            //
661            //
662            //
663            //
664            //
665            //
666            //
667            //
668            //
669            //
670            //
671            //
672            //
673            //
674            //
675            //
676            //
677            //
678            //
679            //
680            //
681            //
682            //
683            //
684            //
685            //
686            //
687            //
688            //
689            //
690            //
691            //
692            //
693            //
694            //
695            //
696            //
697            //
698            //
699            //
700            //
701            //
702            //
703            //
704            //
705            //
706            //
707            //
708            //
709            //
710            //
711            //
712            //
713            //
714            //
715            //
716            //
717            //
718            //
719            //
720            //
721            //
722            //
723            //
724            //
725            //
726            //
727            //
728            //
729            //
730            //
731            //
732            //
733            //
734            //
735            //
736            //
737            //
738            //
739            //
740            //
741            //
742            //
743            //
744            //
745            //
746            //
747            //
748            //
749            //
750            //
751            //
752            //
753            //
754            //
755            //
756            //
757            //
758            //
759            //
760            //
761            //
762            //
763            //
764            //
765            //
766            //
767            //
768            //
769            //
770            //
771            //
772            //
773            //
774            //
775            //
776            //
777            //
778            //
779            //
780            //
781            //
782            //
783            //
784            //
785            //
786            //
787            //
788            //
789            //
790            //
791            //
792            //
793            //
794            //
795            //
796            //
797            //
798            //
799            //
800            //
801            //
802            //
803            //
804            //
805            //
806            //
807            //
808            //
809            //
810            //
811            //
812            //
813            //
814            //
815            //
816            //
817            //
818            //
819            //
820            //
821            //
822            //
823            //
824            //
825            //
826            //
827            //
828            //
829            //
830            //
831            //
832            //
833            //
834            //
835            //
836            //
837            //
838            //
839            //
840            //
841            //
842            //
843            //
844            //
845            //
846            //
847            //
848            //
849            //
850            //
851            //
852            //
853            //
854            //
855            //
856            //
857            //
858            //
859            //
860            //
861            //
862            //
863            //
864            //
865            //
866            //
867            //
868            //
869            //
870            //
871            //
872            //
873            //
874            //
875            //
876            //
877            //
878            //
879            //
880            //
881            //
882            //
883            //
884            //
885            //
886            //
887            //
888            //
889            //
890            //
891            //
892            //
893            //
894            //
895            //
896            //
897            //
898            //
899            //
900            //
901            //
902            //
903            //
904            //
905            //
906            //
907            //
908            //
909            //
910            //
911            //
912            //
913            //
914            //
915            //
916            //
917            //
918            //
919            //
920            //
921            //
922            //
923            //
924            //
925            //
926            //
927            //
928            //
929            //
930            //
931            //
932            //
933            //
934            //
935            //
936            //
937            //
938            //
939            //
940            //
941            //
942            //
943            //
944            //
945            //
946            //
947            //
948            //
949            //
950            //
951            //
952            //
953            //
954            //
955            //
956            //
957            //
958            //
959            //
960            //
961            //
962            //
963            //
964            //
965            //
966            //
967            //
968            //
969            //
970            //
971            //
972            //
973            //
974            //
975            //
976            //
977            //
978            //
979            //
980            //
981            //
982            //
983            //
984            //
985            //
986            //
987            //
988            //
989            //
990            //
991            //
992            //
993            //
994            //
995            //
996            //
997            //
998            //
999            //
1000           //
1001           //
1002           //
1003           //
1004           //
1005           //
1006           //
1007           //
1008           //
1009           //
1010           //
1011           //
1012           //
1013           //
1014           //
1015           //
1016           //
1017           //
1018           //
1019           //
1020           //
1021           //
1022           //
1023           //
1024           //
1025           //
1026           //
1027           //
1028           //
1029           //
1030           //
1031           //
1032           //
1033           //
1034           //
1035           //
1036           //
1037           //
1038           //
1039           //
1040           //
1041           //
1042           //
1043           //
1044           //
1045           //
1046           //
1047           //
1048           //
1049           //
1050           //
1051           //
1052           //
1053           //
1054           //
1055           //
1056           //
1057           //
1058           //
1059           //
1060           //
1061           //
1062           //
1063           //
1064           //
1065           //
1066           //
1067           //
1068           //
1069           //
1070           //
1071           //
1072           //
1073           //
1074           //
1075           //
1076           //
1077           //
1078           //
1079           //
1080           //
1081           //
1082           //
1083           //
1084           //
1085           //
1086           //
1087           //
1088           //
1089           //
1090           //
1091           //
1092           //
1093           //
1094           //
1095           //
1096           //
1097           //
1098           //
1099           //
1100           //
1101           //
1102           //
1103           //
1104           //
1105           //
1106           //
1107           //
1108           //
1109           //
1110           //
1111           //
1112           //
1113           //
1114           //
1115           //
1116           //
1117           //
1118           //
1119           //
1120           //
1121           //
1122           //
1123           //
1124           //
1125           //
1126           //
1127           //
1128           //
1129           //
1130           //
1131           //
1132           //
1133           //
1134           //
1135           //
1136           //
1137           //
1138           //
1139           //
1140           //
1141           //
1142           //
1143           //
1144           //
1145           //
1146           //
1147           //
1148           //
1149           //
1150           //
1151           //
1152           //
1153           //
1154           //
1155           //
1156           //
1157           //
1158           //
1159           //
1160           //
1161           //
1162           //
1163           //
1164           //
1165           //
1166           //
1167           //
1168           //
1169           //
1170           //
1171           //
1172           //
1173           //
1174           //
1175           //
1176           //
1177           //
1178           //
1179           //
1180           //
1181           //
1182           //
1183           //
1184           //
1185           //
1186           //
1187           //
1188           //
1189           //
1190           //
1191           //
1192           //
1193           //
1194           //
1195           //
1196           //
1197           //
1198           //
1199           //
1200           //
1201           //
1202           //
1203           //
1204           //
1205           //
1206           //
1207           //
1208           //
1209           //
1210           //
1211           //
1212           //
1213           //
1214           //
1215           //
1216           //
1217           //
1218           //
1219           //
1220           //
1221           //
1222           //
1223           //
1224           //
1225           //
1226           //
1227           //
1228           //
1229           //
1230           //
1231           //
1232           //
1233           //
1234           //
1235           //
1236           //
1237           //
1238           //
1239           //
1240           //
1241           //
1242           //
1243           //
1244           //
1245           //
1246           //
1247           //
1248           //
1249           //
1250           //
1251           //
1252           //
1253           //
1254           //
1255           //
1256           //
1257           //
1258           //
1259           //
1260           //
1261           //
1262           //
1263           //
1264           //
1265           //
1266           //
1267           //
1268           //
1269           //
1270           //
1271           //
1272           //
1273           //
1274           //
1275           //
1276           //
1277           //
1278           //
1279           //
1280           //
1281           //
1282           //
1283           //
1284           //
1285           //
1286           //
1287           //
1288           //
1289           //
1290           //
1291           //
1292           //
1293           //
1294           //
1295           //
1296           //
1297           //
1298           //
1299           //
1300           //
1301           //
1302           //
1303           //
1304           //
1305           //
1306           //
1307           //
1308           //
1309           //
1310           //
1311           //
1312           //
1313           //
1314           //
1315           //
1316           //
1317           //
1318           //
1319           //
1320           //
1321           //
1322           //
1323           //
1324           //
1325           //
1326           //
1327           //
1328           //
1329           //
1330           //
1331           //
1332           //
1333           //
1334           //
1335           //
1336           //
1337           //
1338           //
1339           //
1340           //
1341           //
1342           //
1343           //
1344           //
1345           //
1346           //
1347           //
1348           //
1349           //
1350           //
1351           //
1352           //
1353           //
1354           //
1355           //
1356           //
1357           //
1358           //
1359           //
1360           //
1361           //
1362           //
1363           //
1364           //
1365           //
1366           //
1367           //
1368           //
1369           //
1370           //
1371           //
1372           //
1373           //
1374           //
1375           //
1376           //
1377           //
1378           //
1379           //
1380           //
1381           //
1382           //
1383           //
1384           //
1385           //
1386           //
1387           //
1388           //
1389           //
1390           //
1391           //
1392           //
1393           //
1394           //
1395           //
1396           //
1397           //
1398           //
1399           //
1400           //
1401           //
1402           //
1403           //
1404           //
1405           //
1406           //
1407           //
1408           //
1409           //
1410           //
1411           //
1412           //
1413           //
1414           //
1415           //
1416           //
1417           //
1418           //
1419           //
1420           //
1421           //
1422           //
1423           //
1424           //
1425           //
1426           //
1427           //
1428           //
1429           //
1430           //
1431           //
1432           //
1433           //
1434           //
1435           //
1436           //
1437           //
1438           //
1439           //
1440           //
1441           //
1442           //
1443           //
1444           //
1445           //
1446           //
1447           //
1448           //
1449           //
1450           //
1451           //
1452           //
1453           //
1454           //
1455           //
1456           //
1457           //
1458           //
1459           //
1460           //
1461           //
1462           //
1463           //
1464           //
1465           //
1466           //
1467           //
1468           //
1469           //
1470           //
1471           //
1472           //
1473           //
1474           //
1475           //
1476           //
1477           //
1478           //
1479           //
1480           //
1481           //
1482           //
1483           //
1484           //
1485           //
1486           //
1487           //
1488           //
1489           //
1490           //
1491           //
1492           //
1493           //
1494           //
1495           //
1496           //
1497           //
1498           //
1499           //
1500           //
1501           //
1502           //
1503           //
1504           //
1505           //
1506           //
1507           //
1508           //
1509           //
1510           //
1511           //
1512           //
1513           //
1514           //
1515           //
1516           //
1517           //
1518           //
1519           //
1520           //
1521           //
1522           //
1523           //
1524           //
1525           //
1526           //
1527           //
1528           //
1529           //
1530           //
1531           //
1532           //
1533           //
1534           //
1535           //
1536           //
1537           //
1538           //
1539           //
1540           //
1541           //
1542           //
1543           //
1544           //
1545           //
1546           //
1547           //
1548           //
1549           //
1550           //
1551           //
1552           //
1553           //
1554           //
1555           //
1556           //
1557           //
1558           //
1559           //
1560           //
1561           //
1562           //
1563           //
1564           //
1565           //
1566           //
1567           //
1568           //
1569           //
1570           //
1571           //
1572           //
1573           //
1574           //
1575           //
1576           //
1577           //
1578           //
1579           //
1580           //
1581           //
1582           //
1583           //
1584           //
1585           //
1586           //
1587           //
1588           //
1589           //
1590           //
1591           //
1592           //
1593           //
1594           //
1595           //
1596           //
1597           //
1598           //
1599           //
1600           //
1601           //
1602           //
1603           //
1604           //
1605           //
1606           //
1607           //
1608           //
1609           //
1610           //
1611           //
1612           //
1613           //
1614           //
1615           //
1616           //
1617           //
1618           //
1619           //
1620           //
1621           //
1622           //
1623           //
1624           //
1625           //
1626           //
1627           //
1628           //
1629           //
1630           //
1631           //
1632           //
1633           //
1634           //
1635           //
1636           //
1637           //
1638           //
1639           //
1640           //
1641           //
1642           //
1643           //
1644           //
1645           //
1646           //
1647           //
1648           //
1649           //
1650           //
1651           //
1652           //
1653           //
1654           //
1655           //
1656           //
1657           //
1658           //
1659           //
1660           //
1661           //
1662           //
1663           //
1664           //
1665           //
1666           //
1667           //
1668           //
1669           //
1670           //
1671           //
1672           //
1673           //
1674           //
1675           //
1676           //
1677           //
1678           //
1679           //
1680           //
1681           //
1682           //
1683           //
1684           //
1685           //
1686           //
1687           //
1688           //
1689           //
1690           //
1691           //
1692           //
1693           //
1694           //
1695           //
1696           //
1697           //
1698           //
1699           //
1700           //
1701           //
1702           //
1703           //
1704           //
1705           //
1706           //
1707           //
1708           //
1709           //
1710           //
1711           //
1712           //
1713           //
1714           //
1715           //
1716           //
1717           //
1718           //
1719           //
1720           //
1721           //
1722           //
1723           //
1724           //
1725           //
1726           //
1727           //
1728           //
1729           //
1730           //
1731           //
1732           //
1733           //
1734           //
1735           //
1736           //
1737           //
1738           //
1739           //
1740           //
1741           //
1742           //
1743           //
1744           //
1745           //
1746           //
1747           //
1748           //
1749           //
1750           //
1751           //
1752           //
1753           //
1754           //
1755           //
1756           //
1757           //
1758           //
1759           //
1760           //
1761           //
1762           //
1763           //
1764           //
1765           //
1766           //
1767           //
1768           //
1769           //
1770           //
1771           //

```

```

63 (new Regex(@"r?\n[^\n]+\/*~[a-zA-Z0-9_]+\/*/", "", 10),
64 // Comparer<TArgument>.Default.Compare(maximumArgument, minimumArgument) < 0
65 // maximumArgument < minimumArgument
66 (new Regex(@"Comparer<[^>\n]+>\.Default\.Compare\\(s*(?<first>[^\n])\n+),\s*(?<second>
→ >[^\n]\n+)\s*)\\s*(?<comparison>[<>=]=?)\\s*0(?<after>\D)", "${first}
→ ${comparison} ${second} ${after}", 0),
67 // public static bool operator ==(Range<T> left, Range<T> right) =>
→ left.Equals(right);
68 //
69 (new Regex(@"r?\n[^\n]+bool operator ==\\((?<type>[^\n]+) (?<left>[a-zA-Z0-9_]+),
→ \k<type> (?<right>[a-zA-Z0-9_]+)\\) =>
→ ((\k<left>|\k<right>)\.Equals\\((\k<left>|\k<right>)\));", "", 10),
70 // public static bool operator !=(Range<T> left, Range<T> right) => !(left == right);
71 //
72 (new Regex(@"r?\n[^\n]+bool operator !=\\((?<type>[^\n]+) (?<left>[a-zA-Z0-9_]+),
→ \k<type> (?<right>[a-zA-Z0-9_]+)\\) => !((\k<left>|\k<right>) ==
→ ((\k<left>|\k<right>)\));", "", 10),
73 // public override bool Equals(object obj) => obj is Range<T> range ? Equals(range)
→ : false;
74 //
75 (new Regex(@"r?\n[^\n]+override bool Equals\\((System\\.)?[Oo]bject
→ (?<this>[a-zA-Z0-9_]+)\\) => \k<this> is [^\n]+ (?<other>[a-zA-Z0-9_]+) \?
→ Equals\\(\k<other>) : false;", "", 10),
76 // out TProduct
77 // TProduct
78 (new Regex(@"(?<before><|, ))(in|out)
→ (?<typeParameter>[a-zA-Z0-9_]+)(?<after>>|,))",
→ "${before}${typeParameter}${after}", 10),
79 // public ...
80 // public: ...
81 (new Regex(@"(?<newLineAndIndent>r?\n?[
→ \t]*) (?<before>[^\{\\(\r\n)*] (?<access>private|protected|public) [ \t]+(?![^\{\\(\r\n]
→ \n]*((?<=\\s)\\W)(interface|class|struct)(\\W)[^\{\\(\r\n]*[\\{\\(\r\n)])",
→ "${newLineAndIndent}${access}: ${before}", 0),
82 // public: static bool CollectExceptions { get; set; }
83 // public: inline static bool CollectExceptions;
84 (new Regex(@"(?<access>(private|protected|public): )(?<before>(static )?[^\r\n]+
→ )(?<name>[a-zA-Z0-9_]+) {[~;]}*(?<=\\W)get;[~;]}*(?<=\\W)set;[~;]}*")",
→ "${access}inline ${before}${name};", 0),
85 // public abstract class
86 // class
87 (new Regex(@"((public|protected|private|internal|abstract|static)
→ )*(?<category>interface|class|struct)", "${category}", 0),
88 // class GenericCollectionMethodsBase<TElement> {
89 // template <typename TElement> class GenericCollectionMethodsBase {
90 (new Regex(@"(?<before>r?\n)(?<indent>[ \t]*) (?<type>class|struct)
→ (?<typeName>[a-zA-Z0-9_]+)<(?<typeParameters>[a-zA-Z0-9
→ ,]+)>(?<typeDefinitionEnding>[^\{]+){", "${before}${indent}template <typename
→ ...> ${type} ${typeName};" + Environment.NewLine + "${indent}template <typename
→ ${typeParameters}> ${type}
→ ${typeName}<${typeParameters}>${typeDefinitionEnding}{", 0),
91 // static void
→ TestMultipleCreationsAndDeletions<TElement>(SizedBinaryTreeMethodsBase<TElement>
→ tree, TElement* root)
92 // template<typename T> static void
→ TestMultipleCreationsAndDeletions<TElement>(SizedBinaryTreeMethodsBase<TElement>
→ tree, TElement* root)
93 (new Regex(@"static ([a-zA-Z0-9_]+) ([a-zA-Z0-9_]+)<([a-zA-Z0-9_]+)>\\(([^\\]\r\n)+)\\)",
→ "template <typename $3> static $1 $2($4)", 0),
94 // interface IFactory<out TProduct> {
95 // template <typename...> class IFactory; \ntemplate <typename TProduct> class
→ IFactory<TProduct>
96 (new Regex(@"(?<before>r?\n)(?<indent>[ \t]*)interface
→ (?<interface>[a-zA-Z0-9_]+)<(?<typeParameters>[a-zA-Z0-9
→ ,]+)>(?<typeDefinitionEnding>[^\{]+){", "${before}${indent}template <typename
→ ...> class ${interface};" + Environment.NewLine + "${indent}template <typename
→ ${typeParameters}> class
→ ${interface}<${typeParameters}>${typeDefinitionEnding}{", 0),
→ " public:", 0),
97 // template <typename TObject, TProperty, TValue>
98 // template <typename TObject, typename TProperty, typename TValue>
99 (new Regex(@"(?<before>template <((, )?typename [a-zA-Z0-9_]+)+,
→ )(?<typeParameter>[a-zA-Z0-9_]+)(?<after>(,|>))", "${before}typename
→ ${typeParameter}${after}", 10),
100 // Insert markers

```

```

101 // private: static void BuildExceptionString(this StringBuilder sb, Exception
102     ↳ exception, int level)
103 // /*~extensionMethod~BuildExceptionString~*/private: static void
104     ↳ BuildExceptionString(this StringBuilder sb, Exception exception, int level)
105 (new Regex(@"private: static [\r\n]+ (?<name>[a-zA-Z0-9]+)\(this [\r\n]+\)",
106     ↳ "/*~extensionMethod~${name}~*/$0", 0),
107 // Move all markers to the beginning of the file.
108 (new Regex(@"\A(?<before>[\r\n]+\r?\n(.|\n)+)(?<marker>\/\/*~extensionMethod~(?<name>
109     ↳ [a-zA-Z0-9]+)~\*/)", "${marker}${before}",
110     ↳ 10),
111 // /*~extensionMethod~BuildExceptionString~*/...sb.BuildExceptionString(exception.In
112     ↳ nerException, level +
113     ↳ 1);
114 // /*~extensionMethod~BuildExceptionString~*/...BuildExceptionString(sb,
115     ↳ exception.InnerException, level + 1);
116 (new Regex(@"(?<before>\/\/*~extensionMethod~(?<name>[a-zA-Z0-9]+)~\*/(.|\n)+\W)(?<var
117     ↳ iable>[_a-zA-Z0-9]+\.\k<name>\(", "${before}${name}(${variable}",
118     ↳ 50),
119 // Remove markers
120 // /*~extensionMethod~BuildExceptionString~*/
121 //
122 (new Regex(@"\/\/*~extensionMethod~[a-zA-Z0-9]+~\*/"), "", 0),
123 // (this
124 // (
125 (new Regex(@"\((this ", "(", 0),
126 // private: static readonly Disposal _emptyDelegate = (manual, wasDisposed) => { };
127 // private: inline static std::function<Disposal> _emptyDelegate = [](auto manual,
128     ↳ auto wasDisposed) { };
129 (new Regex(@"(?<access>(private|protected|public): )?static readonly
130     ↳ (?<type>[a-zA-Z][a-zA-Z0-9]*) (?<name>[a-zA-Z][a-zA-Z0-9_]*) =
131     ↳ \((?<firstArgument>[a-zA-Z][a-zA-Z0-9_]*)
132     ↳ (?<secondArgument>[a-zA-Z][a-zA-Z0-9_]*)\) => {\s*};"); "${access}inline static
133     ↳ std::function<${type}> ${name} = [](auto ${firstArgument}, auto
134     ↳ ${secondArgument}) { };", 0),
135 // public: static readonly EnsureAlwaysExtensionRoot Always = new
136     ↳ EnsureAlwaysExtensionRoot();
137 // public: inline static EnsureAlwaysExtensionRoot Always;
138 (new Regex(@"(?<access>(private|protected|public): )?static readonly
139     ↳ (?<type>[a-zA-Z0-9]+(<[a-zA-Z0-9]+>?)) (?<name>[a-zA-Z0-9_]+) = new
140     ↳ \k<type>\(\);", "${access}inline static ${type} ${name};", 0),
141 // public: static readonly Range<int> SByte = new
142     ↳ Range<int>(std::numeric_limits<int>::min(), std::numeric_limits<int>::max());
143 // public: inline static Range<int> SByte =
144     ↳ Range<int>(std::numeric_limits<int>::min(), std::numeric_limits<int>::max());
145 (new Regex(@"(?<access>(private|protected|public): )?static readonly
146     ↳ (?<type>[a-zA-Z0-9]+(<[a-zA-Z0-9]+>?)) (?<name>[a-zA-Z0-9_]+) = new
147     ↳ \k<type>\(\((?<arguments>[\r\n]+\)\);", "${access}inline static ${type} ${name} =
148     ↳ ${type}(${arguments});", 0),
149 // public: static readonly string ExceptionContentsSeparator = "---";
150 // public: inline static std::string ExceptionContentsSeparator = "---";
151 (new Regex(@"(?<access>(private|protected|public): )?(const|static readonly) string
152     ↳ (?<name>[a-zA-Z0-9_]+) = ""(?<string>\\\"|\\\"[\r\n]+)"";"), "${access}inline
153     ↳ static std::string ${name} = \"${string}\";\", 0),
154 // private: const int MaxPath = 92;
155 // private: inline static const int MaxPath = 92;
156 (new Regex(@"(?<access>(private|protected|public): )?(const|static readonly)
157     ↳ (?<type>[a-zA-Z0-9]+) (?<name>[_a-zA-Z0-9]+) = (?<value>[~;\r\n]+);",
158     ↳ "${access}inline static const ${type} ${name} = ${value};", 0),
159 // ArgumentNotNull(EnsureAlwaysExtensionRoot root, TArgument argument) where
160     ↳ TArgument : class
161 // ArgumentNotNull(EnsureAlwaysExtensionRoot root, TArgument* argument)
162 (new Regex(@"(?<before> [a-zA-Z]+\((([a-zA-Z *],+ |)) (?<type>[a-zA-Z]+) (?<after>(
163     ↳ [a-zA-Z *],+)\))) [ \r\n]+where \k<type> : class)", "${before}${type}*${after}",
164     ↳ 0),
165 // protected: abstract TElement GetFirst();
166 // protected: virtual TElement GetFirst() = 0;
167 (new Regex(@"(?<access>(private|protected|public): )?abstract
168     ↳ (?<method>[~;\r\n]+);", "${access}virtual ${method} = 0;", 0),
169 // TElement GetFirst();
170 // virtual TElement GetFirst() = 0;
171 (new Regex(@"(?<before>[\r\n]+ [ ]+)(?<methodDeclaration>(?!return) [a-zA-Z0-9]+
172     ↳ [a-zA-Z0-9]+\(([\r\n]*\)) (?<after>[ ]*\r\n)"); "${before}virtual
173     ↳ ${methodDeclaration} = 0${after}", 1),
174 // protected: readonly TreeElement[] _elements;
175 // protected: TreeElement _elements[N];

```

```

142 (new Regex(@"(?<access>(private|protected|public): )?readonly
    ↳ (?<type>[a-zA-Z<>0-9]+)([\\[]+) (?<name>[_a-zA-Z0-9]+);"), "${access}${type}
    ↳ ${name}[N];", 0),
143 // protected: readonly TElement Zero;
144 // protected: TElement Zero;
145 (new Regex(@"(?<access>(private|protected|public): )?readonly
    ↳ (?<type>[a-zA-Z<>0-9]+) (?<name>[_a-zA-Z0-9]+);"), "${access}${type} ${name};",
    ↳ 0),
146 // internal
147 //
148 (new Regex(@"(\\W)internal\\s+"), "$1", 0),
149 // static void NotImplementedException(ThrowExtensionRoot root) => throw new
    ↳ NotImplementedException();
150 // static void NotImplementedException(ThrowExtensionRoot root) { return throw new
    ↳ NotImplementedException(); }
151 (new Regex(@"^(\\s+)(private|protected|public)?(: )?(template \\<[^\\r\\n]+\\> )?(static
    ↳ )?(override )?([a-zA-Z0-9]+
    ↳ )([a-zA-Z0-9]+)\\(((\\r\\n)*))\\s+=>\\s+throw([~;\\r\\n]+);"),
    ↳ "$1$2$3$4$5$6$7$8($9) { throw$10; }", 0),
152 // SizeBalancedTree(int capacity) => a = b;
153 // SizeBalancedTree(int capacity) { a = b; }
154 (new Regex(@"^(\\s+)(private|protected|public)?(: )?(template \\<[^\\r\\n]+\\> )?(static
    ↳ )?(override )?(void )?([a-zA-Z0-9]+)\\(((\\r\\n)*))\\s+=>\\s+([~;\\r\\n]+);"),
    ↳ "$1$2$3$4$5$6$7$8($9) { $10; }", 0),
155 // int SizeBalancedTree(int capacity) => a;
156 // int SizeBalancedTree(int capacity) { return a; }
157 (new Regex(@"^(\\s+)(private|protected|public)?(: )?(template \\<[^\\r\\n]+\\> )?(static
    ↳ )?(override )?([a-zA-Z0-9]+
    ↳ )([a-zA-Z0-9]+)\\(((\\r\\n)*))\\s+=>\\s+([~;\\r\\n]+);"), "$1$2$3$4$5$6$7$8($9) {
    ↳ return $10; }", 0),
158 // OnDispose = (manual, wasDisposed) =>
159 // OnDispose = [&](auto manual, auto wasDisposed)
160 (new Regex(@"(?<variable>[a-zA-Z_][a-zA-Z0-9_]*)(?<operator>\\s*\\+?=\\s*)\\(((?<firstArg_
    ↳ ument>[a-zA-Z_][a-zA-Z0-9_]*),
    ↳ (?<secondArgument>[a-zA-Z_][a-zA-Z0-9_]*))\\s*=>"),
    ↳ "${variable}${operator}[&](auto ${firstArgument}, auto ${secondArgument})", 0),
161 // () => Integer<TElement>.Zero,
162 // () { return Integer<TElement>.Zero; },
163 (new Regex(@"\\(\\)\\s+=>\\s+(?<expression>[~() ;\\r\\n]+(\\(((?<parenthesis>\\()|(?<-parent_
    ↳ hesis>\\))| [~() ;\\r\\n]*?)))*?\\[~() ;\\r\\n]*)(?<after>,|\\);)"), "()" { return
    ↳ ${expression}; }${after}", 0),
164 // ~DisposableBase() => Destruct();
165 // ~DisposableBase() { Destruct(); }
166 (new Regex(@"~(?<class>[a-zA-Z_][a-zA-Z0-9_]*)\\(\\)\\s+=>\\s+([~;\\r\\n]+?);"),
    ↳ "~${class}() { $1; }", 0),
167 // => Integer<TElement>.Zero;
168 // { return Integer<TElement>.Zero; }
169 (new Regex(@"\\)\\s+=>\\s+([~;\\r\\n]+?);"), ") { return $1; }", 0),
170 // () { return avlTree.Count; }
171 // [&]() -> auto { return avlTree.Count; }
172 (new Regex(@"(?<before>, |\\()\\(\\) { return (?<expression>[~;\\r\\n]+); }"),
    ↳ "${before}[&]() -> auto { return ${expression}; }", 0),
173 // Count => GetSizeOrZero(Root);
174 // Count() { return GetSizeOrZero(Root); }
175 (new Regex(@"(\\W)([A-Z][a-zA-Z]+)\\s+=>\\s+([~;\\r\\n]+);"), "$1$2() { return $3; }", 0),
176 // Insert scope borders.
177 // interface IDisposable { ... }
178 // interface IDisposable { /*~start~interface~IDisposable~*/ ...
    ↳ /*~end~interface~IDisposable~*/ }
179 (new Regex(@"(?<classDeclarationBegin>\\r?\\n(?<indent>[\\t ]*)interface[\\t
    ↳ ]*(?<type>[a-zA-Z_][a-zA-Z0-9_]*(\\<[^>\\n*>)? [~{}]*{)(?<middle>(\\.|\\n)*)(?<beforeE_
    ↳ nd>(?!<=\\r?\\n)\\k<indent>)(?<end>})"),
    ↳ "${classDeclarationBegin}/*~start~interface~${type}~*/${middle}${beforeEnd}/*~en_
    ↳ d~interface~${type}~*/${end}",
    ↳ 0),
180 // Inside the scope replace:
181 // /*~start~interface~IDisposable~*/ ... bool IsDisposed { get; } ...
    ↳ /*~end~interface~IDisposable~*/
182 // /*~start~interface~IDisposable~*/ ... virtual bool IsDisposed() = 0;
    ↳ /*~end~interface~IDisposable~*/
183 (new Regex(@"(?<before>(?<typeScopeStart>/\\*~start~interface~(?<type>[~^\\n\\*]+)~\\*/)
    ↳ (\\.|\\n)+)(?<propertyDeclaration>(?<access>(private|protected|public):
    ↳ )?(?<propertyType>[a-zA-Z_][a-zA-Z0-9_:<>]*)(?<property>[a-zA-Z_][a-zA-Z0-9_]*)
    ↳ (?<blockOpen>[\\n\\s]*{[\\n\\s]*)(\\[[^\\n]+\\][\\n\\s]*)?get;(?<blockClose>[\\n\\s]*)))(?<
    ↳ after>(\\.|\\n)+?(?<typeScopeEnd>/\\*~end~interface~\\k<type>~\\*/))"),
    ↳ "${before}virtual ${propertyType} ${property}() = 0;${after}", 20),

```

```

184 // Remove scope borders.
185 // /*~start~interface~IDisposable~*/
186 //
187 (new Regex(@"\/\~([~\*\n]+)(~[~\*\n]+)*~\/"), "", 0),
188 // public: T Object { get; }
189 // public: const T Object;
190 (new Regex(@"(?<before>[^\r]\r?\n[ \t]*) (?<access>(private|protected|public):
    → )?(?<type>[a-zA-Z_][a-zA-Z0-9_:<]*)
    → (?<property>[a-zA-Z_][a-zA-Z0-9_]*)(?<blockOpen>[\n\s]*{[\n\s]*}\([^\n]+\)[\n\s]
    → ]*)?get;(?<blockClose>[\n\s]*)(?<after>[\n\s]*)"), "${before}${access}const
    → ${type} ${property};${after}", 2),
191 // public: bool IsDisposed { get => _disposed > 0; }
192 // public: bool IsDisposed() { return _disposed > 0; }
193 (new Regex(@"(?<before>[^\r]\r?\n[ \t]*) (?<access>(private|protected|public):
    → )?(?<virtual>virtual )?bool
    → (?<property>[a-zA-Z_][a-zA-Z0-9_]*)(?<blockOpen>[\n\s]*{[\n\s]*}\([^\n]+\)[\n\s]
    → ]*)?get\s*=>\s*(?<expression>[^\n]+);(?<blockClose>[\n\s]*{[\n\s]*})",
    → "${before}${access}${virtual}bool ${property}() ${blockOpen}return
    → ${expression};${blockClose}", 2),
194 // protected: virtual std::string ObjectName { get => GetType().Name; }
195 // protected: virtual std::string ObjectName() { return GetType().Name; }
196 (new Regex(@"(?<before>[^\r]\r?\n[ \t]*) (?<access>(private|protected|public):
    → )?(?<virtual>virtual )?(?<type>[a-zA-Z_][a-zA-Z0-9_:<]*)
    → (?<property>[a-zA-Z_][a-zA-Z0-9_]*)(?<blockOpen>[\n\s]*{[\n\s]*}\([^\n]+\)[\n\s]
    → ]*)?get\s*=>\s*(?<expression>[^\n]+);(?<blockClose>[\n\s]*{[\n\s]*})",
    → "${before}${access}${virtual}${type} ${property}() ${blockOpen}return
    → ${expression};${blockClose}", 2),
197 // ArgumentInRange(string message) { string messageBuilder() { return message; }
198 // ArgumentInRange(string message) { auto messageBuilder = [&]() -> string { return
    → message; };
199 (new Regex(@"(?<before>\W[_a-zA-Z0-9]+\([^\n\)]*\)[\s\n]*{[\s\n]*([^\}]|\n)*?(\r?\n)
    → ?[ \t]*) (?<returnType>[_a-zA-Z0-9*:] +[_a-zA-Z0-9*:] *)
    → (?<methodName>[_a-zA-Z0-9]+\([^\n\)]*\)[\s\n]*{(?<body>("[^"]*\n|""|
    → [^])|\n)+?})"), "${before}auto ${methodName} = [&]() -> ${returnType}
    → {${body}};", 10),
200 // Func<TElement> treeCount
201 // std::function<TElement()> treeCount
202 (new Regex(@"Func<([a-zA-Z0-9]+)> ([a-zA-Z0-9]+)"), "std::function<$1()> $2", 0),
203 // Action<TElement> free
204 // std::function<void(TElement)> free
205 (new Regex(@"Action(<(?<typeParameters>[a-zA-Z0-9]+(,
    → ([a-zA-Z0-9]+))*>)?(?<after>>| (?<variable>[a-zA-Z0-9]+))"),
    → "std::function<void(${typeParameters})>${after}", 0),
206 // Predicate<TArgument> predicate
207 // std::function<bool(TArgument)> predicate
208 (new Regex(@"Predicate<([a-zA-Z0-9]+)> ([a-zA-Z0-9]+)"), "std::function<bool($1)>
    → $2", 0),
209 // var
210 // auto
211 (new Regex(@"(\W)var(\W)"), "$1auto$2", 0),
212 // unchecked
213 //
214 (new Regex(@"[\r\n]{2}\s*unchecked\s*${$}"), "", 0),
215 // throw new
216 // throw
217 (new Regex(@"(\W)throw new(\W)"), "$1throw$2", 0),
218 // void RaiseExceptionIgnoredEvent(Exception exception)
219 // void RaiseExceptionIgnoredEvent(const std::exception& exception)
220 (new Regex(@"(\\(| ) (System\\.Exception|Exception) (|\\))"), "$1const
    → std::exception&$3", 0),
221 // EventHandler<Exception>
222 // EventHandler<std::exception>
223 (new Regex(@"(\\W) (System\\.Exception|Exception) (\\W)"), "$1std::exception$3", 0),
224 // override void PrintNode(TElement node, StringBuilder sb, int level)
225 // void PrintNode(TElement node, StringBuilder sb, int level) override
226 (new Regex(@"override ([a-zA-Z0-9 \*+]+)(\\([^\r\n]+?\\))"), "$1$2 override", 0),
227 // return (range.Minimum, range.Maximum)
228 // return {range.Minimum, range.Maximum}
229 (new Regex(@"(?<before>return\s*)\\((?<values>[^\n]+)\\)(?!\\)(?<after>\\W)",
    → "${before}${values}${after}", 0),
230 // string
231 // std::string
232 (new Regex(@"(?<before>\\W)(?!::)string(?<after>\\W)"),
    → "${before}std::string${after}", 0),
233 // System.ValueTuple
234 // std::tuple

```

```

235 (new Regex(@"(?<before>\W) (System\.)?ValueTuple(?:\s*=\|() (?<after>\W)"),
    ↪ "${before}std::tuple${after}", 0),
236 // sbyte
237 // std::int8_t
238 (new Regex(@"(?<before>\W) ((System\.)?SB|sb)yte(?:\s*=\|() (?<after>\W)"),
    ↪ "${before}std::int8_t${after}", 0),
239 // short
240 // std::int16_t
241 (new Regex(@"(?<before>\W) ((System\.)?Int16|short) (?:\s*=\|() (?<after>\W)"),
    ↪ "${before}std::int16_t${after}", 0),
242 // int
243 // std::int32_t
244 (new Regex(@"(?<before>\W) ((System\.)?I|i)nt(32)?(?:\s*=\|() (?<after>\W)"),
    ↪ "${before}std::int32_t${after}", 0),
245 // long
246 // std::int64_t
247 (new Regex(@"(?<before>\W) ((System\.)?Int64|long) (?:\s*=\|() (?<after>\W)"),
    ↪ "${before}std::int64_t${after}", 0),
248 // byte
249 // std::uint8_t
250 (new Regex(@"(?<before>\W) ((System\.)?Byte|byte) (?:\s*=\|() (?<after>\W)"),
    ↪ "${before}std::uint8_t${after}", 0),
251 // ushort
252 // std::uint16_t
253 (new Regex(@"(?<before>\W) ((System\.)?UInt16|ushort) (?:\s*=\|() (?<after>\W)"),
    ↪ "${before}std::uint16_t${after}", 0),
254 // uint
255 // std::uint32_t
256 (new Regex(@"(?<before>\W) ((System\.)?UI|ui)nt(32)?(?:\s*=\|() (?<after>\W)"),
    ↪ "${before}std::uint32_t${after}", 0),
257 // ulong
258 // std::uint64_t
259 (new Regex(@"(?<before>\W) ((System\.)?UInt64|ulong) (?:\s*=\|() (?<after>\W)"),
    ↪ "${before}std::uint64_t${after}", 0),
260 // char*[] args
261 // char* args[]
262 (new Regex(@"([_a-zA-Z0-9:~?]\[\] ([a-zA-Z0-9]+)", "$1 $2[]", 0),
263 // float.MinValue
264 // std::numeric_limits<float>::lowest()
265 (new Regex(@"(?<before>\W) (?<type>std::[a-z0-9_]+|float|double)\.MinValue(?<after>\W)
    ↪ )"), "${before}std::numeric_limits<${type}>::lowest()${after}",
    ↪ 0),
266 // double.MaxValue
267 // std::numeric_limits<float>::max()
268 (new Regex(@"(?<before>\W) (?<type>std::[a-z0-9_]+|float|double)\.MaxValue(?<after>\W)
    ↪ )"), "${before}std::numeric_limits<${type}>::max()${after}",
    ↪ 0),
269 // using Platform.Numbers;
270 //
271 (new Regex(@"([\r\n]{2}|~)\s*using [\a-zA-Z0-9+;\s*?${})", "", 0),
272 // class SizedBinaryTreeMethodsBase : GenericCollectionMethodsBase
273 // class SizedBinaryTreeMethodsBase : public GenericCollectionMethodsBase
274 (new Regex(@"(struct|class) ([a-zA-Z0-9]+)(<[a-zA-Z0-9 ,]+>)? : ([a-zA-Z0-9]+)",
    ↪ "$1 $2$3 : public $4", 0),
275 // System.IDisposable
276 // System::IDisposable
277 (new Regex(@"(?<before>System(?:[a-zA-Z_]\w*)*)\. (?<after>[a-zA-Z_]\w*)",
    ↪ "${before}::${after}", 20),
278 // class IProperty : ISetter<TValue, TObject>, IProvider<TValue, TObject>
279 // class IProperty : public ISetter<TValue, TObject>, public IProvider<TValue,
    ↪ TObject>
280 (new Regex(@"(?<before>(interface|struct|class) [a-zA-Z_]\w* : ((public
    ↪ [a-zA-Z_]\w*:(<[a-zA-Z0-9 ,]+>)?,
    ↪ )+)?(?<inheritedType>(?!public)[a-zA-Z_]\w*:(<[a-zA-Z0-9 ,]+>)?(?<after>(,
    ↪ [a-zA-Z_]\w*:(!>)|[\r\n]+))", "${before}public ${inheritedType}${after}",
    ↪ 10),
281 // interface IDisposable {
282 // class IDisposable { public:
283 (new Regex(@"(?<before>\r?\n) (?<indent>[ \t]*)interface
    ↪ (?<interface>[a-zA-Z_]\w*) (?<typeDefinitionEnding>[~{+]){",
    ↪ "${before}${indent}class ${interface}${typeDefinitionEnding}{ " +
    ↪ Environment.NewLine + " public:", 0),
284 // struct TreeElement { }
285 // struct TreeElement { };
286 (new Regex(@"(struct|class) ([a-zA-Z0-9]+) (\s+){([\sa-zA-Z0-9;:_]+?)}([~;])", "$1
    ↪ $2$3{$4};$5", 0),

```

```

287 // class Program { }
288 // class Program { };
289 (new Regex(@"(?<type>struct|class)
→ (?<name>[a-zA-Z0-9]+[^\r\n]*) (?<beforeBody>[\r\n]+(?<indentLevel>[t
→ ]*))\{ (?<body>[\\s]+?[\r\n]+\k<indentLevel>\} (?<afterBody>[;]|$)", "${type}
→ ${name}${beforeBody}${body}${afterBody}", 0),
290 // Insert scope borders.
291 // ref TElement root
292 // ~!root!~ref TElement root
293 (new Regex(@"(?<definition>(?!<pointer>[a-zA-Z0-9]+| [a-zA-Z0-9]+(?<ref>))
→ (?<variable>[a-zA-Z0-9]+)(?=\)|,| =)")), "~!${variable}!~${definition}", 0),
294 // Inside the scope of ~!root!~ replace:
295 // root
296 // *root
297 (new Regex(@"(?<definition>~!(?<pointer>[a-zA-Z0-9]+)!~ref [a-zA-Z0-9]+
→ \k<pointer>(?!<ref>)|,| =) (?<before>((?!~!<pointer>!) (.\n))*?) (?<prefix>(\W
→ | \() \k<pointer> (?<suffix> ( | \)| ; | , ))")),
→ "${definition}${before}${prefix}*${pointer}${suffix}", 70),
298 // Remove scope borders.
299 // ~!root!~
300 //
301 (new Regex(@"~!(?<pointer>[a-zA-Z0-9]+)!~"), "", 5),
302 // ref auto root = ref
303 // ref auto root =
304 (new Regex(@"ref ([a-zA-Z0-9]+) ([a-zA-Z0-9]+) = ref(\W)"), "$1* $2 =$3", 0),
305 // *root = ref left;
306 // root = left;
307 (new Regex(@"\*([a-zA-Z0-9]+) = ref ([a-zA-Z0-9]+)(\W)"), "$1 = $2$3", 0),
308 // (ref left)
309 // (left)
310 (new Regex(@"\ (ref ([a-zA-Z0-9]+) (\)| \(|,))"), "($1$2", 0),
311 // ref TElement
312 // TElement*
313 (new Regex(@"( | \() ref ([a-zA-Z0-9]+) "), "$1$2* ", 0),
314 // ref sizeBalancedTree.Root
315 // &sizeBalancedTree->Root
316 (new Regex(@"ref ([a-zA-Z0-9]+) \. ([a-zA-Z0-9\*]+)"), "&$1->$2", 0),
317 // ref GetElement(node).Right
318 // &GetElement(node)->Right
319 (new Regex(@"ref ([a-zA-Z0-9]+) \ ( ([a-zA-Z0-9\*]+) ) \. ([a-zA-Z0-9]+)"),
→ "&$1($2)->$3", 0),
320 // GetElement(node).Right
321 // GetElement(node)->Right
322 (new Regex(@"([a-zA-Z0-9]+) \ ( ([a-zA-Z0-9\*]+) ) \. ([a-zA-Z0-9]+)"), "$1($2)->$3", 0),
323 // [Fact] \npublic: static void SizeBalancedTreeMultipleAttachAndDetachTest()
324 // public: TEST_METHOD(SizeBalancedTreeMultipleAttachAndDetachTest)
325 (new Regex(@"\[Fact\] \[s\n]+(public:)?(static)?void ([a-zA-Z0-9]+) \ ( \)"), "public:
→ TEST_METHOD($3)", 0),
326 // class TreesTests
327 // TEST_CLASS(TreesTests)
328 (new Regex(@"class ([a-zA-Z0-9]+Tests)"), "TEST_CLASS($1)", 0),
329 // Assert.Equal
330 // Assert::AreEqual
331 (new Regex(@"(?<type>Assert) \. (?<method>(Not)?Equal)"), "${type}::Are${method}", 0),
332 // Assert.Throws
333 // Assert::ExpectException
334 (new Regex(@"(Assert) \. Throws"), "$1::ExpectException", 0),
335 // Assert.True
336 // Assert::IsTrue
337 (new Regex(@"(Assert) \. (True|False)"), "$1::Is$2", 0),
338 // $"Argument {argumentName} is null."
339 // std::string("Argument
→ ").append(Platform::Converters::To<std::string>(argumentName)).append(" is
→ null.")
340 (new Regex(@"\$"" (?<left>(\\" | [^""\r\n])*) { (?<expression>[_a-zA-Z0-9]+) } { (?<right>(\\"
→ | "" | [^""\r\n])*) """,
→ "std::string(\$\"${left}\").append(Platform::Converters::To<std::string>(${expres
→ sion})).append(\"${right}\")",
→ 10),
341 // $"
342 // "
343 (new Regex(@"\$"""), "\"", 0),
344 // std::string(std::string("[").append(Platform::Converters::To<std::string>(Minimum
→ )), append("
→ ").append(Platform::Converters::To<std::string>(Maximum)).append("]")
345 // std::string("[").append(Platform::Converters::To<std::string>(Minimum)).append("
→ ").append(Platform::Converters::To<std::string>(Maximum)).append("]")

```



```

346 (new Regex(@"std::string\((?<begin>std::string\(\"\"\\\"|\"\"[^\"]*)\"\"\\)\.append\((Platf
    ↪ orm::Converters::To<std::string>\([^\n]+\)|[^\n]+\))\)\.append\"),
    ↪ \"${begin}.append\", 10),
347 // Console.WriteLine(\"...\")
348 // printf(\"...\n\")
349 (new Regex(@"Console.WriteLine\(\"\"([^\r\n]+)\"\"\\)\", "printf(\"$1\\n\\n\")", 0),
350 // TElement Root;
351 // TElement Root = 0;
352 (new Regex(@"(?<before>\r?\n[\t ]+)(?<access>(private|protected|public)(:
    ↪ )?)?(?<type>[a-zA-Z0-9:~_]+(?<!return)) (?<name>[_a-zA-Z0-9~_]+);\"),
    ↪ \"${before}${access}${type} ${name} = 0;\", 0),
353 // TreeElement _elements[N];
354 // TreeElement _elements[N] = { {0} };
355 (new Regex(@"(\r?\n[\t ]+)(private|protected|public)?(: )?([a-zA-Z0-9~_]+)
    ↪ ([_a-zA-Z0-9~_]+)\[([_a-zA-Z0-9~_]+)\];\"), \"$1$2$3$4 $5[$6] = { {0} };\", 0),
356 // auto path = new TElement[MaxPath];
357 // TElement path[MaxPath] = { {0} };
358 (new Regex(@"(\r?\n[\t ]+)[a-zA-Z0-9~_]+ ([a-zA-Z0-9~_]+) = new
    ↪ ([a-zA-Z0-9~_]+)\[([_a-zA-Z0-9~_]+)\];\"), \"$1$3 $2[$4] = { {0} };\", 0),
359 // bool Equals(Range<T> other) { ... }
360 // bool operator ==(const Key &other) const { ... }
361 (new Regex(@"(?<before>\r?\n[^\n]+bool )Equals\((?<type>[^\n~]+)
    ↪ (?<variable>[_a-zA-Z0-9~_]+)\)(?<after>(\s|\\n)*{)\"), \"${before}operator ==(const
    ↪ ${type} &${variable}) const${after}\", 0),
362 // Insert scope borders.
363 // class Range { ... public: override std::string ToString() { return ...; }
364 // class Range { /*~Range<T>~*/ ... public: override std::string ToString() { return
    ↪ ...; } }
365 (new Regex(@"(?<classDeclarationBegin>\r?\n(?<indent>[\t ]*)template <typename
    ↪ (?<typeParameter>[^\n~>]+) > (struct|class)
    ↪ (?<type>[_a-zA-Z0-9~_]+< <typeParameter>)> (\s*: \s*[^\n~]+)?[\t ]*(\r?\n)?[\t
    ↪ ]*(?<middle>((?!class|struct)\.|\n)+?) (?<toStringDeclaration>(?(<access>(private|
    ↪ protected|public): )override std::string ToString\(\)\")\",
    ↪ \"${classDeclarationBegin}/*~${type}~*/${middle}${toStringDeclaration}\", 0),
366 // Inside the scope of ~!Range!~ replace:
367 // public: override std::string ToString() { return ...; }
368 // public: operator std::string() const { return ...; } \n\npublic: friend
    ↪ std::ostream & operator <<(std::ostream &out, const A &obj) { return out <<
    ↪ (std::string)obj; } }
369 (new Regex(@"(?<scope>\/\s*(?<type>[_a-zA-Z0-9~_]+)~\s*(\/) (?<separator>.\n) (?<before>
    ↪ ((?!\/\s*~\k<type>~\s*(\/))(\.|\n))*?) (?<toStringDeclaration>\r?\n(?<indent>[
    ↪ \t]*) (?<access>(private|protected|public): )override std::string ToString\(\)
    ↪ (?<toStringMethodBody>{[^\n~]+})\"), \"${scope}${separator}${before}\" +
    ↪ Environment.NewLine + \"${indent}${access}operator std::string() const
    ↪ ${toStringMethodBody}\" + Environment.NewLine + Environment.NewLine +
    ↪ \"${indent}${access}friend std::ostream & operator <<(std::ostream &out, const
    ↪ ${type} &obj) { return out << (std::string)obj; }\", 0),
370 // Remove scope borders.
371 // /*~Range~*/
372 //
373 (new Regex(@"\/\s*~[_a-zA-Z0-9~_]+~\s*(\/)\", \"\", 0),
374 // private: inline static ConcurrentBag<std::exception> _exceptionsBag;
375 // private: inline static std::mutex _exceptionsBag_mutex; \n\n private: inline
    ↪ static std::vector<std::exception> _exceptionsBag;
376 (new Regex(@"(?<begin>\r?\n?(?<indent>[\t ]+)) (?<access>(private|protected|public):
    ↪ )?inline static ConcurrentBag<(?(<argumentType>[^\r\n~]+)>
    ↪ (?<name>[_a-zA-Z0-9~_]+);\"), \"${begin}private: inline static std::mutex
    ↪ ${name}_mutex;\" + Environment.NewLine + Environment.NewLine +
    ↪ \"${indent}${access}inline static std::vector<${argumentType}> ${name};\", 0),
377 // public: static IReadOnlyCollection<std::exception> GetCollectedExceptions() {
    ↪ return _exceptionsBag; }
378 // public: static std::vector<std::exception> GetCollectedExceptions() { return
    ↪ std::vector<std::exception>(_exceptionsBag); }
379 (new Regex(@"(?<access>(private|protected|public): )?static
    ↪ IReadOnlyCollection<(?(<argumentType>[^\r\n~]+)> (?<methodName>[_a-zA-Z0-9~_]+)\(\)
    ↪ { return (?<fieldName>[_a-zA-Z0-9~_]+); }\"), \"${access}static
    ↪ std::vector<${argumentType}> ${methodName}() { return
    ↪ std::vector<${argumentType}>(${fieldName}); }\", 0),
380 // public: static event EventHandler<std::exception> ExceptionIgnored =
    ↪ OnExceptionIgnored; ... };
381 // ... public: static inline Platform::Delegates::MulticastDelegate<void(void*,
    ↪ const std::exception&> ExceptionIgnored = OnExceptionIgnored; };

```



```

382 (new Regex(@"(?<begin>\r?\n(\r?\n)?(?<halfIndent>[
    ↳ \t]+)\k<halfIndent>)(?<access>(private|protected|public): )?static event
    ↳ EventHandler<(?<argumentType>[~;\r\n]+)> (?<name>[_a-zA-Z0-9]+) = (?<defaultDele
    ↳ gate>[_a-zA-Z0-9]+);(?<middle>(.\n)+?)(?<end>\r?\n\k<halfIndent>});")],
    ↳ "${middle}" + Environment.NewLine + Environment.NewLine +
    ↳ "${halfIndent}${halfIndent}${access}static inline
    ↳ Platform::Delegates::MulticastDelegate<void(void*, const ${argumentType}&)>
    ↳ ${name} = ${defaultDelegate};${end}", 0),
383 // public: event Disposal OnDispose;
384 // public: Platform::Delegates::MulticastDelegate<Disposal> OnDispose;
385 (new Regex(@"(?<begin>(?<access>(private|protected|public): )?(static )?)event
    ↳ (?<type>[_a-zA-Z][:_a-zA-Z0-9]+) (?<name>[_a-zA-Z][:_a-zA-Z0-9]+);"),
    ↳ "${begin}Platform::Delegates::MulticastDelegate<${type}> ${name};", 0),
386 // Insert scope borders.
387 // class IgnoredExceptions { ... private: inline static std::vector<std::exception>
    ↳ _exceptionsBag;
388 // class IgnoredExceptions {/*~_exceptionsBag~*/ ... private: inline static
    ↳ std::vector<std::exception> _exceptionsBag;
389 (new Regex(@"(?<classDeclarationBegin>\r?\n(?<indent>[\t ]*)class [^{\r\n}]+\r\n[\t
    ↳ ]*(?<middle>((?!class).\n)+?)(?<vectorFieldDeclaration>(?<access>(private|pro
    ↳ tected|public): )inline static std::vector<(?<argumentType>[~;\r\n]+)>
    ↳ (?<fieldName>[_a-zA-Z0-9]+);)"),
    ↳ "${classDeclarationBegin}/*~${fieldName}~*/${middle}${vectorFieldDeclaration}",
    ↳ 0),
390 // Inside the scope of ~!_exceptionsBag!~ replace:
391 // _exceptionsBag.Add(exception);
392 // _exceptionsBag.push_back(exception);
393 (new Regex(@"(?<scope>\/\~(?<fieldName>[_a-zA-Z0-9]+)\~\/)(?<separator>.\n)(?<befor
    ↳ e>((?!\/\~\k<fieldName>\~\/)(.\n))*?)\k<fieldName>\.Add"),
    ↳ "${scope}${separator}${before}${fieldName}.push_back", 10),
394 // Remove scope borders.
395 // /*~_exceptionsBag~*/
396 //
397 (new Regex(@"\/\~[_a-zA-Z0-9]+\~\/"), "", 0),
398 // Insert scope borders.
399 // class IgnoredExceptions { ... private: static std::mutex _exceptionsBag_mutex;
400 // class IgnoredExceptions {/*~_exceptionsBag~*/ ... private: static std::mutex
    ↳ _exceptionsBag_mutex;
401 (new Regex(@"(?<classDeclarationBegin>\r?\n(?<indent>[\t ]*)class [^{\r\n}]+\r\n[\t
    ↳ ]*(?<middle>((?!class).\n)+?)(?<mutexDeclaration>private: inline static
    ↳ std::mutex (?<fieldName>[_a-zA-Z0-9]+)_mutex;")],
    ↳ "${classDeclarationBegin}/*~${fieldName}~*/${middle}${mutexDeclaration}", 0),
402 // Inside the scope of ~!_exceptionsBag!~ replace:
403 // return std::vector<std::exception>(_exceptionsBag);
404 // std::lock_guard<std::mutex> guard(_exceptionsBag_mutex); return
    ↳ std::vector<std::exception>(_exceptionsBag);
405 (new Regex(@"(?<scope>\/\~(?<fieldName>[_a-zA-Z0-9]+)\~\/)(?<separator>.\n)(?<befor
    ↳ e>((?!\/\~\k<fieldName>\~\/)(.\n))*?){(?<after>((?!lock_guard)[^{};\r\n])*\k<f
    ↳ ieldName>[~;}\r\n]*);)"), "${scope}${separator}${before}{
    ↳ std::lock_guard<std::mutex> guard(${fieldName}_mutex);${after}", 10),
406 // Inside the scope of ~!_exceptionsBag!~ replace:
407 // _exceptionsBag.Add(exception);
408 // std::lock_guard<std::mutex> guard(_exceptionsBag_mutex); \r\n
    ↳ _exceptionsBag.Add(exception);
409 (new Regex(@"(?<scope>\/\~(?<fieldName>[_a-zA-Z0-9]+)\~\/)(?<separator>.\n)(?<befor
    ↳ e>((?!\/\~\k<fieldName>\~\/)(.\n))*?){(?<after>((?!lock_guard)([~{};]|\\n))*?\r
    ↳ ?\n(?<indent>[\t ]*)\k<fieldName>[~;}\r\n]*);)"),
    ↳ "${scope}${separator}${before}{
    ↳ "${indent}std::lock_guard<std::mutex> guard(${fieldName}_mutex);${after}", 10),
410 // Remove scope borders.
411 // /*~_exceptionsBag~*/
412 //
413 (new Regex(@"\/\~[_a-zA-Z0-9]+\~\/"), "", 0),
414 // Insert scope borders.
415 // class IgnoredExceptions { ... public: static inline
    ↳ Platform::Delegates::MulticastDelegate<void(void*, const std::exception&)>
    ↳ ExceptionIgnored = OnExceptionIgnored;
416 // class IgnoredExceptions {/*~ExceptionIgnored~*/ ... public: static inline
    ↳ Platform::Delegates::MulticastDelegate<void(void*, const std::exception&)>
    ↳ ExceptionIgnored = OnExceptionIgnored;
417 (new Regex(@"(?<classDeclarationBegin>\r?\n(?<indent>[\t ]*)class [^{\r\n}]+\r\n[\t
    ↳ ]*(?<middle>((?!class).\n)+?)(?<eventDeclaration>(?<access>(private|protected
    ↳ |public): )static inline
    ↳ Platform::Delegates::MulticastDelegate<(?<argumentType>[~;\r\n]+)>
    ↳ (?<name>[_a-zA-Z0-9]+) = (?<defaultDelegate>[_a-zA-Z0-9]+);)"),
    ↳ "${classDeclarationBegin}/*~${name}~*/${middle}${eventDeclaration}", 0),

```

```

418 // Inside the scope of ~!ExceptionIgnored!~ replace:
419 // ExceptionIgnored.Invoke(NULL, exception);
420 // ExceptionIgnored(NULL, exception);
421 (new Regex(@"(?<scope>/\*~(?<eventName>[a-zA-Z0-9]+)~\*/)(?<separator>.\|\n)(?<before>
→ >((?!/\*~\k<eventName>~\*/)(.\|\n))*?)\k<eventName>\.Invoke"),
→ "${scope}${separator}${before}${eventName}", 10),
422 // Remove scope borders.
423 // /*~ExceptionIgnored~*/
424 //
425 (new Regex(@"/*~[a-zA-Z0-9]+~\*/"), "", 0),
426 // Insert scope borders.
427 // auto added = new StringBuilder();
428 // /*~sb~*/std::string added;
429 (new Regex(@"(auto|(System\.Text\.)?StringBuilder) (?<variable>[a-zA-Z0-9]+) = new
→ (System\.Text\.)?StringBuilder\(\);", "/*~${variable}~*/std::string
→ ${variable}";", 0),
430 // static void Indent(StringBuilder sb, int level)
431 // static void Indent(/*~sb~*/StringBuilder sb, int level)
432 (new Regex(@"(?<start>, \|)(System\.Text\.)?StringBuilder
→ (?<variable>[a-zA-Z0-9]+)(?<end>, \|))", "${start}/*~${variable}~*/std::string&
→ ${variable}${end}", 0),
433 // Inside the scope of ~!added!~ replace:
434 // sb.ToString()
435 // sb
436 (new Regex(@"(?<scope>/\*~(?<variable>[a-zA-Z0-9]+)~\*/)(?<separator>.\|\n)(?<before>
→ ((?!/\*~\k<variable>~\*/)(.\|\n))*?)\k<variable>\.ToString\(\)"),
→ "${scope}${separator}${before}${variable}", 10),
437 // sb.AppendLine(argument)
438 // sb.append(Platform::Converters::To<std::string>(argument)).append(1, '\n')
439 (new Regex(@"(?<scope>/\*~(?<variable>[a-zA-Z0-9]+)~\*/)(?<separator>.\|\n)(?<before>
→ ((?!/\*~\k<variable>~\*/)(.\|\n))*?)\k<variable>\.AppendLine\((?<argument>[^\],\|
→ r\n]+)\)"),
→ "${scope}${separator}${before}${variable}.append(Platform::Converters::To<std::s
→ tring>(${argument})).append(1, '\\n')",
→ 10),
440 // sb.Append('\t', level);
441 // sb.append(level, '\t');
442 (new Regex(@"(?<scope>/\*~(?<variable>[a-zA-Z0-9]+)~\*/)(?<separator>.\|\n)(?<before>
→ ((?!/\*~\k<variable>~\*/)(.\|\n))*?)\k<variable>\.Append\('(?(character>[^\r\n]
→ +)', (?<count>[^\],\r\n]+)\)"),
→ "${scope}${separator}${before}${variable}.append(${count}, '${character}'))", 10),
443 // sb.Append(argument)
444 // sb.append(Platform::Converters::To<std::string>(argument))
445 (new Regex(@"(?<scope>/\*~(?<variable>[a-zA-Z0-9]+)~\*/)(?<separator>.\|\n)(?<before>
→ ((?!/\*~\k<variable>~\*/)(.\|\n))*?)\k<variable>\.Append\((?<argument>[^\],\r\n]
→ +)\)"),
→ "${scope}${separator}${before}${variable}.append(Platform::Converters::To<std::s
→ tring>(${argument}))",
→ 10),
446 // Remove scope borders.
447 // /*~sb~*/
448 //
449 (new Regex(@"/*~[a-zA-Z0-9]+~\*/"), "", 0),
450 // Insert scope borders.
451 // auto added = new HashSet<TElement>();
452 // ~!added!~std::unordered_set<TElement> added;
453 (new Regex(@"auto (?<variable>[a-zA-Z0-9]+) = new
→ HashSet<(?<element>[a-zA-Z0-9]+)>\(\);",
→ "/*~${variable}!~std::unordered_set<${element}> ${variable}";", 0),
454 // Inside the scope of ~!added!~ replace:
455 // added.Add(node)
456 // added.insert(node)
457 (new Regex(@"(?<scope>~!(?<variable>[a-zA-Z0-9]+)!~)(?<separator>.\|\n)(?<before>((?<
→ !~!\k<variable>!~)(.\|\n))*?)\k<variable>\.Add\((?<argument>[a-zA-Z0-9]+)\)"),
→ "${scope}${separator}${before}${variable}.insert(${argument})", 10),
458 // Inside the scope of ~!added!~ replace:
459 // added.Remove(node)
460 // added.erase(node)
461 (new Regex(@"(?<scope>~!(?<variable>[a-zA-Z0-9]+)!~)(?<separator>.\|\n)(?<before>((?<
→ !~!\k<variable>!~)(.\|\n))*?)\k<variable>\.Remove\((?<argument>[a-zA-Z0-9]+)\)"),
→ "${scope}${separator}${before}${variable}.erase(${argument})", 10),
462 // if (added.insert(node)) {
463 // if (!added.contains(node)) { added.insert(node);

```

```

(new Regex(@"if \((?<variable>[a-zA-Z0-9]+)\.insert\((?<argument>[a-zA-Z0-9]+)\)\)(?
    <separator>[\t ]*[\r\n]+)(?<indent>[\t ]*){", "if
    → (!${variable}.contains(${argument}))${separator}${indent}{ " +
    → Environment.NewLine + "${indent}    ${variable}.insert(${argument});", 0),
// Remove scope borders.
// ~!added!~
//
(new Regex(@"~![a-zA-Z0-9]+!~"), "", 5),
// Insert scope borders.
// auto random = new System::Random(0);
// std::srand(0);
(new Regex(@"[a-zA-Z0-9\.] + ([a-zA-Z0-9]+) = new
    → (System::)?Random\((([a-zA-Z0-9]+)\);", "~!$1!~std::srand($3);", 0),
// Inside the scope of ~!random!~ replace:
// random.Next(1, N)
// (std::rand() % N) + 1
(new Regex(@"(?<scope>~!(?<variable>[a-zA-Z0-9]+)!~)(?<separator>[.\n])(?<before>((?<
    → !~!\k<variable>!~)([.\n])*)\k<variable>\.Next\((?<from>[a-zA-Z0-9]+),
    → (?<to>[a-zA-Z0-9]+)\)", "${scope}${separator}${before}(std::rand() % ${to}) +
    → ${from}", 10),
// Remove scope borders.
// ~!random!~
//
(new Regex(@"~![a-zA-Z0-9]+!~"), "", 5),
// Insert method body scope starts.
// void PrintNodes(TElement node, StringBuilder sb, int level) {
// void PrintNodes(TElement node, StringBuilder sb, int level) { /*method-start*/
(new Regex(@"(?<start>\r?\n[\t ]*)(?<prefix>((private|protected|public): )?(virtual
    → )?[a-zA-Z0-9:_]+
    → )?(?<method>[a-zA-Z][a-zA-Z0-9_]*)((?<arguments>[^\)]*)\)(?<override>(
    → override)?)(?<separator>[\t\r\n]*)\{(?<end>[~])\"", "${start}${prefix}${method}
    → (${arguments})${override}${separator}{ /*method-start*/${end}",
    → 0),
// Insert method body scope ends.
// { /*method-start*/...}
// { /*method-start*/.../*method-end*/}
(new Regex(@"{ /*method-start*/(?<body>((?<bracket>\{) | (?<-bracket>\}) | [^\{\}])*)+ )
    → \}", "{ /*method-start*/${body}/*method-end*/}",
    → 0),
// Inside method bodies replace:
// GetFirst(
// this->GetFirst(
(new
    → Regex(@"(?<scope> /*method-start*/)(?<before>((?! /*method-end*/)([.\n])*)?(?
    → <separator>[\\W](?! (:|\\.|.->|throw\\s+)))(?<method>(?! sizeof) [a-zA-Z0-9]+)((?! \\
    → \{)(?<after>([.\n])*)?(?<scopeEnd> /*method-end*/)",
    → "${scope}${before}${separator}this->${method}(${after}${scopeEnd}", 100),
// Remove scope borders.
// /*method-start*/
//
(new Regex(@" /*method-(start|end)\\*/"), "", 0),
// Insert scope borders.
// const std::exception& ex
// const std::exception& ex/*~ex~*/
(new Regex(@"(?<before>\\(| )(?<variableDefinition>(const )?(std::)?exception&?
    → (?<variable>[_a-zA-Z0-9]+))(?<after>\\W)",
    → "${before}${variableDefinition}/*~${variable}~*/${after}", 0),
// Inside the scope of ~!ex!~ replace:
// ex.Message
// ex.what()
(new Regex(@"(?<scope> /*~(?<variable>[_a-zA-Z0-9]+)~\\*/)(?<separator>[.\n])(?<before>
    → >((?! /*~\k<variable>~\\*/)([.\n])*)?(Platform::Converters::To<std::string>\\(\k<
    → variable>\\.Message\\) | \k<variable>\\.Message)",
    → "${scope}${separator}${before}${variable}.what()", 10),
// Remove scope borders.
// /*~ex~*/
//
(new Regex(@" /*~[_a-zA-Z0-9]+~\\*/"), "", 0),
// throw ObjectDisposedException(objectName, message);
// throw std::runtime_error(std::string("Attempt to access disposed object
    → ").append(objectName).append(": ").append(message).append("."));
(new Regex(@"throw ObjectDisposedException\\((?<objectName>[a-zA-Z_][a-zA-Z0-9_]*),
    → (?<message>[a-zA-Z0-9_]*[Mm]essage[a-zA-Z0-9_]*\\(\\)?| [a-zA-Z_][a-zA-Z0-9_]*\\)
    → );", "throw std::runtime_error(std::string(\"Attempt to access disposed object
    → [\\]).append(${objectName}).append(\\"): \").append(${message}).append(\\\".\")\"; ",
    → 0),

```

```

512 // throw ArgumentNullException(argumentName, message);
513 // throw std::invalid_argument(std::string("Argument
514 → ").append(argumentName).append(" is null: ").append(message).append("."));
515 (new Regex(@"throw
516 → ArgumentNullException\((?<argument>[a-zA-Z]*[Aa]rgument[a-zA-Z]*),
517 → (?<message>[a-zA-Z]*[Mm]essage[a-zA-Z]*(\(\))?\)", "throw
518 → std::invalid_argument(std::string(\"Argument \").append(${argument}).append(\"
519 → is null: \").append(${message}).append(\".\"));", 0),
520 // throw ArgumentException(message, argumentName);
521 // throw std::invalid_argument(std::string("Invalid ").append(argumentName).append("
522 → argument: ").append(message).append("."));
523 (new Regex(@"throw
524 → ArgumentException\((?<message>[a-zA-Z]*[Mm]essage[a-zA-Z]*(\(\))?),
525 → (?<argument>[a-zA-Z]*[Aa]rgument[a-zA-Z]*\)", "throw
526 → std::invalid_argument(std::string(\"Invalid \").append(${argument}).append(\"
527 → argument: \").append(${message}).append(\".\"));", 0),
528 // throw ArgumentOutOfRangeException(argumentName, argumentValue, messageBuilder());
529 // throw std::invalid_argument(std::string("Value
530 → [").append(Platform::Converters::To<std::string>(argumentValue)).append("] of
531 → argument [").append(argumentName).append("] is out of range:
532 → ").append(messageBuilder()).append("."));
533 (new Regex(@"throw ArgumentOutOfRangeException\((?<argument>[a-zA-Z]*[Aa]rgument[a-z
534 → A-Z]*([Nn]ame[a-zA-Z]*)?),
535 → (?<argumentValue>[a-zA-Z]*[Aa]rgument[a-zA-Z]*([Vv]alue[a-zA-Z]*)?),
536 → (?<message>[a-zA-Z]*[Mm]essage[a-zA-Z]*(\(\))?\)", "throw
537 → std::invalid_argument(std::string(\"Value
538 → [").append(Platform::Converters::To<std::string>(${argumentValue})).append(\"
539 → of argument [").append(${argument}).append(\"] is out of range:
540 → \").append(${message}).append(\".\"));", 0),
541 // throw NotSupportedException();
542 // throw std::logic_error("Not supported exception.");
543 (new Regex(@"throw NotSupportedException\(\);", "throw std::logic_error(\"Not
544 → supported exception.\");", 0),
545 // throw NotImplementedException();
546 // throw std::logic_error("Not implemented exception.");
547 (new Regex(@"throw NotImplementedException\(\);", "throw std::logic_error(\"Not
548 → implemented exception.\");", 0),
549 // Insert scope borders.
550 // const std::string& message
551 // const std::string& message/*~message~*/
552 (new Regex(@"(?<before>\(| )(?<variableDefinition>(const )?(std::)?string&?|char\*)
553 → (?<variable>[_a-zA-Z0-9]+)(?<after>\W)",
554 → "${before}${variableDefinition}/*~${variable}~*/${after}", 0),
555 // Inside the scope of /*~message~*/ replace:
556 // Platform::Converters::To<std::string>(message)
557 // message
558 (new Regex(@"(?<scope>\/\*~(?<variable>[_a-zA-Z0-9]+)~\*\/)(?<separator>.\|\\n)(?<before>
559 → >((?!\/\*~\k<variable>~\*\/)(.\|\\n))*?)Platform::Converters::To<std::string>\(\k<v
560 → ariable>\)", "${scope}${separator}${before}${variable}",
561 → 10),
562 // Remove scope borders.
563 // /*~ex~*/
564 //
565 (new Regex(@"\/\*~[_a-zA-Z0-9]+~\*\/", "", 0),
566 // Insert scope borders.
567 // std::tuple<T, T> tuple
568 // std::tuple<T, T> tuple/*~tuple~*/
569 (new Regex(@"(?<before>\(| )(?<variableDefinition>(const )?(std::)?tuple<[^\n]+>&?
570 → (?<variable>[_a-zA-Z0-9]+)(?<after>\W)",
571 → "${before}${variableDefinition}/*~${variable}~*/${after}", 0),
572 // Inside the scope of ~!ex!~ replace:
573 // tuple.Item1
574 // std::get<1-1>(tuple)
575 (new Regex(@"(?<scope>\/\*~(?<variable>[_a-zA-Z0-9]+)~\*\/)(?<separator>.\|\\n)(?<before>
576 → >((?!\/\*~\k<variable>~\*\/)(.\|\\n))*?)\k<variable>\.Item(?<itemNumber>\d+)(?<afte
577 → r>\W)",
578 → "${scope}${separator}${before}std::get<${itemNumber}-1>(${variable})${after}",
579 → 10),
580 // Remove scope borders.
581 // /*~ex~*/
582 //
583 (new Regex(@"\/\*~[_a-zA-Z0-9]+~\*\/", "", 0),
584 // Insert scope borders.
585 // class Range<T> {
586 // class Range<T> { /*~type~Range<T>~*/

```

```

(new Regex(@"(?<classDeclarationBegin>\r?\n(?<indent>[\t ]*)(template\s*<[^<>\n]*>
    )?(struct|class)
    (?<fullType>(?(typeName)[a-zA-Z0-9]+)(<[^\n]*>?) (\s*:\s*[^\n]+)?[\t
    ]*(\r?\n)?[\t ]*{)"),
    "$${classDeclarationBegin}/*~type~${typeName}~${fullType}~*/", 0),
// Inside the scope of /*~type~Range<T>~*/ insert inner scope and replace:
// public: static implicit operator std::tuple<T, T>(Range<T> range)
// public: operator std::tuple<T, T>() const { /*~variable~Range<T>~*/
(new Regex(@"(?<scope>/\s*~type~(?(typeName)[^\n\*]+)~(?(fullType)[^\n\*]+)~\s*/)(?<
    separator>.\n)(?<before>((?!/\s*~type~\k<typeName>~\k<fullType>~\s*/)(.|\n))*?)(
    ?<access>(private|protected|public): )static implicit operator
    (?<targetType>[^\n\*]+)\((?<argumentDeclaration>\k<fullType>
    (?<variable>[a-zA-Z0-9]+))\)(?<after>\s*\n?\s*{)"),
    "$${scope}${separator}${before}${access}operator ${targetType}()
    const${after}/*~variable~${variable}~*/", 10),
// Inside the scope of /*~type~Range<T>~*/ replace:
// public: static implicit operator Range<T>(std::tuple<T, T> tuple) { return new
    Range<T>(std::get<1-1>(tuple), std::get<2-1>(tuple)); }
// public: Range(std::tuple<T, T> tuple) : Range(std::get<1-1>(tuple),
    std::get<2-1>(tuple)) { }
(new Regex(@"(?<scope>/\s*~type~(?(typeName)[^\n\*]+)~(?(fullType)[^\n\*]+)~\s*/)(?<
    separator>.\n)(?<before>((?!/\s*~type~\k<typeName>~\k<fullType>~\s*/)(.|\n))*?)(
    ?<access>(private|protected|public): )static implicit operator
    (\k<fullType>|\k<typeName>)\((?<arguments>[^\n\*]+)\)(\s|\n)*{(\s|\n)*return
    (new )?(\k<fullType>|\k<typeName>)\((?<passedArguments>[^\n\*]+)\);(\s|\n)*}"),
    "$${scope}${separator}${before}${access}${typeName}(${arguments}) :
    ${typeName}(${passedArguments}) { }", 10),
// Inside the scope of /*~variable~range~*/ replace:
// range.Minimum
// this->Minimum
(new Regex(@"(?<scope>{\s*~variable~(?(variable)[^\n\*]+)~\s*/)(?<separator>.\n)(?<be
    fore>(?(beforeExpression>(?(bracket>{)|(?(bracket>})|[\s\*])\n)*?)\k<variable>\.
    (?(field>[a-zA-Z0-9]+)(?<after>(,|;|}|
    |\\))(?<afterExpression>(?(bracket>{)|(?(bracket>})|[\s\*])\n)*?)"),
    "$${scope}${separator}${before}this->${field}${after}", 10),
// Remove scope borders.
// /*~ex~*/
//
(new Regex(@"/*~[\s\*~\n]+~[\s\*~\n]+~\s*/"), "", 0),
// Insert scope borders.
// namespace Platform::Ranges { ... }
// namespace Platform::Ranges { /*~start~namespace~Platform::Ranges~*/ ...
    /*~end~namespace~Platform::Ranges~*/ }
(new Regex(@"(?<namespaceDeclarationBegin>\r?\n(?<indent>[\t ]*)namespace
    (?(namespaceName>(?(namePart>[a-zA-Z][a-zA-Z0-9]+)(?(nextNamePart>:[a-zA-Z][a-z
    A-Z0-9]+))(\s|\n)*)(?(middle>(\s|\n)*)(?(end>(?(=\r?\n)\k<indent>)(?!;)))"),
    "$${namespaceDeclarationBegin}/*~start~namespace~${namespaceName}~*/${middle}/*~e
    nd~namespace~${namespaceName}~*/${end}",
    0),
// Insert scope borders.
// class Range<T> { ... };
// class Range<T> { /*~start~type~Range<T>~T~*/ ... /*~end~type~Range<T>~T~*/ };
(new Regex(@"(?<classDeclarationBegin>\r?\n(?<indent>[\t ]*)template <typename
    (?(typeParameter>[^\n\*]+)> (struct|class)
    (?(type>[a-zA-Z0-9]+\k<typeParameter>>)(\s*:\s*[^\n\*]+)?[\t ]*(\r?\n)?[\t
    ]*{) (?(middle>(\s|\n)*)(?(endIndent>(?(=\r?\n)\k<indent>)(?(end>};)))"),
    "$${classDeclarationBegin}/*~start~type~${type}~${typeParameter}~*/${middle}${end}
    Indent}/*~end~type~${type}~${typeParameter}~*/${end}",
    0),
// Inside the scope replace:
// /*~start~namespace~Platform::Ranges~*/ ... /*~start~type~Range<T>~T~*/ ...
    public: override std::int32_t GetHashCode() { return {Minimum,
    Maximum}.GetHashCode(); } ... /*~end~type~Range<T>~T~*/ ...
    /*~end~namespace~Platform::Ranges~*/
// /*~start~namespace~Platform::Ranges~*/ ... /*~start~type~Range<T>~T~*/ ...
    /*~end~type~Range<T>~T~*/ ... /*~end~namespace~Platform::Ranges~*/ namespace std
    { template <typename T> struct hash<Platform::Ranges::Range<T>> { std::size_t
    operator()(const Platform::Ranges::Range<T> &obj) const { return {Minimum,
    Maximum}.GetHashCode(); } }; }

```

```

(new Regex(@"(?<namespaceScopeStart>/\~*start~namespace~(?<namespace>[~*\n\*]+)~\*/)
  (?<betweenStartScopes>(.|\n)+)(?<typeScopeStart>/\~*start~type~(?<type>[~*\n\*]+)
  )~(?<typeParameter>[~*\n\*]+)~\*/)(?<before>(.|\n)+)?(?<hashMethodDeclaration>\r
  ↪ ?\n[ \t]*(?<access>(private|protected|public): )override std::int32_t
  ↪ GetHashCode\(\) (\s|\n)*{\s*(?<methodBody>[~*\n\*]+[~*\s])\s*(?<after>(.|\n
  ↪ )+)?(?<typeScopeEnd>/\~*end~type~\k<type>~\k<typeParameter>~\*/)(?<betweenEndSco
  ↪ pes>(.|\n)+)(?<namespaceScopeEnd>/\~*end~namespace~\k<namespace>~\*/)}r?\n"),
  ↪ "${namespaceScopeStart}${betweenStartScopes}${typeScopeStart}${before}${after}${
  ↪ typeScopeEnd}${betweenEndScopes}${namespaceScopeEnd}" + Environment.NewLine +
  ↪ Environment.NewLine + "namespace std" + Environment.NewLine + "{" +
  ↪ Environment.NewLine + "    template <typename ${typeParameter}>" +
  ↪ Environment.NewLine + "    struct hash<${namespace}:${type}>" +
  ↪ Environment.NewLine + "    {" + Environment.NewLine + "        std::size_t
  ↪ operator()(const ${namespace}:${type} &obj) const" + Environment.NewLine + "
  ↪    {" + Environment.NewLine + "
  ↪    /*~start~method~*/${methodBody}/*~end~method~*/" + Environment.NewLine + "
  ↪    }" + Environment.NewLine + "    };" + Environment.NewLine + "}" +
  ↪ Environment.NewLine, 10),
// Inside scope of /*~start~method~*/ replace:
// /*~start~method~*/ ... Minimum ... /*~end~method~*/
// /*~start~method~*/ ... obj.Minimum ... /*~end~method~*/
583 (new Regex(@"(?<methodScopeStart>/\~*start~method~\*/)(?<before>.+({|,
  ↪ ))(?<name>[a-zA-Z][a-zA-Z0-9]+)(?<after>[~*\n\*]+(?!/*~end~method~\*/|
  ↪ )~\n\*+)(?<methodScopeEnd>/\~*end~method~\*/)"),
  ↪ "${methodScopeStart}${before}obj.${name}${after}${methodScopeEnd}", 10),
587 // Remove scope borders.
588 // /*~start~type~Range<T>~*/
589 //
590 (new Regex(@"/*~[~*\n\*]+(~[~*\n\*]+)*~\*/"), "", 0),
591 // class Disposable<T> : public Disposable
592 // class Disposable<T> : public Disposable<>
593 (new Regex(@"(?<before>(struct|class) (?<type>[a-zA-Z][a-zA-Z0-9]*)<[~*>\n\*+> :
  ↪ (?<access>(private|protected|public) )?\k<type>)(?<after>\b(?:<))"),
  ↪ "${before}<>${after}", 0),
594 // Insert scope borders.
595 // class Disposable<T> : public Disposable<> { ... };
596 // class Disposable<T> : public Disposable<>
  ↪ {/*~start~type~Disposable~Disposable<T>~Disposable~Disposable<>~*/ ...
  ↪ /*~end~type~Disposable~Disposable<T>~Disposable~Disposable<>~*/};
597 (new Regex(@"(?<classDeclarationBegin>\r?\n(?<indent>[\t ]*)template[\t
  ↪ ]*(?<typeParameters>[~*\n\*]+)[\t ]*(struct|class)[\t
  ↪ ]+(?<fullType>(?(type>[a-zA-Z][a-zA-Z0-9]*)<[~*>\n\*+>)?)[\t ]*:[\t
  ↪ ]*(?<access>(private|protected|public) [\t
  ↪ ]+)?(?(fullBaseType>(?(baseType>[a-zA-Z][a-zA-Z0-9]*)<[~*>\n\*+>)?)[\t
  ↪ ]*(\r?\n)?[\t
  ↪ ]*{)(?<middle>(.|\n)*)(?<beforeEnd>(?(=\r?\n)\k<indent>)(?<end>);}"),
  ↪ "${classDeclarationBegin}/*~start~type~${type}~${fullType}~${baseType}~${fullBas
  ↪ eType}~*/${middle}${beforeEnd}/*~end~type~${type}~${fullType}~${baseType}~${full
  ↪ BaseType}~*/${end}",
  ↪ 0),
598 // Inside the scope replace:
599 // /*~start~type~Disposable~Disposable<T>~Disposable~Disposable<>~*/ ... ) : base(
  ↪ ... /*~end~type~Disposable~Disposable<T>~Disposable~Disposable<>~*/
600 // /*~start~type~Disposable~Disposable<T>~Disposable~Disposable<>~*/ ... ) :
  ↪ Disposable<>( /*~end~type~Disposable~Disposable<T>~Disposable~Disposable<>~*/
601 (new Regex(@"(?<before>(?(typeScopeStart>/\~*start~type~(?<types>(?(type>[~*\n\*]+)~
  ↪ (?<fullType>[~*\n\*]+)~\k<type>~(?(fullBaseType>[~*\n\*]+))~\*/)(.|\n)+?)\s*:\s
  ↪ )base(?<after>\((.|\n)+?(?<typeScopeEnd>/\~*end~type~\k<types>~\*/))"),
  ↪ "${before}${fullBaseType}${after}", 20),
602 // Inside the scope replace:
603 // /*~start~type~Disposable~Disposable<T>~X~X<>~*/ ... ) : base( ...
  ↪ /*~end~type~Disposable~Disposable<T>~X~X<>~*/
604 // /*~start~type~Disposable~Disposable<T>~X~X<>~*/ ... ) : X(
  ↪ /*~end~type~Disposable~Disposable<T>~X~X<>~*/
605 (new Regex(@"(?<before>(?(typeScopeStart>/\~*start~type~(?<types>(?(type>[~*\n\*]+)~
  ↪ (?<fullType>[~*\n\*]+)~(?(baseType>[~*\n\*]+)~(?(fullBaseType>[~*\n\*]+))~\*/)(.
  ↪ |\n)+?)\s*:\s)base(?<after>\((.|\n)+?(?<typeScopeEnd>/\~*end~type~\k<types>~\*/|
  ↪ ))"), "${before}${baseType}${after}",
  ↪ 20),
606 // Inside the scope replace:
607 // /*~start~type~Disposable~Disposable<T>~X~X<>~*/ ... public: Disposable(T object)
  ↪ { Object = object; } ... public: Disposable(T object) : Disposable(object) { }
  ↪ ... /*~end~type~Disposable~Disposable<T>~X~X<>~*/
608 // /*~start~type~Disposable~Disposable<T>~X~X<>~*/ ... public: Disposable(T object)
  ↪ { Object = object; } /*~end~type~Disposable~Disposable<T>~X~X<>~*/

```

```

609 (new Regex(@"(?<before>(?<typeScopeStart>/\~*start~type~(?<types>(?<type>[~\n\*]+)~
    (?<fullType>[~\n\*]+)~(?<baseType>[~\n\*]+)~(?<fullBaseType>[~\n\*]+))~\*/)(.
    ↪ |\n)+?(?<constructor>(?(access>(private|protected|public):[\t
    ↪ ]*)?k<type>\((?<arguments>[~()\n]+)\)\s*{[~{}\n]+}) (.|\n)+?(?<duplicateConstru
    ↪ ctor>(?(access>(private|protected|public):[\t
    ↪ ]*)?k<type>\(k<arguments>\)\s*: [~{}\n]+\s*{[~{}\n]+}) (?(after>(.|\n)+?(?<typeS
    ↪ copeEnd>/\~*end~type~k<types>~\*/))"), "{$before}$after}",
    ↪ 20),
610 // Remove scope borders.
611 // /\~*start~type~Disposable~Disposable<T>~Disposable~Disposable<>~*/
612 //
613 (new Regex(@"/\~*[~\*\n]+(~[~\*\n]+)*~\*/"), "", 0),
614 // Insert scope borders.
615 // private: inline static const AppDomain _currentDomain = AppDomain.CurrentDomain;
616 // private: inline static const AppDomain _currentDomain =
    ↪ AppDomain.CurrentDomain; /\~app-domain~_currentDomain~/
617 (new Regex(@"(?<declaration>(?(access>(private|protected|public):[\t ]*)?(inline[\t
    ↪ ]+)?(static[\t ]+)?(const[\t ]+)?AppDomain[\t
    ↪ ]+(?<field>[a-zA-Z_][a-zA-Z0-9_]*)[\t ]*=[\t ]*AppDomain\.CurrentDomain;")),
    ↪ "{$declaration}/\~app-domain~{field}~/", 0),
618 // Inside the scope replace:
619 // /\~app-domain~_currentDomain~/ ... _currentDomain.ProcessExit += OnProcessExit;
620 // /\~app-domain~_currentDomain~/ ... std::atexit(OnProcessExit);
621 (new Regex(@"(?<before>(?<fieldScopeStart>/\~*app-domain~(?<field>[~\n\*]+)~\*/)(.|\n)+?k<field>\.ProcessExit[\t ]*\+=[\t
    ↪ ]*(?<eventHandler>[a-zA-Z_][a-zA-Z0-9_]*)"); "{$before}std::atexit({eventHandl
    ↪ er}); /\~process-exit-handler~{eventHandler}~/",
    ↪ 20),
622 // Inside the scope replace:
623 // /\~app-domain~_currentDomain~/ ... _currentDomain.ProcessExit -= OnProcessExit;
624 // /\~app-domain~_currentDomain~/ ... /* No translation. It is not possible to
    ↪ unsubscribe from std::atexit. */
625 (new Regex(@"(?<before>(?<fieldScopeStart>/\~*app-domain~(?<field>[~\n\*]+)~\*/)(.|\n)+?r?n[\t ]*k<field>\.ProcessExit[\t ]*\-=[\t
    ↪ ]*(?<eventHandler>[a-zA-Z_][a-zA-Z0-9_]*)"); "{$before}/* No translation. It is
    ↪ not possible to unsubscribe from std::atexit. */", 20),
626 // Inside the scope replace:
627 // /\~process-exit-handler~OnProcessExit~/ ... static void OnProcessExit(void
    ↪ *sender, EventArgs e)
628 // /\~process-exit-handler~OnProcessExit~/ ... static void OnProcessExit()
629 (new Regex(@"(?<before>(?<fieldScopeStart>/\~*process-exit-handler~(?<handler>[~\n\
    ↪ *]+)~\*/)(.|\n)+?static[\t ]+void[\t ]+k<handler>\( [~()\n]+\n)"), "{$before}",
    ↪ 20),
630 // Remove scope borders.
631 // /\~app-domain~_currentDomain~/
632 //
633 (new Regex(@"/\~*[~\*\n]+(~[~\*\n]+)*~\*/"), "", 0),
634 // AppDomain.CurrentDomain.ProcessExit -= OnProcessExit;
635 // /* No translation. It is not possible to unsubscribe from std::atexit. */
636 (new Regex(@"AppDomain\.CurrentDomain\.ProcessExit -= ([a-zA-Z_][a-zA-Z0-9_]*)");
    ↪ "/* No translation. It is not possible to unsubscribe from std::atexit. */", 0),
637 }.Cast<ISubstitutionRule>().ToList();
638
639 /// <summary>
640 /// <para>
641 /// The to list.
642 /// </para>
643 /// <para></para>
644 /// </summary>
645 public static readonly IList<ISubstitutionRule> LastStage = new List<SubstitutionRule>
646 {
647     // IDisposable disposable)
648     // IDisposable &disposable)
649     (new Regex(@"(?<argumentAbstractType>I[A-Z][a-zA-Z0-9]+(<[~>\r\n]+>)?)
    ↪ (?<argument>[_a-zA-Z0-9]+)(?<after>,|\))"), "{$argumentAbstractType}
    ↪ &${argument}${after}", 0),
650     // ICounter<int, int> c1;
651     // ICounter<int, int>* c1;
652     (new Regex(@"(?<abstractType>I[A-Z][a-zA-Z0-9]+(<[~>\r\n]+>)?)
    ↪ (?<variable>[_a-zA-Z0-9]+)(?<after> = null)?"); "{$abstractType}
    ↪ *${variable}${after}";, 0),
653     // (expression)
654     // expression
655     (new Regex(@"(\(|\)|)(([a-zA-Z0-9_]*:)+)\(|\)|;|\n)"), "$1$2$3", 0),
656     // (method(expression))
657     // method(expression)

```



```

(new Regex(@"(?<firstSeparator>\(|\)|\((?<method>[a-zA-Z0-9_\->\*:]*)\)((?<expression>((?<parenthesis>\(|\)|(?<-parent
    ↪ hesis>)|[a-zA-Z0-9_\->\*:]*)+)(?(parenthesis)(?!))\)\)\)(?<lastSeparator>(,|
    ↪ |;|\\))"), "${firstSeparator}${method}(${expression})${lastSeparator}", 0),
659 // .append(".")
660 // .append(1, '.');
661 (new Regex(@"\.\append\\(\"([^\\""]|\\\"")\"\\\""), ".append(1, '$1')", 0),
662 // return ref _elements[node];
663 // return &_elements[node];
664 (new Regex(@"return ref ([_a-zA-Z0-9]+)\([([_a-zA-Z0-9*]+)\];"), "return &$1[$2];",
    ↪ 0),
665 // ((1, 2))
666 // ({1, 2})
667 (new Regex(@"(?<before>\(|,)\)((?<first>[^\n()]+),
    ↪ (?<second>[^\n()]+)\)((?<after>\)|,)", "${before}${{first},
    ↪ ${second}}${after}", 10),
668 // {1, 2}.GetHashCode()
669 // Platform::Hashing::Hash(1, 2)
670 (new Regex(@"{((?<first>[^\n{]+), (?<second>[^\n{]+))}\.GetHashCode\\(\\""),
    ↪ "Platform::Hashing::Hash(${first}, ${second})", 10),
671 // range.ToString()
672 // Platform::Converters::ToStd::string>(range).data()
673 (new Regex(@"(?<before>\W)(?<variable>[_a-zA-Z][_a-zA-Z0-9]+)\.ToString\\(\\""),
    ↪ "${before}Platform::Converters::ToStd::string>(${variable}).data()", 10),
674 // new
675 //
676 (new Regex(@"(?<before>\r?\n[^\r\n]*(\"\\\"|\"[^\r\n]*\"[^\r\n]*)(?<=\W)new\\
    ↪ s+\""), "${before}",
    ↪ 10),
677 // x == null
678 // x == nullptr
679 (new Regex(@"(?<before>\r?\n[^\r\n]*(\"\\\"|\"[^\r\n]*\"[^\r\n]*)(?<=\W)(?<v
    ↪ ariable>[_a-zA-Z][_a-zA-Z0-9]+)(?<operator>s*(==|!=)\s*)null(?<after>\W)\""),
    ↪ "${before}${variable}${operator}nullptr${after}", 10),
680 // null
681 // {}
682 (new Regex(@"(?<before>\r?\n[^\r\n]*(\"\\\"|\"[^\r\n]*\"[^\r\n]*)(?<=\W)null\\
    ↪ (?<after>\W)\""), "${before}-{${after}",
    ↪ 10),
683 // default
684 // 0
685 (new Regex(@"(?<before>\r?\n[^\r\n]*(\"\\\"|\"[^\r\n]*\"[^\r\n]*)(?<=\W)defa
    ↪ ult(?<after>\W)\""), "${before}0${after}",
    ↪ 10),
686 // object x
687 // void *x
688 (new Regex(@"(?<before>\r?\n[^\r\n]*(\"\\\"|\"[^\r\n]*\"[^\r\n]*)(?<=\W)(?<!
    ↪ @)(object|System\.Object) (?<after>\w)\""), "${before}void *${after}",
    ↪ 10),
689 // <object>
690 // <void*>
691 (new Regex(@"(?<before>\r?\n[^\r\n]*(\"\\\"|\"[^\r\n]*\"[^\r\n]*)(?<=\W)(?<!
    ↪ @)(object|System\.Object) (?<after>\W)\""), "${before}void*${after}",
    ↪ 10),
692 // @object
693 // object
694 (new Regex(@"@([_a-zA-Z0-9]+)\""), "$1", 0),
695 // this->GetType().Name
696 // typeid(this).name()
697 (new Regex(@"(this)->GetType\\(\\"\\).Name\""), "typeid($1).name()", 0),
698 // ArgumentNullException
699 // std::invalid_argument
700 (new Regex(@"(?<before>\r?\n[^\r\n]*(\"\\\"|\"[^\r\n]*\"[^\r\n]*)(?<=\W)(Sys
    ↪ tem\.)?ArgumentNullException(?<after>\W)\""),
    ↪ "${before}std::invalid_argument${after}", 10),
701 // InvalidOperationException
702 // std::runtime_error
703 (new Regex(@"(\W)(InvalidOperationException|Exception)(\W)\""),
    ↪ "$1std::runtime_error$3", 0),
704 // ArgumentException
705 // std::invalid_argument
706 (new Regex(@"(\W)(ArgumentException|ArgumentOutOfRangeException)(\W)\""),
    ↪ "$1std::invalid_argument$3", 0),
707 // template <typename T> struct Range : IEquatable<Range<T>>
708 // template <typename T> struct Range {

```

```

709 (new Regex(@"(?<before>template <typename (?<typeParameter>[^\n]+)> (struct|class)
    ↳ (?<type>[a-zA-Z0-9]+<[^\n]+>)) : (public
    ↳ )?IEquatable<k<type>>(?(after>(\s|\n)*{")), "${before}${after}", 0),
710 // public: delegate void Disposal(bool manual, bool wasDisposed);
711 // public: delegate void Disposal(bool, bool);
712 (new Regex(@"(?<before>(?(access>(private|protected|public): )delegate
    ↳ (?<returnType>[a-zA-Z][a-zA-Z0-9:]+)
    ↳ (?<delegate>[a-zA-Z][a-zA-Z0-9:]+)\(((?<leftArgumentType>[a-zA-Z][a-zA-Z0-9:]+),
    ↳ *)?(?<argumentType>[a-zA-Z][a-zA-Z0-9:]+)
    ↳ (?<argumentName>[a-zA-Z][a-zA-Z0-9:]+)(?(after>(,
    ↳ (?<rightArgumentType>[a-zA-Z][a-zA-Z0-9:]+)
    ↳ (?<rightArgumentName>[a-zA-Z][a-zA-Z0-9:]+))*\);)"),
    ↳ "${before}${argumentType}${after}", 20),
713 // public: delegate void Disposal(bool, bool);
714 // using Disposal = void(bool, bool);
715 (new Regex(@"(?<access>(private|protected|public): )delegate
    ↳ (?<returnType>[a-zA-Z][a-zA-Z0-9:]+)
    ↳ (?<delegate>[a-zA-Z][a-zA-Z0-9:]+)\(((?<argumentTypes>[^\(\)\n]*\)\);)", "using
    ↳ ${delegate} = ${returnType}(${argumentTypes});", 20),
716 // <4-1>
717 // <3>
718 (new Regex(@"(?<before><)4-1(?(after>>)", "${before}3${after}", 0),
719 // <3-1>
720 // <2>
721 (new Regex(@"(?<before><)3-1(?(after>>)", "${before}2${after}", 0),
722 // <2-1>
723 // <1>
724 (new Regex(@"(?<before><)2-1(?(after>>)", "${before}1${after}", 0),
725 // <1-1>
726 // <0>
727 (new Regex(@"(?<before><)1-1(?(after>>)", "${before}0${after}", 0),
728 // #region Always
729 //
730 (new Regex(@"(^\r?\n)[ \t]*\#(region|endregion)[^\r\n]*(\r?\n|$)", "", 0),
731 // // #define ENABLE_TREE_AUTO_DEBUG_AND_VALIDATION
732 //
733 (new Regex(@"\\\/[ \t]*\#define[ \t]+[_a-zA-Z0-9]+[ \t]*"), "", 0),
734 // #if USEARRAYPOOL\r\n#endif
735 //
736 (new Regex(@"#if [a-zA-Z0-9]+\s+#endif", "", 0),
737 // [Fact]
738 //
739 (new Regex(@"(?<firstNewLine>\r?\n|\A)(?<indent>[ \t
    ↳ ]+)\[[a-zA-Z0-9]+\(((?<expression>((?<parenthesis>\()|(?<-parenthesis>\))|[^()\r
    ↳ \n]*+)(?(parenthesis)(?!))\))?\][ \t]*(\r?\n\k<indent>?)",
    ↳ "${firstNewLine}${indent}", 5),
740 // \A \n ... namespace
741 // \Anamespace
742 (new Regex(@"(\A)(\r?\n)+namespace", "$1namespace", 0),
743 // \A \n ... class
744 // \Aclass
745 (new Regex(@"(\A)(\r?\n)+class", "$1class", 0),
746 // \n\n\n
747 // \n\n
748 (new Regex(@"\r?\n[ \t]*\r?\n[ \t]*\r?\n"), Environment.NewLine +
    ↳ Environment.NewLine, 50),
749 // {\n\n
750 // {\n
751 (new Regex(@"{[ \t]*\r?\n[ \t]*\r?\n"), "{" + Environment.NewLine, 10),
752 // \n\n}
753 // \n}
754 (new Regex(@"\r?\n[ \t]*\r?\n(?<end>[ \t]*)"), Environment.NewLine + "${end}", 10),
755 }.Cast<ISubstitutionRule>().ToList();
756
757 /// <summary>
758 /// <para>
759 /// Initializes a new <see cref="CSharpToCppTransformer"/> instance.
760 /// </para>
761 /// <para></para>
762 /// </summary>
763 /// <param name="extraRules">
764 /// <para>A extra rules.</para>
765 /// <para></para>
766 /// </param>
767 public CSharpToCppTransformer(IList<ISubstitutionRule> extraRules) :
    ↳ base(FirstStage.Concat(extraRules).Concat>LastStage).ToList()) { }

```

```

768
769     /// <summary>
770     /// <para>
771     /// Initializes a new <see cref="CSharpToCppTransformer"/> instance.
772     /// </para>
773     /// <para></para>
774     /// </summary>
775     public CSharpToCppTransformer() : base(FirstStage.Concat(LastStage).ToList()) { }
776 }
777 }

```

1.2 ./csharp/Platform.RegularExpressions.Transformer.CSharpToCpp.Tests/CSharpToCppTransformerTests.cs

```

1  using Xunit;
2
3  namespace Platform.RegularExpressions.Transformer.CSharpToCpp.Tests
4  {
5      /// <summary>
6      /// <para>
7      /// Represents the sharp to cpp transformer tests.
8      /// </para>
9      /// <para></para>
10     /// </summary>
11     public class CSharpToCppTransformerTests
12     {
13         /// <summary>
14         /// <para>
15         /// Tests that empty line test.
16         /// </para>
17         /// <para></para>
18         /// </summary>
19         [Fact]
20         public void EmptyLineTest()
21         {
22             // This test can help to test basic problems with regular expressions like incorrect
23             ↪ syntax
24             var transformer = new CSharpToCppTransformer();
25             var actualResult = transformer.Transform("");
26             Assert.Equal("", actualResult);
27         }
28         /// <summary>
29         /// <para>
30         /// Tests that hello world test.
31         /// </para>
32         /// <para></para>
33         /// </summary>
34         [Fact]
35         public void HelloWorldTest()
36         {
37             const string helloWorldCode = @"using System;
38 class Program
39 {
40     public static void Main(string[] args)
41     {
42         Console.WriteLine(""Hello, world!"");
43     }
44 }";
45             const string expectedResult = @"class Program
46 {
47     public: static void Main(std::string args[])
48     {
49         printf(""Hello, world!\n"");
50     }
51 };";
52             var transformer = new CSharpToCppTransformer();
53             var actualResult = transformer.Transform(helloWorldCode);
54             Assert.Equal(expectedResult, actualResult);
55         }
56     }
57 }

```

Index

./csharp/Platform.RegularExpressions.Transformer.CSharpToCpp.Tests/CSharpToCppTransformerTests.cs, 18
./csharp/Platform.RegularExpressions.Transformer.CSharpToCpp/CSharpToCppTransformer.cs, 1