

1.1 ./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     public class CSharpToCppTransformer : Transformer
11     {
12         public static readonly IList

```

```

59 // protected virtual
60 // virtual
61 (new Regex(@"protected virtual"), "virtual", null, 0),
62 // protected abstract TElement GetFirst();
63 // virtual TElement GetFirst() = 0;
64 (new Regex(@"protected abstract ([^;]+);"), "virtual $1 = 0;", null, 0),
65 // protected abstract TElement GetFirst();
66 // virtual TElement GetFirst() = 0;
67 (new Regex(@"([a-zA-Z0-9]+ [a-zA-Z0-9]+\(([^\\])*\\);"), "virtual $1 = 0;", null, 0),
68 // public virtual
69 // virtual
70 (new Regex(@"public virtual"), "virtual", null, 0),
71 // protected readonly
72 //
73 (new Regex(@"protected readonly "), "", null, 0),
74 // protected readonly TreeElement[] _elements;
75 // TreeElement _elements[N];
76 (new Regex(@"(protected|private) readonly ([a-zA-Z<>0-9]+)([\\[\\]]+
→ ([_a-zA-Z0-9]+);"), "$2 $4[N];", null, 0),
77 // protected readonly TElement Zero;
78 // TElement Zero;
79 (new Regex(@"(protected|private) readonly ([a-zA-Z<>0-9]+) ([_a-zA-Z0-9]+);"), "$2
→ $3;", null, 0),
80 // private
81 //
82 (new Regex(@"(\\W)(private|protected|public|internal) "), "$1", null, 0),
83 // SizeBalancedTree(int capacity) => a = b;
84 // SizeBalancedTree(int capacity) { a = b; }
85 (new Regex(@"(^\\s+)(override )?(void )?([a-zA-Z0-9]+)\\(((\\[\\])*\\)\\s+=>\\s+([^;]+);"),
→ "$1$2$3$4($5) { $6; }", null, 0),
86 //int SizeBalancedTree(int capacity) => a;
87 // int SizeBalancedTree(int capacity) { return a; }
88 (new Regex(@"(^\\s+)(override )?([a-zA-Z0-9]+
→ )([a-zA-Z0-9]+)\\(((\\[\\])*\\)\\s+=>\\s+([^;]+);"), "$1$2$3$4($5) { return $6; }",
→ null, 0),
89 // () => Integer<TElement>.Zero,
90 // () { return Integer<TElement>.Zero; },
91 (new Regex(@"\\(\\)\\s+=>\\s+([^\\r\\n;]+?);"), "()" { return $1; }", null, 0),
92 // => Integer<TElement>.Zero;
93 // { return Integer<TElement>.Zero; }
94 (new Regex(@"\\(\\)\\s+=>\\s+([^\\r\\n;]+?);"), "()" { return $1; }", null, 0),
95 // () { return avlTree.Count; }
96 // [&]()-> auto { return avlTree.Count; }
97 (new Regex(@"\\(\\) { return ([^;]+); }"), " ", [&]()-> auto { return $1; }", null, 0),
98 // Count => GetSizeOrZero(Root);
99 // GetCount() { return GetSizeOrZero(Root); }
100 (new Regex(@"([A-Z][a-z]+)\\s+=>\\s+([^;]+);"), "Get$1() { return $2; }", null, 0),
101 // var
102 // auto
103 (new Regex(@"(\\W)var(\\W)"), "$1auto$2", null, 0),
104 // unchecked
105 //
106 (new Regex(@"[\\r\\n]{2}\\s*unchecked\\s*?$"), "", null, 0),
107 // $"
108 // "
109 (new Regex(@"\\$"""), "\\\"", null, 0),
110 // Console.WriteLine("...")
111 // printf("...\n")
112 (new Regex(@"Console\\.WriteLine\\(\"([^\""]+)*\"\\)"), "printf\\(\"$1\\n\\)", null, 0),
113 // throw new InvalidOperationException
114 // throw std::exception
115 (new Regex(@"throw new (InvalidOperationException|Exception)"), "throw
→ std::exception", null, 0),
116 // override void PrintNode(TElement node, StringBuilder sb, int level)
117 // void PrintNode(TElement node, StringBuilder sb, int level) override
118 (new Regex(@"override ([a-zA-Z0-9 \\*+]+)\\((\\[\\])*\\)"), "$1$2 override", null, 0),
119 // string
120 // char*
121 (new Regex(@"(\\W)string(\\W)"), "$1char*$2", null, 0),
122 // sbyte
123 // std::int8_t
124 (new Regex(@"(\\W)sbyte(\\W)"), "$1std::int8_t$2", null, 0),
125 // uint
126 // std::uint32_t
127 (new Regex(@"(\\W)uint(\\W)"), "$1std::uint32_t$2", null, 0),
128 // char*[] args
129 // char* args[]

```

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130 (new Regex(@"([_a-zA-Z0-9:\*?]\[\] ([a-zA-Z0-9]+)"), "$1 $2["], null, 0),
131 // using Platform.Numbers;
132 //
133 (new Regex(@"([\r\n]{2}|~)\s*?using [\.\a-zA-Z0-9]+\s*?$"), "", null, 0),
134 // struct TreeElement { }
135 // struct TreeElement { };
136 (new Regex(@"(struct|class) ([a-zA-Z0-9]+)(\s+){([\sa-zA-Z0-9;:_]+?)}([\~;])", "$1
    → $2$3{$4};$5", null, 0),
137 // class Program { }
138 // class Program { };
139 (new Regex(@"(struct|class) ([a-zA-Z0-9]+[^\r\n]*) ([\r\n]+(?<indentLevel>[\t
    → ]*)?)\{([\S\s]+?[\r\n]+\k<indentLevel>)\}([\~;]|$)", "$1 $2$3{$4};$5", null, 0),
140 // class SizedBinaryTreeMethodsBase : GenericCollectionMethodsBase
141 // class SizedBinaryTreeMethodsBase : public GenericCollectionMethodsBase
142 (new Regex(@"class ([a-zA-Z0-9]+) : ([a-zA-Z0-9]+)", "class $1 : public $2", null,
    → 0),
143 // class IProperty : ISetter<TValue, TObject>, IProvider<TValue, TObject>
144 // class IProperty : public ISetter<TValue, TObject>, IProvider<TValue, TObject>
145 (new Regex(@"(?<before>class [a-zA-Z0-9]+ : ((public [a-zA-Z0-9]+(<[a-zA-Z0-9
    → ,]+>)?, )+)?(?<inheritedType>(?!public) [a-zA-Z0-9]+(<[a-zA-Z0-9
    → ,]+>)?(?<after>(, [a-zA-Z0-9]+(?!>)|[\r\n]+)))", "${before}public
    → ${inheritedType}${after}", null, 10),
146 // Insert scope borders.
147 // ref TElement root
148 // ~!root!~ref TElement root
149 (new Regex(@"(?<definition>(?!<= |\) (ref [a-zA-Z0-9]+|[a-zA-Z0-9]+(?<ref>
    → (?<variable>[a-zA-Z0-9]+)(?=\\|, | =))", "~!${variable}!~${definition}", null,
    → 0),
150 // Inside the scope of ~!root!~ replace:
151 // root
152 // *root
153 (new Regex(@"(?<definition>~!(?<pointer>[a-zA-Z0-9]+)!~ref [a-zA-Z0-9]+
    → \k<pointer>(?!<= |\) (ref [a-zA-Z0-9]+|[a-zA-Z0-9]+(?<ref>
    → |\) \k<pointer>(?!<suffix>( |\) |;|,)))",
    → "${definition}${before}${prefix}*${pointer}${suffix}", null, 70),
154 // Remove scope borders.
155 // ~!root!~
156 //
157 (new Regex(@"~!(?<pointer>[a-zA-Z0-9]+)!~", "", null, 5),
158 // ref auto root = ref
159 // ref auto root =
160 (new Regex(@"ref ([a-zA-Z0-9]+) ([a-zA-Z0-9]+) = ref(\W)", "$1* $2 =$3", null, 0),
161 // *root = ref left;
162 // root = left;
163 (new Regex(@"\*([a-zA-Z0-9]+) = ref ([a-zA-Z0-9]+)(\W)", "$1 = $2$3", null, 0),
164 // (ref left)
165 // (left)
166 (new Regex(@"\ (ref ([a-zA-Z0-9]+)(\)|\(|,)", "($1$2", null, 0),
167 // ref TElement
168 // TElement*
169 (new Regex(@"( |\) (ref ([a-zA-Z0-9]+) )", "$1$2* ", null, 0),
170 // ref sizeBalancedTree.Root
171 // &sizeBalancedTree->Root
172 (new Regex(@"ref ([a-zA-Z0-9]+)\.([a-zA-Z0-9\*]+)", "&$1->$2", null, 0),
173 // ref GetElement(node).Right
174 // &GetElement(node)->Right
175 (new Regex(@"ref ([a-zA-Z0-9]+)\((([a-zA-Z0-9\*]+)\)\)\.([a-zA-Z0-9]+)",
    → "&$1($2)->$3", null, 0),
176 // GetElement(node).Right
177 // GetElement(node)->Right
178 (new Regex(@"([a-zA-Z0-9]+)\((([a-zA-Z0-9\*]+)\)\)\.([a-zA-Z0-9]+)", "$1($2)->$3",
    → null, 0),
179 // [Fact]\npublic static void SizeBalancedTreeMultipleAttachAndDetachTest()
180 // TEST_METHOD(SizeBalancedTreeMultipleAttachAndDetachTest)
181 (new Regex(@"\[Fact\] [\s\n]+(static )?void ([a-zA-Z0-9]+)\(\)", "TEST_METHOD($2)",
    → null, 0),
182 // class TreesTests
183 // TEST_CLASS(TreesTests)
184 (new Regex(@"class ([a-zA-Z0-9]+)Tests", "TEST_CLASS($1)", null, 0),
185 // Assert.Equal
186 // Assert::AreEqual
187 (new Regex(@"Assert\.Equal", "Assert::AreEqual", null, 0),
188 // TElement Root;
189 // TElement Root = 0;
190 (new Regex(@"(\\r?\\n[\\t ]+)([a-zA-Z0-9:_]+(?<return>)) ([_a-zA-Z0-9]+);", "$1$2 $3 =
    → 0;", null, 0),

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```
// TreeElement _elements[N];
// TreeElement _elements[N] = { {0} };
(new Regex(@"(\\r?\\n[\\t ]+)([a-zA-Z0-9]+) ([_a-zA-Z0-9]+)\\([[_a-zA-Z0-9]+)\\];"),
→ "$1$2 $3[$4] = { {0} };", null, 0),
// auto path = new TElement[MaxPath];
// TElement path[MaxPath] = { {0} };
(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[$4] = { {0} };", null, 0),
// Insert scope borders.
// auto added = new HashSet<TElement>();
// ~!added!~std::unordered_set<TElement> added;
(new Regex(@"auto (?<variable>[a-zA-Z0-9]+) = new
→ HashSet<(?<element>[a-zA-Z0-9]+)>\\(\\);"),
→ "~!${variable}!~std::unordered_set<${element}> ${variable};", null, 0),
// Inside the scope of ~!added!~ replace:
// added.Add(node)
// added.insert(node)
(new Regex(@"(?<scope>~!(?<variable>[a-zA-Z0-9]+)!~)(?<separator>\\.|\\n)(?<before>((?<
→ !~!\\k<variable>!~)(\\.|\\n))*?)\\k<variable>\\.Add\\((?<argument>[a-zA-Z0-9]+)\\)",
→ "${scope}${separator}${before}${variable}.insert(${argument})", null, 10),
// Inside the scope of ~!added!~ replace:
// added.Remove(node)
// added.erase(node)
(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(${argument})", null, 10),
// if (added.insert(node)) {
// if (!added.contains(node)) { added.insert(node);
(new Regex(@"if \\((?<variable>[a-zA-Z0-9]+)\\.insert\\((?<argument>[a-zA-Z0-9]+)\\)\\)(?
→ <separator>[\\t ]*[\\r\\n]+)(?<indent>[\\t ]*{")", "if
→ (!${variable}.contains(${argument}))${separator}${indent}{\" +
→ Environment.NewLine + "${indent}    ${variable}.insert(${argument});", null, 0),
// Remove scope borders.
// ~!added!~
//
(new Regex(@"~!(?<pointer>[a-zA-Z0-9]+)!~"), "", null, 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($3);", null, 0),
// Inside the scope of ~!random!~ replace:
// random.Next(1, N)
// (std::rand() % N) + 1
(new Regex(@"(?<scope>~!(?<variable>[a-zA-Z0-9]+)!~)(?<separator>\\.|\\n)(?<before>((?<
→ !~!\\k<variable>!~)(\\.|\\n))*?)\\k<variable>\\.Next\\((?<from>[a-zA-Z0-9]+),
→ (?<to>[a-zA-Z0-9]+)\\)", "${scope}${separator}${before}(std::rand() % ${to}) +
→ ${from}", null, 10),
// Remove scope borders.
// ~!random!~
//
(new Regex(@"~!(?<pointer>[a-zA-Z0-9]+)!~"), "", null, 5),
// Insert method body scope starts.
// void PrintNodes(TElement node, StringBuilder sb, int level) {
// void PrintNodes(TElement node, StringBuilder sb, int level) {/*method-start*/
(new Regex(@"(?<start>\\r?\\n[\\t ]+)(?<prefix>((virtual )?[a-zA-Z0-9:_]+
→ )))(?<method>[a-zA-Z] [a-zA-Z0-9]*)\\((?<arguments>[\\^\\])*\\)(?<override>(
→ override)?)(?<separator>[\\t\\r\\n]*)\\{(?<end>[~])", "${start}${prefix}${method}
→ (${arguments})${override}${separator}{/*method-start*/${end}", null,
→ 0),
// Insert method body scope ends.
// {/*method-start*/...}
// {/*method-start*/.../*method-end*/}
(new Regex(@"\\[/\\*method-start*/(?<body>((?<bracket>\\}|(?<-bracket>\\{)|[\\^\\{\\}]+)
→ \\)", "{/*method-start*/${body}/*method-end*/}", null,
→ 0),
// Inside method bodies replace:
// GetFirst(
// this->GetFirst(
// (new Regex(@"(?<separator>(\\(||([\\W])|return ))(?<!(->|\\*
→ )))(?<method>(?!sizeof)[a-zA-Z0-9]+)\\((?!\\) \\{")",
→ "${separator}this->${method}(", null, 1),
(new Regex(@"(?<scope>/\\*method-start*/)(?<before>((?<!/\\*method-end\\*/)(\\.|\\n))*?) (
→ ?<separator>[\\W] (?<!(::|\\.|->)) (?<method>(?!sizeof)[a-zA-Z0-9]+)\\((?!\\)
→ \\)(?<after>(\\.|\\n))*?) (?<scopeEnd>/\\*method-end\\*/)",
→ "${scope}${before}${separator}this->${method}(${after}${scopeEnd}", null, 100),
```

```

241 // Remove scope borders.
242 // /*method-start*/
243 //
244 (new Regex(@"\/\*method-(start|end)\*/"), "", null, 0),
245 }.Cast<ISubstitutionRule>().ToList();
246
247 public static readonly IList<ISubstitutionRule> LastStage = new List<SubstitutionRule>
248 {
249     // (expression)
250     // expression
251     (new Regex(@"(\(|\)|((([a-zA-Z0-9_\\*:]*)\\(|\;|\)|)))", "$1$2$3", null, 0),
252     // (method(expression))
253     // method(expression)
254     (new Regex(@"(?<firstSeparator>\\(|
    ↪ ))\\((?<method>[a-zA-Z0-9_\\*:]*)\\((?<expression>((?<parenthesis>\\(|(?<-parent
    ↪ hesis>\\)|[a-zA-Z0-9_\\*:]*)\\((?<parenthesis>(?!))\\))\\((?<lastSeparator>\\(|
    ↪ |;|\\)))")", "${firstSeparator}${method}${expression}${lastSeparator}", null, 0),
255     // return ref _elements[node];
256     // return &elements[node];
257     (new Regex(@"return ref ([_a-zA-Z0-9]+)\\([[_a-zA-Z0-9\\*]+]\\);", "return &$1[$2];",
    ↪ null, 0),
258     // default
259     // 0
260     (new Regex(@"(\\W)default(\\W)", "${1}0$2", null, 0),
261     // // #define ENABLE_TREE_AUTO_DEBUG_AND_VALIDATION
262     //
263     (new Regex(@"\\\/[ \t]*#define[ \t]+[_a-zA-Z0-9]+[ \t]*")", "", null, 0),
264     // #if USEARRAYPOOL\r\n#endif
265     //
266     (new Regex(@"#if [a-zA-Z0-9]+\\s+#endif")", "", null, 0),
267     // [Fact]
268     //
269     (new Regex(@"(?<firstNewLine>\\r?\\n|\\A)(?<indent>[ \t ]+)\\[[a-zA-Z0-9]+(\\((?<expressio
    ↪ n>((?<parenthesis>\\(|(?<-parenthesis>\\)|\\^([ ]*)\\((?<parenthesis>(?!))\\))\\)?\\[
    ↪ \t]*\\(\\r?\\n\\k<indent>)?")", "${firstNewLine}${indent}", null, 5),
270     // \n ... namespace
271     // namespace
272     (new Regex(@"(\\S[\\r\\n]{1,2})?[\\r\\n]+namespace")", "$1namespace", null, 0),
273     // \n ... class
274     // class
275     (new Regex(@"(\\S[\\r\\n]{1,2})?[\\r\\n]+class")", "$1class", null, 0),
276 }.Cast<ISubstitutionRule>().ToList();
277
278 public CSharpToCppTransformer(IList<ISubstitutionRule> extraRules) :
    ↪ base(FirstStage.Concat(extraRules).Concat(LastStage).ToList()) { }
279
280 public CSharpToCppTransformer() : base(FirstStage.Concat(LastStage).ToList()) { }
281 }
282 }

```

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

```

1 using Xunit;
2
3 namespace Platform.RegularExpressions.Transformer.CSharpToCpp.Tests
4 {
5     public class CSharpToCppTransformerTests
6     {
7         [Fact]
8         public void HelloWorldTest()
9         {
10             const string helloWorldCode = @"using System;
11 class Program
12 {
13     public static void Main(string[] args)
14     {
15         Console.WriteLine("Hello, world!");
16     }
17 }";
18             const string expectedResult = @"class Program
19 {
20     public:
21     static void Main(char* args[])
22     {
23         printf("Hello, world!\n");
24     }
25 };";
26             var transformer = new CSharpToCppTransformer();
27             var actualResult = transformer.Transform(helloWorldCode, new Context(null));

```

```
28         Assert.Equal(expectedResult, actualResult);
29     }
30 }
31 }
```

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