FSML++ + Testing

Carsten Hartenfels Benjamin Haßel

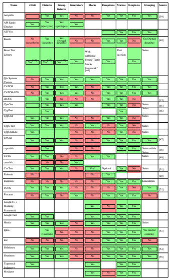
2014-02-26

Contents

1. Frameworks

1. Frameworks

- Many available...



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CATCH-VC6	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	
cfixYes	🟩	Yes	No	No	No	Yes	Yes	No		[13]
CputYes	🟩	Yes	Yes	Yes		Yes	Yes	No	Suites	[45]
CppTest		Yes					Yes		Suites	[46]
CppUnit	Yes	Yes	Yes	No	No	Yes	Yes	No	Suites	
CppUTest	Yes	Yes	Yes	No	Yes	No	Yes	No	Suites	
CppUnitLite	Yes			No	No	No	Yes	No	Suites	
CPUnit	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	[47]
crpcutNo	🟥	Yes		No	No		Yes	Yes	Suites within Suites	[48]
CUTE	Yes	Yes	No	No	Yes	Yes			Suites	[49]
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Google C++ Mocking Framework					Yes	No	Yes	Yes		
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lest	No	No	No	No	No	Yes	Yes	Yes	No	
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Typemock Isolator++	Yes				Yes		Yes	Yes		
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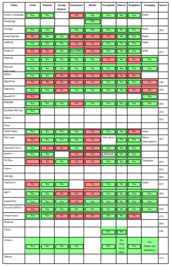

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NullUnit	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Suites	
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upp11	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	[68]
UquoniTest	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	
VectorCAST/C++	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	[36]
Visual Assert	Yes	Yes	No	No	No	Yes	Yes	No		[37]
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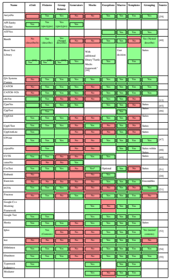

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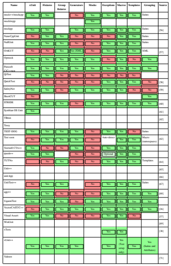

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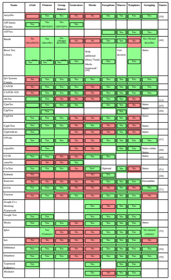
1. Frameworks

- Many available...
- ...but unsuitable to our approach
- Simple algorithm



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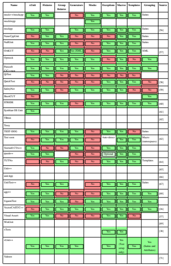

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2. Basic Testing

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- Identity Testing

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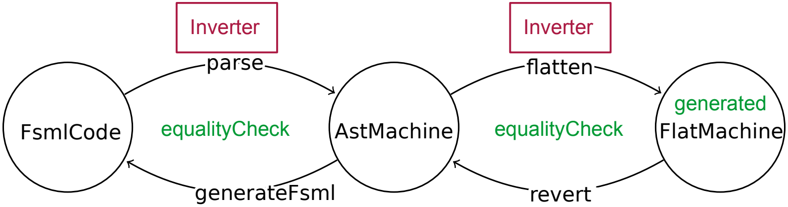
- Testing parser, abstract syntax and flat representation



3. Test Data Generation

- Goedelization (2 states / 25 configurations)

Goedel Number	Transition		
0			
1	s0 → s0		
2	s1 → s0		
3	s0 → s1		
4	s1 → s1		
5	s0 → s0	s0 → s0	
6	s1 → s0	s0 → s0	
7	s0 → s1	s0 → s0	
8	s1 → s1	s0 → s0	
9	s0 → s0	s1 → s0	
10	s1 → s0	s1 → s0	
11	s0 → s1	s1 → s0	
12	s1 → s1	s1 → s0	
13	s0 → s0	s0 → s1	
14	s1 → s0	s0 → s1	
15	s0 → s1	s0 → s1	
16	s1 → s1	s0 → s1	
17	s0 → s0	s1 → s1	
18	s1 → s0	s1 → s1	
19	s0 → s1	s1 → s1	
20	s1 → s1	s1 → s1	
21	s0 → s0	s0 → s0	s0 → s0
22	s1 → s0	s0 → s0	s0 → s0
23	s0 → s1	s0 → s0	s0 → s0
24	s1 → s1	s0 → s0	s0 → s0
25	s0 → s0	s1 → s0	s0 → s0

3. Test Data Generation

- Algorithm

```
static FlatStep
genStep(const cpp_int& pos, const cpp_int& num, const cpp_int& states)
{
    const cpp_int source = (pos / num) % states;
    const cpp_int target = (pos / (num * states)) % states;
    return {"s" + source.str(), "input" + pos.str(), "", "s" + target.str()};
}


const cpp_int states = stateCount;
const cpp_int pow = states * states;
for (cpp_int off = 1, no = pow, num = 1; off <= t; off += no, no *= pow, num *= pow)
    fm.addStep(genStep(t - off, num, states));

return fm;
```

4. Extended Testing

- Problem: Constraints are not fulfilled

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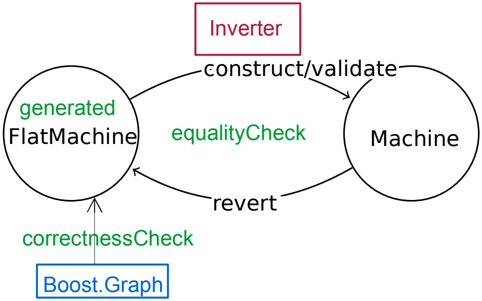
- Problem: Constraints are not fulfilled
- Solution: Boost.Graph as oracle



5. Running It

Example

Thank You All For Listening

GitHub: `https://github.com/hartenfels/FSMLplusplus/`