testgen/runs-2014-07-26__02_24_31

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results from testgen/runs-2014-07-26__02_24_31

1 Improvements

- Removed duplicates models after generating n random models, which saves repeated work.
- Solution validation. Check the solution are consistent with their domains e.g. sets can't have duplicates. Also verify the domain attributes are satisfied. Solution validation founds some new bugs.

2 Validate Solution

2.1 set attributes

Using a combination of maxSize, minSize and size causes all 3 eprimes to have a solution when it should not. This was not caught be inconsistent from before since the bug affected all epirimes.

Listing 1.1: 1406342762.essence

```
summary/gErrorsSolve/validateSolution/1406342762_0001/1406342762.essence

language Essence 1.3

find var1: matrix indexed by [int(4..4), int(3..3)] of int(5..5)
find var0:
        set (size 1, minSize 4, maxSize 2) of
            function (total, surjective, minSize 1) int(1..1) --> int(5..5)
```

Listing 1.2: Validating the solution

```
Error for
Value:   {function(1 --> 5)}
Domain:  set (size 1, minSize 4, maxSize 2) of
             function (total, surjective, minSize 1) int(1..1) --> int(5..5)
Details:
  (minSize 4) not satisfied; Too few elements in set
      set (maxSize 2, minSize 4, size 1) of
          function (surjective, total, minSize 1) int(1..1) --> int(5..5)
      {function(1 --> 5)}
```

The same problem occurs with relations

Listing 1.3: 1406343903.essence

```
language Essence 1.3

find var1:
        set (size 4, minSize 1, maxSize 3) of
            relation (size 1, maxSize 3, minSize 2) of (int(4..4) * int(2..5))
find var0: set of matrix indexed by [int(3..5)] of int(2..4)
```

2.2 Functions

```
language Essence 1.3

find var1: matrix indexed by [int(3..4)] of function int(5..5) --> int(2..3)
find var0: matrix indexed by [int(3..4)] of relation of (int(5..5) * int(2..2))
```

finds a bug in solution translation of `var1` when using `Function1DPartial` giving the answer `[function(); int(3..4)]` instead of `[function(), function(); int(3..4)]`

3 Inconsistent

3.1 set of function (minSize 3)

Listing 1.4: 1406371130.essence

```
language Essence 1.3
find var0: set of function (minSize 3) int(1..2) --> int(5..5)
```

3 eprimes, 2 are satisfiable and have solutions, 1 does not

3.2 relations and functions

Listing 1.5: 1406371836.essence

```
language Essence 1.3

find var1:
        relation of (set of int(2..5) * matrix indexed by [int(2..5)] of int(4..4))
find var0: set of function int(2..5) --> int(3..3)
```

5 eprimes, 4 are satisfiable and have solutions, 1 does not.

4 Solution Translation

- `matrix indexed by [int(1..1)] of partition (size 2) from int(1..3)` (1406342749.essence, 1406375182.essence, 1406377200.essence, 1406378178.essence same)
- `relation of (function int(3..5) -> int(2..4))` (comp, 1406345766.essence)
- very nested (1406372004.essence)
-

5 Misc

- Since we probably don't want errors which are too similar, one idea is to bias the away from area which have know errors.
- Biasing the selection of attributes to favour using less attributes. e.g $1/2$ for no attributes $1/4$ for 1 attributes $1/8$ for 2 attributes and so on. This give better test cases while still getting coverage.
- Random number don't look that random in some cases e.g `1406343927.essence` for example, check the rnd is being updated. Ironically still gave a good test case.
- Always allow solution translation and solution validation? solution translation is basically instant. solution validation can take a while if there are lots of constraints.