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This form is a summary description of the model entitled "SieveSingleMsgMbox" proposed for the Model Checking Contest @ Petri Nets. Models can be given in several instances parameterized by scaling parameters. Colored nets can be accompanied by one or many equivalent, unfolded P/T nets. Models are given together with property files (possibly, one per model instance) giving a set of properties to be checked on the model.

Description

The model comes from a suite of 50 examples that come from the analysis of Erlang programs [1]. They were generated in [2] using an Erlang verification tool called Soter, using the example programs found on Soter's website [3].

The source model has an initial marking ($l_0 \geq 1$) constraint rather than a single initial marking, this is used in the MCC to scale the model up. The depth parameter corresponds to the unrolling depth used for loops.

Models found in [4] where converted to PNML thanks to an ITS-Tools [5] library.

References

1. Emanuele D'Osualdo and Jonathan Kochems and C.-H. Luke Ong. Automatic verification of erlang-style concurrency. CoRR, abs/1303.2201, 2013.
2. J. Esparza, R. Ledesma-Garza, R. Majumdar, P. J. Meyer, and F. Niksic. An smt-based approach to coverability analysis. In CAV, volume 8559 of Lecture Notes in Computer Science, pages 603–619. Springer, 2014
3. SOTER 0.1 web interface http://mjolnir.cs.ox.ac.uk/soter/
4. Klara J. Meyer, Petrinizer repository, https://github.com/meyerphi/petrinizer.
5. Y. Thierry-Mieg, Homepage of ITS-tools https://lip6.github.io/ITSTools-web/

Scaling parameter

Parameter name	Parameter description	Chosen parameter values
d, m	d is the depth, m the number of tokens in place **l0**	(0, 4), (0, 6), (0, 18), (0, 36), (0, 64), (0, 96), (1, 4), (1, 6), (1, 18), (1, 36), (1, 64), (1, 96), (2, 4), (2, 6), (2, 18), (2, 36), (2, 64), (2, 96)

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Size of the model

Parameter	Number of places	Number of transitions	Number of arcs
d=0, d=4	262	73	292
d=0, d=6	262	73	292
d=0, d=18	262	73	292
d=0, d=36	262	73	292
d=0, d=64	262	73	292
d=0, d=96	262	73	292
d=1, d=4	1295	749	2996
d=1, d=6	1295	749	2996
d=1, d=18	1295	749	2996
d=1, d=36	1295	749	2996
d=1, d=64	1295	749	2996
d=1, d=96	1295	749	2996
d=2, d=4	2398	1954	7816
d=2, d=6	2398	1954	7816
d=2, d=18	2398	1954	7816
d=2, d=36	2398	1954	7816
d=2, d=64	2398	1954	7816
d=2, d=96	2398	1954	7816

Structural properties

ordinary — *all arcs have multiplicity one* ..... ✔
simple free choice — *all transitions sharing a common input place have no other input place* ..... ✗ [a]
extended free choice — *all transitions sharing a common input place have the same input places* ..... ✗ [b]
state machine — *every transition has exactly one input place and exactly one output place* ..... ✗ [c]
marked graph — *every place has exactly one input transition and exactly one output transition* ..... ✗ [d]
connected — *there is an undirected path between every two nodes (places or transitions)* ..... ✗ [e]
strongly connected — *there is a directed path between every two nodes (places or transitions)* ..... ✗ [f]
source place(s) — *one or more places have no input transitions* ..... ✔ [g]
sink place(s) — *one or more places have no output transitions* ..... ✔ [h]
source transition(s) — *one or more transitions have no input places* ..... ✗ [i]
sink transitions(s) — *one or more transitions have no output places* ..... ✗ [j]
loop-free — *no transition has an input place that is also an output place* ..... ✗ [k]
conservative — *for each transition, the number of input arcs equals the number of output arcs* ..... ✔ [l]
subconservative — *for each transition, the number of input arcs equals or exceeds the number of output arcs* ..... ✔ [m]
nested units — *places are structured into hierarchically nested sequential units* [n] ..... ✗

[a] stated by CÆSAR.BDD version 3.7 on all 18 instances (three values of d × 6 values of m).
[b] transitions "t1" and "t2" share a common input place "s1", but only the former transition has input place "l0".
[c] stated by CÆSAR.BDD version 3.7 on all 18 instances (three values of d × 6 values of m).
[d] stated by CÆSAR.BDD version 3.7 on all 18 instances (three values of d × 6 values of m).
[e] stated by CÆSAR.BDD version 3.7 on all 18 instances (three values of d × 6 values of m).
[f] the net is not connected and, thus, not strongly connected.
[g] stated by CÆSAR.BDD version 3.7 on all 18 instances (three values of d × 6 values of m).
[h] stated by CÆSAR.BDD version 3.7 on all 18 instances (three values of d × 6 values of m).
[i] stated by CÆSAR.BDD version 3.7 on all 18 instances (three values of d × 6 values of m).
[j] stated by CÆSAR.BDD version 3.7 on all 18 instances (three values of d × 6 values of m).
[k] stated by CÆSAR.BDD version 3.7 on all 18 instances (three values of d × 6 values of m).
[l] stated by CÆSAR.BDD version 3.7 on all 18 instances (three values of d × 6 values of m).
[m] stated by CÆSAR.BDD version 3.7 on all 18 instances (three values of d × 6 values of m).
[n] the definition of Nested-Unit Petri Nets (NUPN) is available from http://mcc.lip6.fr/nupn.php

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Behavioural properties

safe — *in every reachable marking, there is no more than one token on a place* ..... ✗ [o]
dead place(s) — *one or more places have no token in any reachable marking* ..... ✔ [p]
dead transition(s) — *one or more transitions cannot fire from any reachable marking* ..... ?
deadlock — *there exists a reachable marking from which no transition can be fired* ..... ?
reversible — *from every reachable marking, there is a transition path going back to the initial marking* ..... ?
live — *for every transition t, from every reachable marking, one can reach a marking in which t can fire* ..... ?

Size of the marking graphs

Parameter	Number of reachable markings	Number of transition firings	Max. number of tokens per place	Max. number of tokens per marking
d=0, d=4	?	?	?	5 [q]
d=0, d=6	?	?	?	7 [r]
d=0, d=18	?	?	?	19 [s]
d=0, d=36	?	?	?	37 [t]
d=0, d=64	?	?	?	65 [u]
d=0, d=96	?	?	?	97 [v]
d=1, d=4	?	?	?	5 [w]
d=1, d=6	?	?	?	7 [x]
d=1, d=18	?	?	?	19 [y]
d=1, d=36	?	?	?	37 [z]
d=1, d=64	?	?	?	65 [aa]
d=1, d=96	?	?	?	97 [ab]
d=2, d=4	?	?	?	5 [ac]
d=2, d=6	?	?	?	7 [ad]
d=2, d=18	?	?	?	19 [ae]
d=2, d=36	?	?	?	37 [af]
d=2, d=64	?	?	?	65 [ag]
d=2, d=96	?	?	?	97 [ah]

[o] stated by CÆSAR.BDD version 3.7 on all 18 instances (three values of d × 6 values of m).
[p] stated by CÆSAR.BDD version 3.7 on all 18 instances (three values of d × 6 values of m).
[q] number of initial tokens, because the net is conservative.
[r] number of initial tokens, because the net is conservative.
[s] number of initial tokens, because the net is conservative.
[t] number of initial tokens, because the net is conservative.
[u] number of initial tokens, because the net is conservative.
[v] number of initial tokens, because the net is conservative.
[w] number of initial tokens, because the net is conservative.
[x] number of initial tokens, because the net is conservative.
[y] number of initial tokens, because the net is conservative.
[z] number of initial tokens, because the net is conservative.
[aa] number of initial tokens, because the net is conservative.
[ab] number of initial tokens, because the net is conservative.
[ac] number of initial tokens, because the net is conservative.
[ad] number of initial tokens, because the net is conservative.
[ae] number of initial tokens, because the net is conservative.
[af] number of initial tokens, because the net is conservative.
[ag] number of initial tokens, because the net is conservative.
[ah] number of initial tokens, because the net is conservative.