

This form is a summary description of the model entitled “RERS17pb115” 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

RERS17pb115 belongs to the parallel training problems of the RERS (Rigorous Examination of Reactive Systems) challenge in 2017^(a). This model has been elaborated to preserve some properties by construction [1] and does not represent a real problem. However, it is built from patterns making it of interest to evaluate tools.

References

1. B. Steffen, M. Jasper, J. Meijer, and J. van de Pol. Property-preserving generation of tailored benchmark Petri nets. In 17th International Conference on Application of Concurrency to System Design, ACSD 2017, Zaragoza, Spain, June 25-30, 2017, pages 1–8

Scaling parameter

Parameter name	Parameter description	Chosen parameter values
N	Initial Marking Multiplier	1, 2, 3, 4, 5, 6, 7, 8, 9

Size of the model

Although the model is parameterized, its size does not depend on parameter values.

number of places: 2 819
number of transitions: 288 739
number of arcs: 1 154 829

Structural properties

ordinary — all arcs have multiplicity one ?
simple free choice — all transitions sharing a common input place have no other input place ?
extended free choice — all transitions sharing a common input place have the same input places ?
state machine — every transition has exactly one input place and exactly one output place ?
marked graph — every place has exactly one input transition and exactly one output transition ?
connected — there is an undirected path between every two nodes (places or transitions) ?
strongly connected — there is a directed path between every two nodes (places or transitions) ?
source place(s) — one or more places have no input transitions ?
sink place(s) — one or more places have no output transitions ?
source transition(s) — one or more transitions have no input places ?
sink transitions(s) — one or more transitions have no output places ?
loop-free — no transition has an input place that is also an output place ?
conservative — for each transition, the number of input arcs equals the number of output arcs ?
subconservative — for each transition, the number of input arcs equals or exceeds the number of output arcs ?
nested units — places are structured into hierarchically nested sequential units^(b) ?^(c)

^(a)See <http://www.rers-challenge.org/2017/>.

^(b)the definition of Nested-Unit Petri Nets (NUPN) is available from <http://mcc.lip6.fr/nupn.php>

^(c)This information exists and is valid when $N = 1$, NUPN information is not relevant otherwise.

Behavioural properties

- safe** — *in every reachable marking, there is no more than one token on a place* ? (d)
- 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* ?
- quasi-live** — *for every transition t , there exists a reachable marking in which t can fire* ?
- live** — *for every transition t , from every reachable marking, one can reach a marking in which t can fire* ?

(d) This is structurally true when $N = 1$, otherwise it is not.