This form is a summary description of the model entitled “IBMB2S56S3960” 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

This model is the biggest one (in terms of places and transition) of a collection of 1386 Petri nets that were derived from industrial business process models that were provided by IBM. The Petri nets have workflow structure (unique source and sink place) and can be checked for soundness (marking the source place, does the CTL formula “AGEF sink” hold). More information on the models can be found in the referenced paper.

The soundness check is an ideal challenge for the model checking contest, because it can be performed by checking a CTL formula or by checking the short-circuited net for liveness and boundedness. This allows for generic as well as Petri net-specific approaches.

References


Scaling parameter

This model is not parameterized.

Size of the model

- number of places: 273
- number of transitions: 179
- number of arcs: 572

Structural properties

- free choice — all (different) transitions with a shared input place have no other input place
- 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 a 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 transition(s) — one or more transitions have no output places

(a) stated by CÆSAR.BDD version 1.7.
(b) 144 transitions are not of a state machine, e.g., transition “callToProcess.s00003859.inputCriterion.s00001053”.
(c) 34 places are not of a marked graph, e.g., place “alpha”.
(d) stated by CÆSAR.BDD version 1.7.
(e) from place “callToProcess.s00001108.input.s00001066” one cannot reach place “alpha”.
(f) place “alpha” is a source place.
(g) there exist 10 sink places, e.g., place “callToProcess.s00001108.output.s00001077”.
(h) stated by CÆSAR.BDD version 1.7.
(i) stated by CÆSAR.BDD version 1.7.
loop-free — no transition has an input place that is also an output place ................................................................. ✓ (j)

conservative — for each transition, the number of input arcs equals the number of output arcs .................................. X (k)

subconservative — for each transition, the number of input arcs equals or exceeds the number of output arcs ........... X (l)

Behavioural properties

safe — in every reachable marking, there is no more than one token on a place ......................................................... X (m)

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 ................. ?

Size of the marking graph

number of reachable markings: \( 1.551 \times 10^{16} \) (n)

number of transition firings: ?

max. number of tokens per place: ?

max. number of tokens per marking: \( \geq 11 \) (o)

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(j) stated by CÆSAR BDD version 1.7.

(k) 141 transitions are not conservative, e.g., transition “callToProcess.s00003859.inputCriterion.s00001053”.

(l) 72 transitions are not subconservative, e.g., transition “callToProcess.s00003859.outputCriterion.s00001055”.

(m) firing transition “merge.s00001162.activate.s00001065” puts a token in place “merge.s00001162.activated” although this place already has a token in the current marking.

(n) Computed by marcie and pnxdd at MCC’2013.

(o) lower bound given by the number of initial tokens.