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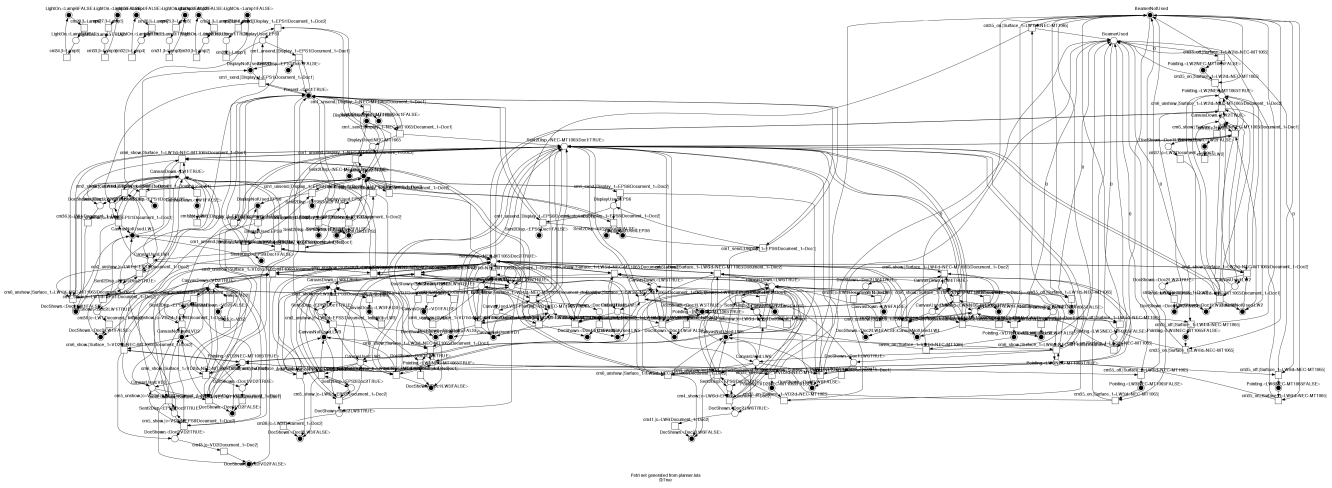
This form is a summary description of the model entitled "AI Planning" proposed for the Model Checking Contest @ Petri Nets. Models can be given in several instances parameterized by scaling parameters. Colored nets can be accompanied by one or many equivalent, unfolded P/T nets. Models are given together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

Description

The net models the equipment (displays, canvases, documents, and lamps) of a smart conference room of the University of Rostock. It was derived from a proprietary description format that was used by an AI planning tool to generated plans to bring the room in a desired state, for instance displaying a document on a certain canvas while switching off the lights. This problem can be expressed as a reachability problem.

An example for a reachable marking is

LightOn.<Lamp1|TRUE> = 1 AND
LightOn.<Lamp2|TRUE> = 1 AND
DocShown.<Doc1|LW3|TRUE> = 1 AND
DocShown.<Doc2|LW1|TRUE> = 1 AND
CanvasDown.<VD1|TRUE> = 1



Scaling parameter

This model is not parameterized.

Size of the model

number of places:	126
number of transitions:	128
number of arcs:	652

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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] ..... ✗

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* ..... ✗ [q]
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 graph

number of reachable markings:	$\geq$ 4.97832e+16 [r]
number of transition firings:	?
max. number of tokens per place:	?
max. number of tokens per marking:	$\geq$ 77

[a] 240 arcs are not simple free choice, e.g., the arc from place “p1” (which has 8 outgoing transitions) to transition “t41” (which has 2 input places).
[b] transitions “t48” and “t41” share a common input place “p1”, but only the former transition has input place “p70”.
[c] 84 transitions are not of a state machine, e.g., transition “t1”.
[d] 90 places are not of a marked graph, e.g., place “p1”.
[e] 12 places are not connected to place “p10”, e.g., place “p27”; 12 transitions are not connected to place “p10”, e.g., transition “t127”.
[f] the net is not connected and, thus, not strongly connected.
[g] stated by CÆSAR.BDD version 1.7.
[h] there exist 26 sink places, e.g., place “p111”.
[i] stated by CÆSAR.BDD version 1.7.
[j] stated by CÆSAR.BDD version 1.7.
[k] 68 transitions are not loop free, e.g., transition “t1”.
[l] 68 transitions are not conservative, e.g., transition “t1”.
[m] 68 transitions are not subconservative, e.g., transition “t1”.
[n] the definition of Nested-Unit Petri Nets (NUPN) is available from http://mcc.lip6.fr/nupn.php
[o] firing transition “t20” puts a token in place “p88” although this place already has a token in the current marking.
[p] stated by CÆSAR.BDD version 3.3.
[q] stated by CÆSAR.BDD version 2.0.
[r] stated by CÆSAR.BDD version 3.3.