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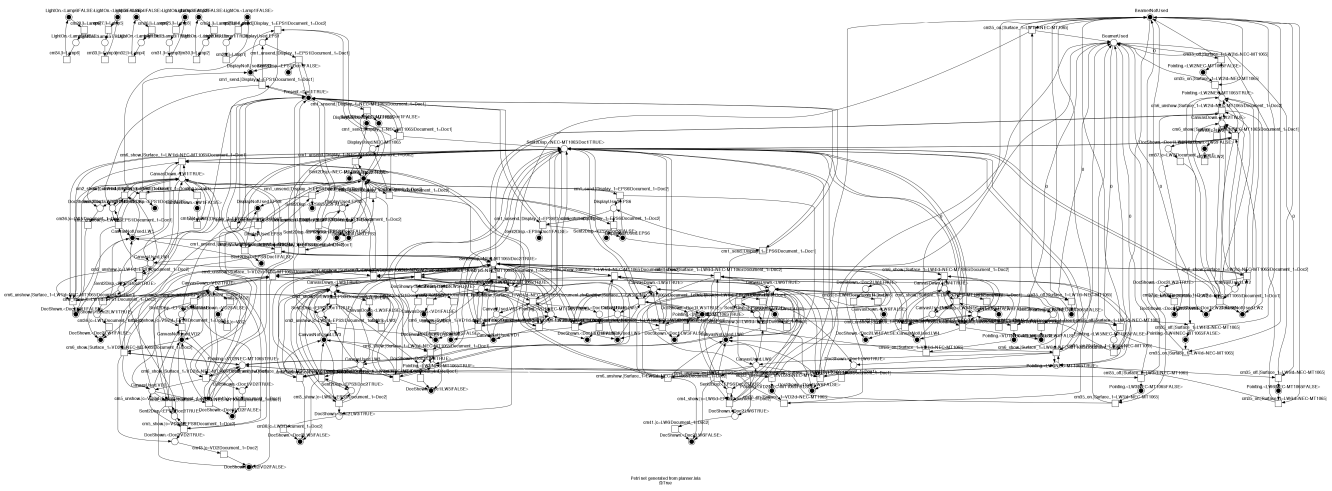
This form is a summary description of the model entitled "AI Planning" proposed for the Model Checking Contest @ Petri Nets. Models can be given in several instances parameterized by scaling parameters. Colored nets can be accompanied by one or many equivalent, unfolded P/T nets. Models are given together 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.