3. Composition and validation of multi-state automata procedure

The Hopcroft algorithm[1],[2]

```
P := {F, Q \ F};
W := {F};
while (W is not empty) do
     choose and remove a set A from W
     for each c in Σ do
          let X be the set of states for which a transition on c leads to a state in A
          for each set Y in P for which X ∩ Y is nonempty and Y \ X is nonempty do
               replace Y in P by the two sets X ∩ Y and Y \ X
               if Y is in W
                    replace Y in W by the same two sets
               else
                    if |X ∩ Y| <= |Y \ X|
                         add X ∩ Y to W
                    else
                         add Y \ X to W
          end;
     end;
end;
```

Two automata interact and create a new automata via. functional composition

Unreachable states cannot be accessed from at least one other state (apart from itself).

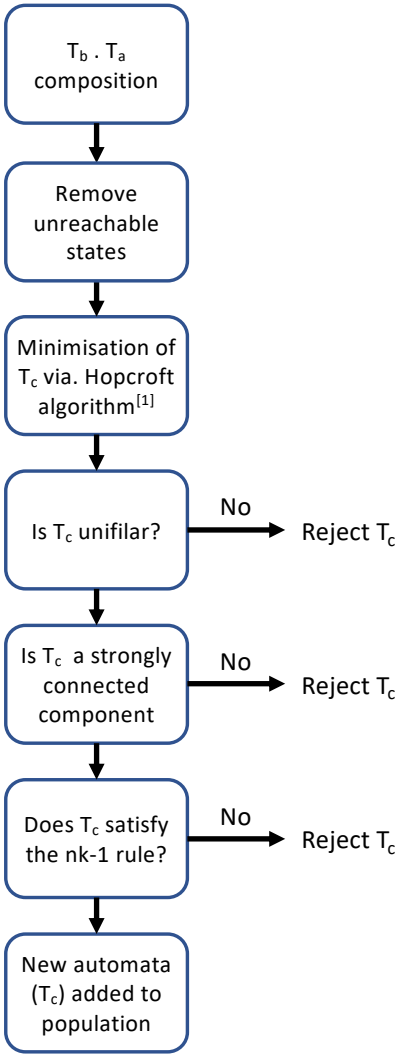
Automata activated in the previous time step emit information which is received by other membrane automata

No duplicate transitions from the same state.

All states of the automata are reachable from any state.

'nk-1' rule where 'n' number of states and 'k' the size of the alphabet processed by the automata. An automata with 'n x k' transitions is not minimal.

New automata may represent a completely new type of automata



[1] Hopcroft, J. (1971) "An *n* log *n* algorithm for minimizing states in a finite automaton", Theory of machines and computations, Proc. Internat. Sympos. Technion Haifa,1971.
[2] Pseudocode reproduced from: Wikipedia contributors. "DFA minimization." *Wikipedia, The Free Encyclopedia*. Wikipedia, The Free Encyclopedia, 19 Jun. 2018. Web. 3 Oct. 2018.