High level Petri nets
Extending classical Petri nets with color, time and hierarchy
(informal introduction)

prof.dr.ir. Wil van der Aalst
Limitations of classical Petri nets

• Inability to test for zero tokens in a place.
• Models tend to become large.
• Models cannot reflect temporal aspects
• No support for structuring large models, cf. top-down and bottom-up design
Inability to test for zero tokens in a place

“Tricks” only work if p is bounded
Models tend to become (too) large

Size linear in the number of products.
Models tend to become (too) large (2)

Size linear in the number of tracks.
Models cannot reflect temporal aspects

Duration of each phase is highly relevant.
No support for structuring large models
High-level Petri nets

- To tackle the problems identified.
- Petri nets extended with:
  - Color (i.e., data)
  - Time
  - Hierarchy
- For the time being be do not choose a concrete language but focus on the main concepts.
- Later we focus on a concrete language: CPN.
- These concepts are supported by many variants of CPN including ExSpect, CPN AMI, etc.
Example: CPN Tools
Classical net
Extension with color

```
1. ("John", 0) ++
1. ("Mary", 0)

1. ("John", 0) ++ 1. ("Mary", 0)

alive

Person

(n,a)

(birthday

(n,a)

death

[a > 65]

(n,a)

dead

Person
```
Extension with time
Hierarchy