



FAKULTÄT FÜR  
INFORMATIK

# Applied Discrete Modelling

Proxel Simulation - Examples

## Example: The Weather Example

There are two weather conditions: sunny and cloudy

A sunny period lasts from  $\frac{1}{4}$  to  $\frac{1}{2}$  day uniformly distributed

A cloudy period lasts always exactly  $\frac{1}{2}$  day

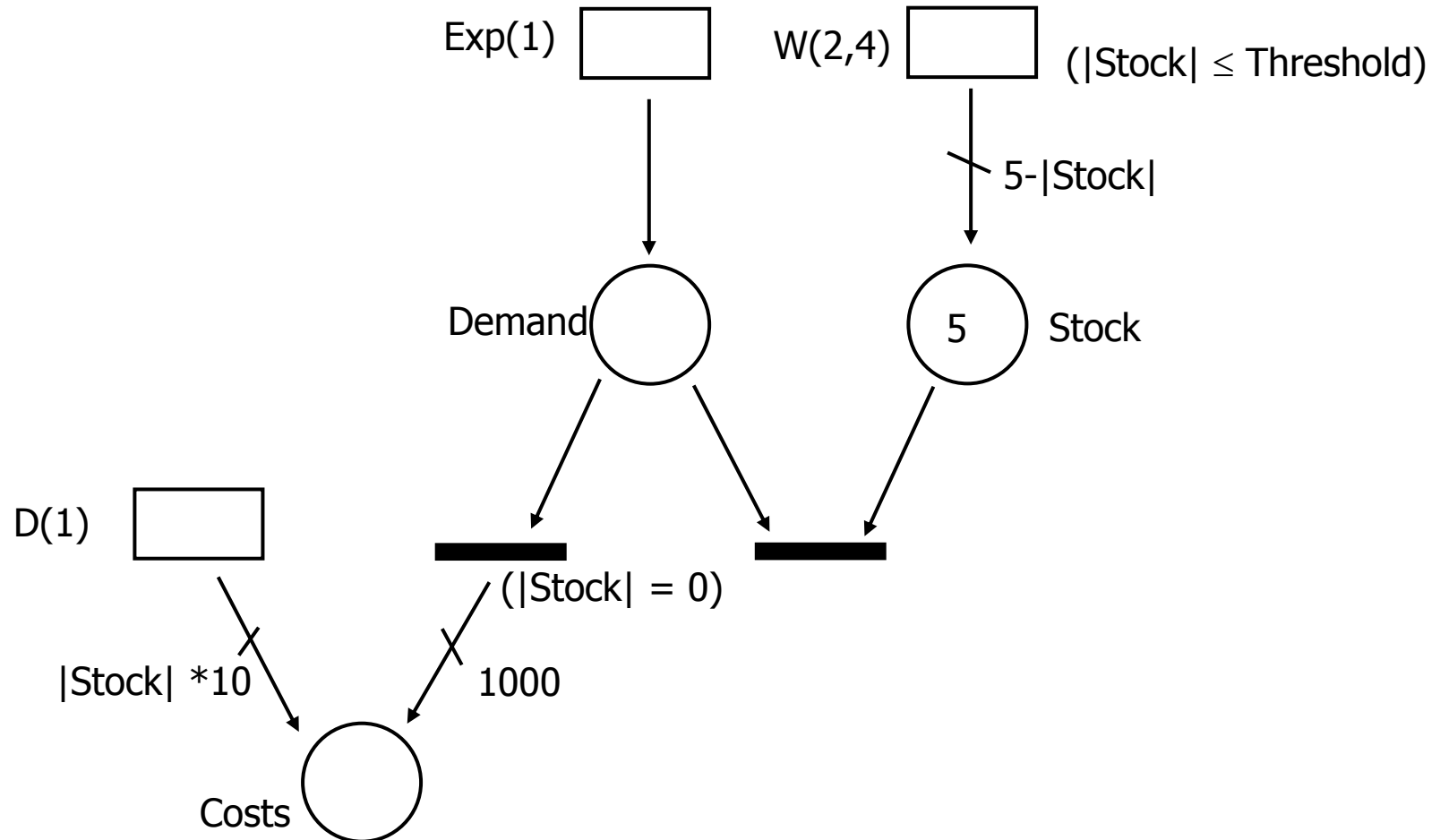
# Example: Inventory System

We are interested in simulating an inventory

The real system:

- Maximum stock level = 5 items
- Items are removed (singly) at intervals  $\sim \text{Exp}(1 \text{ day})$
- Cost of holding each item in store = 10 €/day
- When stock  $\leq$  threshold, replacements are ordered
- The replacements take Weibull(2,4) days to arrive
- Replacement refills the store completely
- Cost of not being able to provide an item = 1000 €

# The Petri Net



## Example: Vehicle Warranty Model

1. Mileage per year of a vehicle  $\sim$ Weibull ( $\alpha=4500, \beta=1.5$ )
2. Vehicle component fails has average  $10^{-5}$  failures per mile.
3. Each failure generates repair costs of \$1000.
4. Under warranty  $\rightarrow$  costs will be paid by manufacturer.
5. Warranty runs out after a specific number of years or number of driven miles, whatever is reached first.
6. Multiple different warranty packages are available

Mileage	5000	10000	15000	20000
Years	1	2	3	4

$\rightarrow$  estimate the average repair costs  $\rightarrow$  price of the warranty package to accuracy \$0.01.