

Example: Inventory System

We are interested in simulating an inventory

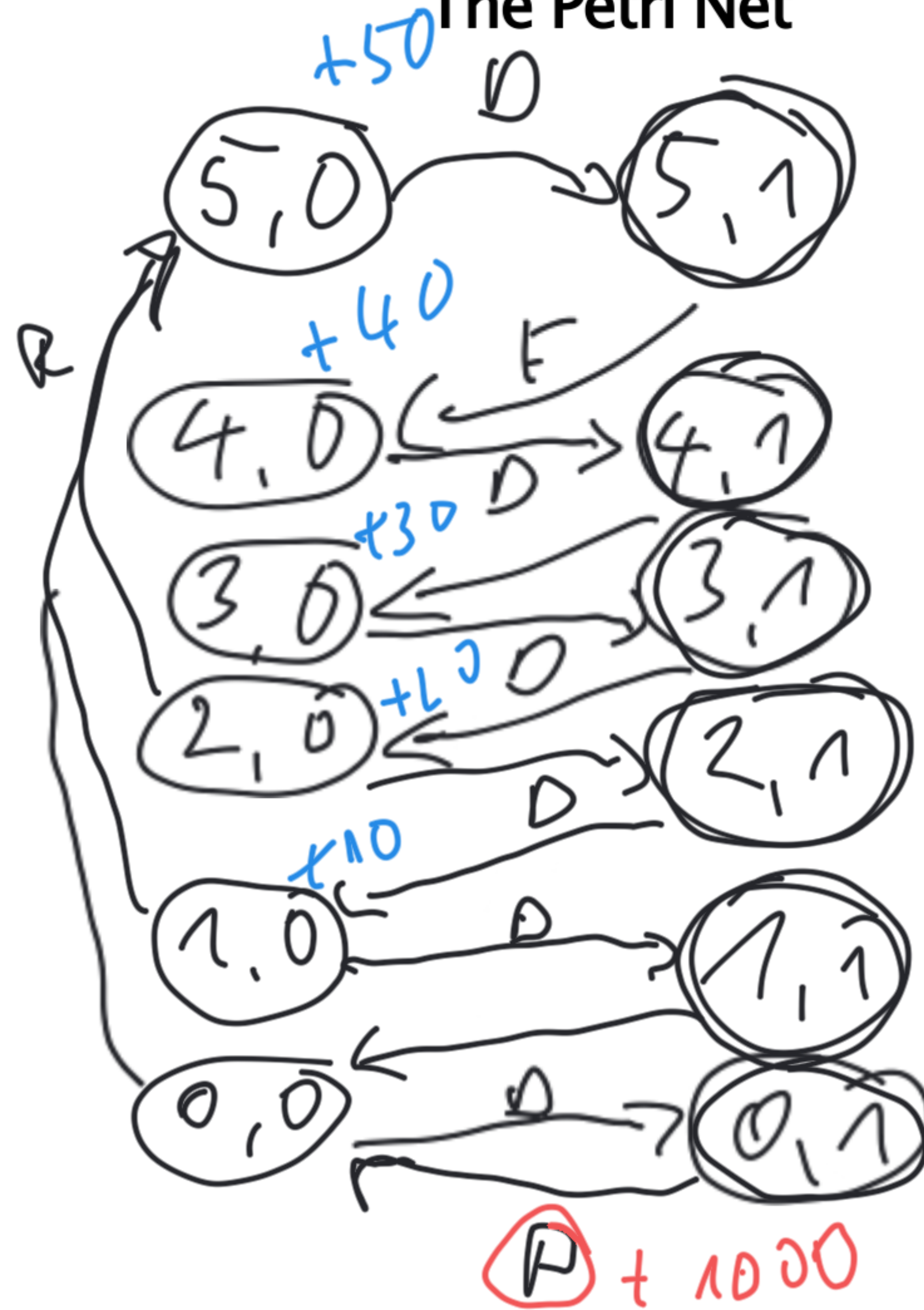
The real system:

- 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 €

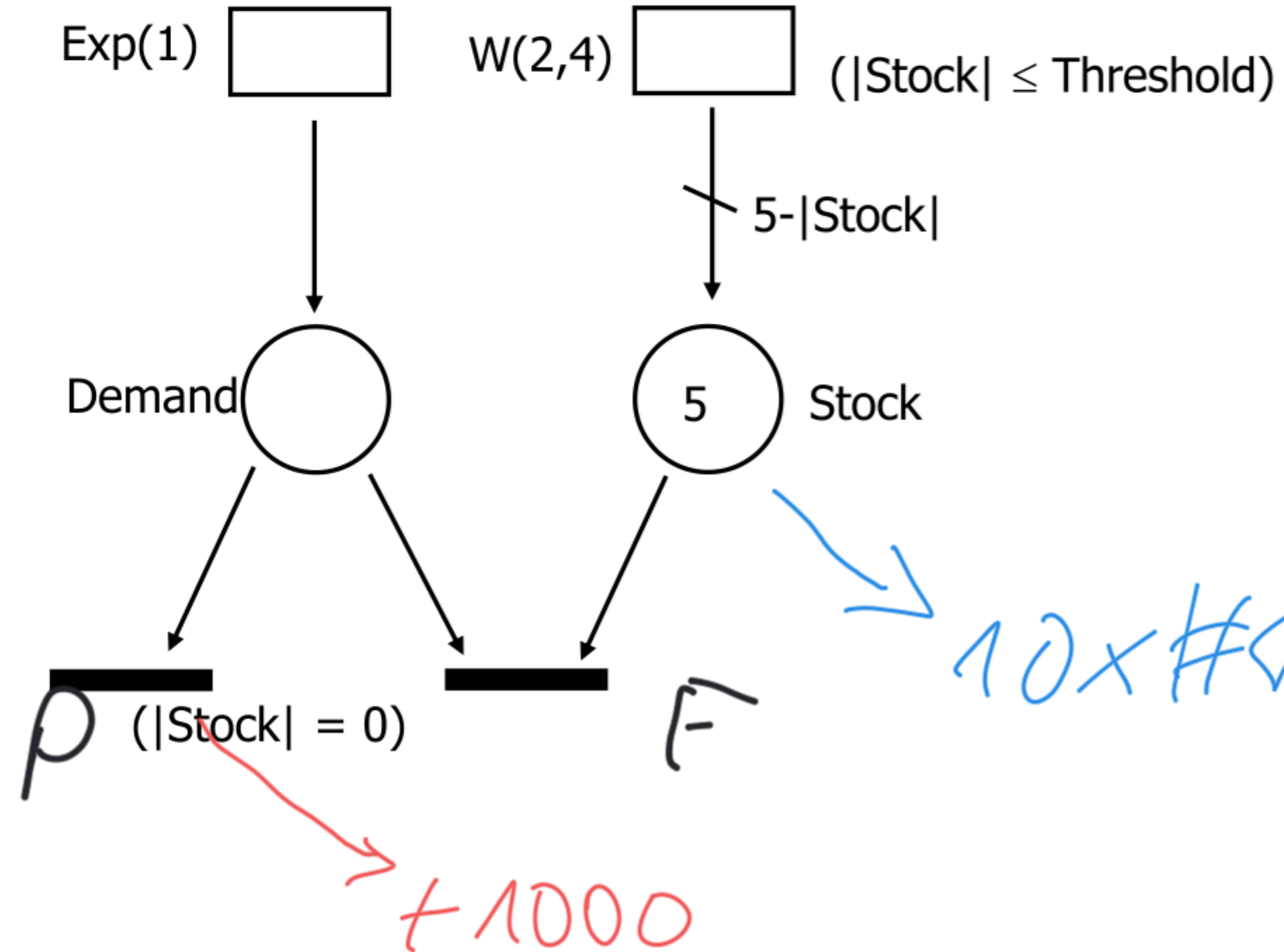
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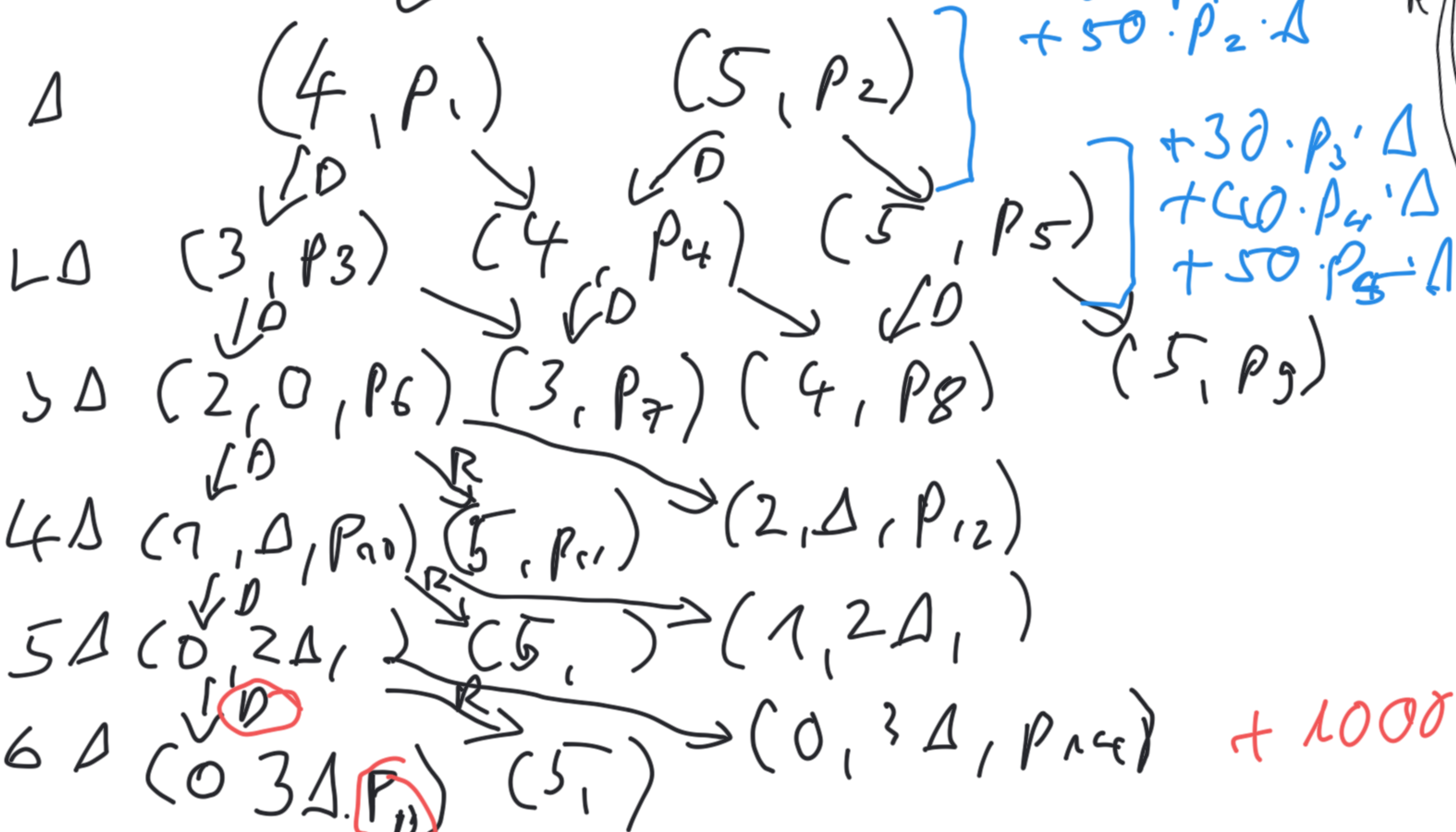


$$T(t=2)$$



$$t = 0$$

$$(5, -, 1) + 50 \cdot \Delta$$



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 \$1 000.
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.