

*Introductory Tutorial I*

**Informal Introduction to Petri Nets**

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- Preface:
- history of Petri Nets
  - structure of the tutorial

- Petri Nets:
- an example
  - passive and active components
  - dynamic behavior
  - conclusion

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**Preface**

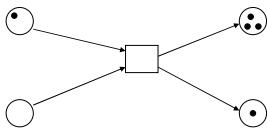
starting point:

Carl-Adam Petri  
*Kommunikation mit Automaten*  
PhD 1962

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In the 1970ies:

*Place / Transition Nets*

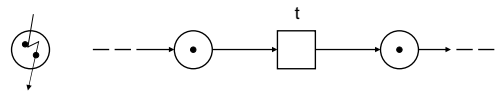


many tokens at a place

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meanwhile also important:

*elementary net systems*

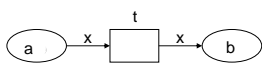


at most one token at a place

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A sophisticated net model:

*high-level nets*

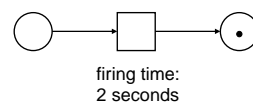


tokens are individual items

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important for applications:

*timed and stochastic nets*



transition takes time

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hence the structure of the tutorial:

G. Rozenberg:  
Elementary Net Systems

(J. Desel, W. Reisig) K. Schmidt  
Place / Transition Nets

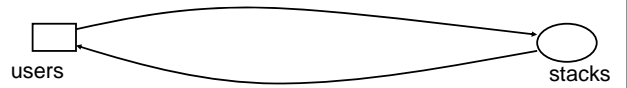
K. Jensen:  
High Level Nets

S. Donatelli:  
Timed and Stochastic Nets

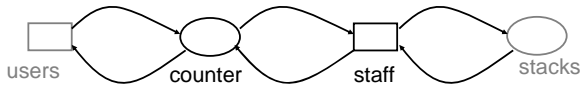
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## Petri Nets

### 1. An Example: A library



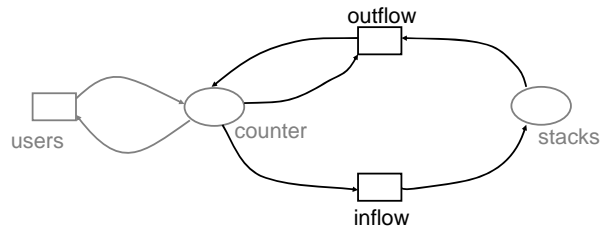
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arrows denote direct connection  
access

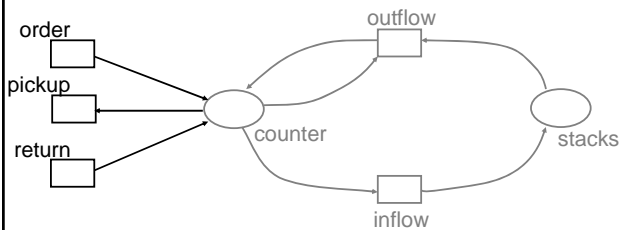
hence: users have no direct access to the stacks

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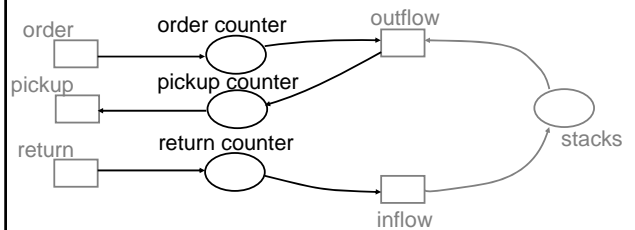
○ passive component  
□ active component

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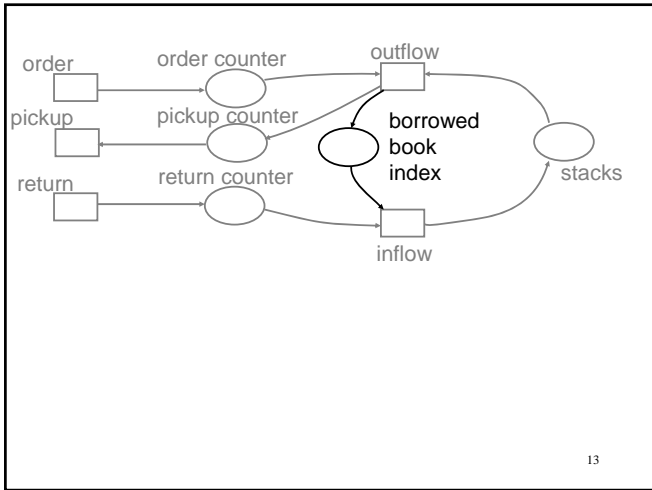


different activities of users

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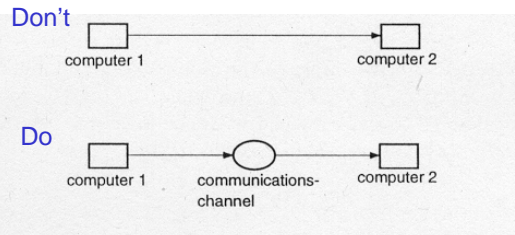
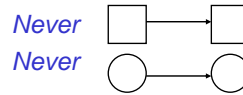
## 2. Passive and Active Components

- |   |   |
|---|---|
| <p><b>P</b> passive component</p> <ul style="list-style-type: none"> <li>- stores items (goods, information, bits...)</li> <li>- makes items visible</li> </ul> | <p><b>T</b> active component</p> <ul style="list-style-type: none"> <li>- changes passive components</li> <li>- produces items</li> <li>- consumes items</li> <li>- transports items</li> </ul> |
|---|---|

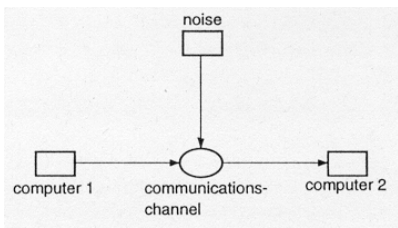
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- no system component but
- abstract relation between components
  - logical connection
  - access right
  - physical proximity
  - direct message link

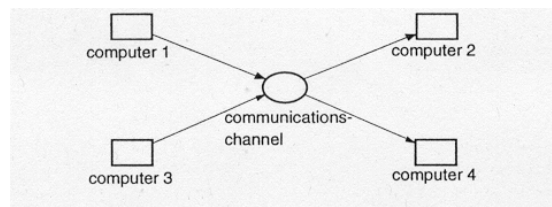
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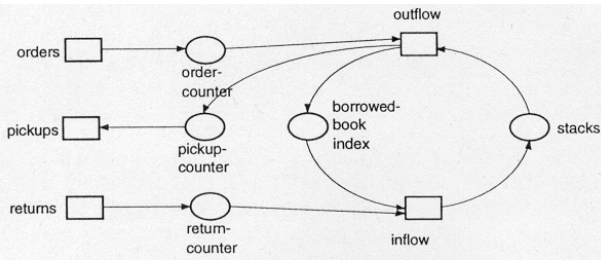


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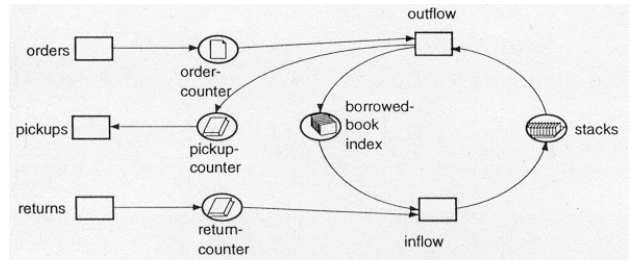


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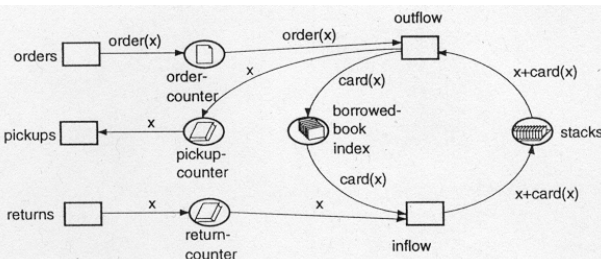
### 3. Dynamic Behaviour



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### Conclusion

#### Principles of System Design with Petri Nets

- separate passive and active components
- indicate logical, functional, abstract relations

- refine until dynamics can be expressed by the token game

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