

Theorie – Formale Methode CSP

- Standard Formalisms
- CSP-Processes
- Operational Semantics
- Traces Semantics
- Failures and Divergences Semantics

Standard Formalisms

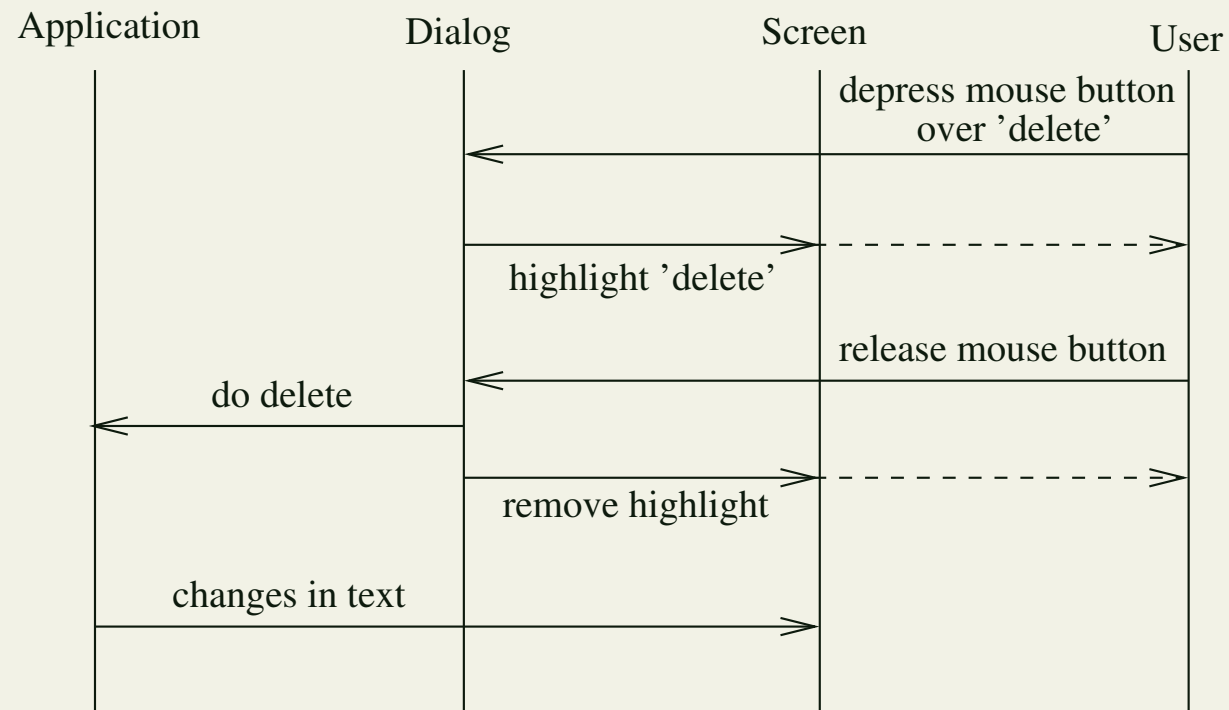
- Specification of interactive systems
 - Formal notations for communication: syntax and semantics
 - Formal notations for analysis: model-checking and verification
- Model-oriented notations (example Z)
describe the system's states and operations
- Temporal and denotical logics (example TL)
describe when things happen and who is responsible
- Process algebra (example CSP)
describe the effects of sequences of actions

CSP Processes

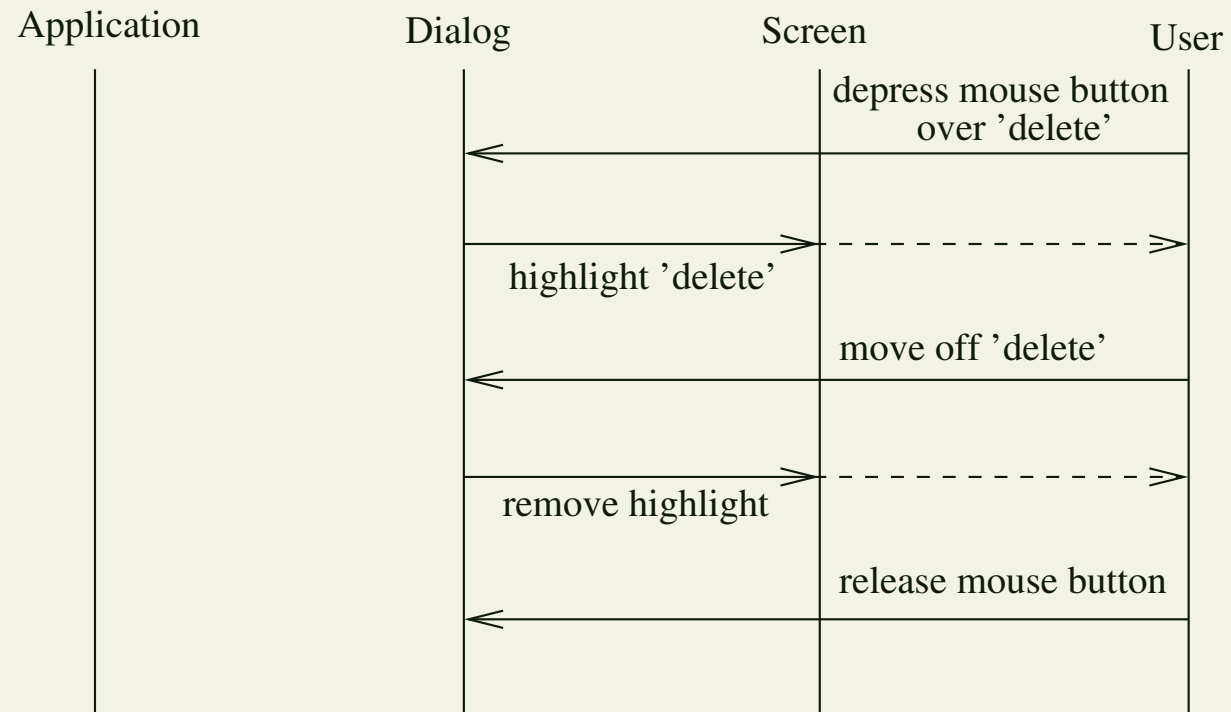
- Motivation
- Fundamental operators
- Parallel operators
- Hiding and renaming
- Termination and sequential composition

Motivation: Drücke 'delete'-Button

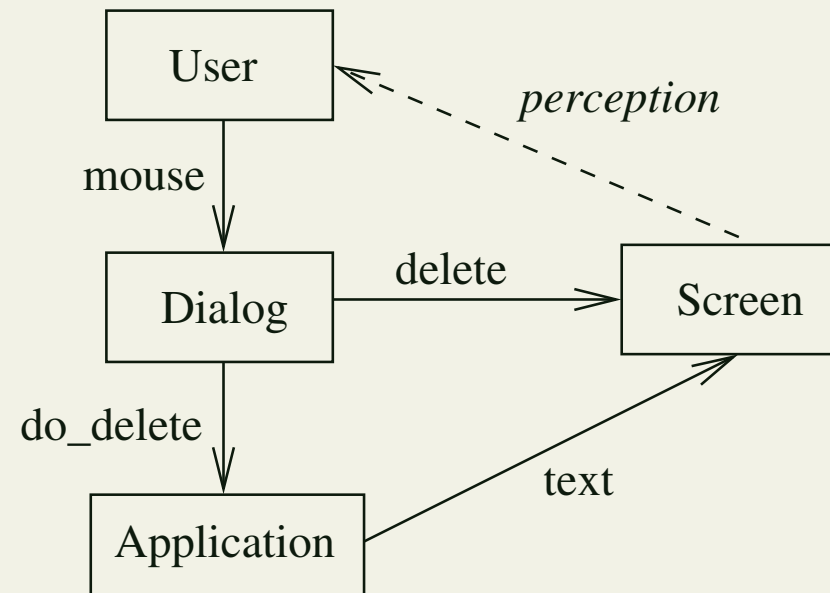
- Button getroffen



- Button nicht getroffen



- Interaktion zwischen Komponenten



- Eine CSP-Spezifikation

- Definition der Aktionen an Mouse-Button, 'delete'-Button and Text

```
datatype MOUSE_BUTTON = depress | release | move_off  
datatype DELETE_BUTTON = highlight | remove_highlight  
datatype TEXT = change | not_change
```

- Spezifikation der Interaktionskanäle

```
channel mouse: MOUSE_BUTTON  
channel delete: DELETE_BUTTON  
channel text: TEXT  
channel do_delete
```

- Spezifikation der Komponenten

```
User = mouse.depress ->
      (mouse.release -> SKIP
       []
       mouse.move_off -> mouse.release -> SKIP)
```

```
Screen = delete.highlight -> delete.remove_highlight ->
        (text.change -> SKIP [] SKIP)
```

```
Dialog = mouse.depress -> delete.highlight ->
         (mouse.release -> do_delete
          -> delete.remove_highlight -> SKIP
          []
          mouse.move_off -> delete.remove_highlight
          -> mouse.release -> SKIP)
```

```
Application = do_delete -> text.change -> SKIP  
            []  
            SKIP
```

- Spezifikation der Interaktion

```
SYS = ((User [|{ mouse |}] Dialog)  
      [|{ delete |}] Screen)  
      [|{ text, do_delete |}] Application
```

- Korrektheit

- ▷ Button getroffen

```
SCREEN_HIT = mouse.depress -> delete.highlight  
            -> mouse.release -> do_delete  
            -> delete.remove_highlight  
            -> text.change -> SKIP
```

- ▷ Button nicht getroffen

```
SCREEN_MISS = mouse.depress -> delete.highlight  
            -> mouse.move_off -> delete.remove_highlight  
            -> mouse.release -> SKIP
```

- ▷ Aussagen

```
assert SYS [T= SCREEN_HIT  
assert SYS [T= SCREEN_MISS
```