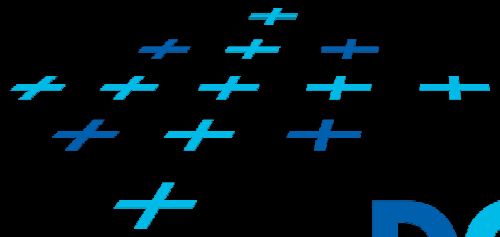


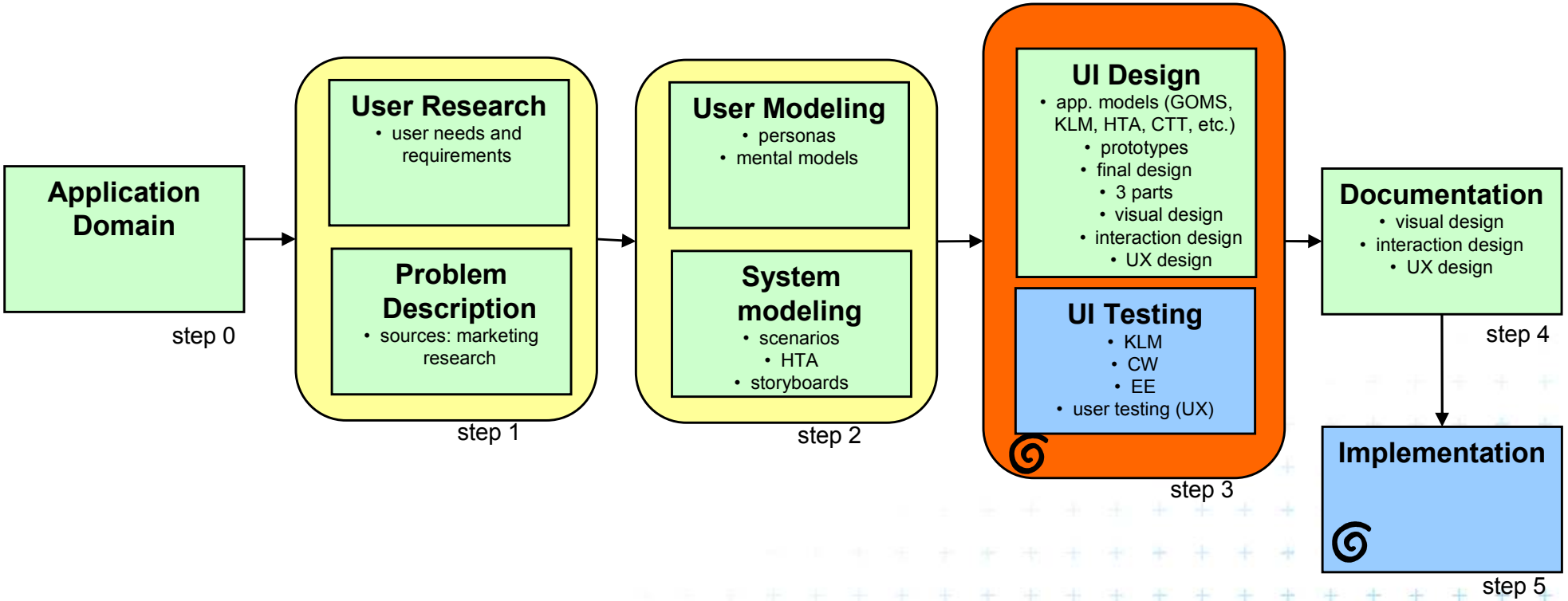
DCGI

DEPARTMENT OF COMPUTER GRAPHICS AND INTERACTION

NUR - Prototyping & Evaluation

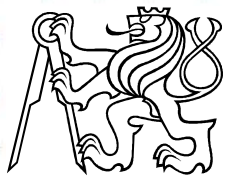
High Fidelity Prototyping, Usability evaluation

User interface design - big picture



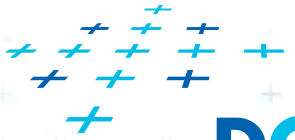
Prototyping

High fidelity prototyping



High fidelity prototype

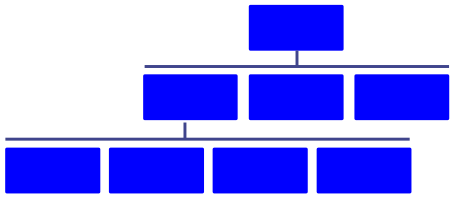
- Illusion of final visual and interaction design
  - look&feel should follow the basic GUI guidelines
    - e.g., MS Windows, iPhone, Mac OS, Android
  - usage of target devices
    - e.g., iPhone NOT web app. on desktop PC
  - interaction realized in the same way as final implementation
    - e.g., gestures and virtual keyboard for iPhone NOT mouse and PC keyboard
- Application logic **not** necessarily implemented
  - Wizard of Oz, usage of illustrative data, simulation of the application logic
- Main parts of the application UI application implemented
  - not all parts/details of the applications are prototyped
  - horizontal vs. vertical prototype

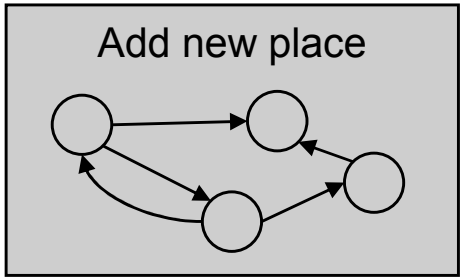


What must be done before

- User research and problem analysis (D1)

- Problem description, UI modelling (D2)
  - HTA, STN





- Low fidelity prototype (D3)
  - not necessary, but recommended
    - e.g., small upgrade of existing system

Catch&Run

GPS based multi-user mobile game

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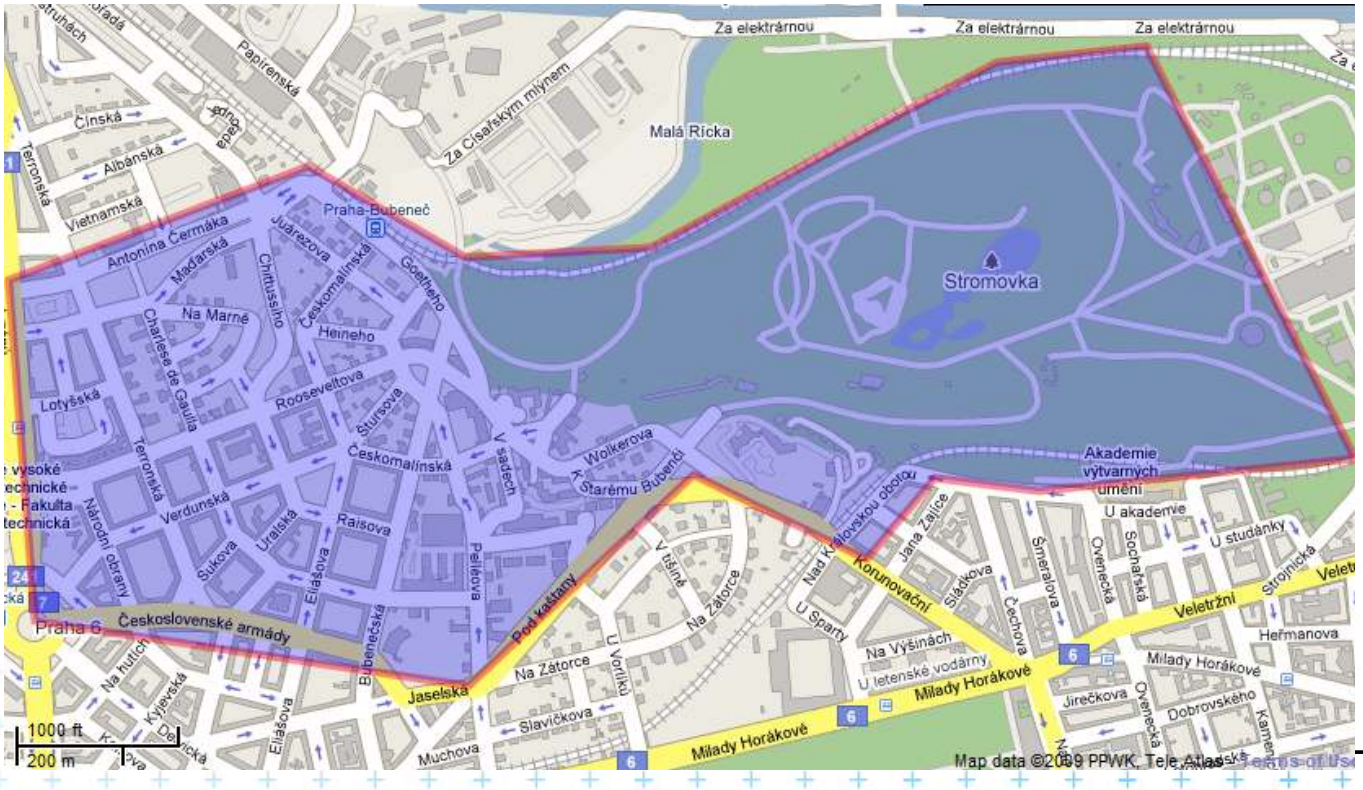
Game description

- GPS game in real environment
- Players are catching each other

- Defined game area
- Three states
  - idler ... waiting for the chase
  - catcher ... catching runner
  - runner ... run out of catcher



Mid-fidelity prototype

- Web applet
- GPS simulator
- Static data
- Simulation of collaboration

- Remote testing
- 99 participants

High-fidelity prototype

- Application running on the mobile device
- Usage of target framework
- Collaboration server implemented

- Field test
- 6 participants

- http://www.youtube.com/watch?v=zZesDMB7eqs

BTour Guide

Mobile City Tourist Guide

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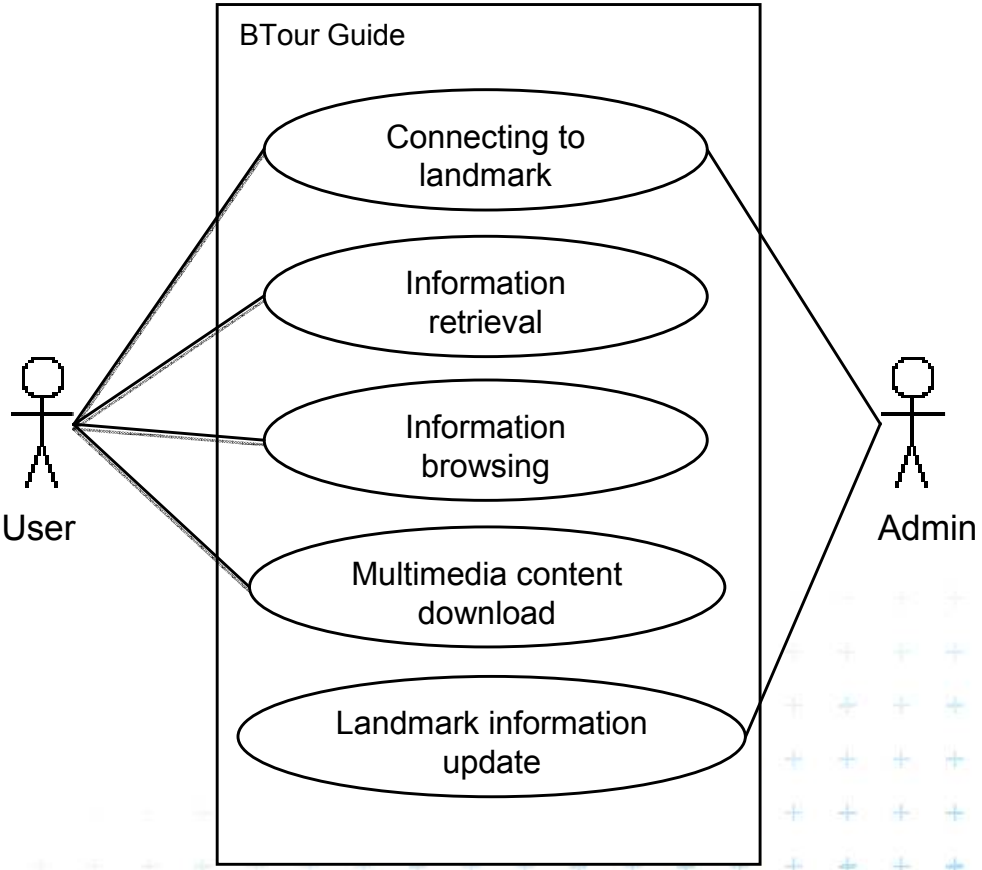
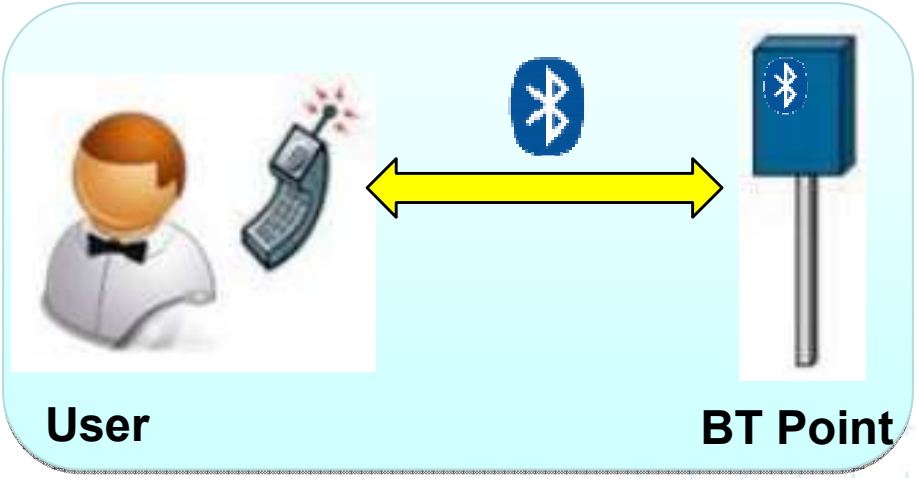
Btour Guide – description

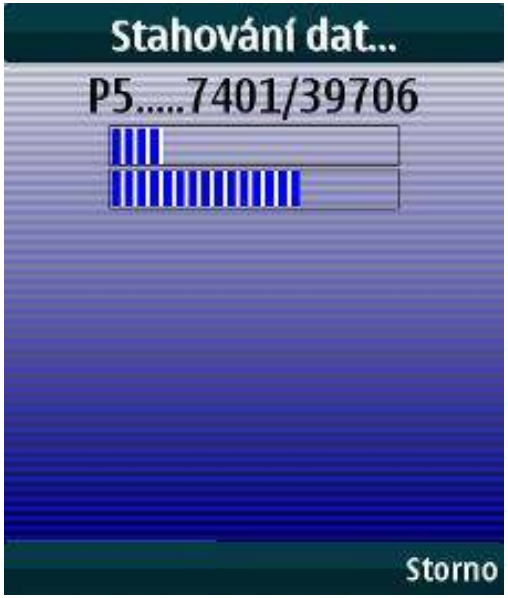




High-fidelity prototype

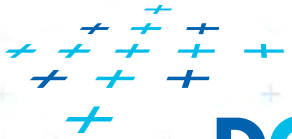
- Application running on the mobile device
- Target framework used
- BT points implemented (HW+SW)

- No implementation of solutions of "trouble" scenarios



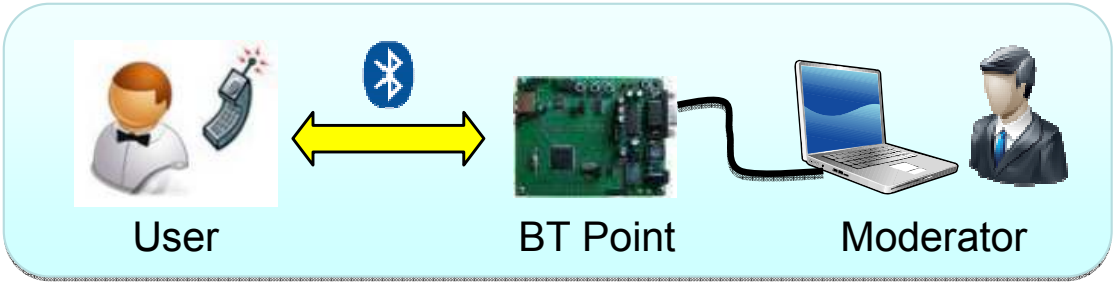
"Trouble" scenarios

- Scenario 1
  - slow and background download
  - necessity for repeat browsing
- Scenario 2
  - problems with BT point connection – signal strength is low, necessity to locate BT point
  - waiting for complete download
- Scenario 3
  - problems with BT point connection – connection refusal, BT point is busy
  - transparent download, no info to the user
- Scenario 4
  - download on demand
  - problems with BT point connection – connection interrupted



"Trouble" scenarios implementation

- Simulation of trouble situations



- Special client and server implemented
- Wizard of Oz technique

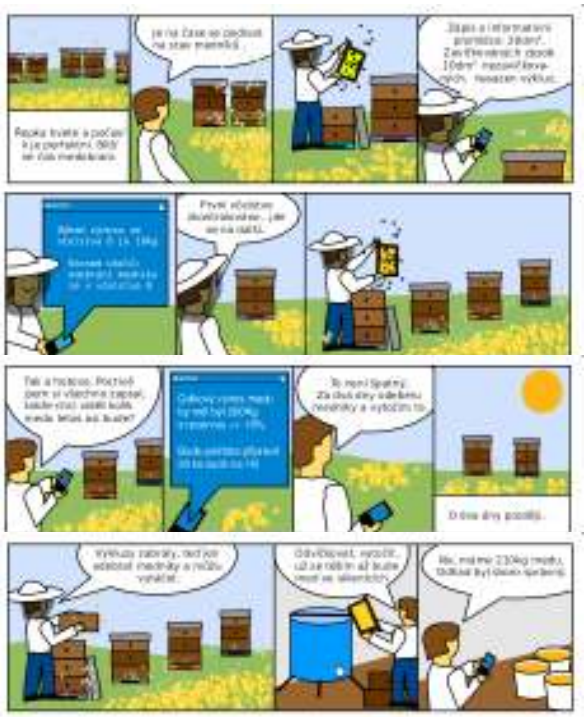
BEEPER MOBILE

Mobilní systém pro podporu včelařské práce

http://benman.ondramandik.com/beeper-pro-mobilni-zarizeni

DCGI

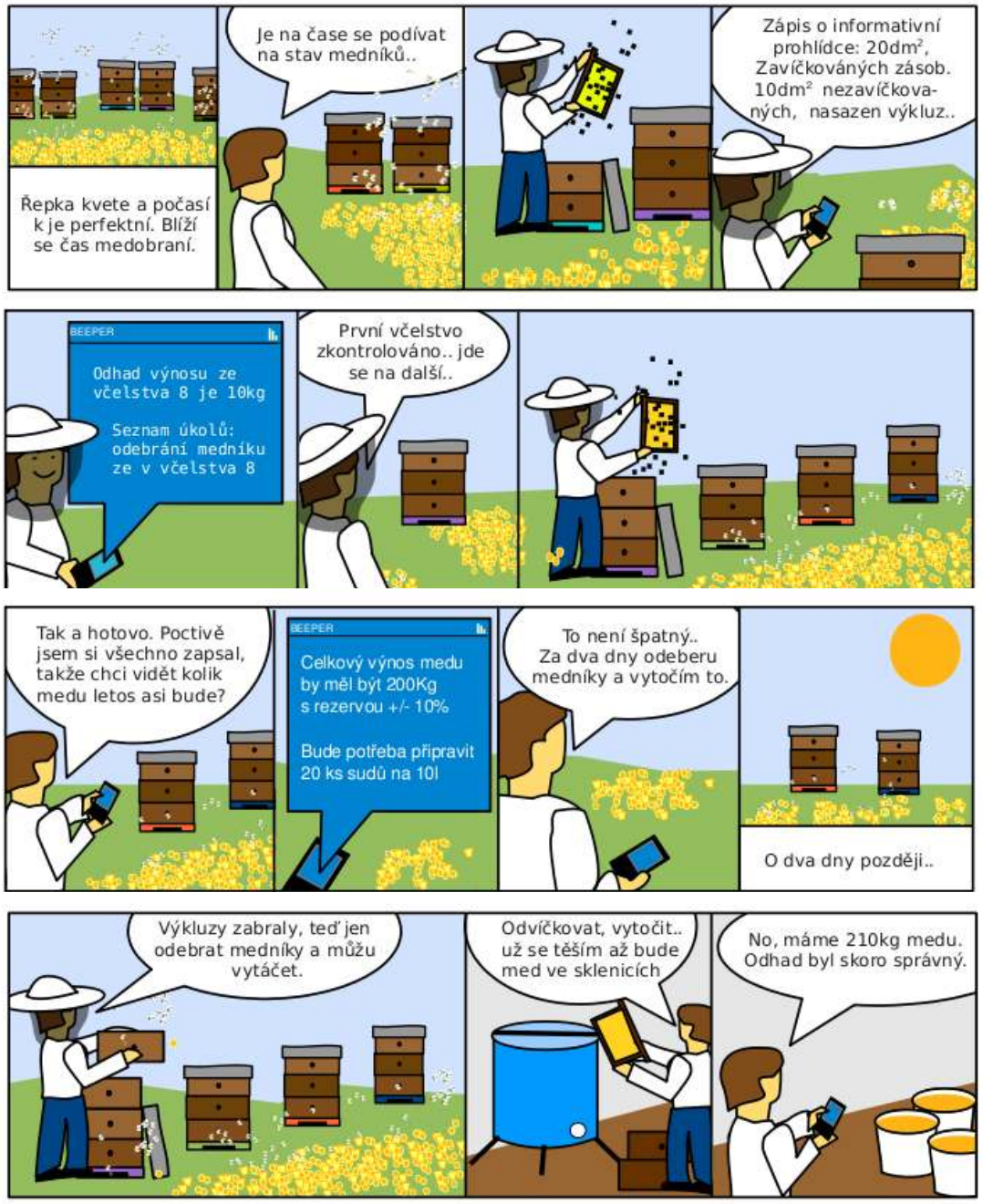
From Storyboard to HiFi Prototype



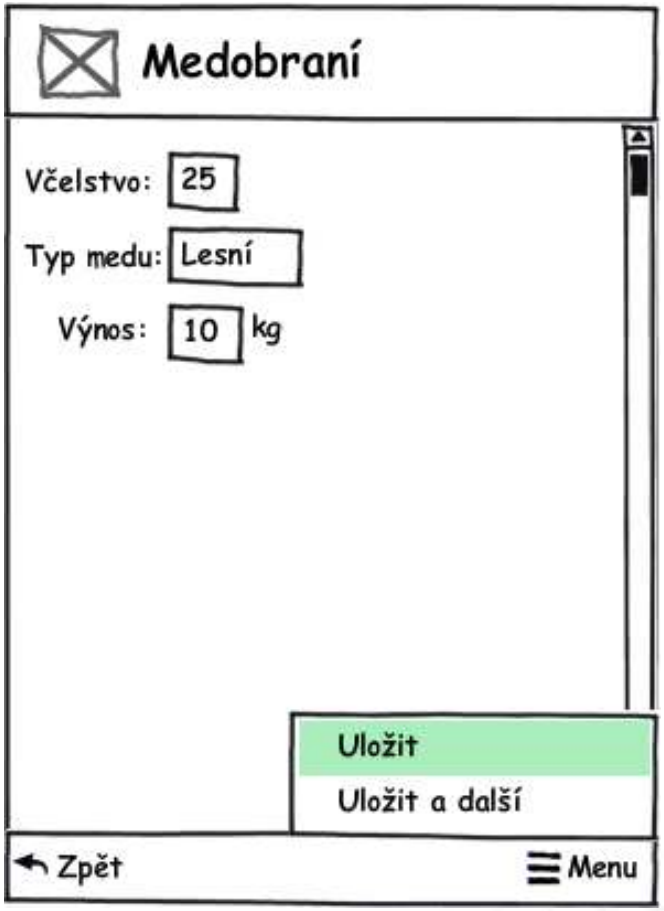
Storyboard | LoFi Prototype | HiFi Prototype

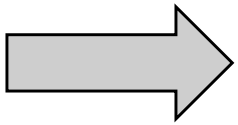
- Rozdělení na akce a zobrazování informací, je nutné přepracovat nebo úplně vypustit.
- Je třeba rozdělit storyboard o tvoření nových včel, tak aby nedošlo k záměně termínu oddělek a smetenec.
- Je nutné znovu navrhnout uživatelské rozhraní pro správu včelařského inventáře.
  - Pracovat pouze s nástavkovým systémem, rámky a polorámky. Odstranit složitý systém nastavování rozměrů.
- Do oblasti léčení včelstev vůbec nevstupovat.
- Produkce medu musí evidovat všechny včelařské produkty.

Storyboards: 11 storyboards



LoFi -> HiFi Prototype





38 screens

LoFi -> HiFi Prototype

38 screens

Field tests

Intelligent household (i2home)

Intelligent household for elderly

http://www.i2home.org

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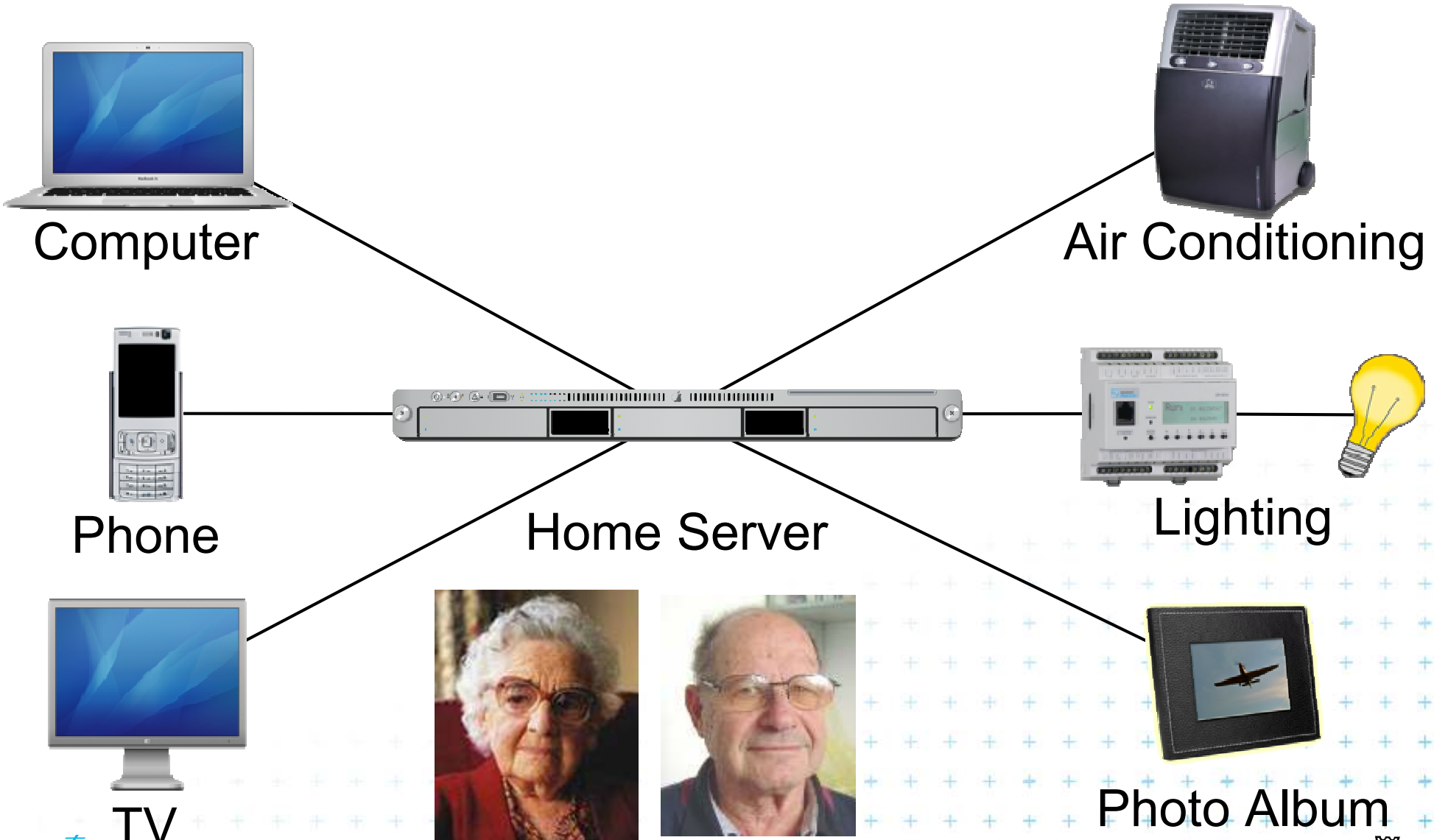
Intelligent household - description



Intelligent household - description

- bringing technology closer to elderly people
  - help them to stay with touch with relatives
  - make them less dependent on others
- make technology easier to use
  - evaluating new interaction methods
- rapid UI development with UIProtocol
  - from prototype to final application

High-fidelity prototype of TV and household

TV remote control


BLANKA


BLANKA

Somebody is ringing the bell

Now you can talk

Low vs High fidelity prototype

- LOW FIDELITY
- hours/days to develop
- many alternatives
- no final interaction techniques
- not on target devices
- sketchy look&feel
  - paper/electronic paper
- lab tests

- HIGH FIDELITY
- days/months to develop
- few alternatives (if any)
- final interaction techniques
- on target devices
- final visual and interaction look&feel
  - target framework or testing environment running on target platform with final look&feel
- lab or field tests

Problems with prototypes

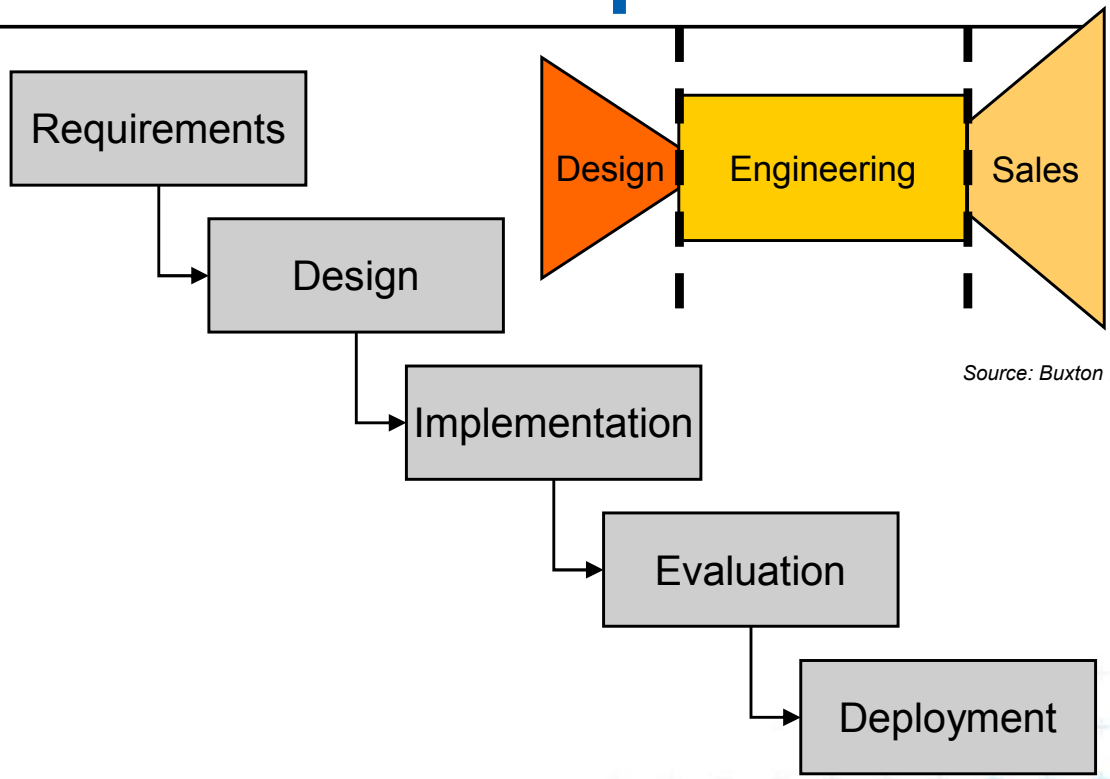
- skipping deep user requirements analysis (D1)
  - especially low-fid prototypes (very fast and funny)
- user confusion: prototype vs. final project
  - especially high-fid prototypes
- expensive and time consuming
  - especially high-fid prototypes
  - highly interactive systems
  - real-time response to highly changing environment

Types of prototyping

- Throw away prototyping
  - light-weight
  - short-time usage
- Evolutionary prototyping
  - very robust
  - constantly refined

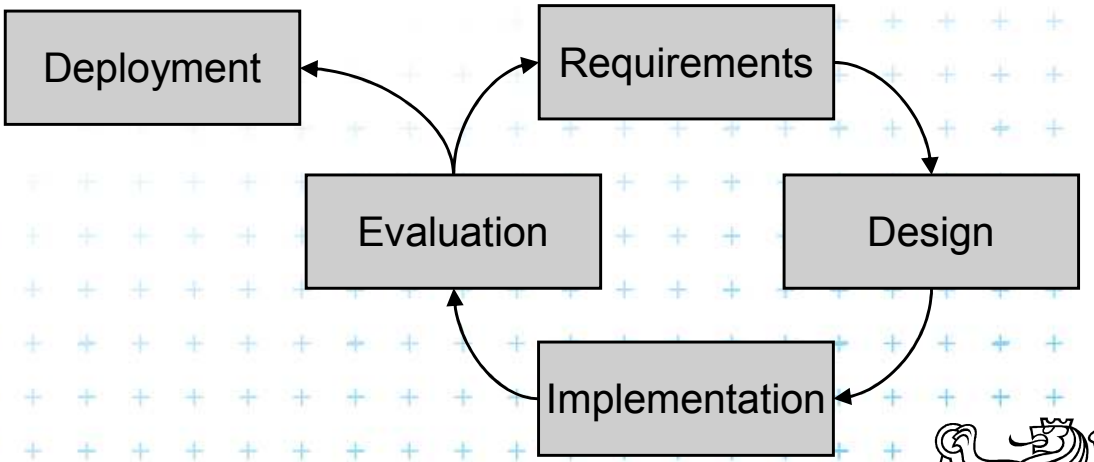
Prototyping as a part of SW dev. process

- Waterfall
  - in design phase
  - not evaluated
  - serves as specification
    - rather then text description
- Iterative
  - in implementation phase
  - can be evaluated
  - design perceived as a part of implementation



Source: Buxton 2007

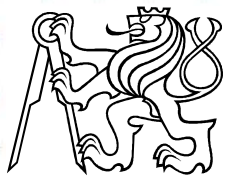
- In fact we can/should do prototyping in every stage continuously



- HOW? The role of evaluation must be revised?

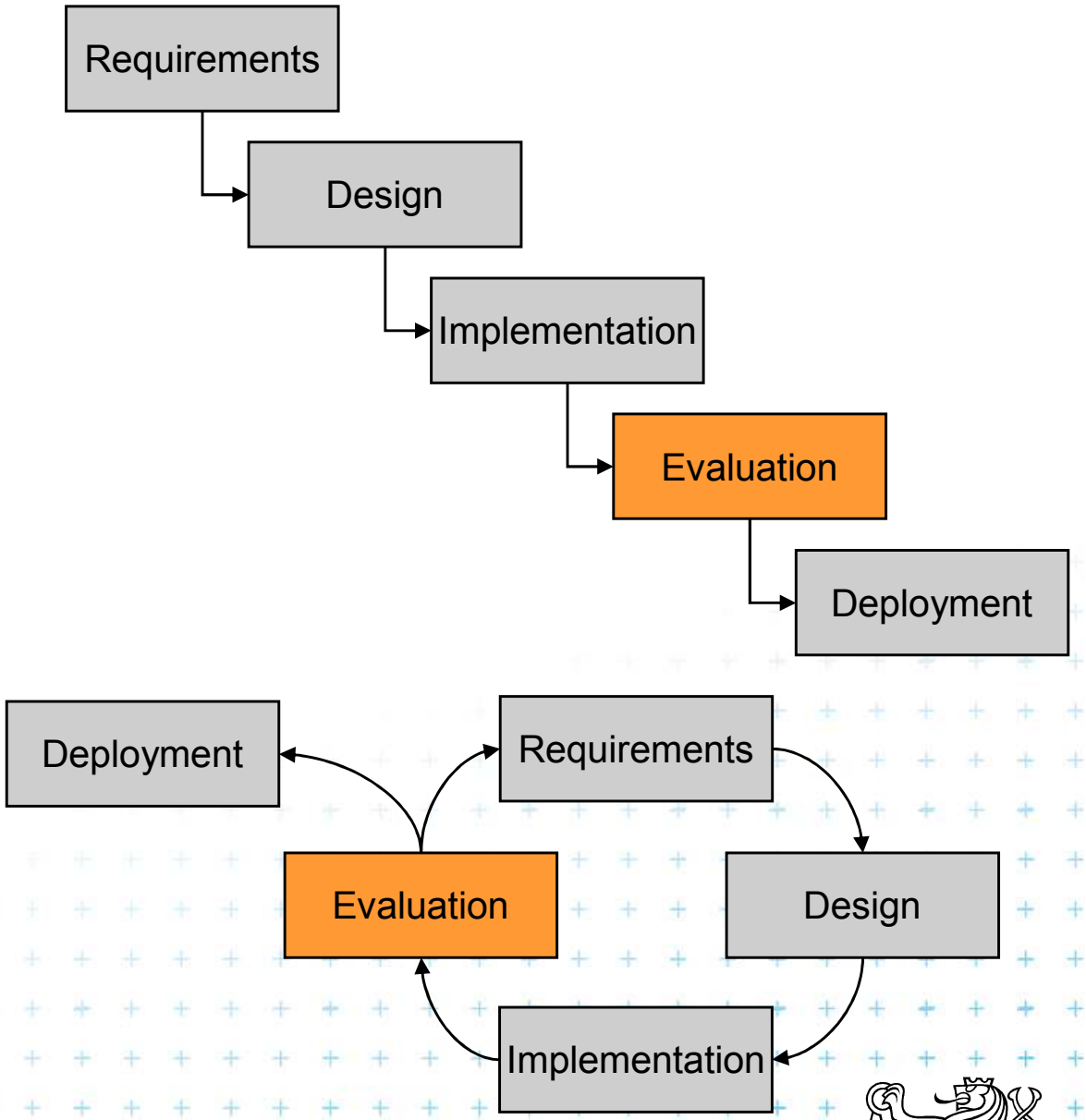
Evaluation

Formative usability evaluation



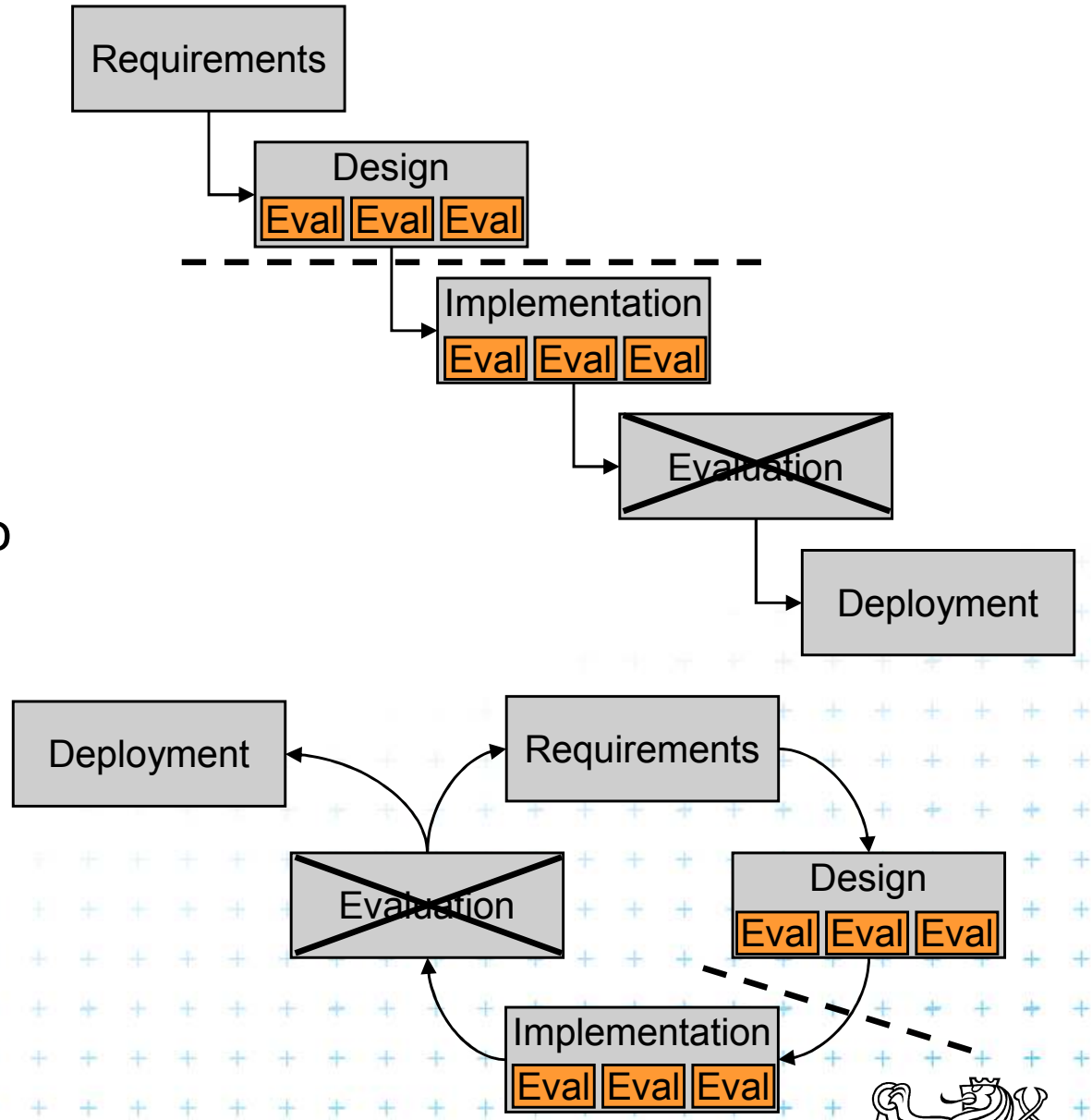
Evaluation supporting the design process

- Summative
  - at the end of SW design process



Evaluation supporting the design process

- Summative
  - at the end of SW design process
- Formative *[Hix and Hartson, 1993]*
  - supports the overall SW design process
  - helps form the solutions to the design problems
  - continuous evaluation
  - strict distinction of Design and Engineering



Usage of prototypes for evaluation

- Analytical evaluation
  - based on simulation
  - GOMS, KLM, CW, HE
- Empirical evaluation
  - user tests
  - prototypes needed

Formative evaluation methods

- Learning from designing prototypes

- Informal user tests of low-fid prototypes
- Laboratory user tests
  - all kinds of prototypes
  - controlled conditions
  - statistical evaluation possible
- Field tests with users
  - mid/high fidelity prototypes
  - some tests can be done here only
    - collaboration
    - intensive interaction with the dynamically changing environment

Performing evaluation

- Focus evaluation on few specific requirements
  - performance requirements are easy to evaluate

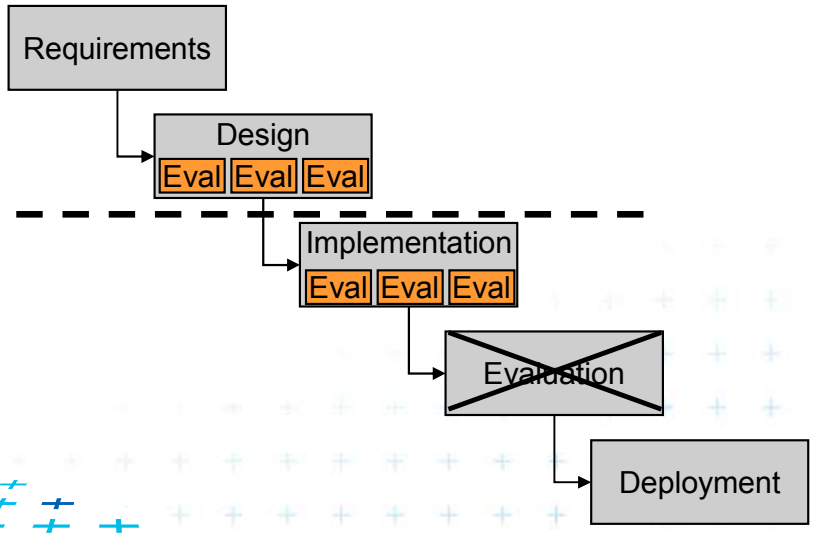
- 1. Usability properties identification (specific requirements)
- 2. Prototype creation
- 3. Experiment design
- 4. Test run and data collection
- 5. Data analysis
- 6. Conclusions and recommendations statement

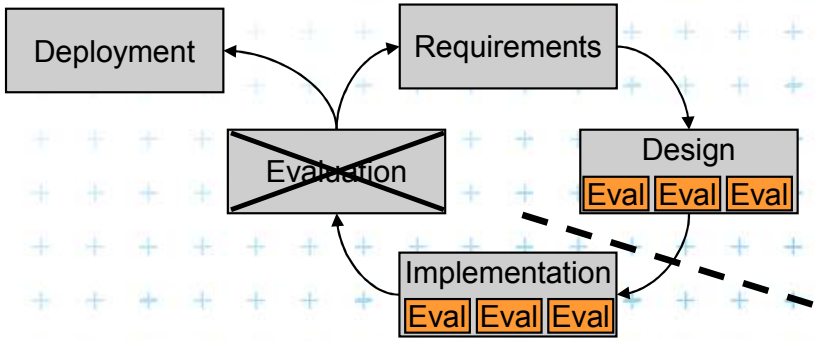
Performing evaluation - problems

- 3. Experiment design
  - poor choice of task mix => indistinguishable results
  - wrong choice of participants => misleading results
    - unaware mixing novice and expert users can seem like design improvement
  - accidental changes in the test conditions => insignificant or misleading results
    - large spread of measured values => insignificant results
    - shift of measured values => misleading results
- 5. Data analysis
  - analysis of test condition influence on the data measured
  - analysis by more evaluators

Evaluation of interactive system

- Do we need prototypes for evaluation?
- YES. Why?
  - user testing needed (empirical evaluation)
  - without prototypes it is impossible
- => Formative evaluation involves prototyping in all stages of the SW design process





Thank for your attention