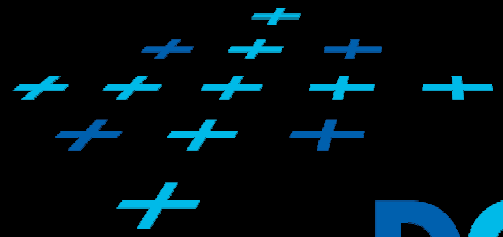


DCGI

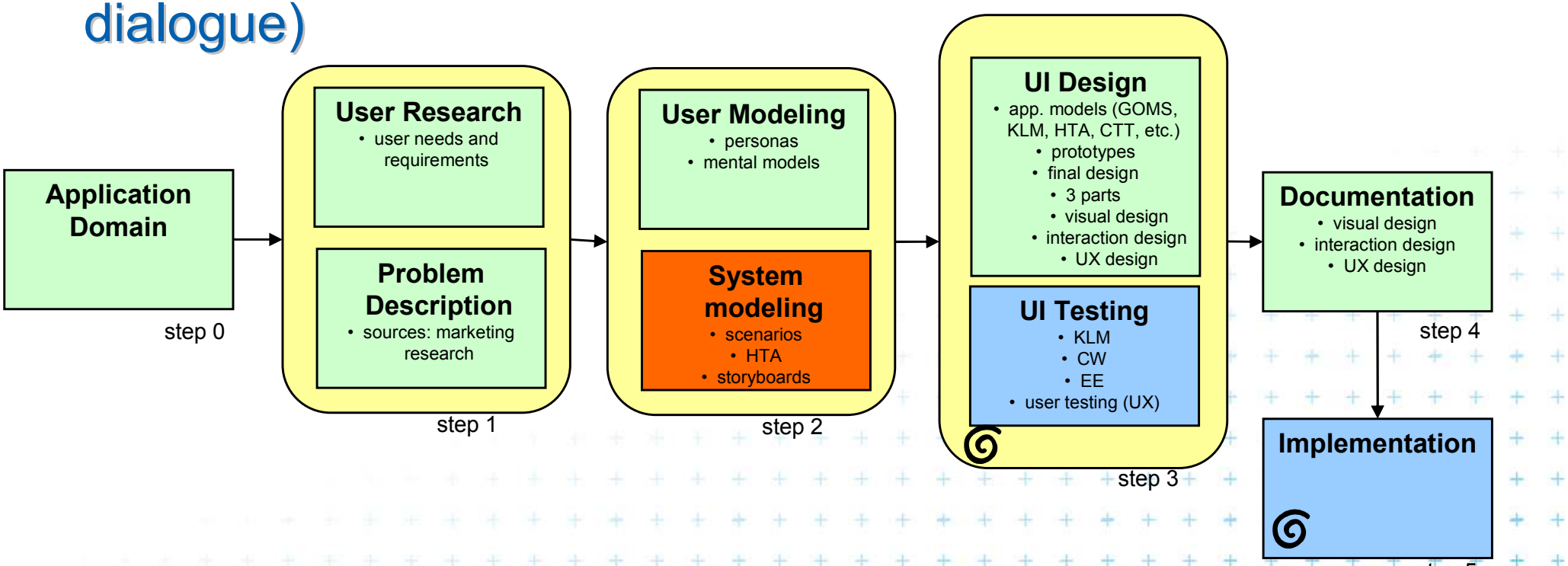
DEPARTMENT OF COMPUTER GRAPHICS AND INTERACTION

NUR- Formal description/models of user interfaces

Task models

User requirements

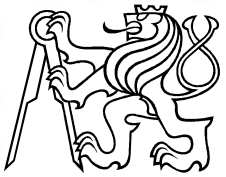
- Analysis of user activities (task analysis)
- Description of the course of the dialogue. The description will be used to the subsequent implementation of UI (methods of formal description of dialogue)



Some terminology

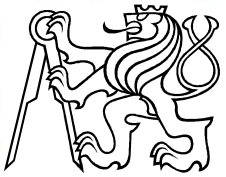
Goals vs. Tasks vs. Actions

- Goal
  - end result to be achieved
- Task
  - structured set of related activities undertaken in a sequence
- Action
  - one step or action performed (part of a task)



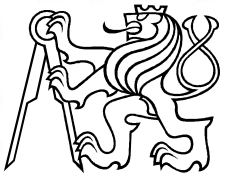
Describing Tasks and Requirements

- HTA form of Task Analysis
- Stories (from Extreme Programming)
- Scenarios
  - an informal narrative story, simple, ‘natural’, personal, not generalizable
- Use cases
  - assume interaction with a system
  - assume detailed understanding of the interaction
- Essential Use Cases
  - abstract away from the details
  - does not have the same assumptions as use cases



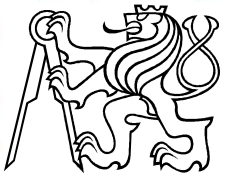
Scenarios

- By one definition, a scenario is:
  - an informal narrative story
  - simple, ‘natural’, personal
  - not generalizable
- Some use term *Task Scenario*
  - Narrative description of a specific thing done with a current system
  - Like a concrete use-case. (Real, representative)



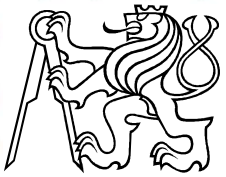
Scenario for shared calendar

"The user types in all the names of the meeting participants together with some constraints such as the length of the meeting, roughly when the meeting needs to take place, and possibly where it needs to take place. The system then checks against the individuals' calendars and the central departmental calendar and presents the user with a series of dates on which everyone is free all at the same time. Then the meeting could be confirmed and written into people's calendars. Some people, though, will want to be asked before the calendar entry is made. Perhaps the system could email them automatically and ask that it be confirmed before it is written in."



Use Cases

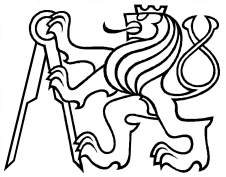
- Each use case has a name
  - e.g. Borrrow Copy of Book
- A family (or set, or class) of scenarios
  - One main scenario for “normal” behavior or situation
  - A sequence of interactions
  - Also set of different but related scenarios
- Documenting Use Cases
  - (Maybe) A UML Diagram showing all of them
    - Actors are stick-figures; use cases are ovals
  - (Certainly) For each use case define using English
    - A clear textual description (like a stories, a scenarios
    - A set of scenarios in outline form



Example: Actors and Use Cases

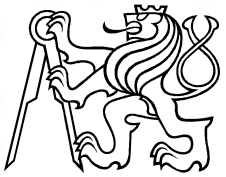
- Consider a library system…

- Actors
  - BookBorrower
  - JournalBorrower
  - Browser (person who browses, not software)
  - Librarian
- Use Cases
  - Borrow copy of a book
  - Reserve a book
  - Return copy of book
  - Borrow journal
  - Browse
  - Update Catalog



Example Template for Use Cases

- *Use case number or id:*
- *Use case title:*
- *Text description (a few sentences)*
- *Preconditions (if applicable):*
- *Flow of Events:*
- *Basic path:*
- *1.First step*
- *2.Second step*
- *3.etc*
- *Alternative Paths:*
  - *Name and short description (in words) of first alternative path/scenario.*
  - *Name and short description (in words) of 2nd alternative path/scenario.*
  - *etc.*
- *Postconditions (if applicable)*
- *Special conditions (if applicable).*



Path for use case for shared calendar

1. The user chooses the option to arrange a meeting.
2. The system prompts user for the names of attendees.
3. The user types in a list of names.
4. The system checks that the list is valid.
5. The system prompts the user for meeting constraints.
6. The user types in meeting constraints.
7. The system searches the calendars for a date that satisfies the constraints.
8. The system displays a list of potential dates.
9. The user chooses one of the dates.
10. The system writes the meeting into the calendar.
11. The system emails all the meeting participants informing them of them appointment

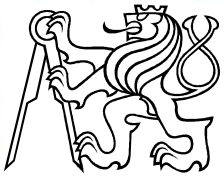
Essential Use Cases

- Same idea as use case but…
  - simplified, abstract, generalized
  - captures user tasks
  - without assuming anything about technology or interface implementation
- Shows user intentions, desire
  followed by
  System response
- Essential use cases are at user/system level only

Example essential use case for shared calendar

Name: arrangeMeeting

USER INTENTION	***SYSTEM RESPONSIBILITY***
arrange a meeting	
	request meeting attendees & constraints
identify meeting attendees & constraints	
	search calendars for suitable dates
	suggest potential dates
choose preferred date	
	book meeting



Hierarchical Task Analysis (HTA)

Task analysis

- Important phase of the UI design is the Task analysis.
- Analysis of technical requirements is “projected” into hardware requirements
- Specification of programming tools determines performance of software created
- Task analysis determines in certain way performance of the user during execution of task

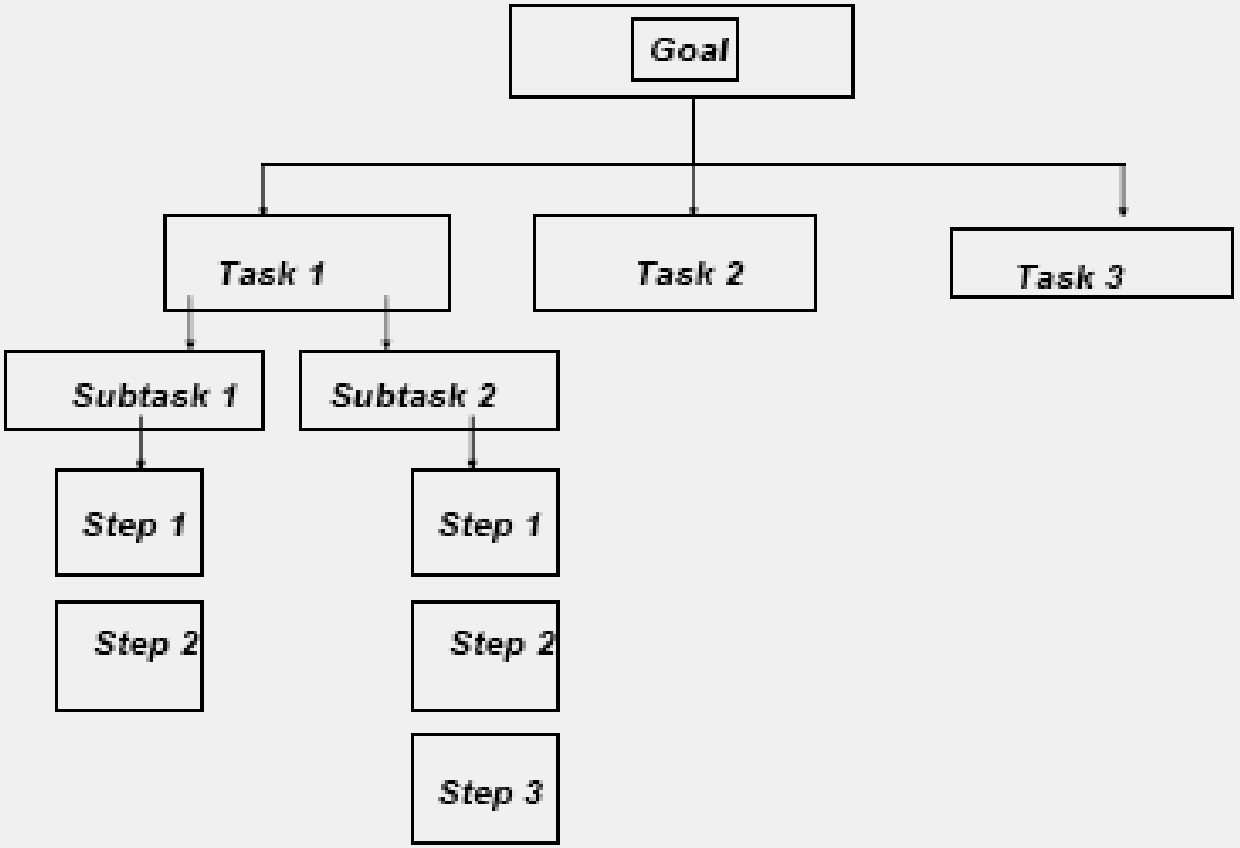
Task analysis

What we need to know:

- what the users are doing
- what they need for their activity (tools etc.)
- what they need to know

- It is necessary to divide the task into subtasks (hierarchically) and to analyze single steps
- Method: HTA (Hierarchical Task Analysis)

HTA

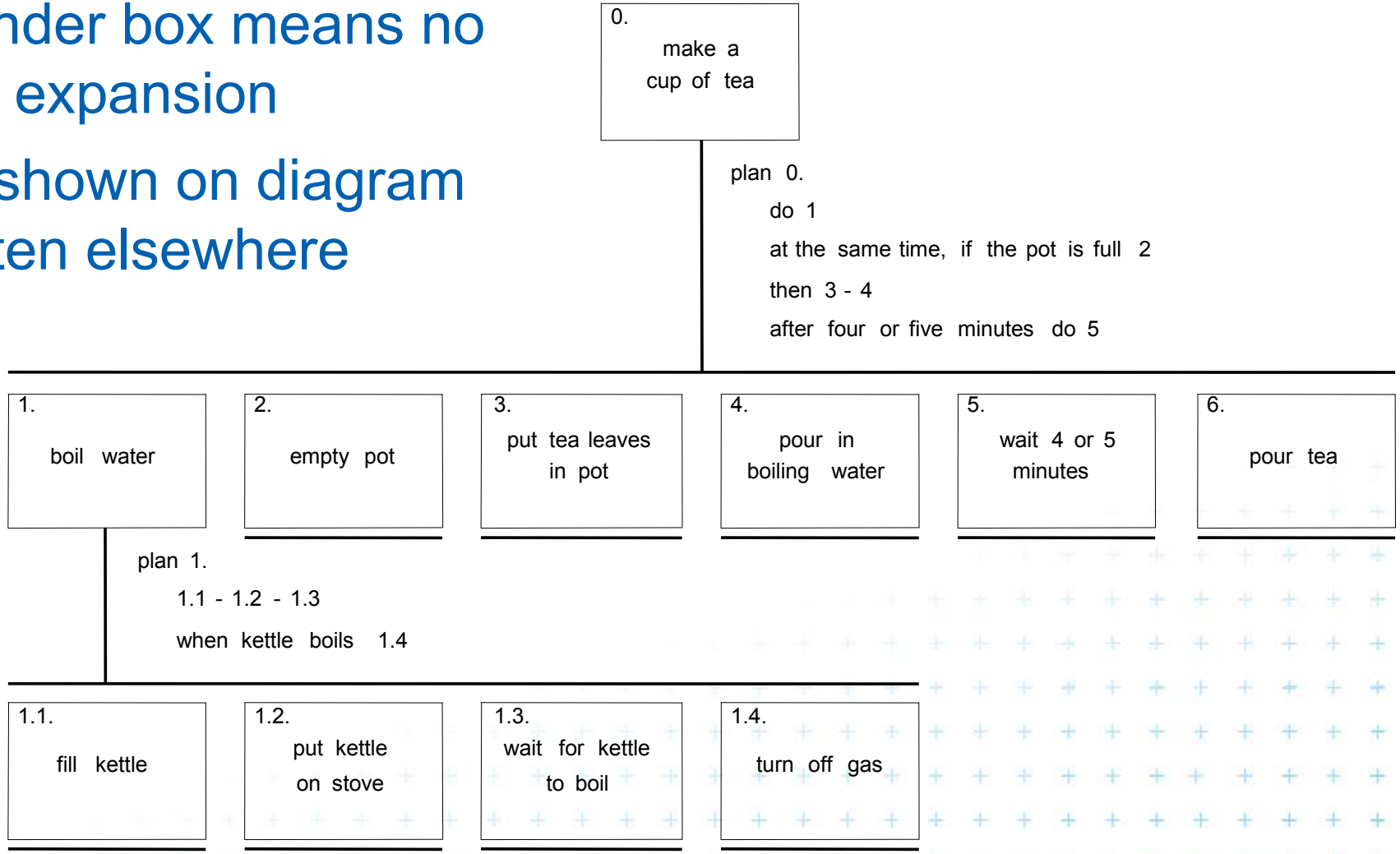

Goal
Task 1
Task 2
Task 3
Subtask 1
Subtask 2
Step 1
Step 2
Step 1
Step 2
Step 3

Example: how to prepare tea

- Pay attention to the level of decomposition
- Question: can we continue in decomposition?
- Do we know in which order to execute single subtasks?
- Is it (always) important ?

Diagramatic HTA

- Line under box means no further expansion
- Plans shown on diagram or written elsewhere

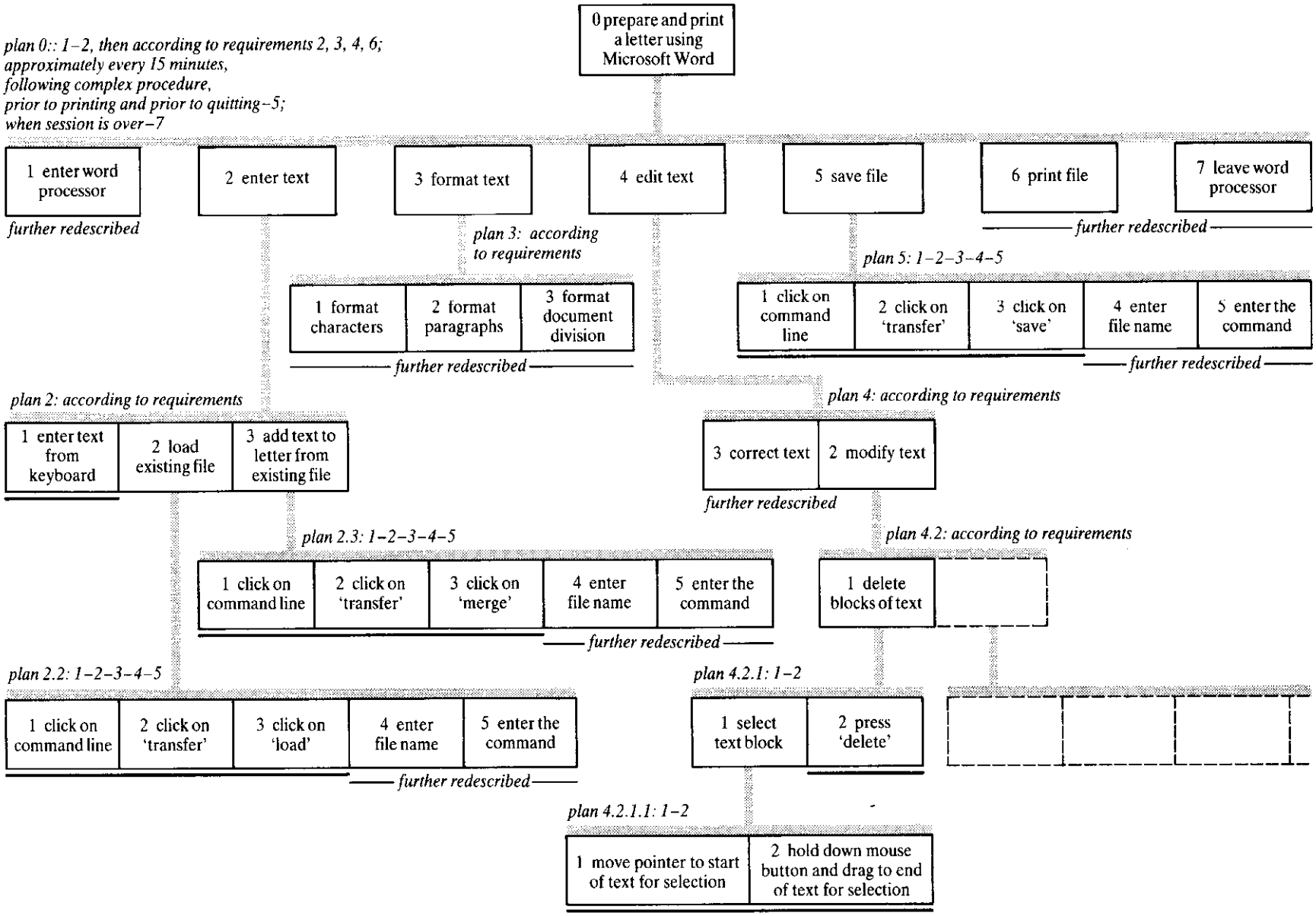


Diagramatic HTA

- Decomposition: tree
- Plans: execution

- What is important on planes?
- They tell us in which order should be individual steps executed

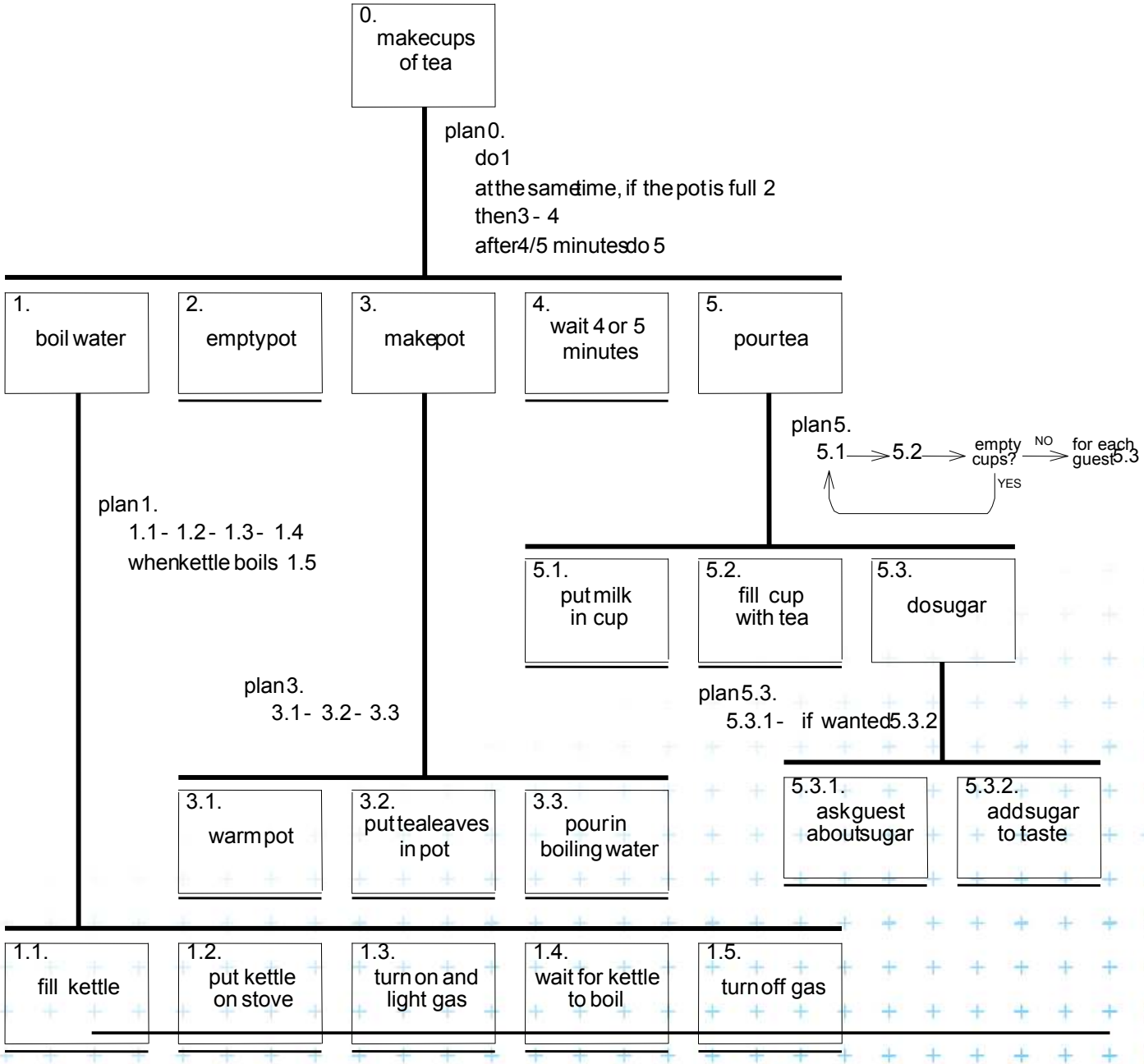
Example of a complex HTA - homework



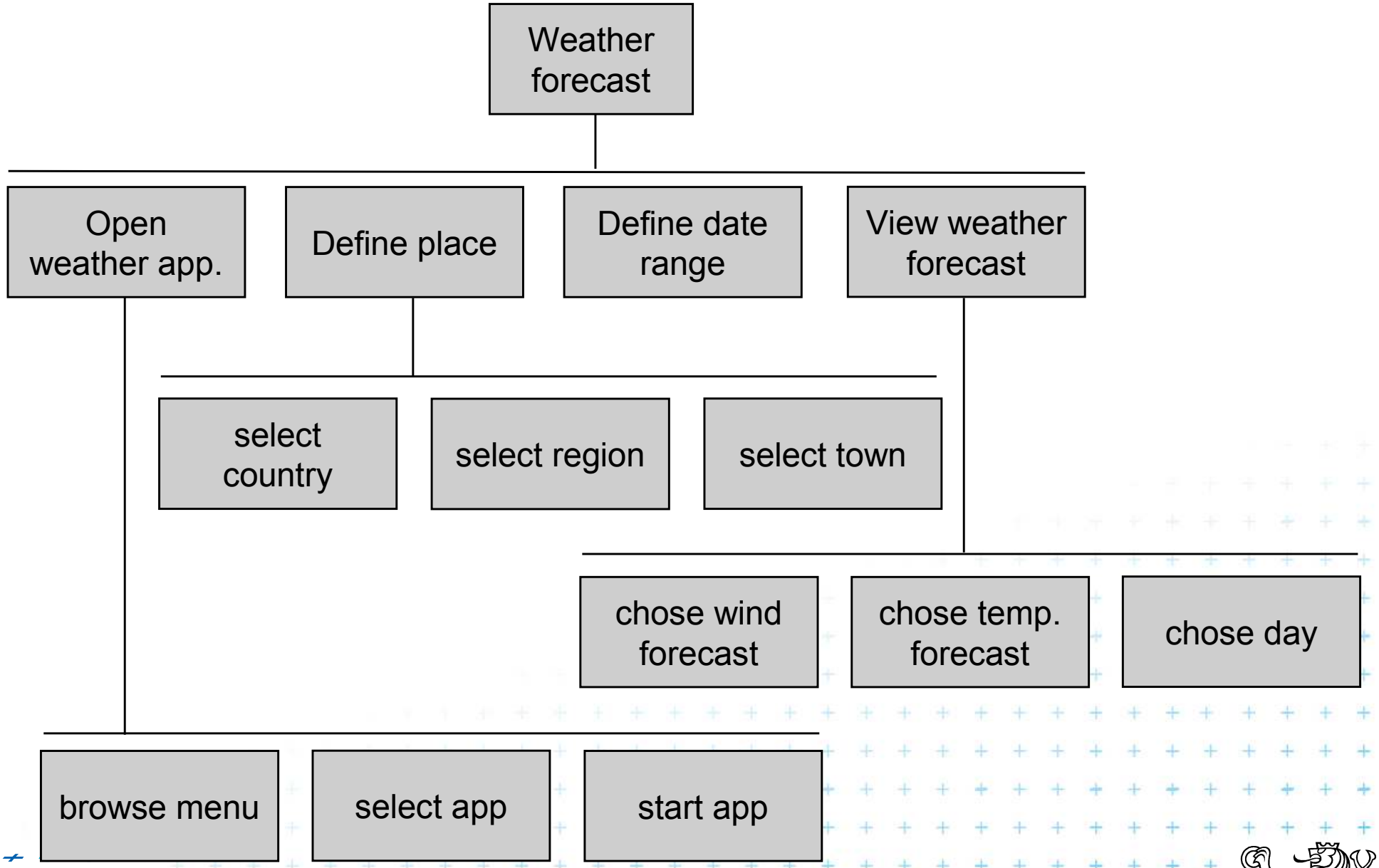
Answers to some questions

Given above (how to make HTA more descriptive)

Redefined HTA For Making Tea



Weather forecast HTA



HTA – what we have gained when using it

- We have some idea about the sequence of individual steps that bring us to the desired goal (e.g. tea ready for drinking, letter written, …)

Alternative description of HTA

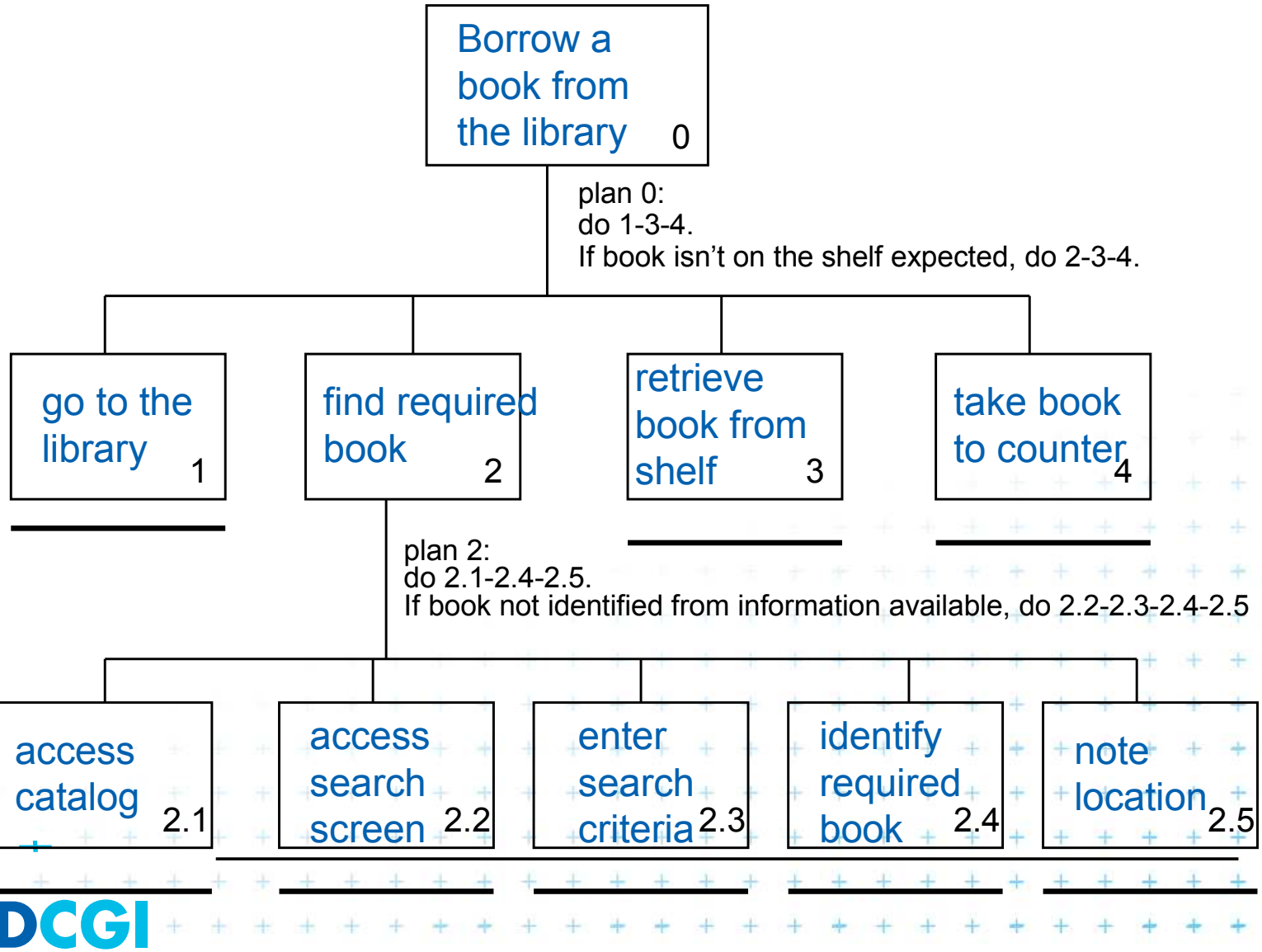
- Besides graphical form it is possible to use textual (structured) form
- It is more compact
- It is harder to read
- Example: how to borrow a book from library

Example Hierarchical Task Analysis

0. In order to borrow a book from the library
    1. go to the library
    2. find the required book
        2.1 access library catalog
        2.2 access the search screen
        2.3 enter search criteria
        2.4 identify required book
        2.5 note location
    3. go to correct shelf and retrieve book
    4. take book to checkout counter

plan 0: do 1-3-4. If book isn't on the shelf expected, do 2-3-4.
plan 2: do 2.1-2.4-2.5. If book not identified do 2.2-2.3-2.4.

Example Hierarchical Task Analysis

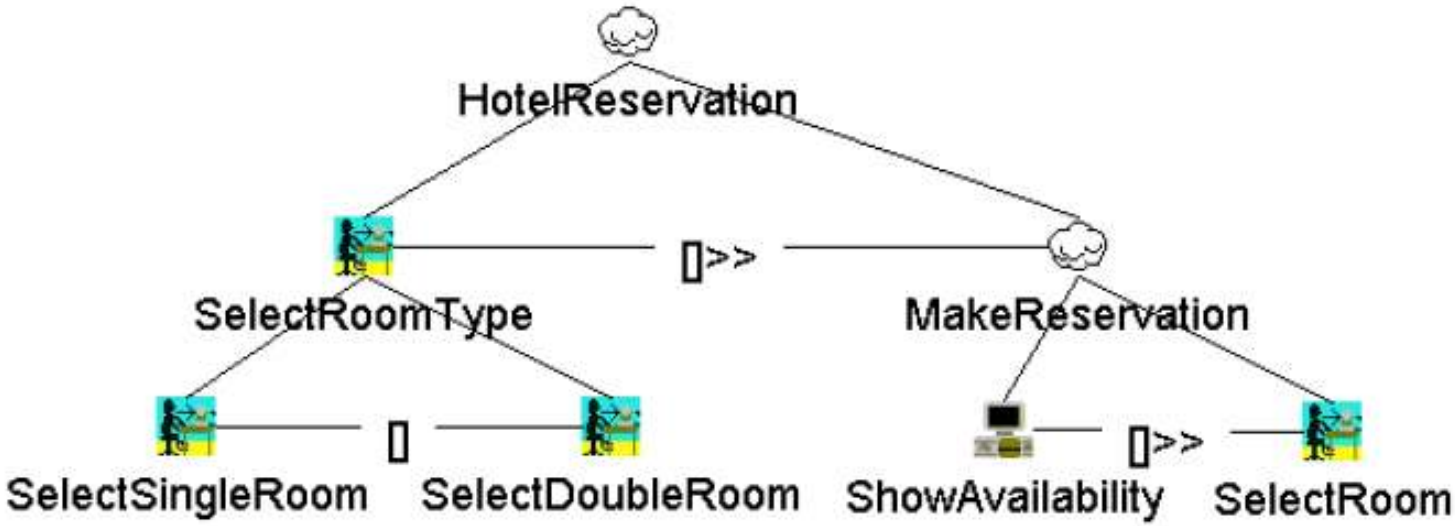


Concurrent Task Tree (CTT)

CTT – operators used

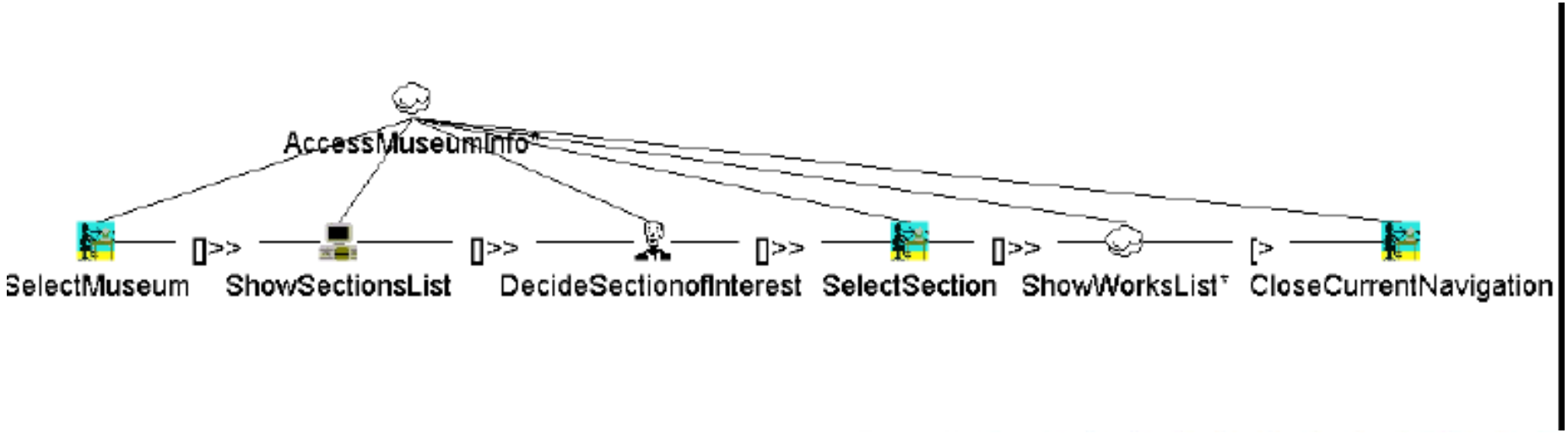
Enabling	T1 >> T2 or T1 [] >> T2
Disabling	T1 [> T2
Interruption	T1 |> T2
Choice	T1 [] T2
Iteration	T1* or $T1_{\{n\}}$
Concurrency	T1 ||| T2 T1 |[]| T2
Optionality	[T]

CTT example

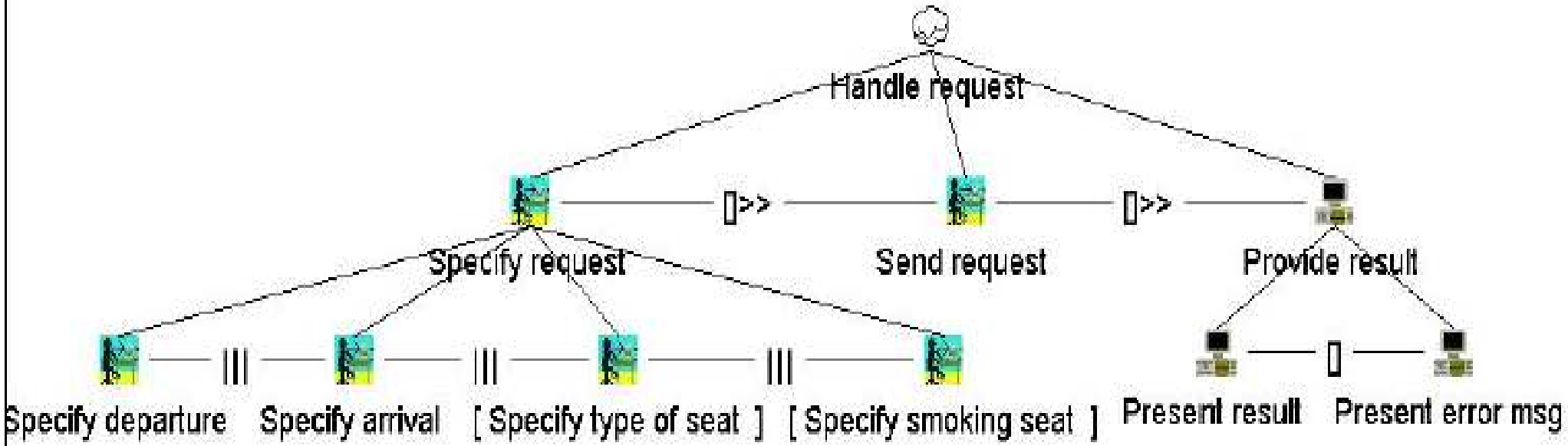


Different types of nodes

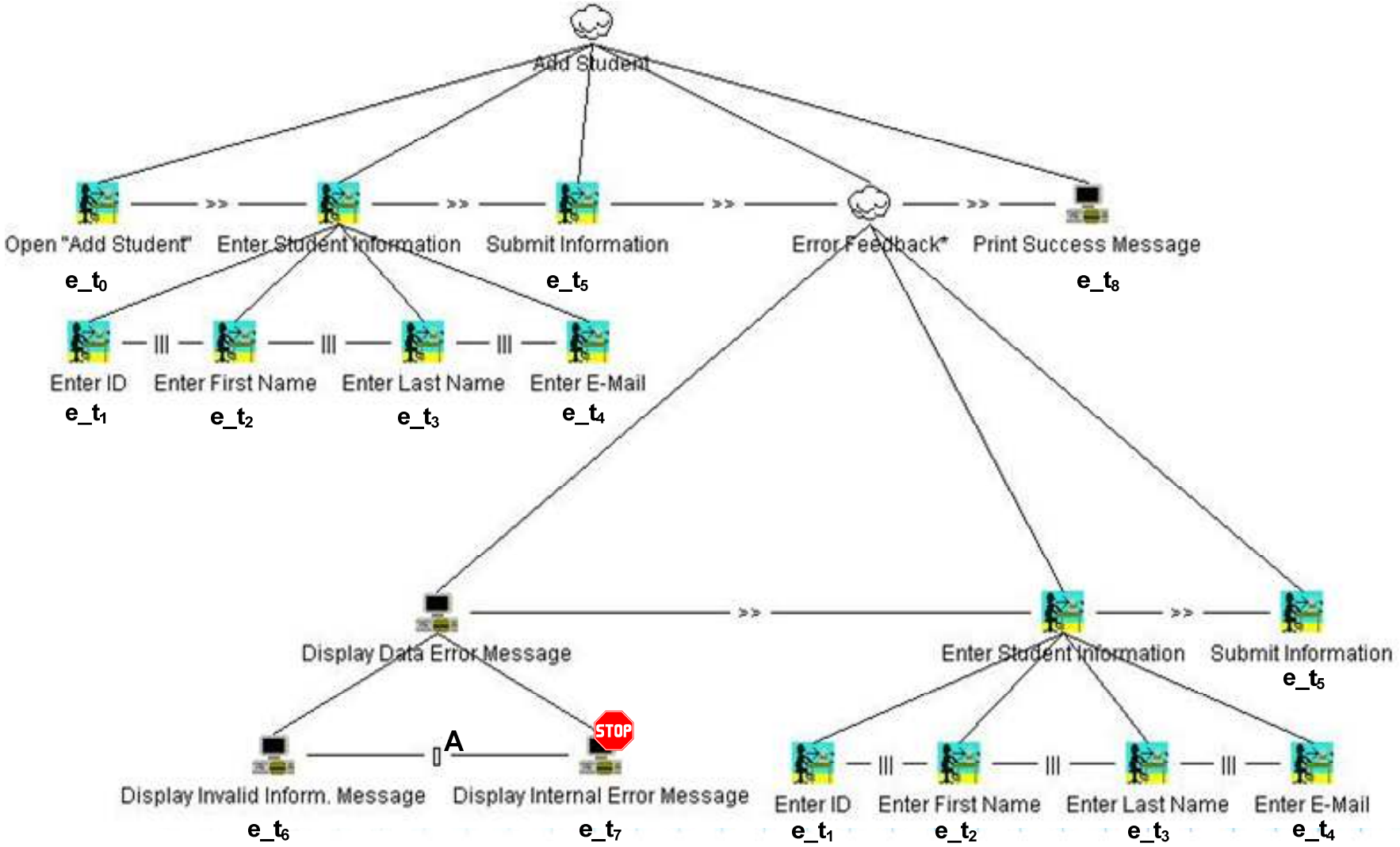
Another CTT example



CTT example – what task is it?

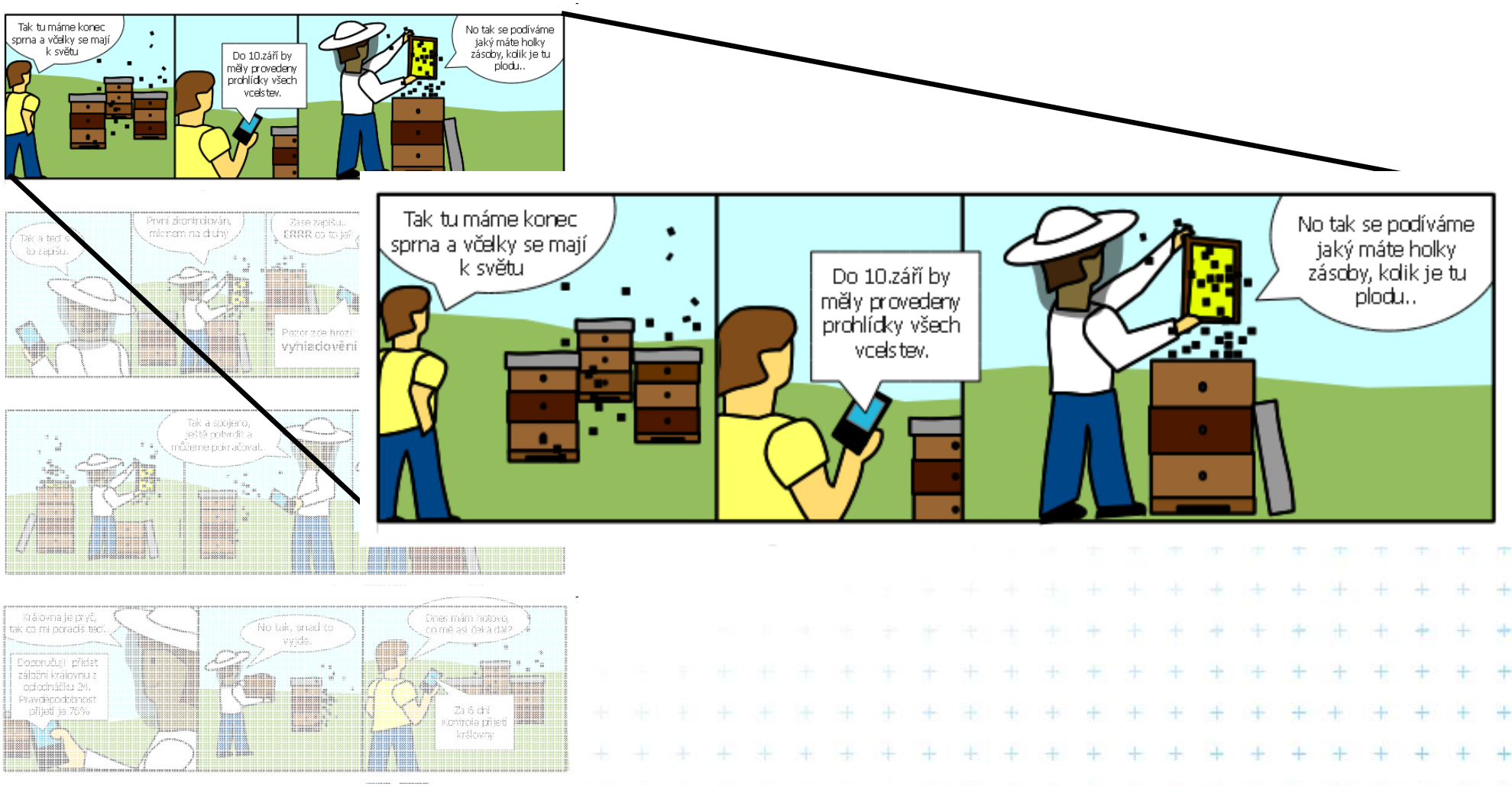


CTT – “KOS – like” example



Storyboard

Storyboard example - BEEPER

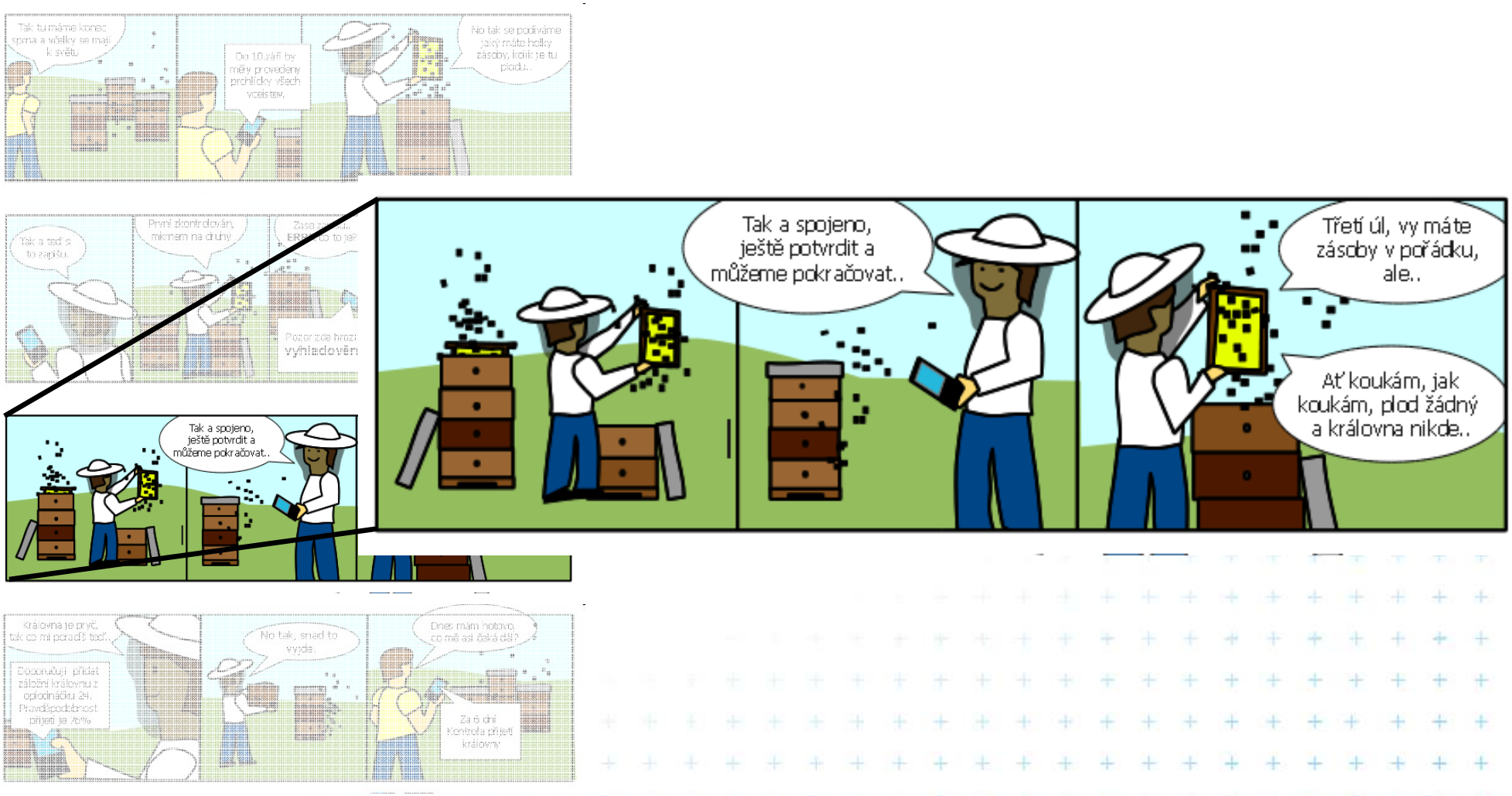


Source: Ondřej Mandík, CTU student

Storyboard example - BEEPER

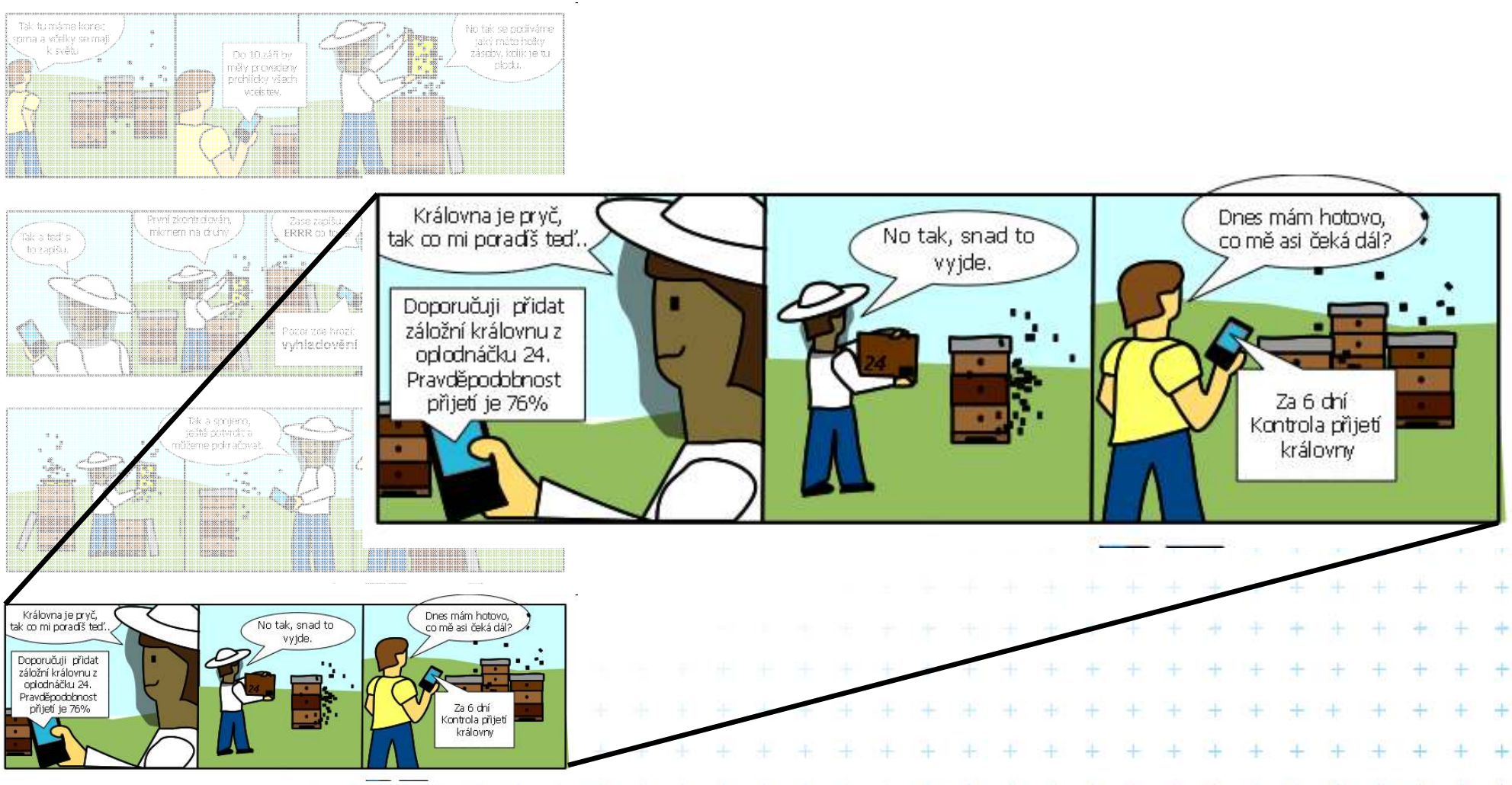
Source: Ondřej Mandík, CTU student

Storyboard example - BEEPER



Source: Ondřej Mandík, CTU student

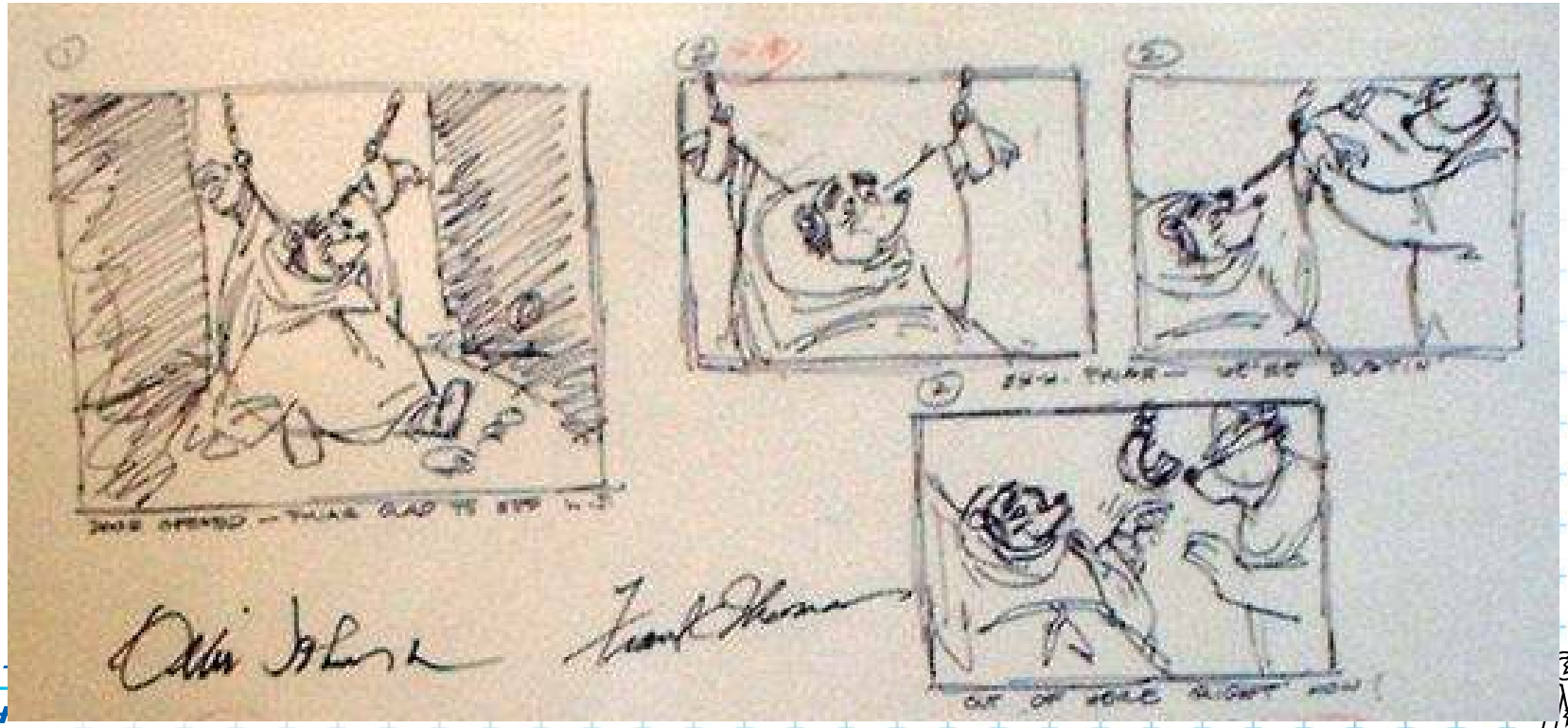
Storyboard example - BEEPER



Source: Ondřej Mandík, CTU student

Storyboarding

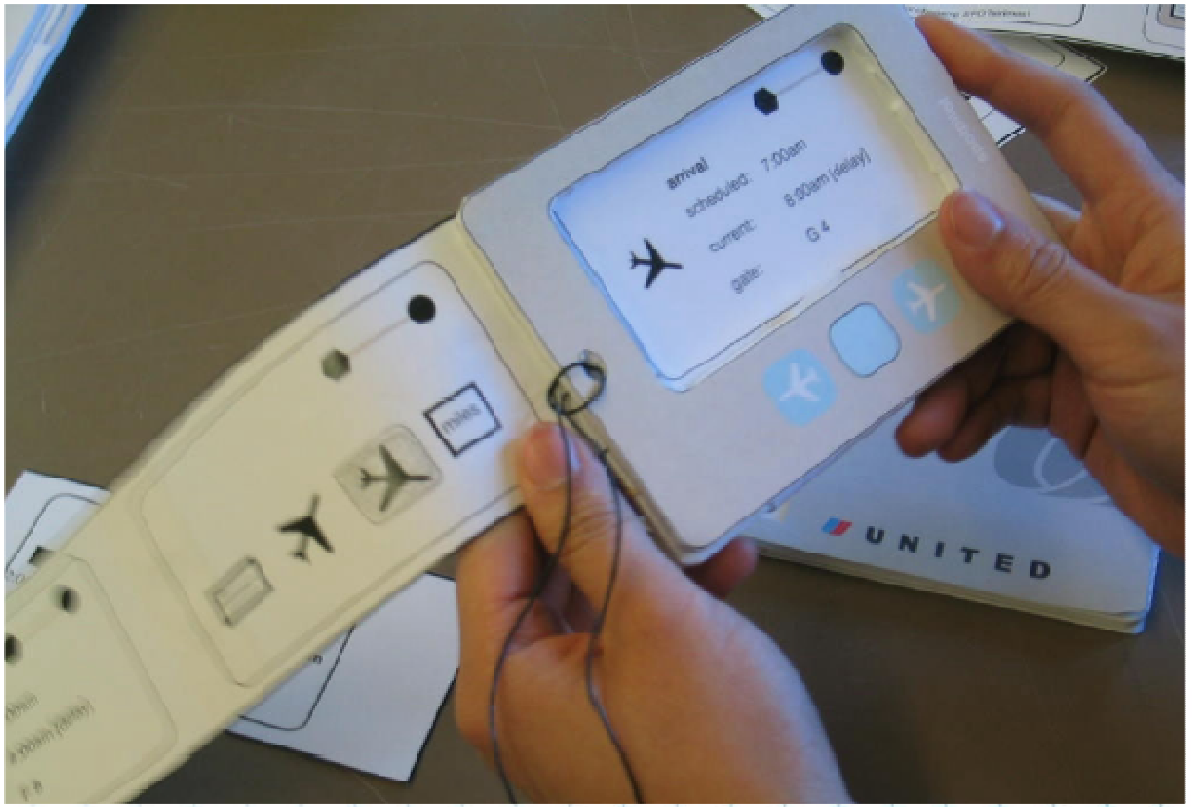
- a series of key frames as sketches
  - originally from film industry; used to get the idea of a scene
  - snapshots of the interface at particular points in the interaction
- users can evaluate quickly the direction the interface is heading



Excerpts from Disney's Robin Hood storyboard, www.animaart.com/Cellar/disneyart/90robin%20storyboard.jpg.html

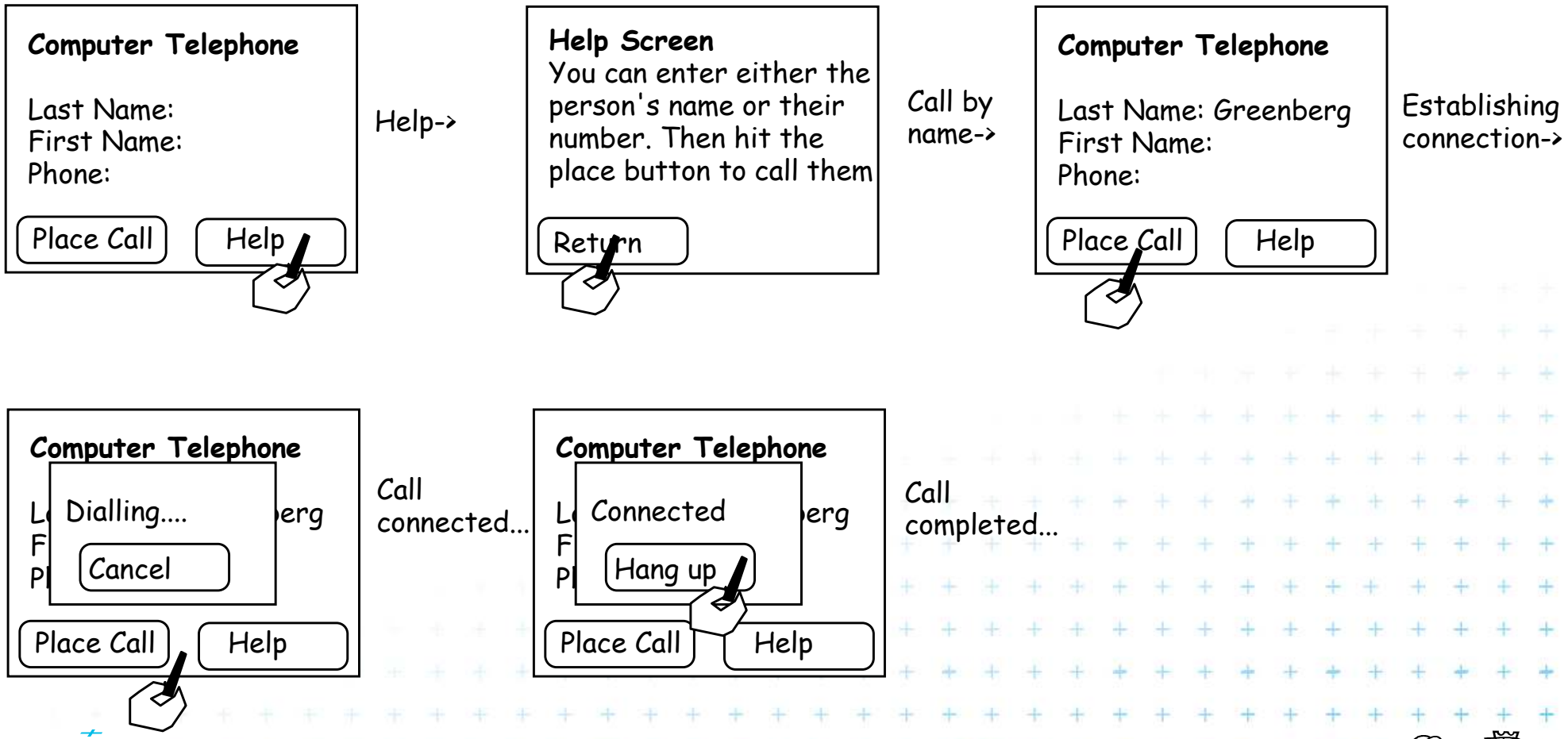
Storyboarding

- **Spotlight:** an interactive foam core and paper sketch/storyboard Credit: Sue-Tze Tan, Dept Industrial Design, University of Washington

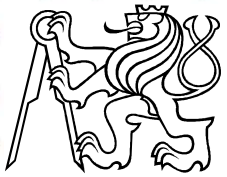


From Design for the Wild, Bill Buxton (in press) with permission

Storyboard of a computer telephone - homework

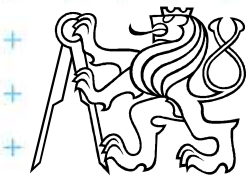


SUMMARY



How Could This Be Useful?

- Manuals, training, help systems
- Requirements capture and system design
  - Models how the user would use the system
  - Based on existing system
    - What should be added? Where do new features fit?
    - What can be left out?
    - What's most critical? What's most frequently done?
  - May help you choose a high-level interaction style or think about a conceptual model
- Detailed interface design
  - Plans map to paths through dialogs
  - Menu design based on task decomposition
- Scenarios for user evaluation tests



Thank for your attention