Schedule

11:00-11:30  Reporting back
11:30-12:00  Objective Trees: Goals and requirements
12:00-12:01  Take coffee 😊
12:01-13:00  Exercise: Goals and requirements
13:00-14:00  Lunch break
The Objective Tree: Defining goals and requirements

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Agenda

- Requirements definition in the Planets Preservation Planning methodology
- Constructing objective trees
- Examples
- Tool support
- Outlook
The Objective Tree

- Define all relevant goals and characteristics (high-level, detail) with respect to a given application domain
- Put the requirements in relation to each other → Tree structure
- Top-down or bottom-up
  - Start from high-level goals and break down to specific criteria
  - Collect criteria and organize in tree structure
Influence Factors

Technology
Standards
User requirements
User requirements

Characteristics of digital objects

Appearance
Content
Structure
Behaviour
Context

Technical characteristics
Infrastructure characteristics
Process characteristics

Website

Record characteristics

Legal constraints
Policies
Organisational requirements
Business needs, Budget constraints
Stakeholders

- Input needed from a wide range of persons, depending on the institutional context and the collection

Diagram:

- IT Staff
- Domain experts
- Curators
- Administration
- Managers
- Lawyers
- Technical experts
- Producers
- Consumers
- Others

- Website
  - Technical characteristics
  - Infrastructure characteristics
  - Process characteristics
  - Record characteristics
    - Appearance
    - Content
    - Structure
    - Behaviour
    - Context
Analog...
... or born-digital
Importing objective trees

<table>
<thead>
<tr>
<th>Focus</th>
<th>Node</th>
<th>Objective Requirements</th>
<th>Single</th>
<th>Scale</th>
<th>Restriction</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Save</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proceed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Upload Freemind XML

Does the tree have Units? [ ]

[File upload window with file names: office-website.xml, tna.xml, tna-xml007.xml, tna-website.png]
### Identify Requirements

**Objective Tree**

**Descriptive Information**

#### Objective Tree

**How can I define the objective tree?**

<table>
<thead>
<tr>
<th>Focus</th>
<th>Node</th>
<th>Single</th>
<th>Scale</th>
<th>Restriction</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Website</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>X</td>
<td>Record characteristics</td>
<td></td>
<td>Ordinal</td>
<td>Ubiquitous/Widespread/Specific</td>
<td></td>
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<tr>
<td>X</td>
<td>Technical characteristics</td>
<td></td>
<td>Positive Integer</td>
<td></td>
<td>number of tools</td>
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<tr>
<td>X</td>
<td>Ubiquity</td>
<td></td>
<td>Ordinal</td>
<td>Automatic/Manual/No</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>Support</td>
<td></td>
<td>Ordinal</td>
<td>Automatic/Manual/No</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>Documentation</td>
<td></td>
<td>Ordinal</td>
<td>Lossy/Lossless</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>Stability</td>
<td></td>
<td>Ordinal</td>
<td>Detectable/Recoverable</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>Ease of identification</td>
<td></td>
<td>Ordinal</td>
<td>Automatic/Manual/No</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>Ease of validation</td>
<td></td>
<td>Ordinal</td>
<td>Automatic/Manual/No</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>Lossiness</td>
<td></td>
<td>Ordinal</td>
<td>Lossy/Lossless</td>
<td></td>
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<tr>
<td>X</td>
<td>IPR</td>
<td></td>
<td>Ordinal</td>
<td>Yes/No</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>Complexity</td>
<td></td>
<td>Ordinal</td>
<td>High/Medium/Low</td>
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<tr>
<td>X</td>
<td>Fault tolerance</td>
<td></td>
<td>Ordinal</td>
<td>None/Detected/Recoverable</td>
<td></td>
</tr>
</tbody>
</table>

Release 1.1 - Institute of Software Technology and Interactive Systems: «off-ice bears»
Case Study: Web archiving

- Static web pages from the public domain
- Includes documents in formats such as doc, pdf
- Images
- No interactive content shall be preserved
Object characteristics

- Content
- Structure
- Appearance
- Behaviour
- Context
A bit more detail...
Assign Measurable Units

- Leaf criteria should be objectively measurable
  - Seconds per object
  - Euro per object
  - Bits of colour depth

- Subjective scales where necessary
  - Adoption of file format
  - Amount of (expected) support

- Quantitative results
Types of scales

- Numeric
- Yes/No (Y/N)
- Yes/Acceptable/No (Y/A/N)
- Ordinal: define the possible values
- Subjective 0-to-5
File format characteristics

- Ubiquitous/Widespread/Specialised/Obsolete
- Ubiquity
- Primary/Secondary
- Number of tools
- Quality
- disclosure
- Openness
- Documentation
- Availability
- Speed of change
- Stability
- Backwards compatibility
- Technical characteristics
- Automatic/Manual/No
- Ease of identification
- Automatic/Manual/No
- Ease of validation
- Lossy/Lossless
- Lossiness
- Y/N
- IPR
- High/Medium/Low
- Complexity
- None/Detectable/Recoverable
- Error tolerance
- Larger/Same/Smaller
- Comparative size
• Visitor counter and similar things can be
  • Frozen at the point of harvesting
  • Left out
  • Still counting while being accessed in the archive (Is this desirable?)
Interactive multimedia

- 35% menus and navigation path
  - Y/N
  - 30% overall page layout
  - Y/N
  - 35% complete
  - 25% structure

Object characteristics

- 40% content
- 22% video
- 22% sound
- 22% image
- 12% user manual

- 10% context
- 10% behaviour
- 15% navigation
- 10% reaction to activity
- 80% metadata reference valid
- 20% video/sound control
- 20% documentation material

- 25% mouse
- 25% pointer
- 20% transitions
- 15% animations
- 5% background
- 25% menu speed
- 10% appearance

- Colour
  - 10% fonts
  - 40% style
  - 25% type
  - 10% size

- 25% synchronisation
- 22% picture
- 22% sound
- 22% content
- 22% loop
d
- Effects
- Quality
- Content identical
Behaviour

- Interactive presentations exhibit two facets
  - Graph-like navigation structure
  - Navigation along the paths

<table>
<thead>
<tr>
<th>Node</th>
<th>Scale</th>
<th>Restriction</th>
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</thead>
<tbody>
<tr>
<td>object characteristics</td>
<td></td>
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<tr>
<td>behaviour</td>
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<td></td>
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<tr>
<td>navigation</td>
<td>Ordinal</td>
<td>interactive and integrated/navigable/none</td>
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<tr>
<td>reaction to activity</td>
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<td></td>
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<tr>
<td>mouse</td>
<td>Boolean</td>
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<td>position</td>
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<td>clicks</td>
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<td></td>
</tr>
<tr>
<td>keyboard</td>
<td>Boolean</td>
<td></td>
</tr>
<tr>
<td>video/sound control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>structure</td>
<td></td>
<td></td>
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<tr>
<td>menus and navigation path</td>
<td>Ordinal</td>
<td>complete and free/partial (linear)/none</td>
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<td>complete</td>
<td>Boolean</td>
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<tr>
<td>overall page layout</td>
<td>Ordinal</td>
<td>Y/A/N</td>
</tr>
</tbody>
</table>
Results of Phase 1

- Defined and documented the context of a preservation problem
  - Which types of objects
  - Which environment
  - What are the obligations and constraints
- Defined and documented representative samples for performing experiments
- Defined and documented goals and requirements
Practice time!

• How to construct the tree?

• With the open-source mind-mapping tool Freemind
  – USB stick with file and default mindmap
  – Java required
  – Freemind is installed in 20 seconds

• With post-it notes
  – Please recreate the tree in FreeMind
  – Tree is most readable on screen
The template

- This is *one* way to start
- Add (and remove) criteria as you like
- Adapt hierarchy as you deem appropriate
Types of scales

- Numeric
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<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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</thead>
<tbody>
<tr>
<td>now</td>
<td>Breakout session</td>
</tr>
<tr>
<td>14:10</td>
<td>Report back and discuss</td>
</tr>
<tr>
<td></td>
<td>Outlook on tool support in Plato 2.0</td>
</tr>
<tr>
<td>14:45</td>
<td>Break</td>
</tr>
</tbody>
</table>
Outlook: Improving tool support

- Two key aspects:
  - Tree construction
  - Automatic evaluation

- Tree library contains templates and fragments

- Mapping of requirements to technical characteristics
  - Object properties can be extracted through characterisation tools such as the eXtensible Characterisation Languages (XC*L)
  - Format properties and risks can be retrieved from technical registries such as PRONOM

- Automating the evaluation of preservation actions
Questions?

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