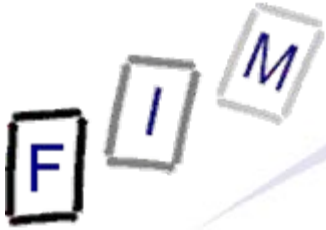

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Deriving Sub-Courses from CPS Packages by Metadata Taxonomy Filtering

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Introduction

- Towards a single base package
- What is "taxonomy filtering"?
- Sample implementation
  - → Metadata transformation
  - → The filtering process
- Filtering example
  - → Lecture/practice
  - → Single chapter
  - → Introductory version
- Conclusions

Towards a single base package

- Typical Learning Objects (LO) are large
  - → Consequence: Low reuse as a whole
  - → Extracting small parts for reuse is suboptimal
    - » Smaller parts lose educational context, cross-references, ...
  - → Updates/corrections do not propagate back and forth
- One solution: Create a single large LO and derive various smaller courses from it automatically
  - ✓ Changes propagate to all versions: single "master" course
  - ✓ Reuse in similar/related areas increases
  - ✓ Context, e.g. metadata, is preserved for parts
  - ✗ Does not improve reuse for completely different topics

What is "taxonomy filtering"?

- "Taxonomy": A hierarchical classification
- Filtering: For deriving specific sub-courses from a complete CPS package some selection is necessary
  - → Based on metadata contained within the package
    - » Direct selection would bring problems on changes!
  - → Metadata description required for all "decision points"
    - – I.e. elements, which might or might not be included in a derived subset together with their children
    - » So some metadata must be added, but not for all elements
    - » Metadata annotation can take place incrementally
  - → Selected as filtering source: LOM – "classification"
    - » "classification" is orthogonal to the navigation as described by the CPS package

Sample implementation

- Filtering has been integrated into a CPS editor & transformer
  - → Filtering necessary for element visibility anyway!
- Metadata is converted to a more intuitive form by XSLT
  - → To simplify the selection expressions
  - → Making them more "natural" for teachers
    - » As opposed to software developers and CPS experts
  - → No knowledge of LOM needed!
- Metadata transformation:
  - → From element content to element names
  - → Taxonomy sources transformed to namespaces
  - → Structure simplification
  - → Slight information reduction (e.g. language)

Metadata transformation example

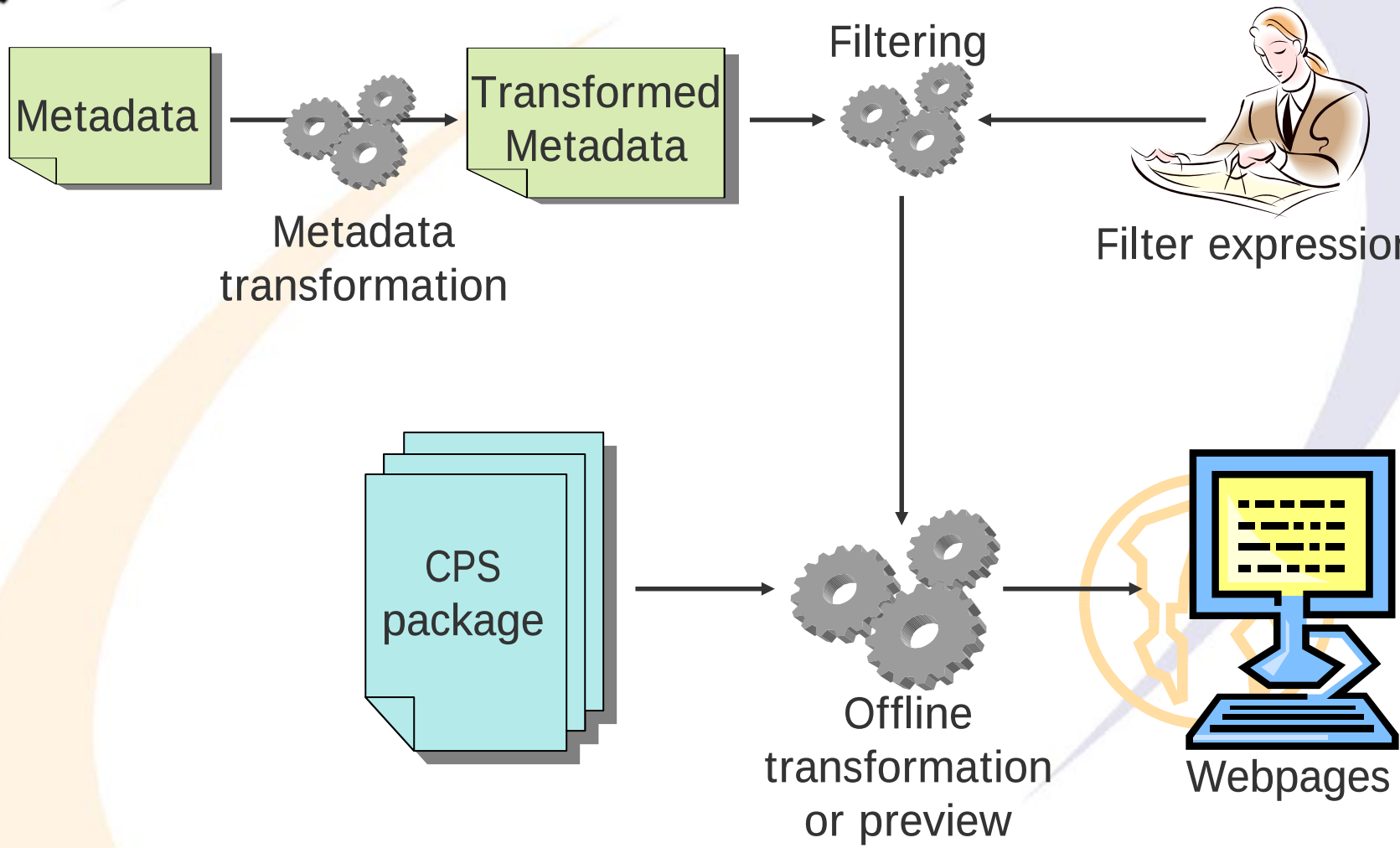
Source metadata:

```
<classification>
  <purpose>
    <source>LOMv1.0</source><value>discipline</value>
  </purpose>
  <taxonPath>
    <taxon>
      <id>9.3</id>
      <entry><string language = "en">Information
Science</string></entry>
    </taxon>
    <taxon>
      <id>9.3.1</id>
      <entry><string>Information Processing</string></entry>
    </taxon>
    <source>
      <string>http://www.example.com/science</string>
    </source>
  </taxonPath>
</classification>
```

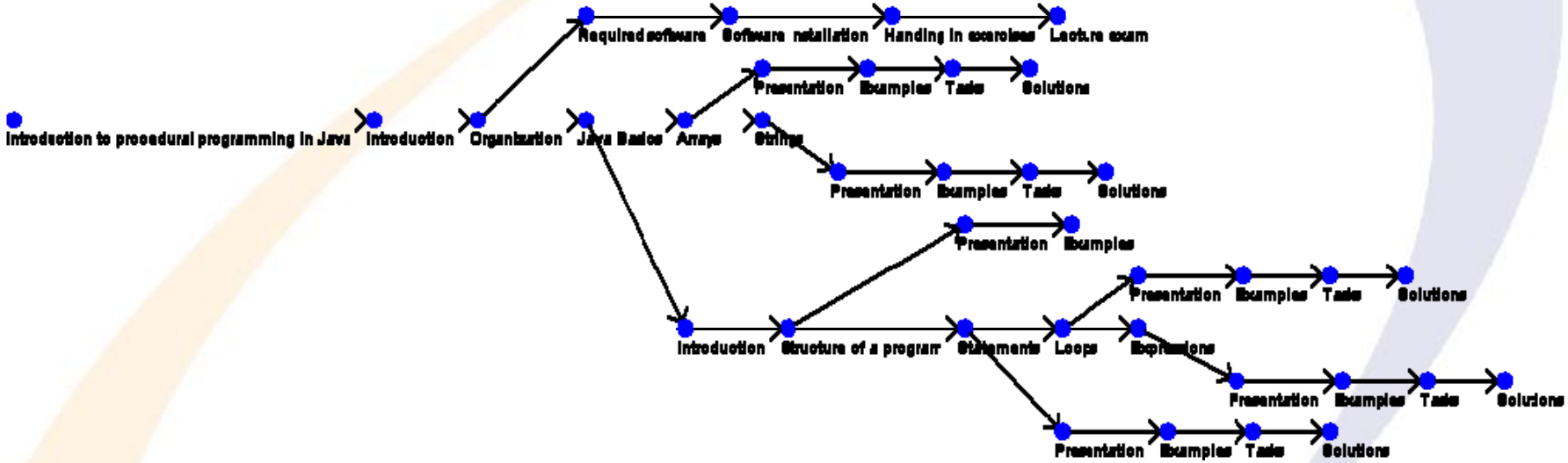
Result after transformation:

```
<discipline source="LOMv1.0">
  <InformationScience id="9.3"
        xmlns ="http://www.example.com/science">
    <InformationProcessing id="9.3.1"/>
  </InformationScience>
</discipline>
```

Filtering process



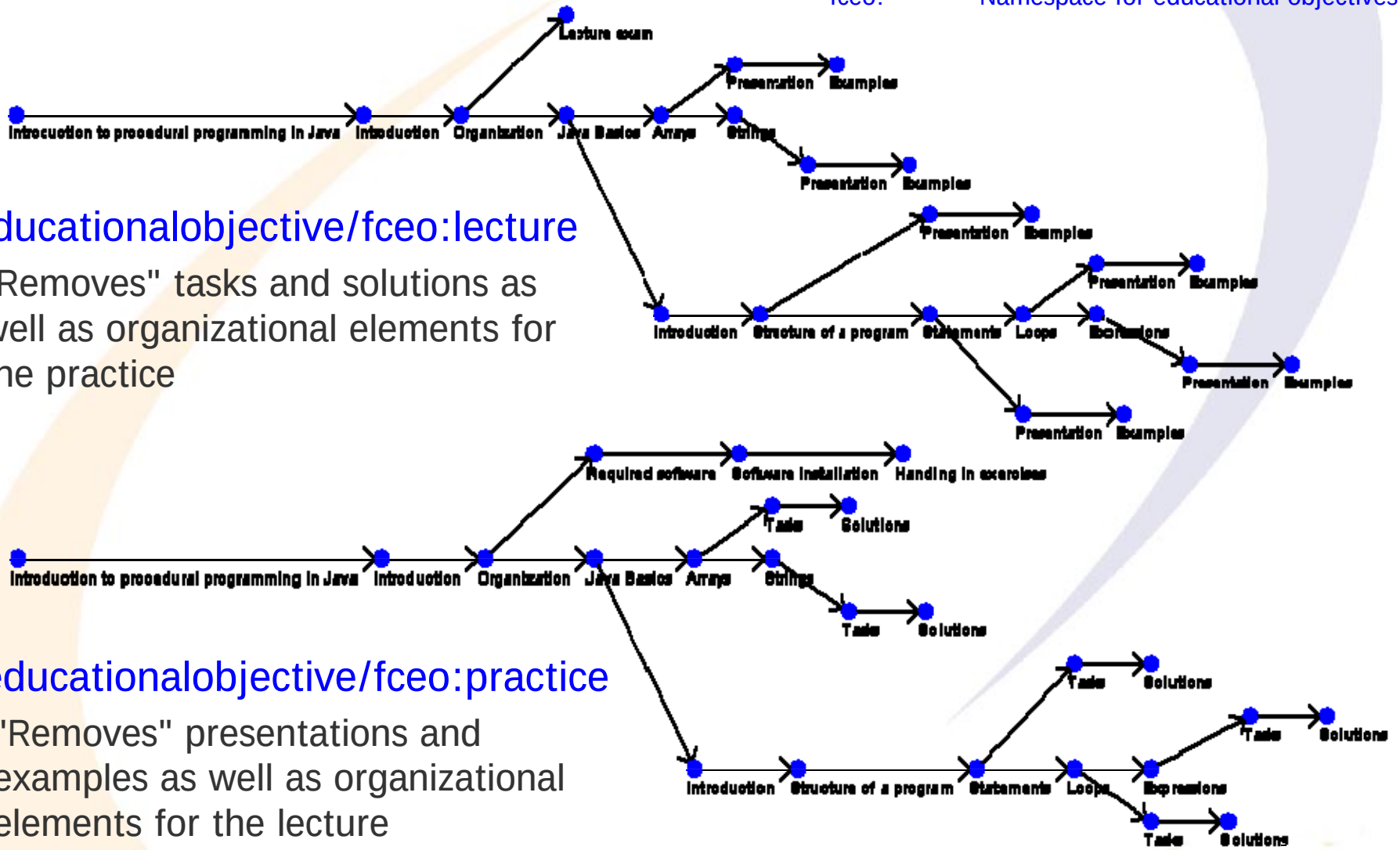
Filtering examples: Complete package



- An introductory course for Java programming
  - → Contains organizational aspects as well as content
  - → Slides from presentations, examples, tasks, solutions
  - → Several separate topics, e.g. arrays, strings, ...

Filtering examples: Lecture/practice extraction

fceo: Namespace for educational objectives



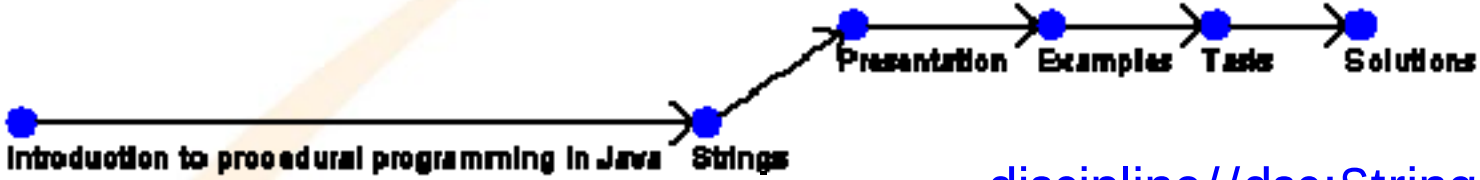
educationalobjective/fceo:lecture

"Removes" tasks and solutions as well as organizational elements for the practice

educationalobjective/fceo:practice

"Removes" presentations and examples as well as organizational elements for the lecture

Filtering examples: Chapter extraction



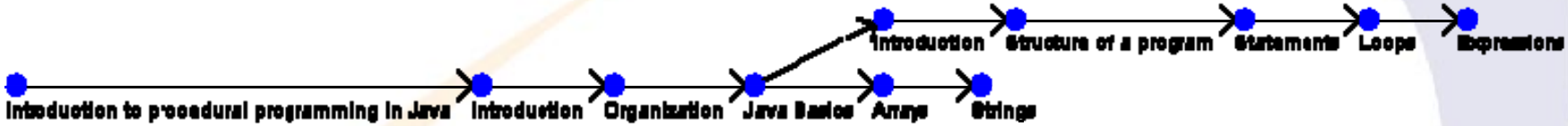
discipline//dsc:Strings

Only the single subchapter remains

fceo: Namespace for educational objectives
dsc: Namespace for course discipline

Both are custom taxonomies. If standardized ones are available, these can be used too!

Filtering examples: Introductory version extraction

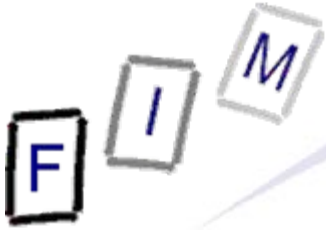



```
educationalobjective/fceo:lecture/fceo:introduction |
educationalobjective//*[@id="organization"]
```

- Consists of:
  - → Introductory lecture parts
    - » I.e. course and chapter prefaces; the "general" parts
  - → Plus the organization node as such
    - » Different approach than above: Not the entry but the ID of the taxonomy element was used for selection
      - – This helps coping with translations of taxonomies
      - – Requires detailed taxonomy knowledge, however
      - – Useful only for special cases

Conclusions

- Useful approach, but metadata is vital for success
  - → This should always be present, but in practice often is not!
  - → Approach for reducing this problem: Metadata inheritance
    - » "Down" is rather easy, at least for some taxonomies
    - » "Up" is more difficult, but useful especially for compound LO
- Potential problem: Taxonomies
  - → Custom created, not electronically available, etc.
  - → Potential solution: VDEX
    - » IMS Specification: Vocabulary Definition EXchange
    - » Would allow creating the filtering expression through a GUI
- Actual usage of metadata provides an incentive for authors to add it to their learning material
  - → Then usable for other applications as well, e.g. discovery!



Questions?

Thank you for your attention!