

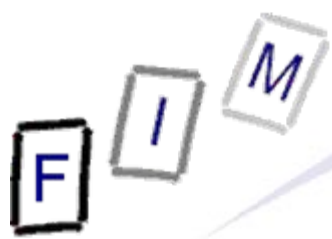


Deriving Sub-Courses from CPS Packages by Metadata Taxonomy Filtering

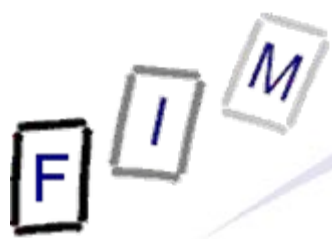
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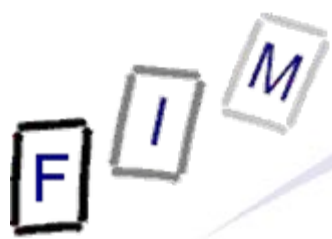


- Towards a single base package
- What is "taxonomy filtering"?
- Sample implementation
 - Metadata transformation
 - The filtering process
- Filtering example
 - Lecture/practice
 - Single chapter
 - Introductory version
- Conclusions



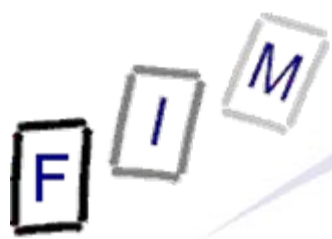
Towards a single base package

- 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



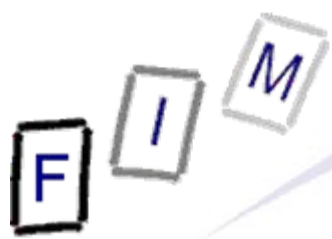
What is "taxonomy filtering"?

- "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:

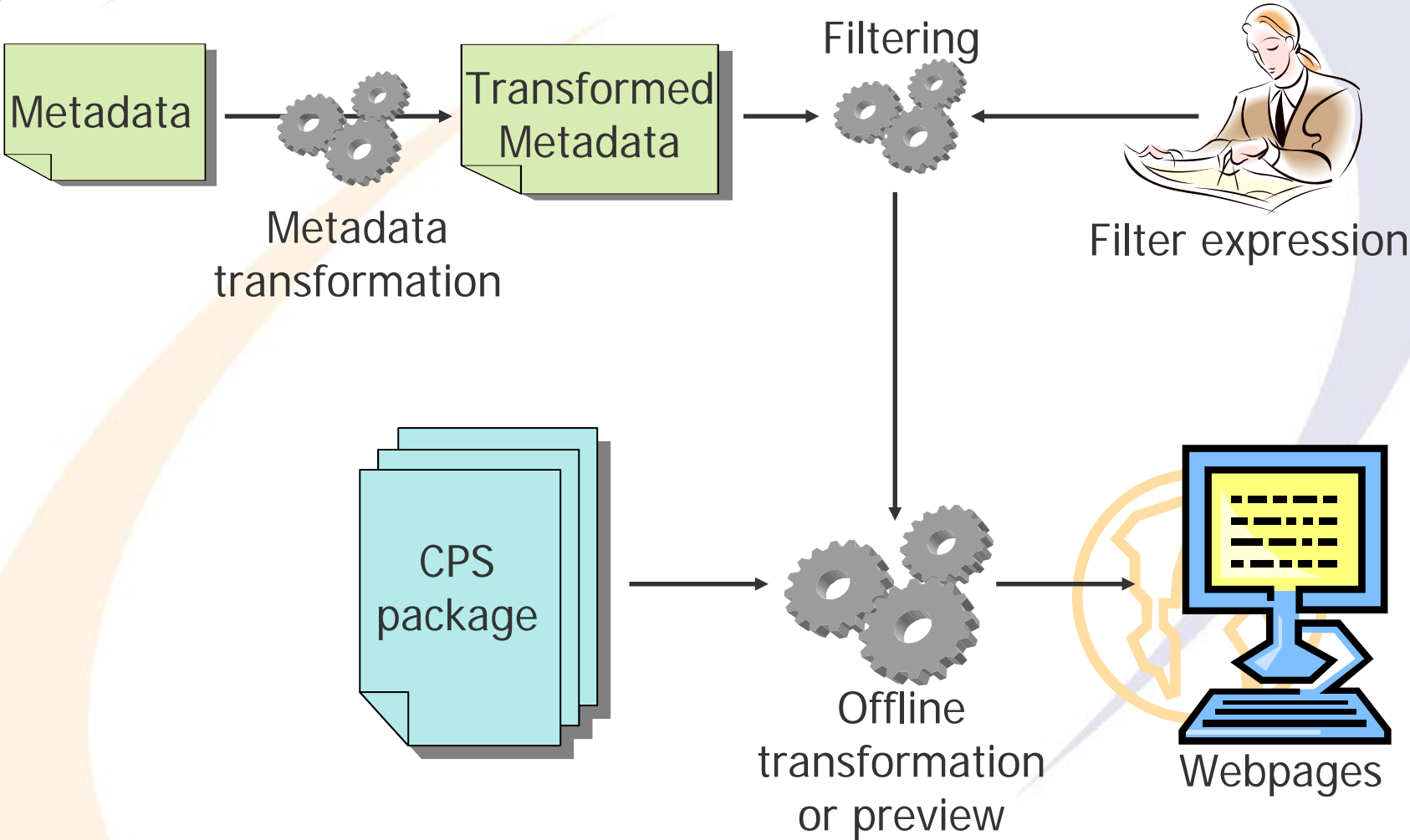
```
<classification>
  <purpose>
    <source>LOMv1.0</source><value>discipline</value>
  </purpose>
  <taxonPath>
    <taxon>
      <id>9.3</id>
      <entry><string language = "en">Information
Science</string></entry>
    </taxon>
    <taxon>
      <id>9.3.1</id>
      <entry><string>Information Processing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

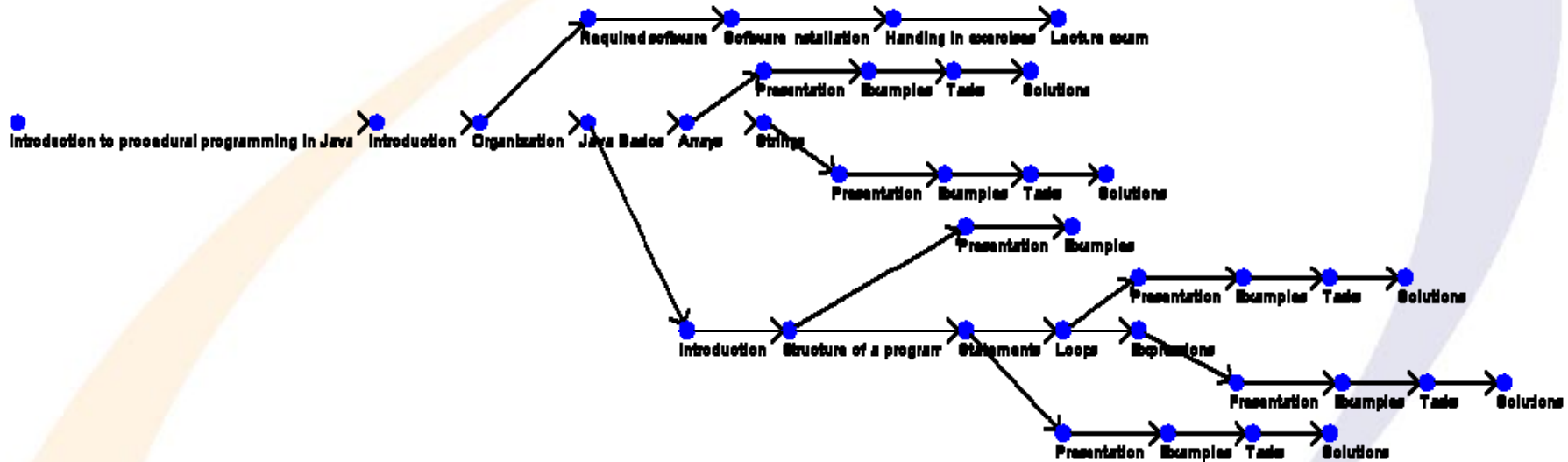
Result after transformation:

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

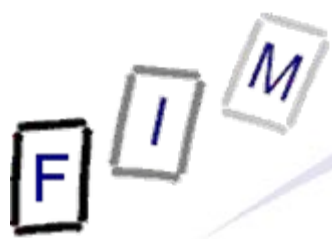


Filtering process

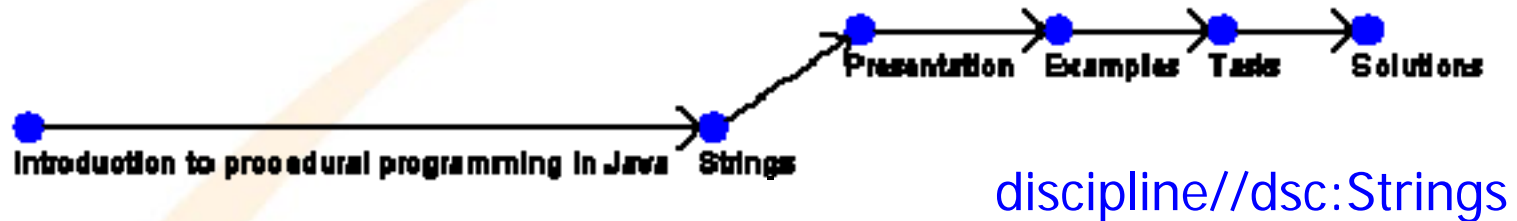




- An introductory course for Java programming
 - Contains organizational aspects as well as content
 - Slides from presentations, examples, tasks, solutions
 - Several separate topics, e.g. arrays, strings, ...



Filtering examples: Chapter extraction



Only the single subchapter remains

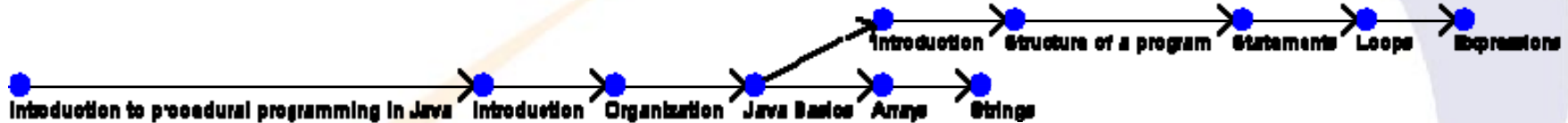
fce: Namespace for educational objectives

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



- 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!

F I M

Questions?

Thank you for your attention!