WebALT Project – Tools for eLearning

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Overview

- Aims to create standards and contents for mathematics eLearning

- Started in fall 2001 at Department of Mathematics in University of Helsinki

- Developed a multilingual online database of mathematical exercises and tools to edit materials and maintain the database

Technicalties

- Programs written in Java using J2EE standards

- Contents coded in XML, structures defined with XML Schemas

- Math content coded with MathML, an XML application for mathematical notation and semantics

- Uses an XML database for storing contents

Mathematics specific issues

- Traditionally mathematical notation and especially meaning has been problematic in electronic online contents

- Solution: MathML and OpenMath, XML projects started in 90's in which UH has been involved

MathML

- Enables to write mathematics on web and moreover to *convey the meaning* of mathematical expressions

- Encoding in XML with a defined structure

- OpenMath generalizes MathML through extensibility with *Content Dictionaries*
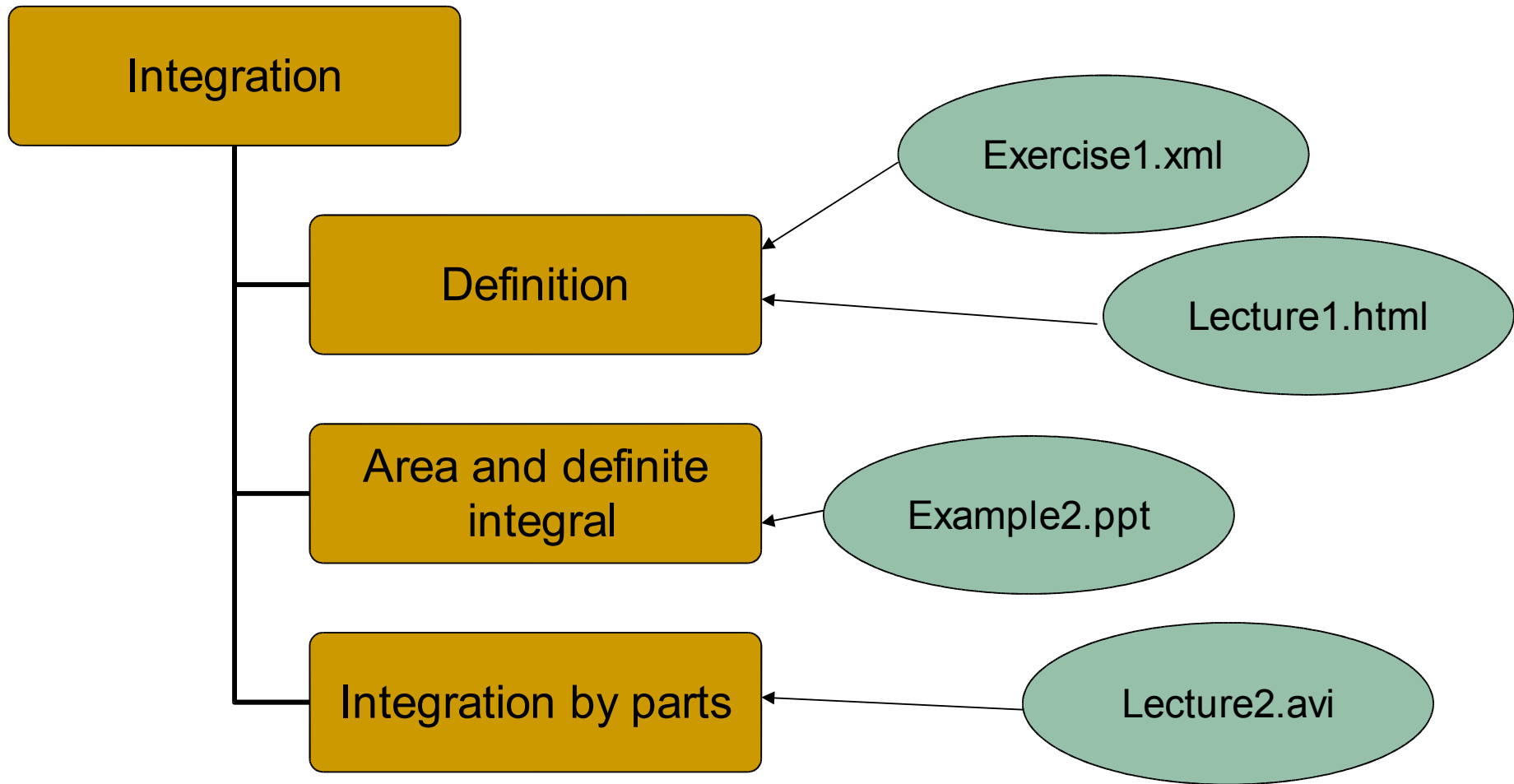
Benefits of MathML

- Math content is "intelligent" rather than gif pictures of formulas

- Enables queries over math content

- Allows one to cut and paste a formula to a math program and analyze it or calculate with it

$$\sum_{k=0}^{n} k^3 = \frac{n^4}{4} + \frac{n^3}{2} + \frac{n^2}{4}$$

Content Dictionaries

- WebALT project has defined a standard for categorizing mathematics elearning materials, called Content Dictionaries (CD)

- CD's specify the topical hierarchy of contents

- Every piece of content is linked to a topic in a CD

Example of a CD

Benefits of CD's

- Structured collection of elearning materials which enables easier maintainability, queries, and choosing materials under specific criteria

- Allows easier *sharing* of materials between educators. Authors can collaborate to produce online courses

- Use of distributed databases of elearning materials via Web Services

Future of WebALT project

- Aims to collaborate with universities and companies to produce an extensive and high-quality distributed storage of elearning materials

- Producing advanced standards and tools for elearning utilizing semantic web and web services technologies

For more information

http://webalt.net/index.html

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