MathML:
Mathematical Markup Language

Menyhárt László, Salzburg
2004.06.26-07.02.

MathML

- General
- What was before this?
- What does Markup Language mean?
- What is MathML?
- How does it work?
- Syntax
- Examples
- My extra opinion.

General

- Online presentations
- My theme is XML. Studying: data handling, storing, processing, communication, databases, and
- Data presentation (Mathematics)
- Possible solution: MathML (XML based)

- Technical approach (not didactics)

What was before this?

- MS Word / Equation Editor: WYSIWYG, formatter/reader, easy to use, integrated, expensive, no wide usage
- TEX/LATEX: formatter, readers (DVI,PS,PDF), high quality math, not easy to use
- HTML+GIF: server-side formatting, browsers, limited accessibility, flexible, inflexible
  - example0.html

What does Markup Language mean?

- Human and computer can read
- Text file, documents (XML documents)
- Tags, attributes (name=”value”), content
  ($…$)
- Including (<msup><mi>x</mi> <mn>2</mn></msup>)
- Processing Instructions (presentation: <?xml-stylesheet type=”text/xsl” href=”example.xsl” ?>)

What is MathML?

- W3C Math project
- Math for HTML
- Presentation (Example 2-5)
- Content (processing, evaluation(!) (Rutishauser, prefix operator)) (Example 7-)
- XML
- Version 2 (2001)
- http://www.w3c.org/Math

How does it work?

- Internet Explorer 5.5< + MathPlayer/Techexplorer plugins **(W)**
- Netscape 6.1 (Techexplorer) **(M)**
- Netscape 7.0< (Native presentation) **(W, L)**
- Mozilla 0.9.4/MathML ver., Mozilla 0.9.5+ **(W, L)**
- Amaya **(W, L)**

(Windows W, Linux L, Macintosh M)

How does it work?

- XHTML
  - Example (1)
- XML+XSLT
- Add stylesheet PI
  - Example (2a)
- Renderer (CSS, MathPlayer, Techexplorer, Nativ)
- We **can** say which renderer **need**.
  - Example (2b)

Example (1)

- XHTML

```
<?xml version="1.0"?>
<html xmlns="http://www.w3.org/1999/xhtml">
 <head>...</head>
 <body>
  <h1>Example</h1>
   ...
 </body>
</html>
```

ONLY HTML:

<B><*I*> </B></*I*>

XHTML:

<B>**<I> </I>**</B>

Example (2)

- XML-STYLESHEET (a)

```
<?xml version="1.0"?>
<?xml-stylesheet type="text/xsl"
  href="http://www.w3.org/Math/XSL/pmathml.xsl"?>
<html xmlns="http://www.w3.org/1999/xhtml">
…
</html>
```

- (b)

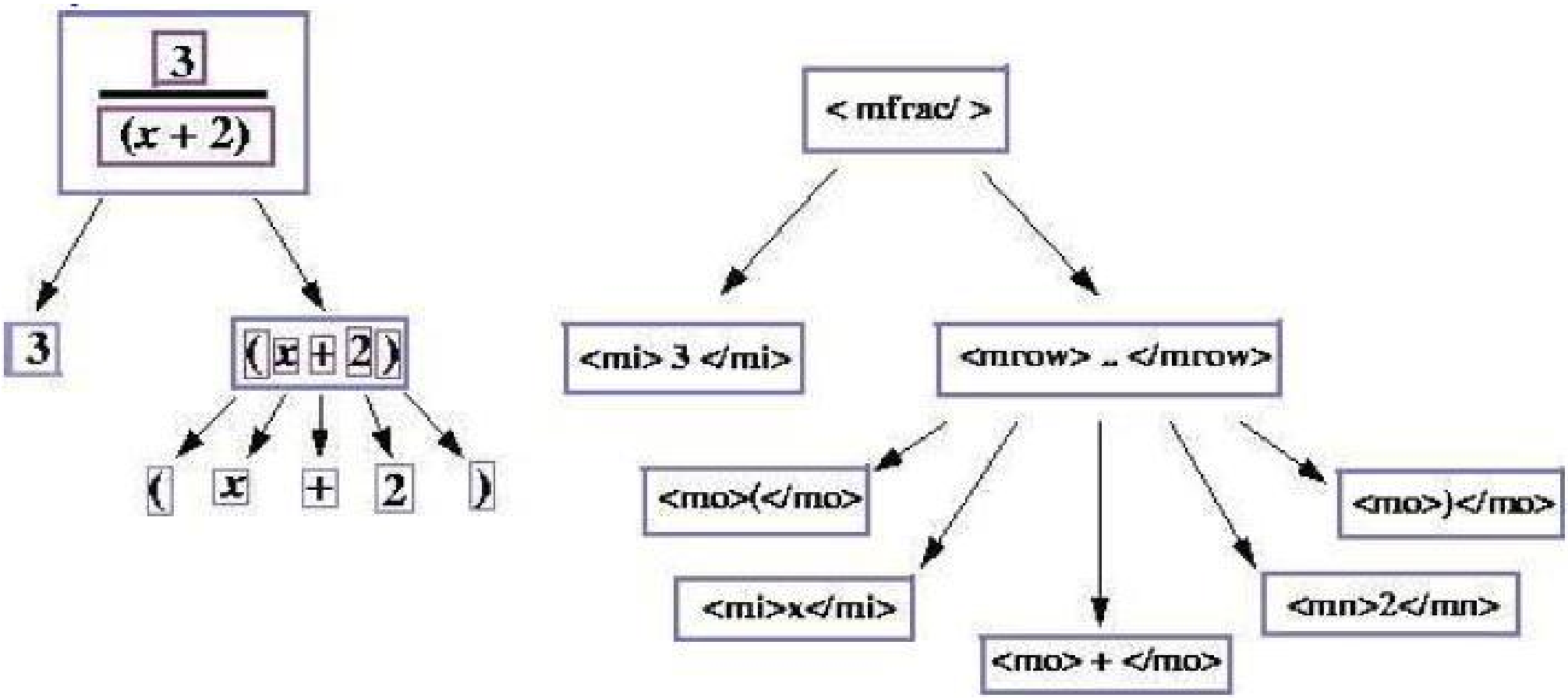
```
<html xmlns="http://www.w3.org/1999/xhtml"
  xmlns:pref="http://www.w3.org/2002/Math/preference"
  pref:renderer="css" > (pref:renderer="mathplayer")
…
</html>
```

Syntax to Presentation

- XML
- Tags
  - Identifiers: <mi> … </mi>
  - Operators: <mo> … </mo>
  - Horizontal row: <mrow> ... </mrow>
  - Grouping: <mfenced> child … </mfenced>
  - Grouping whit style: <mstyle> child …</msytle>
  - …
- Examples (3)

Example (3)

- Tags, tree, DOM (document object model)


3
(x + 2)
3
(x + 2)
(x + 2)
< mfrac/ >
<mi> 3 </mi>
<mrow> .. </mrow>
<mo>(</mo>
<mi>x</mi>
<mo> + </mo>
<mn>2</mn>
<mo>)</mo>

Syntax to Presentation (2)

- Tags
  - Fraction: <mfract> numerator denominator </mfract>
  - Radicals:
    - <msqrt> children </msqrt>
    - <mroot> base index </mroot>
  - Index:
    - Super: <msup> base script </msup>
    - Subs: <msub> base script </msub>
    - Both: <msubsup> base superscript subscript</msub>
- Examples (4,5)

Learning - Online

- **Analogy**

  Student

  Teacher

  Online tutorial

Finish

- Questions?

THANK YOU!

Menyhárt László Gábor
egyetemi tanársegéd
Eötvös Loránd Tudományegyetem
IK, Informatika Szakmódszertani Csoport
Cím: 1117 Budapest, INFO Park, Pázmány Péter sétány 1/C.
Tel.: (+36) 1 209 0555 / 8652 mellék
E-mail: menyhart@elte.hu
web: http://xml.inf.elte.hu