A Bare Bones Guide to Beginning *webMathematica*

Mike Martin & Steve Wilson

JCCC Mathematics

Today's Outline

- What is *webMathematica*?
  - Examples: Global & Local
  - Licensing & Installation Issues
- Creating *webMathematica* Pages
  - Basic Structure
  - Static Pages
  - Images & Packages
  - Interactive Pages
- Just Released
  - Version 2

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What is *webMathematica*?

- What and How?
  - Adds Interactive Calculations & Visualizations to Web
  - Utilizes Web Server Technology to Integrate *Mathematica*
  - Runs Through a Web Browser or Other Web Clients
- *webMathematica* vs *Mathematica*
  - Same Engine
  - Different Interface & Audiences
  - *Mathematica* as a development environment
  - SA's set up site & others populate with content
  - User's need not know *Mathematica* or that they are using it
- Examples
  - www.jccc.net/~mmartin/webmath.html
  - www.jccc.net/~mmartin/webmathXtra.html

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Amateur License Restrictions

- Can use "the power of a specific capability of *Mathematica*."
- Cannot allow "arbitrary, open-ended calculation requests."
- Pages must be publicly accessible.
- Must apprise Wolfram of all existing pages.
- A banner link to Wolfram is required.

web*MATHEMATICA*

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Version 2.0

- New Features
  - Simplified Installation
  - New Templating based on JSP (MSP still supported)
  - New Layout
  - HTTP file upload capabilities
  - Session Variables
  - Improved HTML Formatting
  - MathML, XML, SVG, & XSLT stylesheets support
  - Improved Documention & Examples
  - Apache JServ Support Dropped

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Contacts

- Mike Martin, JCCC
  mmartin@jccc.net
  http://www.jccc.net/~mmartin

- Steve Wilson, JCCC
  swilson@jccc.net
  http://staff.jccc.net/swilson

math.jccc.net

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Steven J. Wilson

For local testing of files:
>Start Tomcat (which also loads Java)
>Open Internet Explorer

To view Wolfram's canned examples:
http://localhost:8080/webMathematica/

To view a file on the local machine directly:
C:\Program Files\Wolfram Research\Mathematica\4.1\AddOns\Applications\Msp\MSPScripts\Examples\Hello.msp
Is opened by pointing the browser to
http://localhost:8080/webMathematica/MSP/Examples/Hello

For local testing, files must reside in the folder:
C:\ProgramFiles\Wolfram Research\Mathematica\4.1\AddOns\Applications\Msp\MSPScripts
or its subfolders, and must have the extension .msp (Mathematica Server Page).

Creating a page:
Can use Notepad to get pure code.
Type all code (HTML, Mathematica, etc.) in Notepad.
Save to folder as indicated above.

Making pages public:
Open FTP session with math.jccc.net.
Open subdirectory mathematica (actually redirection to another directory)
Transfer files to this directory, or a subdirectory of it.
Ask Steve Wilson to provide a link from the Math Faculty Projects page.

Basic structure of an MSP file:
Mathematica code occurs in Mathlet tags (often inside MSP commands).
Mathlet tags are included in HTML code (often inside forms).
HTML code is saved as an .msp file in the appropriate folder.

Static Page Example:
>`<h4>Here is a simple example of a static page</h4>`
>`<%Mathlet   5*6+2*3  %>`
>`<%Mathlet   Expand[(x+4)^3]   %>`

To show images:
Basic commands include:
MSPShow[*image*]   displays *image*, not –Graphics–
MSPShowAnimation[*images*]   animates a table of *images*
MSPFormat[*expr*,StandardForm] displays image of *expr* in standard form

Examples:

```
<%Mathlet   MSPShow[Plot[x^2,{x,0,5}]]   %>
<%Mathlet   MSPShowAnimation[Table[Plot[x^2+k,{x,0,4}],{k,1,5,1}]] %>
<%Mathlet   MSPLive3D[Plot3D[Sin[x+y],{x,-5,5},{y,-5,5}]]  %>
<%Mathlet   MSPFormat[ 3/5, StandardForm]  %>
```

To use Mathematica packages:

```
<%Mathlet   Needs["Graphics`Graphics`"];   %>
<%Mathlet   MSPShow[PolarPlot[Cos[5t],{t,0,2 Pi}]]  %>
```

To avoid shadowing of variables, a command to load a package must not be in the same Mathlet tag as the commands from that package.

For interactivity, forms are required:

Here is a bare bones form that grabs the input and returns it:

```
<form action="filename" method="post">
<input type="text" name="var">
<%Mathlet   $$var   %>
<input type="submit" name="submitButton" value="Evaluate">
</form>
```

filename must match the name of the .msp page doing the processing.
The input variable must have $$ prepended when placed in the Mathlet tag.

Example which provides a default value and retain previous values in forms:
`<input type="text" name="num" value="<%Mathlet  MSPValue[$$num,"2"] %>">`

A basic programming construct:

MSPBlock[{$$*var*}, *body*]   evaluates *body* if *var* has a value

Examples:

```
<form action="filename" method="post">
<input type="text" name="expr">
<%Mathlet  MSPBlock[{$$expr}, Expand[$$expr]]  %>
<input type="submit" name="submitButton" value="Evaluate">
</form>
```

will take *expr* as input, expand it, and return the result.
MSP Block is sometimes required when form variables are used.

Other tips:

- Avoid using % in Mathematica code. Instead, use variable names. Each MSP call restarts Mathematica's computation count.
- Avoid using line breaks for multiple computations. Use two or more Mathlet tags. Line breaks are spaces on MSP pages, and therefore multiplication.

Brief Info about our limited license:

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