User manual

Revision history

Version	Last updated	Author(s)	Remarks
0.1	02.05.2010	Mihkel Jõhvik	Initial document

Table of contents

Purpose of this document	1
1. Introduction	1
2. Using	2
2.1 Main	3
2.2 Application menu	4
2.3 Top menu	4
2.4 Bottom menu	5
2.5 Editor	5
2 Deployment	6
3 Extending	7
3.1 Adding equations	7
3.2 Adding characters	8
3.3 Adding new menus	8
3.3.1 Top menu	8
3.3.2 Bottom menu	9
4. License	. 10

Purpose of this document

The purpose of this document is to introduce to potential users and developers the ins and outs of Equation Editor 2.

1. Introduction

Equation Editor 2 is an embeddable plugin for websites that allows it's users to create, edit and export scientific equations of any kind in MathML or LaTex format. The plugin is easy to integrate with any HTML5 webpage, easy to use and easy to extend. Equation Editor 2 is also small-screen-friendly, meaning it can be used from small devices like mobile phones or tablets. While keyboard interaction is supported for those using this on a standard PC, all the functionality is also available on the screen, so no added on-screen keyboards or other programs are needed on mobile devices.

This user manual is divided into three sections. The first provides an overview of the elements visible to end users. The second is intended to aid any developer with adding Equation Editor 2 to their website. The third shows how to add functionality to the editor.

A quick video example showing some features is available at <u>youtube.com</u>. Please enable annotations as they are used to describe what is happening in the video.

2. Using

Supported browsers:

- Firefox 3.6
- Limited support in Opera 10.5

Before you can start using this application HTML5 needs to be enabled. In Firefox, this can be achieved by typing about:config into the address bar and pressing enter.



If there is a warning, click to proceed. In the window that just opened, find the Filter section at the very top of the page and write html5 inside it.

Filter: html5

There should be only one entry shown now. Double clicking it will enable HTML5.

Preference Name A Status Type Value html5.enable user set boolean true

Now you can close this page and start using Equation Editor!



1. Application menu button. This brings up the application menu detailed in section 2.2. This is also the handler for dragging the application. If you press and hold your left mouse botton on this button, you can drag the editor around the page.

2. Top menu bar. This contains all the equation menus.

3. A top menu button. This brings up a submenu where you can insert new equations from. Detailed in section 2.3.

4. Bottom menu. This contains characters you can insert inside the equations. Detailed in section 2.4.

5. Delete button. Clicking on this will delete the current selection from the editor. Be careful with this, the changes are non-reversible. Backspace is also used for deleting selected elements, but backspace works as intended (only deleting the last character) when adding content to an input box.

6. Bottom menu selection. This can be used to cycle through different character menus, from numbers to greek letters.

7. The actual editor. This is where your inserted symbols and equations will be shown. Detailed in section 2.5.

8. Current equation. The equation currently being edited.

9. Resize handler. Clicking and dragging this will resize the editor. Clicking on the editor or bottom menu part of the editor will close all opened menus.

2.2 Application menu

Download Formula Latex Presentation MathML	1 2
Import Formula Latex Presentation MathML	3 4
Export Formula Latex Presentation MathML Content MathML	5 6 7
Help [X] Close Window	

This is where the created equation can be saved or existing equations can be imported for further editing. Opening the application menu will close all other opened menus. Clicking on any of the buttons will close the main menu.

1. Download LaTex. This allows you to download the current equation as a file (.mml extension) onto your hard-drive in LaTex format.

2. Download Presentation MathML. This allows you to download the current equation as a file (.mml extension) onto your hard-drive in MathML format, the same code shown in the editor window.

3. Import formula LaTex. This allows importing LaTex equations for editing.

4. Import formula Presentation MathML. This allows importing MathML equations for editing.

5. Export formula LaTex. Clicking this will create a pop-up containing the current euation in LaTex format. It is presented within a textarea for easy copying.

6. Export formula Presentation MathML. This allows copying the current MathML code shown in the editor window. Clicking on it will create a pop-up containing MathML code inside a textarea.

7. Export Content MathML. This can be used to create Content MathML code from your equasion and copy it onto your clipboard.

8. Close window. This closes the application editor. Be careful when using this, if the webmaster has not created a place (a button or a link) to reopen the editor, you will need to reload the page to access it again.

2.3 Top menu



These menus allow inserting new parts to your equations. Opening a top menu will close the application menu.

1. Previous button. This can be used to slide the menu to the left.

2. Buttons. Clicking on one of these will close the menu and insert the desired equation into the selected element. There are two different placeholders used. \Box denotes the element being added and \blacksquare the element selected. So having x selected and clicking $\blacksquare+\Box$ would produce x+?. Note that in the actual application, the \blacksquare element is white and the element is blue with a white border.

3. Next button. This can be used to slide the menu to the right.



2.4 Bottom menu

This is the place where you can add characters and numbers to your equations.

1. Menu selection button. Clicking on this will bring up a menu selection window.

2. Menu selection window. Clicking on any of the links there will switch the current menu for the desired one.

3. Previous button. Clicking this will cycle the menu to the left.

4. Buttons. Clicking on any of these will insert the character into the selected element. Note that if a larger construction is selected (for example, a squareroot), it will be overridden.

5. Next button. Clicking this will cycle the menu to the right.

2.5 Editor



When Equation Editor is active (it has focus, meaning you have just clicked on it and not clicked on anything outside the editor) and an input field is selected, it listens to a-z and 0-9

keys for user input. When you start typing, it inserts anything you type inside the input element.

1. Current equation. This is the equation currently being edited.

2. Current selection. This is the active selection on which operations can be done (adding new equations, deleting etc). There are two types of selections. One is the input field which can be used to enter characters/numbers from the keyboard. Clicking on it will create an area where you can type. The second is simply a selector of equation constructs. This selection allows doing operations like deleting, but does not allow for user input via the keyboard.

2 Deployment

Deployment of Equation Editor is fairly easy. You just need to copy the files and folders to the desired location in your web directory, add the script and css files to your html file and initialize the editor.

Please keep the file structure intact!

The minimal required code follows (each line will be explained in more detail below):

```
<link href="css/ui.css" rel="stylesheet" type="text/css" />
<script src="../lib/jquery.js" type="text/javascript"></script></script></script></script>
<script src="../lib/jquery.ui.js" type="text/javascript"></script>
<script src="../lib/jquery.jcarousel.pack.js" type="text/javascript">
</script>
<script type="text/javascript" src="../lib/LaTeXMathML.js"></script>
<script src="js/main.js" type="text/javascript"></script>
<script src="js/operations.js" type="text/javascript"></script></script></script></script></script>
<script src="js/ui.js" type="text/javascript"></script>
<script type="text/javascript">
$(function() {
      eqEd.init({
             parentId: 'eqEdContainer',
      });
});
</script>
```

If copying this code, be sure to change the paths to the files appropriately.

```
A more detailed explanation of each line:
<link href="css/ui.css" rel="stylesheet" type="text/css" />
This is the main CSS file of the application. This file contains all the styles (colors,
positioning) used in the application and therefore the look and feel of the application is
easily configurable to anyone with enough knowledge of CSS.
<script src="../lib/jquery.js" type="text/javascript"></script>
<script src="../lib/jquery.js" type="text/javascript"></script>
<script src="../lib/jquery.ui.js" type="text/javascript"></script>
<script src="../lib/jquery.ui.js" type="text/javascript"></script>
<script src="../lib/jquery.jcarousel.pack.js" type="text/javascript"></script>
<script src="../lib/jquery.jcarousel.pack.js" type="text/javascript"></script>
<script src="../lib/jquery.jcarousel.pack.js" type="text/javascript"></script>
</script>
```

These are the libraries needed to run Equation Editor. The first one is the jOuery Javascript library. The second contains the necessary script to make the application window resizable and draggable. The third allows menus within the application to be viewed as if on a carousel. The fourth is for importing LaTeX code into the application (note, that if you do not need this functionality, then not adding it will not cause any errors within the editor). <script src="js/main.js" type="text/javascript"></script> <script src="js/operations.js" type="text/javascript"></script> <script src="js/ui.js" type="text/javascript"></script> These files contain the actual Equation Editor code. <script type="text/javascript"> \$(function() { //when the document DOM is loaded eqEd.init({ //when user clicks on the element, initialize the editor parentId: 'eqEdContainer', //the id of the element where the editor will be inserted }); });

</script>

This is the actual initialization of the editor. The script above is commented, but the only important part here is the parentId variable. This is the container in which the editor will be created and is needed for the editor to run. The markup should be inside your document. An example:

<div id="eqEdContainer"></div>

The above code will start the editor when the page has loaded. It is also possible to add the initializing code inside an event handler. That way the editor could be loaded, for example, when a user clicks on a link.

Optional configuration variables:

width: sets the width of the editor window. Default is 400. A value in pixels is assumed. height: sets the height of the editor window. Default is 300. A value in pixels is assumed. minWidth: sets the minimal allowed width for the editor window. The editor window will not resize it's width to less then the value of this variable. Default is the width parameter. minHeight: sets the minimal allowed height for the editor window. The editor window will not resize it's height to less then the value of this variable. Default is the height parameter. edit: allows to pass in MathML code to the constructor. This code will be shown instead of the "?". Useful for example when adding the editor constructor to mathml elements for easy edititing.

3 Extending

3.1 Adding equations

Adding new eqautions to Equation Editor is incredibly easy. All you need is the Presentation MathML code for the equation you wish to add. Then you need to figure out into which menu the new equation should go. All the menus are located in the html folder inside the file eqEdTopMenu.html. Locate the menu you wish to add the new equation to and create a new element in it. Then add your MathML code inside it. If you're inserting equations with a placeholder, be sure to use \Box as the placeholder for the element to be added and a set the placeholder for the element currently active (for example, if you wish to add a new equation similar to $\blacksquare+\Box$, the \blacksquare would be the selected element and the \Box would mean the

element being added. So having number 7 selected and clicking on the above construct would produce 7+?). That's it, the equation is now ready to be used (note that sometimes browsers cache the html files used in this application so before trying to add the new equation, you should clear your browser cache).

3.2 Adding characters

Adding new characters to the bottom menu of the editor is equally simple. All you need is to add a new element inside the eEdBottomMenu.html file inside the desired menu's element. Then enter the character you wish to add inside that element. As all these files use utf-8 encoding, you can just type the character and save the file. No html entities needed.

3.3 Adding new menus

3.3.1 Top menu

Adding entirely new menus is a bit more complicated. If you wish to add a new menu to the top of the editor, you need to edit the eqEdTopMenu.html file in two places: first add a new element in the inside <div id = "eqEdCatMenuItemDiv"> (this is the very first div in the file). The element should have the eqEdCatMenuItem class and a unique id in the style of eqEdMENUNAMEMenu where MENUNAME is the name you wish to give your menu. It can be anything that is currently not used within the editor (used names are Structures, Basics, Groups, Calculus and Common). We will need this id later. Inside the element you should add the "icon" of the menu – a MathML element which represents what you can find inside. It can also be text or anything else you find suitable.

The next step is to create the menu itself. The structure of the menu looks like this:

```
<div id="eqEdMENUNAMEMenuItem" class="eqEdSubMenuItem">
   <a id="eqEdMENUNAMEMenuItemDivPrev" class="eqEdNavArrow">&lt;</a>
   <div id="eqEdMENUNAMEMenuItemDiv" class="eqEdSubMenuItemDiv">
      <11>
       <1i>
        <<u>math</u>>
         ... MathML code ...
        </div>
    <a id="eqEdMENUNAMEMenuItemDivNext" class="eqEdNavArrow">&qt;</a>
 </div>
The code is broken down more clearly below:
<div id="eqEdMENUNAMEMenuItem" class="eqEdSubMenuItem">
This is the container of the construction.
<a id="eqEdMENUNAMEMenuItemDivPrev" class="eqEdNavArrow">&lt;</a>
<a id="eqEdMENUNAMEMenuItemDivNext" class="eqEdNavArrow">&qt;</a>
These are the next and previous arrows on the carousel.
```

```
<div id="eqEdMENUNAMEMenuItemDiv" class="eqEdSubMenuItemDiv">
```

This is the container of the menu. Needed for the carousel.

```
<<u>math</u>>
... MathML code ...
</math>
```

This is the actual menu

The above code can be copied, provided you replace MENUNAME with the name you picked in step one. Each element inside this menu represents a button. Adding new equations inside these buttons is described in section 3.1.

Note the classes on the elements. These are used to add event listeners and handlers to each element and are required for the menu to work. The id naming should also follow the above example.

If everything has been done correctly, the menu should need no further configuration. Carousels, open and close events etc should be added automatically.

3.3.2 Bottom menu

If you wish to add a new bottom menu, you need to edit the eqEdBottomMenu.html file in two places.

First, add the menu itself. The structure of the menu should look like this:

<div id="eqEdBottomMenuItemX" class="eqEdBottomMenuItem">
<
<div id="eqEdBottomMenuItemDivX" class="eqEdBottomMenuItemDiv">

> </div>

The code is broken down more clearly below:

<div id="eqEdBottomMenuItemX" class="eqEdBottomMenuItem">

This is the container for the entire construction

<
>
These are navigation buttons for the carousel.

<div id="eqEdBottomMenuItemDivX" class="eqEdBottomMenuItemDiv">
This is the container of the menu. Needed for the carousel.

.. some character ..

This is the actual menu.

X is the number of the menu needed to distinguish them from each other. The easiest thing to do is the increment the existing menus' number by one (the first usable number for the basic build of the editor is 5). Each $\langle l i \rangle$ element inside the menu is a button. Adding buttons to the bottom menu is described in section 3.2.

The second thing you need to do is make the menu selectable. To do that, you need to add a new anchor inside the <div id="eqEdBottomMenuSelection"> div. This is the element that pops up when you click the blue botton on the bottom-left corner of the editor. The anchor should look like this: ..., where X is the number of

the menu you chose earlier. Inside the anchor you should write something to show what the menu contains (for example "123" would contain numbers). Some editing of the CSS file might be required to make the new anchor fit nicely, if the text inside it is too long. This can be done in the css/ui.css file on line 275. Change the value of width to whatever you require.

The above code can be copied, provided you change the value of X to a number (5-9 in the original build).

NB! Currenlty the code provides support for up to 10 bottom menus.

4. License

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

- Redistribution of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
- Redistribution in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
- Neither the name of the University of Tartu, nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR

CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.