PreTeXt for Novices Using Windows

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Jessica K. Sklar
Pacific Lutheran University

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Contents

Chapter 1

Important introductory notes

This tutorial will help novice PreTeXt (PTX) users install necessary software on their Windows machine and learn the basics of compiling PTX files into HTML and PDF forms. It will be important to keep the following in mind throughout.

- Much of the documentation about PreTeXt (PTX) will refer to it by its previous name, MathBook XML (XML), and many of the example PTX documents found in the `mathbook` repo (you'll learn what that is in Chapter 3) will have XML extensions. "XML" is being slowly being migrated to "PTX" in the documentation, but it may take a while since the documentation is extensive! You can replace, in your mind, XML with PTX anytime it appears.
- We recommend ***NOT*** changing PATH environment variables on Windows unless you absolutely have to. Which sometimes you do. But if you see in documentation that changing the PATH variable is *optional*, don't do it. Many Windows users have a surprising amount of trouble changing PATH variables, through no fault of their own.
- You're encouraged to join the Google group `pretext-support`: `https://groups.google.com/forum/?fromgroups#!forum/pretext-support`. When you run into trouble or have questions, you can post in the group; you can also search the group for possible posts addressing your questions.
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Chapter 2

Software and GitHub account setup

Here we provide a list of the steps you will need to take to get PTX up and running on your local Windows machine. (You can find more extensive documentation for this in Sections E.1–E.3 in Dave Rosoff's invaluable *Windows Installation Notes* in [2], though we recommend ***avoiding performing the task described in Section E.2.2***; see Step 5 below.)

You may perform most of the installations in any order, but should perform Step 5 after Step 2.

1. Install a text editor.

   If you don't already have one installed that you like to use, you will need to install a text editor that will produce "unformatted" text.

   If you don't know what that means, or don't already have such an editor that you like, we recommend installing Sublime Text, which you can download at `https://www.sublimetext.com/`. (You can use the trial version for free indefinitely, but will get regular pop-ups asking you to register; as of summer 2017, registration cost $70.)

   For more extensive information about text editors you may use with PTX, see Appendix B in [2].

   Why this installation? You will write your PTX source documents using this editor.

   Installation difficulty level: Easy.

2. Install Git and create a shortcut to the Git Bash shell.

   (a) Install Git by choosing the Windows option at `https://git-scm.com/book/en/v2/Getting-Started-Installing-Git` and selecting the default options.

   Why this installation? From the Introduction in [1]: "Git ... is a revision control system. What's that? It is a tool to record changes to software, a tool to experiment with changes to software, and a tool to collaborate creating software."

   For more details on why you'll be using Git (and how to use it!), see [1].

(b) Create a shortcut to the file `git-bash.exe`.

Why this shortcut creation? ***You will perform all of your compilations in the Git Bash shell***, which is installed when you install Git. You don't need to know what it is, exactly, other than that it is a command-line interface in which you'll enter your commands. If you've used Unix or Linux, you're in your wheelhouse in the Git Bash shell. If you haven't, don't worry; we'll cover the basics of what you need to know.

Installation and shortcut creation difficulty level: Easy.

3. Sign up for a GitHub account at `https://github.com`.

   Why sign up for this account? GitHub is a code hosting platform. We will later elaborate on how we will use GitHub.

   Sign-up difficulty level: Easy.

4. If you plan to create PDFs from your PTX files, you will need to have a LaTeX compiler installed. (If you only plan to create HTML files, you may skip this step.)

   If you don't already have one, one option is MiKTeX, which you can download from `https://miktex.org/howto/install-miktex`. Simply choose the default options when installing, as long as by default it installs into a folder whose path name (e.g., `C:/Users/username/AppData/Local/Programs/MiKTeX/`) contains no spaces. (Spaces in path names can cause problems, and should be avoided as much as possible.) If the default path name contains spaces, change the installation location to one that doesn't contain spaces.

   If you choose another LaTeX compiler, make sure it includes the executable files `xetex.exe` and `pdflatex.exe`, and again, make sure to install it in a location that avoids spaces in its path name.

   Why this installation? We can compile our PTX files to LaTeX files using `xsltproc` (see Step 5), but we must then use a LaTeX compiler to compile the LaTeX files to PDFs.

   Installation difficulty level: Easy, other than ensuring installation paths don't contain spaces.

5. Install `xsltproc`.

   Follow the instructions for installing `xsltproc` ***exactly*** as described in the Karl-Dieter Crisman's Windows *Getting Started* video found at `http://mathbook.pugetsound.edu/documentation.html#getting-started-videos`. The installation files are at `https://www.zlatkovic.com/libxml.en.html` and the discussion of the installation of `xsltproc` begins in the video at 3:31. We elaborate on some of the video instructions below.

   - A description of the exact files you will need to download from the website are found in Lists E.2.1 and E.2.2 in Appendix E of [2].
   - ***It is essential that you install the `xsltproc` files in your default Git Bash directory in order for you to avoid making adjustments to later commands.***

     To find what that directory is, open the Git Bash shell using the shortcut on your desktop, and enter `pwd`. This will likely yield `c/users/username`, where `username` is the profile under which you're

logged into your Windows machine. In any case, ***this is your default Git Bash directory***. You will need to move all the files you extract, as per the video instructions, into this directory.

- ***Do not move the* `xsltproc` *folder or its contents from their initial locations, and do not change the PATH environment variable name, despite this option being described in E.2.2 in [2].***

Why this installation? `xsltproc` is a command line tool for applying XSLT stylesheets to XML documents. You don't need to worry about what this means, but you do need to have the tool installed.

Installation difficulty level: Moderate. (Potentially-difficult-to-hair-pulling if you try to change the PATH variable name.) Carefully follow the video instructions.

Chapter 3

Cloning and maintaining the `mathbook` repo

Don't know what this means? That's ok! A GitHub repository (or "repo") is basically a collection of files hosted on GitHub, and what you need to know for now is that you're essentially copying onto your local computer a GitHub repo in a way that will allow you to later easily update the files on your local machine in accordance with their updates in the corresponding GitHub repo. Some of these files you don't "need" (e.g., the library of examples), but some you do (e.g., the files `mathbook-html.xsl` and `mathbook-latex.xsl`), and you will need to update these from GitHub from time to time, so you should follow these instructions exactly.

1. *Cloning the* `mathbook` *repository*

   In your Git Bash shell, first enter the command `cd` (this will take you to your default directory).

   Next, enter in the following commands, pressing enter after each command:

   ```
   git clone https://github.com/rbeezer/mathbook.git
   cd mathbook
   git checkout dev
   ```

   This will install a folder called `mathbook` in your on your local machine that contains the necessary (and optional) files. ***Do not move this folder or its contents. If you install this folder somewhere else, or move it, you will need to make adjustments to later commands described in this tutorial.***

2. *Keeping the* `mathbook` *repository on your local machine up to date*

   Whenever the developers make changes to the files in the GitHub repository `mathbook`, you can update these files accordingly on your local machine by navigating in the Git Bash shell to the `mathbook` folder and entering the command `git pull`.

   You should pull from this repo daily, or at least whenever you plan to compile, since it is very regularly updated.

   Important note: When you `git pull` to update your `mathbook` folder, you should be in the `dev`, not `master`, branch.If your Git Bash prompt

ends in `mathbook (dev)`, you're in the correct branch. If it ends in `mathbook (master)`, enter in `git checkout dev` to move to the correct `dev` branch before entering `git pull`.

Chapter 4

Command Line Navigation

In order to compile your documents and use `git`, you will need to be able to navigate your file system using the command line in your Git Bash shell. You can find a decent summary of the basic navigation commands at Beginner: Linux Navigation Manual and an index of the Git Bash shell commands at An A-Z Index of the Bash command line for Linux.

The essentials for you to learn are the commands `pwd` and `ls`, and how to use the command `cd` to move from one folder to another. In particular, `cd ~` will return you to your default directory, `cd ..` will take you up one level in the file system, and entering in `cd im/going/here`, for instance, while in your default directory will take you to the directory `here` with file path `~/im/going/here`.

Chapter 5

Compiling a PTX file

Now is the time for the magic to happen! You will take a sample PTX file (extension `ptx` or `xml`) and use it to create an HTML document and a PDF. (Note: XML is a deprecated file type; when you create PTX documents, your extension should be `ptx`.)

First, navigate in your Git Bash shell to the folder containing the PTX or XML file you plan to work with. For our example, navigate to `~/mathbook/examples/hello-world`, which contains the XML file `hello-world.xml`.

To compile to HTML: From the folder containing `hello-world.xml`, type

`~/xsltproc/xsltproc --xinclude ~/mathbook/xsl/mathbook-html.xsl hello-world.xml`.

This will compile the XML file into an HTML file, `hello-world.html`, in the same folder as `hello-world.xml`. You can open it by navigating to the folder via the Windows desktop and opening it the way you'd open any HTML document on your machine.

To compile to PDF:

1. From the folder containing `hello-world.xml`, type in the same command as you used to create the HTML document, replacing the `mathbook-html.xsl` with `mathbook-latex.xsl`; that is, enter

   `~/xsltproc/xsltproc --xinclude ~/mathbook/xsl/mathbook-latex.xsl hello-world.xml`.

   This will compile the XML file into a LaTeX file, `hello-world.tex`, in the same folder as `hello-world.xml`.

2. From ***the same folder***, enter the command `pdflatex hello-world.tex` to create a PDF from the LaTeX file. `hello-world.pdf` will appear in the folder. You can open it by navigating to the folder via the Windows desktop and opening it the way you'd open any PDF document on your machine.

You can generalize from this to compile any PTX (XML) file to HTML or PDF.

Note 5.0.1.

- To compile a file, ***first make sure you are in the directory in your Git Bash shell which contains the file to be compiled***.
- If your `xsltproc` and `mathbook` folders are in your default directory on your local machine, you can always start off your `xsltproc` compilation

commands with

`~/xsltproc/xsltproc --xinclude ~/mathbook/xsl/mathbook-html.xsl` (for HTML),

or

`~/xsltproc/xsltproc --xinclude ~/mathbook/xsl/mathbook-html.xsl` (for LaTeX),

and simply append the name of your PTX (XML) file. ***If you have installed or moved one or both of these directories elsewhere, you will need to change the path(s) to*** **`xsltproc.exe`** ***and/or to the*** **`xsl`** ***file in the command.***

- You can always compile your LaTeX file to PDF by typing `pdflatex` and appending the name of your LaTeX file (provided you're in the directory containing your LaTeX file).

Remark 5.0.2. What was all that stuff in the `xsltproc` compilation commands??

- `~/xsltproc/xsltproc` ran the `xsltproc` executable, living within the `xsltproc` folder.
- `--xinclude` is an optional command that is required if you include modular PTX files in your main PTX file; don't worry about what that means for now. Suffice to say that you can always include that optional command without running into problems, so why not include it by default?
- `~/mathbook/xsl/mathbook-html.xsl` and `~/mathbook/xsl/mathbook-latex.xsl`) are the style files that make the PTX compile to HTML or LaTeX.
- Finally, `hello-world.xml` was, of course, the name of the file you were compiling to HTML or LaTeX!

Chapter 6

Creating a PTX file

6.1 First steps

Now is a good time to try creating your own PTX document. The easiest way to do this is to first follow the instructions in the "A Careful, Quick Minimal Example," chapter in [2] to create your first PTX document.

The next step might then be to choose a PTX (or XML) file from the `mathbook/examples` folder and use it as a template. A good template to start with is `mathbook/examples/sample-article/sample-article.xml`: the HTML version of the sample article, http://mathbook.pugetsound.edu/examples/sample-article/html/, provides some instruction for writing in PTX, while the XML code itself demonstrates actual PTX coding.

Remember that when you compile, you will always need to be sure you are including the correct path to the style file, based on your PTX file's location.

Changing your output file names: By default, your PTX will compile to an HTML (respectively, LaTeX) file called `index.html` (resp., `index.tex`). If you are writing an `<article>` and you wish your output files to have,say, the title "ducks" preceding the extension, add the attribute `xml:id="ducks"` to your `<article>` element using the following code: `<article xml:id="ducks">`.

Take some time playing with whichever template(s) you choose. Experiment with creating lists, using `<theorem>` and `<example>` elements, etc. (For now you can think of "elements" in PreTeXt as playing the role which environments play in LaTeX.) ***Try not to worry about the appearance of your HTML or PDF at the moment; you can customize appearances later.***

6.2 Familiarize yourself with the RELAX-NG schema

From the section on RELAX-NG schema in [2]: "A **schema** is a set of patterns which describe how the elements of a language may be combined. The PreTeXt vocabulary is described by a RELAX-NG schema".

As you experiment, you should start getting used to the "RELAX-NG SCHEMA." If you do not follow the schema, your PTX code may not compile correctly, and even if it does compile correctly, it may not do so after an update to the `mathbook` repo.

A decription for the RELAX-NG schema can be found at http://mathbook.pugetsound.edu/doc/schema/. For instance, if you select the element `<example>` in the left-hand column, you will see lists of elements under the headings "***Con-***

tent model elements" and "***Included in content model of elements***." The former list contains the elements that the `<example>` element may contain, and the latter contains the elements in which the `<example>` element may be contained.

6.3 Coding modularly using `xinclude`

From [2]: "The `xinclude` mechanism ... is of some use for organizing your work, so you do not have mammoth files open in your editor." By using this mechanism you can put portions of your document in separate PTX files and then "include" them in your main file. For instance, if your book has five chapters, you may want to write each chapter in a separate PTX file.

If you wish to, for instance, include the chapter in the file `algebra.ptx` in your main file, `index.ptx`, put `algebra.ptx` in the same directory as `index.ptx`, and insert the following code in `index.ptx` where you want the chapter to appear: `<xi:include href="algebra.ptx" />`. You can see examples of this technique being used in `mathbook/examples/sample-book/sample-book.xml`.

For more details, see the section on Modular Source Files in [2].

Appendix A

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