Chapter 1

Author's Guide to Diderot

Let's start with creating and uploading chapters. Let's use the "Slides" book that I created (you can create as many books as you want, see below). Go to "Manage Books" from the "Links" on the center right, to the left of search bar on top. Now you can create a chapter.

1.1 Course Home Page

The Zones. Course home page, shown below, consists of four zones.

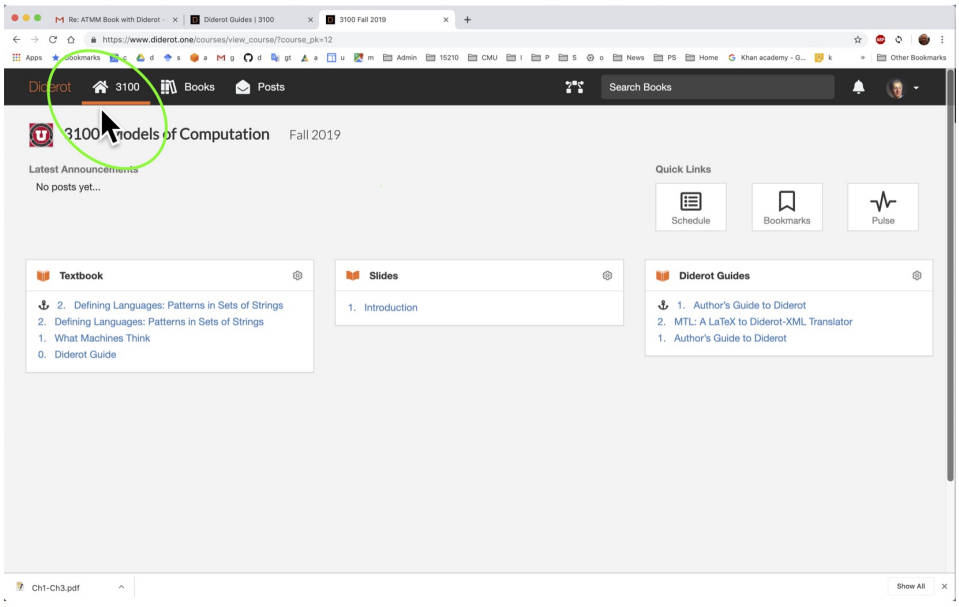
1. A toolbar, at the top

2. A "news" or "Latest Announcements" area on the top left quadrant.

3. Quick links on the right top right quadrant.

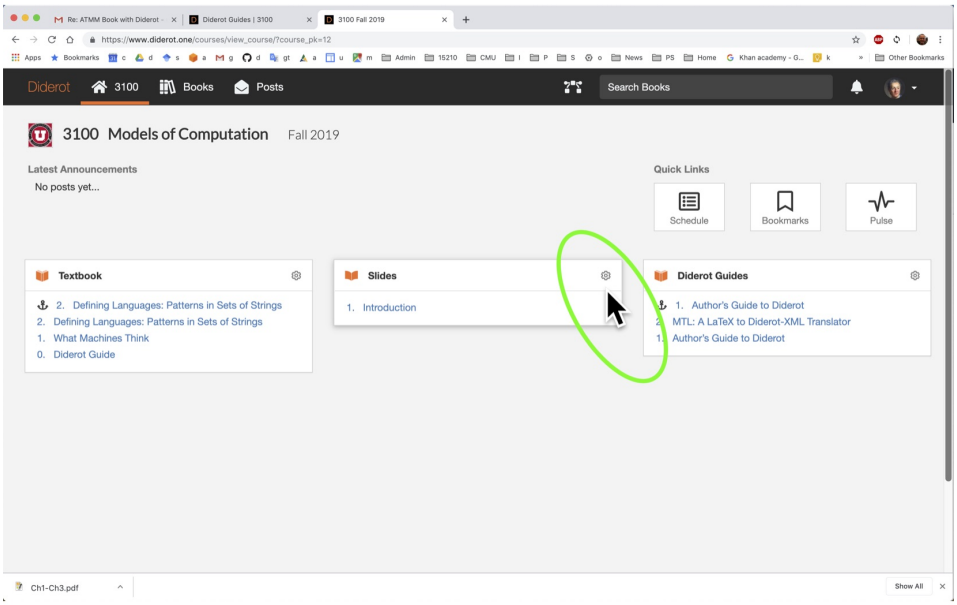
4. The books, an the lower half.

You can go to the course home page by pressing the "Home" button at the top right corner.



1.2 Book Management

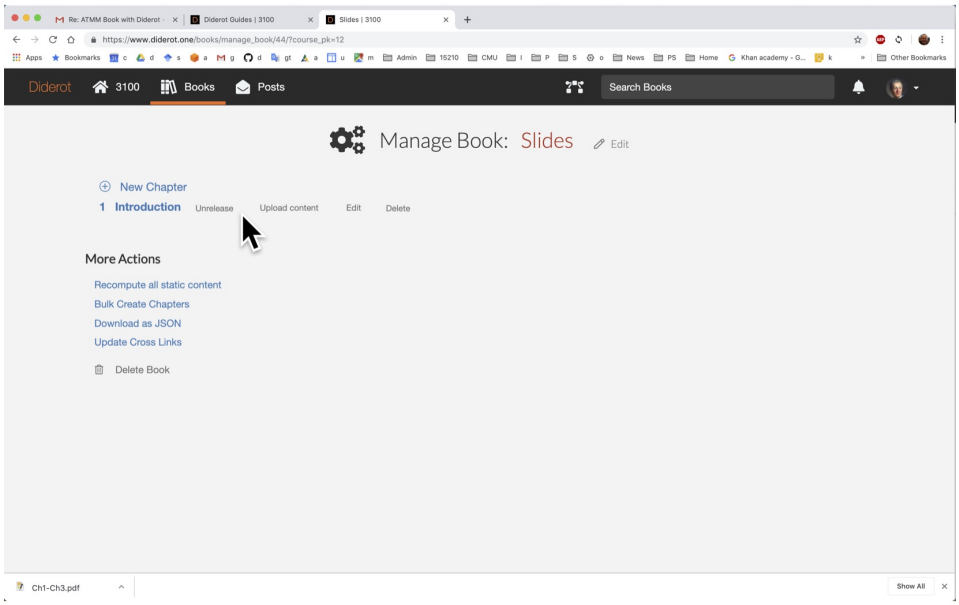
Finding Book Management. As an author, you will spend much of your time in the "Book Management" page. A quick way to get to this page is to go to the course home page and to press the settings ("wheel") icon for the book that you want to manage.



The book management page offers functionality for

- creating chapters,
- uploading content onto chapters,
- realeasing/unreleasing chapters,
- deleting chapters,
- additional more advanced operations, which we will skip for now.

To see the actions that you can perform on a chapter options, move the mouse over to that chapter.

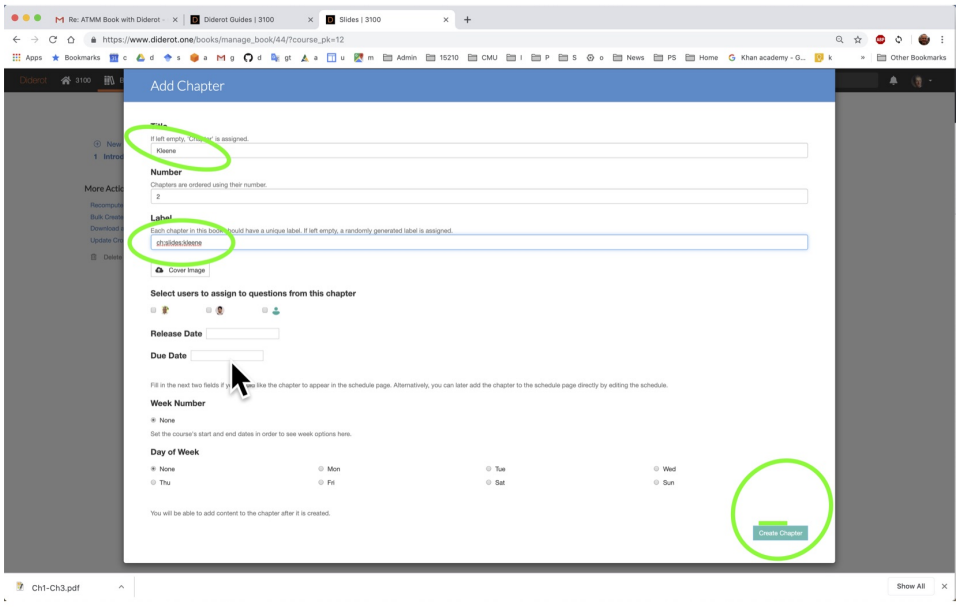


1.3 Chapters

Chapter Creation. You can add a chapter to a book.

- Go to course home page.
- Find the book that you want to edit. You can reach the book management screen from the "Manage Books" link from the "Links" button on the center right, to the left of search bar on top.
- Press "Create chapter" and follow the instructions. To create a chapter in its most basic form, you can leave all of the rest of the fields empty. The additional field are discussed below.

When creating a chapter, assign the chapter a unique number and a unique label, e.g., `ch:kleene`. The label needs to be unique only within the book—no two chapters of the same book can have the same label. If the chosen label does not meet this criteria, you will receive an error message and can choose another one.



Exercise 1.1. As an example, create now a chapter for your second slide deck from your Fall 2018 site and give it the label `ch:kleene`.

Released versus Unreleased Chapters. A chapter is either released or unreleased. ***Released*** chapters are visible to the students. ***Unreleased*** chapters are not visible to the students but are visible to course staff.

This is designed to allow for a "feedback cycle" before releasing chapters to students. For example, I typically upload my lectures a bit ahead of time and before releasing them, ask my TAs to look over them and give feedback. To give feedback, the TA's simply select the relevant atom and create a feedback, e.g., they might note a typo. I then fix these problems, reupload the chapter, and then release it.

Release Dates and Schedule. You can assign release dates to your chapters and this will automatically construct (and maintain) a schedule for you. Let's skip this step for now. So leave these fields empty. You can edit chapters to add schedule information later.

User Assignments. You can "assign" users to a chapter. The intention here is to designate ***discussion chairs***, who are usually TAs for each chapter. They will be assigned the questions asked on that content.

I don't know who I will assign the chapters to at the time of creation and therefore leave this blank. I or the TAs later edit the chapter to assign the discussion chairs.

Upload Window. To upload contents into a chapter, move the mouse over the chapter and select upload content. Here you can upload either an XML file or a PDF.

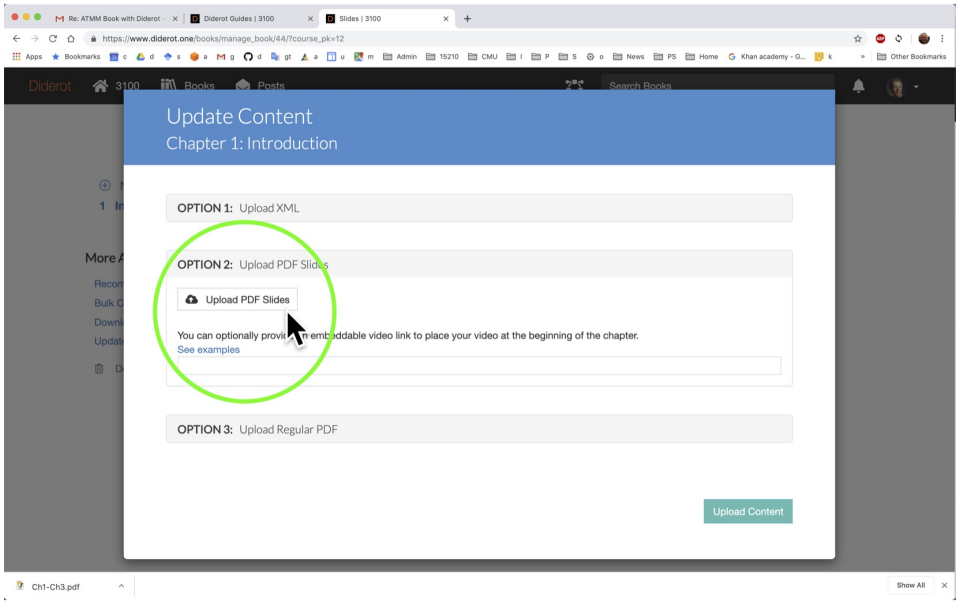
PDF Uploads. To upload a PDF document bring up the upload window and select

- "Upload PDF Slides", or
- "Upload Regular PDF."

Then select the PDF file to upload, and press "Upload Content".

Now you will see a spinning wheel. This will take some time maybe a minute or two. What is going on is that the PDF is split into pages and the text is extracted from it. When it is finished, click on the chapter and you should be able to view it.

As an example, upload your second slide deck from your Fall 2018 site to the chapter that you have created above.

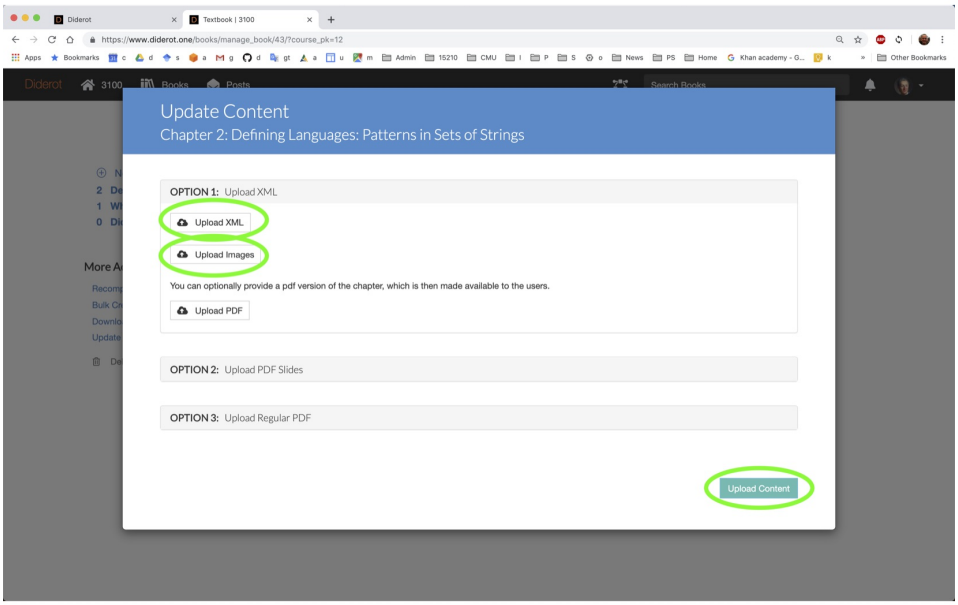


XML Uploads. To upload a Diderot XML, first use the MTL compiler to generate one. You can generate Diderot XML from LaTeX or from Markdown. Next, press the "Upload XML" and select the XML file that you want to upload.

If your chapter includes images, you can upload the images along with your XML by pressing "Upload Images" and then selecting all of the images (multiple images can be selected) that you want to upload.

Now press "Upload Content". You will see a spinning wheel. This will take some time maybe a minute or two. What is going on is that your XML document is parsed into a tree of a chapter, sections, and atoms and everything is linked so that the images and document links now point to their right places.

When the spin stops, click on the chapter and you should be able to view it.



Important (Unreleased chapters are not searchable). When a PDF/XML document is uploaded, its contents is stored into an index, allowing it to be searched via the search bar when the chapter is released. Unreleased chapters will not be searchable (so students won't see unreleased content).

Note. Currently, pdf documents themselves are shown as JPEG images. We are in the process of changing this so that they are shows an PDFs. This should be ready soon.

Interactive Chapters. Once a chapter is uploaded, it becomes interactive.

- If unreleased, course staff may send feedback and open other discussions.
- If released: all the students and staff may send feedback, ask questions, take private notes on the content, etc.

Updating a Chapter. For unreleased chapters, simply re-upload the contents. This will recreate the chapter and delete all prior discussions on it.

For released chapters, you can unrelease and re-upload, but this will delete all content, including student created content (private notes, questions, etc). Unreleasing and re-uploading could be thought as the same as deleting the chapter and recreating it. Because it deletes all related content, we discourage using this feature (after a course starts). If you don't currently have students and are developing content, you may release chapters, and re-upload them as you wish.

There is only one reliable way to update released content without deletion or without unreleasing it: assign to the chapter, all sections, and all groups, and atoms a label. This allows Diderot to match the content being uploaded to existing content without ambiguities. Otherwise, there can be possible ambiguities, because, for example, Diderot doesn't know which updated section corresponds to which existing section.

1.4 Books

Create a book. You can create new books and as many as you want. I usually create one for textbook, one for recitations, one for assignments, one for additional materials (misc). Many courses create a "Slides" book.

To create a book go to "links" to the right of the search bar and then press manage books. You will give your book a unique label (e.g, "textbook", "recitations", "misc"...) and a unique"rank" which is the order it will be shown but is otherwise immaterial.

By default, a book is selected to be a ***booklet***, which consists of a sequence of chapter. If you want the book to contain "parts" as an organization element above chapters, uncheck the "booklet" box.

A book can contain PDFs or XMLs (generated by a compiler).

Example 1.1. In the algorithms (15210) course, the main textbook has parts but the rest of the books don't. So all the books except for the textbook are booklets.

Editing a Book. To edit the book, create and upload chapters, go to "Manage Books" and select your book. Here you can edit various properties of the book, create chapters upload PDF content , and upload XML content .

1.5 User Accounts

Creation. To create user accounts, you can upload a roster in CSV format, which will email them all. I usually wait to do that until the first day of the class or right before it but you can create accounts for your TAs a bit ahead of time so that they can start playing with things (TAs and undergrads seem to pick things up super quickly). When you create accounts, the users receive email notifications and instructions on how to log on.

Chapter 2

DC: Diderot Compiler

2.1 Overview

Diderot is an online book system that integrates discussions with content. Diderot consists of two separate systems that are designed to work together:

- the Diderot website, which provides the users (instructors and students) with an online interface for reading books and holding discussions,
- the Diderot compiler, ***DC*** for short, that translates LaTeX and Markdown sources to Diderot-style XML.

Diderot-style XML files may be uploaded onto the Diderot site. In addition to XML, Diderot site accepts conventional PDF documents and slide decks for upload.

Important (Sources and Contributions). To go through the examples in this chapter, please clone this github repository and follow the instructions in INSTALL.md.

This guide is public. Feel free to contribute to the sources and send feedback on Diderot.

Note (Questions and Feedback). You can click any "mail" button in this guide and send feedback or ask questions.

2.2 Typesetting with LaTex

DC is compatible with LaTeX. Whatever updates you make to upload your notes on Diderot will be compatible with LaTeX. This means for example that you can generate a PDF document from your notes. The reverse direction, going from LaTeX to Diderot, is not as definitive but works reasonably well. If you have LaTeX sources that you are able to compile and generate PDF from, then in most cases, you can use DC to generate XML from your LaTeX sources. DC also provides a few additional syntactic elements that helps improve the interactivity of the content.

Definition 2.1 (Books and Booklets)**.** After a LaTeX document is translated to XML via DC, it can be uploaded as a ***chapter*** to a Diderot book or Diderot booklet. A Diderot ***book*** is a collection of parts, where each ***part*** is a collection of chapters. A Diderot ***booklet*** is a collection of chapters.

Example 2.1. The folders book and booklet contain a sample book (consisting of parts and chapters) and booklet (consisting only of chapters) respectively. Each come with a Makefile for generating PDF and Diderot-XML from the sources.

Example 2.2 (PDF Generation)**.** You can generate the PDF for the whole book by running the following.

```
$ cd examples/book
$ make book.pdf

$ cd examples/booklet
$ make book.pdf
```

Example 2.3 (XML Generation)**.** For ease of publication on Diderot, XML generation occurs on a chapter by chapter basis. You can generate the XML for each chapter by specifying the chapter path.

```
$ cd examples/book
$ make probability/expectation.xml

$ cd examples/booklet
$ make skyline/main.xml
```

2.2.1 Basic Structure of LaTeX

As with Latex, DC requires a book to be organized into chapters, each of which then contains sections (section, subsection, subsubsection, and paragraph). Each chapter and section can in turn contain "elements" each of which is an "atom" or a "group".

Example 2.4 (Sections)**.** A chapter is typically structured into a number of sections.

```
\chapter{Introduction}
\label{ch:example}  % Chapters must have a label.

<elements>

\section{A Section}
\label{sec:example} % Optional but recommended section label.

<elements>

\subsection{A Subsection}
\label{sec:example::sub} % Optional but recommended section label.
```

```
<elements>

\subsubsection {A Subsubsection}
\label{sec:example::subsub}
<elements>

\paragraph {A paragraph}
\label{sec:example::paragraph}
<elements>
```

The term element in the example refers to an "atom" or a "group".

2.2.2 Atoms

Definition 2.2 (Atom)**.** An ***atom*** is either

1. a plain paragraph, or
2. a single-standing environment of the form

   ```
   \begin{<atom>}[Optional title]
   \label{atom-label} % optional but recommended label
   <atom body>
   \end{<atom>}
   ```

   The term <atom> above can be replaced with any of the following:

   - algorithm, assumption,
   - code, corollary, costspec,
   - datastr (data structure), datatype, definition
   - example, exercise,
   - gram (non descript atom, i.e., a paragraph),
   - hint,
   - important,
   - lemma,
   - note,
   - preamble (as a first atom of chapter), problem (a problem for students to solve), proof, proposition,
   - remark (an important note), reminder,
   - solution (a solution to an exercise/problem), syntax (a piece of syntax)
   - task (a task in an assignment), theorem.

Note. Authors can currently use only these atoms defined above. We are working on allowing authors to define their own atoms. In the mean time, you can request new atoms (please send feedback here).

Important. Atoms are ***single standing***, that is to say surrounded by "vertical white spaces" or blank lines on both ends. Therefore, white space matters. In the common case, this goes along with our intuition of how text is organized but is worth keeping in mind. For example, the following code will not be a definiton atom, but will be a plain paragraph atom, because definition is not single standing.

```
We can now define Kleene closure as follows.
\begin{definition}
...
\end{definition}
```

The following is a definition atom, because it is single standing.

```
\begin{definition}
...
\end{definition}
```

Note. Atoms can contain multiple paragraphs. The following text consists of a text-paragraph atom and a definition atom.

```
Paragraph 0. Sentence 1.
Sentence 2.

\begin{definition}[Definition Title]
Paragraph 1

Paragraph 2
\end{definition}
```

Controlling granularity

DC will create an atom for each text paragraph. If a piece of text contains many small (one or two line) paragraphs, it can distracting for the user. For example, the following text consists of three small paragraphs.

```
If this then that.

If that then this.

This if and only of if that.
```

We usually don't write like this but sometimes it happens. In such a case, you may want to wrap this text into a single paragraph atom.

```
\begin{gram}[If and only If]
If this then that.

If that then this.
```

```
This if and only of if that.
\end{gram}
```

Alternatively you can wrap the text by curly braces as follows.

```
{
If this then that.

If that then this.

This if and only of if that.
}
```

Both will have no impact on the PDF but on Diderot, you will have only one atom for the three sentences.

2.2.3 Groups

Definition 2.3 (Group)**.** A ***group*** consist of a sequence of atoms. DC currently support only one kind of group: flex. On Diderot, a flex will display its first atom and allow the user to reveal the rest of the atoms by using a simple switch. This, for example, can be useful for hiding simple examples for a definition, the solution to an exercise, and a tangential remark, etc.

```
\begin{flex}
\begin{definition}[A Definition]
\label{def:a}

A definition
\end{definition}

\begin{example}[Simple Example I]
\label{ex:a-simple}
Simple example 1
\end{example}

\begin{example}[Simple Example II]
\label{ex:a-simple-2}
Simple example 2
\end{example}

\end{flex}
```

Note. This has turned out be a favorite feature of Diderot for authors and students alike. You can see how this 'flex' example works below, where a definition atom has been paired flexibly with two examples. Click the drawer icon at the bottom left to open the 'flex' and click again to close it.

Definition 2.4 (A Definition)**.** A definition.

Example 2.5 (Simple Example)**.** Simple example 1

Example 2.6 (Simple Example)**.** Simple example 2

2.2.4 Labels and References

Diderot uses labels to identify atoms uniquely. All labels in a book must be unique. To help in authoring, we recommended giving each chapter a unique label, and prepending each label with that of the chapter.

Example 2.7. We recommend labeling content as follows.

```
\chapter{Introduction}
\label{ch:intro}

\begin{preamble}
\label{prml:intro}
...
\end{preamble}

\section{Overview}
\label{sec:intro::overview}


This is a paragraph (atom) without a label. The following paragraph (atom) has a lal


\begin{gram}
\label{grm:intro::present}
In this section, we present...
\end{gram}

Here is another paragraph atom, consisting of two environments:
\begin{itemize}
...
\end{itemize}
\begin{enumerate}
...
\end{enumerate}
```

References. To reference a label you can either use

- \href{label}{ref text}
- \ref{label}.

DC replaces the former with \hyperref[][] command so that we can get proper linked refs is latex/ pdf.

DC generates a unique label for each atom, group, and section, in a document. When doing so, DC uses different prefixes for labels: sec for all sections, grp for groups, and the following for atoms. Atoms and their labels are shown below.

```
algorithm : "alg"
assumption : "asm"
code : "cd"
corollary : "crl"
costspec : "cst"
datastr : "dtstr"
datatype : "adt"
definition : "def"
example : "xmpl"
exercise : "xrcs"
hint : "hint"
important : "imp"
lemma : "lem"
note : "nt"
gram : "grm"
preamble : "prmbl"
problem : "prb"
proof : "prf"
proposition : "prop"
remark : "rmrk"
reminder : "rmdr"
slide : "slide"
solution : "sol"
syntax : "syn"
task : "tsk"
theorem : "thm"
```

2.2.5 Code

For code, you can use \lstinline and the lstlisting environment. The language has to be specified first (see below for an example). The Kate language highligting spec should be included in the "meta" directory and the name of the file should match that of the language. For example if language = C, then the Kate file should be meta/C.xml. If the language is a dialect, then, e.g., language = \{[Cdialect]C}, then the file should be called CdialectC. Kate highlighting definitions for most languages are available online. If you need a custom language, you can probably write one with a bit of effort by starting with the Kate specification for a suitably close language.

Example 2.8 (Python Code)**.** Specify language as python, and include line-numbers on the left of each line. Don't forget to include the Kate highlighting file for python in the meta directory.

```
\begin{lstlisting}[language = python, numbers = left]
def is_even (i):
  if i %2 = 0:
    return true
  else
    return false
\end{lstlisting}
```

The code above will render like this:

```
1 def is_even (i):
2   if i %2 = 0:
3     return true
4   else
5     return false
```

Example 2.9 (Code in C Dialect)**.** Specify the dialect preferred, and don't include line-numbers. Don't forget to include the Kate highlighting file for the dialect in the meta directory.

```
\begin{lstlisting}[language = {[C0]C}]
main () {
  return void
}
\end{lstlisting}
```

2.2.6 Images

You can include JPEG or PNG images by using the usual includegraphics command. We currently don't support PDF images (will be available shortly).

There is one point to be careful about: sizing. In principle, you could use fixed sizes, e.g.,

```
\includegraphics[width=5in]{myimage.jpg}
```

The problem with this approach is that the PDF output and the Diderot output will likely have different formats and the image that looks just fine on paper might look too big on Diderot or possibly vice versa. I therefore recommend using relative widths using the following approach

```
\includegraphics[width=0.5\textwidth]{myimage.jpg}
```

DC will translate this to 50% width in html and 50% of textwidth in PDF and the image will look consistent with its environment in both cases.

Note. For PDF output, the author could also use \textheight. But this is not meaningful for HTML output, and will not work as expected.

Important (Scale is not Supported). For PDF output it is also possible to use scale. For example,

```
\includegraphics[scale=0.5]{myimage.jpg}
```

This means that the image should be shown at 50% of its actual dimensions. This has the same issues as the absolute measures approach. Furthermore, DC doesn't detect attempt to detect the actual dimensions of the image and this approach is not supported.

2.2.7 Typesetting Mathematics

Diderot uses MathJax to render math environments. This works in many cases, especially for use that is consistent with AMS Math packages. There are a few important caveats.

- Once you switch to math, try to stay in math. You can switch to text mode using \mbox but if you use macros inside the mbox, then they might not work (because mathjax doesn't know about your macros). For example, the following won't work.

  ```
  $\lstinline ‘xyz‘$
  ```

- The "tabular" environment does not work in MathJax. Use "array" instead.

- The environment

  ```
  \begin{alignat}
  ...
  \end{alignat}
  ```

  should be wrapped with \htmlmath, e.g.,

  ```
  \htmlmath{
  \begin{alignat}
  ...
  \end{alignat}
  }
  ```

2.2.8 Indexing

In the near term, we plan to index books automatically by doing some natural-language processing. To aid this, we recommend marking definitional terms by using one of the following LaTeX commands: defb, \defe, \defn. You can define these commands as follows or any other way you prefer.

```
\newcommand{\defb}[1]{\textbf{#1}}
\newcommand{\defe}[1]{\emph{#1}}
\newcommand{\defn}[1]{\textbf{\emph{#1}}}
```

The indexing algorithm will lookup these commands and link the use of these terms to their definition.

Example 2.10.

Definition 2.5 (Algorithm)**.** An ***algorithm*** is a recipe for solving a problem.

Definition 2.6 (Single Source Shortest Paths Problem)**.** The ***single source shortest path problem*** or ***SSSP problem*** for short requires finding the shortest paths from a given source vertex to each and every vertex in a graph.

Given these definitions, the following sentence will be processed so that the terms "algorithm" and "SSSP" are linked to the two definitions above. Dijkstra's algorithm solves the SSSP problem.

2.2.9 Colors

You can use colors as follows

```
\textcolor{red}{my text}
```

2.2.10 Limitations

LaTeX has grown rich[1] but many authors tend to use a small subset. DC appears to work well for most uses. Here is a list of known limitations.

- For XML translation work, the chapter should be compileable to PDF.
- Do not use \input directives in your chapters.
- Each chapter must have a unique label.
- Fancy packages will not work. Stick to basic latex and AMS Math packages.
- Support for tabular environment is limited: borders will not show and columns will be centered. You can use the array (math/mathjax) as a substitute. This could require using \mbox for text fields.
- Center environment definitions will be ignored.
- You can use itemize and enumerate in their basic form. Changing the label format with enumitem package and similar packages do not work. You can imitate these by using heading for your items.
- Labeling and references are limited to atoms. You can label atoms and refer to them, but you cannot label codelines, items in lists, etc.

Remark. The above limitations all pertain to XML generation. Because DC works on a plain LaTeX document, these don't apply to generating other outputs such as PDF.

[1] Some would argue "too rich" and has become "too big to break".

2.2.11 Compiling Latex to XML

You can translate LaTeX to XML by using the dc binary. The following instructions are tested on Mac OS X and Ubuntu. The binaries in 'bin' might not work on systems that are not Mac or Linux/Unix-like.

As examples, the folders book and booklet contain several files.

- templates/diderot.sty

  Supplies diderot definitions needed for compiling latex to pdf's. You don't need to modify this file.

- templates/preamble.tex

  Supplies your macros that will be used by generating a pdf via pdflatex. Nearly all packages and macros should be included here. Each chapter will be compiled in the context of this file. Ideally this file should - include as few packages as possible - define no environment definitions - macros should be simple

- templates/preamble−diderot.tex

  Equivalent of preamble.tex but it is customized for XML output. This usually means that most macros will remain the same but some will be simplified to work with 'pandoc'. If you don't need to customize, you can keep just one preamble. The example in directory 'booklet' does so.

For ease of compilation and publishing on Diderot, we recommend structuring your book sources to streamline your workflow for PDF generation and for Diderot uploads. We have found that the structure outlined below. The example book and booklet provided follow this structure (see folders 'book' and 'booklet').

Booklets. Booklets are books that don't have parts. For these I recommend creating one directory per chapter and placing a single main.tex file to include all contain that you want. Place all media (images, videos etc) under a media/ subdirectory.

- ch1/main.tex
- ch1/media/: all my media files, *.png *.jgp, *.graffle, etc.
- ch2/main.tex
- ch2/media/: all my media files for chapter 2, *.png *.jgp, *.graffle, etc.
- ch3/main.tex

Books. Books have parts and chapters. We recommend structuring these as follows, where 'ch1, ch2' etc can be replaced with names of your choice.

- part1/ch1.tex

- part1/ch2.tex
- part1/media−ch1/
- part1/media−ch2/
- part2/ch3.tex
- part2/ch4.tex
- part2/ch5.tex
- part2/media−ch3/
- part2/media−ch4/
- part2/media−ch5/

Making PDFs. You can use pdflatex to generate a PDF output. See the Makefile in book or booklet as examples. For example, you can invoke the Makefile as follows to make a PDF:

```
$ make book.pdf
```

2.2.12 Making PDF for a Specific Chapter

To make specific chapters, extend the Makefile to compile each chapter separately. See the Makefile in book or booklet as examples. For example, you can compile the chapter probability in the book directory as follows.

```
$ make ch2
```

Making XML. To generate xml, simply use the Makefile provided as follows.

```
$ make ch2/main.xml
```

To obtain more information from a run, you can turn on the verbose option.

```
$ make verbose=true ch2/main.xml
```

Error messages from the XML translator are not particularly useful at this time. But, if you are able to generate a PDF, then you should be able to generate an XML. If you encounter a puzzling error try the "debug" version which will print the atoms as it goes through the input.

```
$ make debug=true ch2/main.xml
```

If that fails, there is another relatively simply way to debug, see Section Internals for additional information.

Using DC directly. Assuming that you structure your book as suggested above, then you will mostly be using the Makefile but you could also use the DC tools directly. This tools translates the given input LaTeX file to xml.

```
$ dc --meta ./meta --preamble preamble.tex input.tex -o output.xml
```

The meta folder contains some files that may be used in the xml translation. You can ignore this directory to start with and then start populating it based on your needs. The main file that you might want to add are Kate highlighting specifications to be used for highlighting code.

dc.dbg. This tools is the "debug" version of the dc binary above. As you might notice, dc doesn't currenty give reasonable error messages. The debug version prints out the text that it parses, so you can have some sense of where things have gone wrong.

```
dc --meta ./meta --preamble preamble.tex input.tex -o output.xml
```

2.3 Typesetting with Markdown

DC has basic support for Markdown to XML translation.

Header. For translation to work Markdown documents should have either of the following two headers

- Without front matter

  ```
  # Chapter Title
  ...
  ```

- With YAML frontmatter.

  ```
  ---
  Frontmatter
  ---
  # Chapter Title
  ...
  ```

Important (Special Symbols). Special symbols should be escaped.

- The hash sign # is a special symbol in LaTeX and must be escaped when using LaTeX macros.
- In math mode % is a LaTeX-Math special symbol and should be escaped.

2.3.1 Chapters and Sections

We support the atx-sytle headers, which start by 1-6 hash (#) signs, e.g.,

```
# This is a chapter

## This is a section

### This is a subsection

#### This is a subsubsection

##### This is a paragraph
```

2.3.2 Code

Usual Markdown conventions apply. You can include inline code by using the backtick symbol. For code blocks use three or more backticks and specify the lanugage. It is important to finish a code block with the same number of backtics.

Example 2.11.

````
```html
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="utf-8"/>
    <meta content="IE=edge" http-equiv="X-UA-Compatible"/>
    <meta content="width=device-width, initial-scale=1.0" name="viewport"/>
...

```


```ocaml
let x = 2 in
2+2
```


```python
def fun x:
  if x then x
  else x
```
````

2.3.3 Typesetting Mathematics

You can use the usual LaTeX delimiters to include mathematics, i.e., for inline style, use single dollar sign. For math blocks use double-dollars or \[.

2.3.4 Images

You can include JPEG, PNG, and SVG images by using following syntax.

```
![caption](image_file.ext){width=xy%}
```

Example 2.12. The following code displays the image papers.svg.

```
![A categorization of CS papers.](papers.svg){width=90%}
```

2.3.5 Limitations

Markdown to XML translation is relatively basic at this time. If you need a particular feature not supported here, please let us know. Here are few known limitations.

- Markdown usually allows blocks to be ended with equal or greater number of delimiter symbols than the start. For example a codeblock that starts with ‘‘‘ can be ended with ‘‘‘‘‘‘‘ . DC insists on blocks to start and end with the same length delimeters.
- Blank lines in DC will always start an atom. For example if you pepper blank lines into your list, each list item will turn into a separate atom. This is probably not what you have intended.

```
* Item 1 is its own atom, because it starts with an blank line.

* Item 2 is its own atom, because it starts with an blank line.
```

- DC does not allow nested paragraphs as some Markdown extensions do.

```
* Item 1 is its own atom, because it starts with an blank line.

    Here is a paragraph that you migh want to nest inside Item 1.
This will instead start a new atom in DC.

* Item 2 is its own atom, because it starts with an blank line.
```

2.3.6 Compiling Markdown To XML

The guide includes a very simple markdown documentmarkdown/example.md.

Making XML. To generate xml, simply use the Makefile provided as follows.

```
$ make markdown/example.xml
```

If you would like to know more about how thing are being handled, you can turn on the verbose option

```
$ make verbose=true markdown/example.xml
```

Using DC directly. You could also use the DC tools directly as follows. The command will generate markdown/example.xml.

```
$ dc markdown/example.md
```

The "Debugger". The tool dc.dbg is the "debug" version of the dc binary above. As you might notice, dc doesn't currenty give reasonable error messages. The debug version prints out the text that it parses, so you can have some sense of where things have gone wrong. See also Section Internals for additional debugging help.

```
dc.dbg input.md -o output.xml
```

2.4 Internals

When using DC, a high-level understanding of the DC's internal could help. DC works by splitting the LaTeX or Markdown document into atoms, which it treats as units. It uses a Latex to HTML/XML or Latex to HTML/XML compiler to translate each atom and stitches the outputs back to construct the XML for the document. The current implementation works with pandoc , though other compilers such as LaTeXML were also used at some point in the past.

When you receive an error, it will likely look like this:

```
*latex_file_to_html: Executing command: pandoc --mathjax --lua-filter ./meta/codebloc
Error in html translation.
Command exited with code: 65
Now exiting.make: *** [dc/dc.xml] Error 65
```

The error occurred when compiling atom # 67, which is stored in the file /tmp/67.tex. To understand the error you can open this file. The file is a complete LaTeX file and you can edit it and run pandoc on it, possible with the flag --verbose, which will likely be helpful. You can ask pandoc to generate a standalone html, by passing the -s flag, so that you can open the result and examine how it looks rrin your browser.

```
pandoc --verbose --mathjax --lua-filter ./meta/codeblock.lua --lua-filter ./meta/spar
```

Once you figure out what the problem is what remains is to update your main document and proceed. Basically the same workflow applies to Markdown inputs.

This is all you need. Happy Diderowing!

Chapter 3

Diderot Command Line Interface

Diderot has a command line interface available to make interacting with the platform a little easier if you prefer using the command line instead of web UI's.

Important (Sources and Contributions). The CLI is available on AFS, at the following path: TODO (rohany): add the path in later.

To download the CLI, please clone this github repository and follow the instructions in README.md.

The Diderot CLI is public. Feel free to contribute or open an issue if there are any commands or utilities that you think would be useful to have. Please send feedback about the CLI on Diderot.

Note (Questions and Feedback). You can click any "mail" button in this guide and send feedback or ask questions.

3.1 Basic Usage

Run either `d%iderot` or `diderot_admin` and login with your Diderot credentials to open an interactive shell with the commands below. To exit, press `Ctrl+D` or type `exit` or `quit`. For a list of all available commands, type `help`. To get more information about a particular command, type either `help <command>` or `<command> -h`.

3.2 Student Interface

- `list_courses`: List all available course labels. Operations which require a course input must use the one of the labels returned from this command.
- `set_course`: Set the current target course for the CLI. All commands will now target the specified course rather than requiring a course as input.

- `unset_course`: Removes the current set course. All course-specific commands will now require a course label as input.
- `list_assignments`: Lists all assignments for a course.
- `download_assignment`: Downloads all handout/writeup files (if present) from a target course and assignment into the current directory.
- `submit_assignment`: Submit a handin.tar file to a given course and homework.

3.3 Admin Interface

The admin CLI contains all the above commands, and expands the set to include some commands relating to manipulation of books and assignments.

- `list_books`: List all books, can optionally filter by course.
- `list_parts`: List all parts of a book.
- `list_chapters`: List all chapters of a book.
- `create_chapter`: Create a chapter in an input part of a book. Optionally specify the new chapter's label and or title. If not, these values are filled in with a default.
- `update_book`: Update the content of an existing chapter. Upload either a standalone pdf, pdf of a slideshow, or an xml/mlx document and image attachments. The image upload accepts filenames, globs, and folder names (folders are recursively traversed).
- `update_assignment`: Update the files relating to an existing homework on Diderot. Upload any of the autograder tar, autograder makefile, pdf writeup, and student handout.

Chapter 4

Play

$$\dfrac{\lambda x.x \quad \lambda y.y \quad \lambda x.x \qquad \dfrac{\lambda x.x \quad \lambda y.y \quad \lambda x.x \qquad \lambda x.x \quad \lambda y.y \quad \lambda x.x}{\lambda y.y}\,InnerLabel}{\lambda y.y}\,Label$$