

” **tutorial.do.txt** ”

TITLE: Doconce: Document Once, Include Anywhere  
 AUTHOR: Hans Petter Langtangen at Simula Research Laboratory and University of Oslo  
 DATE: September 10, 2010

- \* When writing a note, report, manual, etc., do you find it difficult to choose the typesetting format? That is, to choose between plain (email-like) text, Wiki, Word/OpenOffice, LaTeX, HTML, reStructuredText, Sphinx, XML, etc. Would it be convenient to start with some very simple text-like format that easily converts to the formats listed above, and at some later stage eventually go with a particular format?
- \* Do you find it problematic that you have the same information scattered around in different documents in different typesetting formats? Would it be a good idea to write things once, in one place, and include it anywhere?

If any of these questions are of interest, you should keep on reading.

===== The Doconce Concept =====

Doconce is two things:

- o Doconce is a working strategy for documenting software in a single place and avoiding duplication of information. The slogan is: "Write once, include anywhere". This requires that what you write can be transformed to many different formats for a variety of documents (manuals, tutorials, books, doc strings, source code documentation, etc.).
- o Doconce is a simple and minimally tagged markup language that can be used for the above purpose. That is, the Doconce format look like ordinary ASCII text (much like what you would use in an email), but the text can be transformed to numerous other formats, including HTML, Wiki, LaTeX, PDF, reStructuredText (reST), Sphinx, Epytext, and also plain text (where non-obvious formatting/tags are removed for clear reading in, e.g., emails). From reStructuredText you can go to XML, HTML, LaTeX, PDF, OpenOffice, and from the latter to RTF and MS Word.

Doconce was particularly written for the following sample applications:

- \* Large books written in LaTeX, but where many pieces (computer demos, projects, examples) can be written in Doconce to appear in other contexts in other formats, including plain HTML, Sphinx, or MS Word.
- \* Software documentation, primarily Python doc strings, which one wants to appear as plain untagged text for viewing in Pydoc, as reStructuredText for use with Sphinx, as wiki text when publishing the software at googlecode.com, and as LaTeX integrated in, e.g., a master's thesis.
- \* Quick memos, which start as plain text in email, then some small amount of Doconce tagging is added, before the memos can appear as MS Word documents or in wikis.

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=====  
What Does Doconce Look Like? =====

Doconce text looks like ordinary text, but there are some almost invisible text constructions that allow you to control the formatting. For example,

- \* bullet lists arise from lines starting with an asterisk,
- \* *\*emphasized words\** are surrounded by asterisks,
- \* words in boldface are surrounded by underscores,
- \* words from computer code are enclosed in back quotes and then typeset verbatim,
- \* blocks of computer code can easily be included, also from source files,
- \* blocks of LaTeX mathematics can easily be included,
- \* there is support for both LaTeX and text-like inline mathematics,
- \* figures with captions, URLs with links, labels and references are supported,
- \* comments can be inserted throughout the text,
- \* a preprocessor (much like the C preprocessor) is integrated so other documents (files) can be included and large portions of text can be defined in or out of the text.

Here is an example of some simple text written in the Doconce format:

```
!bc
===== A Subsection with Sample Text =====
label{my:first:sec}
```

Ordinary text looks like ordinary text, and the tags used for boldface words, *\*emphasized\** words, and `'computer'` words look natural in plain text. Lists are typeset as you would do in an email,

- \* item 1
- \* item 2
- \* item 3

Lists can also have automatically numbered items instead of bullets,

- o item 1
- o item 2
- o item 3

URLs with a link word are possible, as in `http://folk.uio.no/hpl<hpl>`. Just a file link goes like `URL:"tutorial.do.txt"`. References to sections may use logical names as labels (e.g., a "label" command right after the section title), as in the reference to `Chapter ref{my:first:sec}`. Doconce also allows inline comments such as `[hpl: here I will make some remarks to the text]` for allowing authors to make notes. Inline comments can be removed from the output by a command-line argument (see `Chapter ref{doconce2formats}` for an example).

Tables are also supported, e.g.,

## tutorial.do.txt

time	velocity	acceleration
0.0	1.4186	-5.01
2.0	1.376512	11.919
4.0	1.1E+1	14.717624

# lines beginning with # are comment lines

!ec

The Doconce text above results in the following little document:

==== A Subsection with Sample Text ====

label{my:first:sec}

Ordinary text looks like ordinary text, and the tags used for `_boldface_` words, `*emphasized*` words, and ``computer`` words look natural in plain text. Lists are typeset as you would do in an email,

- \* item 1
- \* item 2
- \* item 3

Lists can also have numbered items instead of bullets, just use an ``o`` (for ordered) instead of the asterisk:

- o item 1
- o item 2
- o item 3

URLs with a link word are possible, as in `http://folk.uio.no/hpl<hpl>`. Just a file link goes like `URL:"tutorial.do.txt"`. References to sections may use logical names as labels (e.g., a `"label"` command right after the section title), as in the reference to `Chapter ref{my:first:sec}`.

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time	velocity	acceleration
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==== Mathematics and Computer Code ====

Inline mathematics, such as `$_nu = \sin(x)$|$_v = \sin(x)$`, allows the formula to be specified both as LaTeX and as plain text. This results in a professional LaTeX typesetting, but in other formats the text version normally looks better than raw LaTeX mathematics with backslashes. An inline formula like `$_nu = \sin(x)$|$_v = \sin(x)$` is typeset as

!bc

`$_nu = \sin(x)$|$_v = \sin(x)$`

!ec

The pipe symbol acts as a delimiter between LaTeX code and the plain text

## tutorial.do.txt

version of the formula.

Blocks of mathematics are better typeset with raw LaTeX, inside `'!bt'` and `'!et'` (`begin tex / end tex`) instructions.

The result looks like this:

```
!bt
\begin{eqnarray}
\{\partial u \over \partial t\} \&=& \nabla^2 u + f, \backslash label{myeq1} \\
\{\partial v \over \partial t\} \&=& \nabla \cdot (q(u) \nabla v) + g
\end{eqnarray}
!et
```

Of course, such blocks only looks nice in LaTeX. The raw LaTeX syntax appears in all other formats (but can still be useful for those who can read LaTeX syntax).

You can have blocks of computer code, starting and ending with `'!bc'` and `'!ec'` instructions, respectively. Such blocks look like

```
!bc cod
from math import sin, pi
def myfunc(x):
    return sin(pi*x)

import integrate
I = integrate.trapezoidal(myfunc, 0, pi, 100)
!ec
```

It is possible to add a specification of a (ptex2tex-style) environment for typesetting the verbatim code block, e.g., `'!bc xxx'` where `'xxx'` is an identifier like `'pycod'` for code snippet in Python, `'sys'` for terminal session, etc. When Doconce is filtered to LaTeX, these identifiers are used as in ptex2tex and defined in a configuration file `'.ptext2tex.cfg'`, while when filtering to Sphinx, one can have a comment line in the Doconce file for mapping the identifiers to legal language names for Sphinx (which equals the legal language names for Pygments):

```
!bc
# sphinx code-blocks: pycod=python cod=py cppcod=c++ sys=console
!ec
By default, 'pro' and 'cod' are 'python', 'sys' is 'console',
while 'xpro' and 'xcod' are computer language specific for 'x'
in 'f' (Fortran), 'c' (C), 'cpp' (C++), and 'py' (Python).
# 'rb' (Ruby), 'pl' (Perl), and 'sh' (Unix shell).
```

```
# (Any sphinx code-block comment, whether inside verbatim code
# blocks or outside, yields a mapping between bc arguments
# and computer languages. In case of multiple definitions, the
# first one is used.)
```

One can also copy computer code directly from files, either the complete file or specified parts. Computer code is then never duplicated in the documentation (important for the principle of avoiding copying information!). A complete file is typeset with `'!bc pro'`, while a part of a file is copied into a `'!bc cod'` environment. What `'pro'` and `'cod'` mean is then defined through a `'.ptex2tex.cfg'` file for LaTeX and a `'sphinx code-blocks'` comment for Sphinx.

Another document can be included by writing `'#include "mynote.do.txt"'` on a line starting with (another) hash sign. Doconce documents have extension `'do.txt'`. The `'do'` part stands for doconce, while the

” **tutorial.do.txt** ”

trailing `'.txt'` denotes a text document so that editors gives you the right writing enviroment for plain text.

==== Macros (Newcommands), Cross-References, Index, and Bibliography ====  
`label{newcommands}`

Doconce supports a type of macros via a LaTeX-style `*newcommand*` construction. The newcommands defined in a file with name `'newcommand_replace.tex'` are expanded when Doconce is filtered to other formats, except for LaTeX (since LaTeX performs the expansion itself). Newcommands in files with names `'newcommands.tex'` and `'newcommands_keep.tex'` are kept unaltered when Doconce text is filtered to other formats, except for the Sphinx format. Since Sphinx understands LaTeX math, but not newcommands if the Sphinx output is HTML, it makes most sense to expand all newcommands. Normally, a user will put all newcommands that appear in math blocks surrounded by `'!bt'` and `'!et'` in `'newcommands_keep.tex'` to keep them unchanged, at least if they contribute to make the raw LaTeX math text easier to read in the formats that cannot render LaTeX. Newcommands used elsewhere throughout the text will usually be placed in `'newcommands_replace.tex'` and expanded by Doconce. The definitions of newcommands in the `'newcommands*.tex'` files *must* appear on a single line (multi-line newcommands are too hard to parse with regular expressions).

Recent versions of Doconce also offer cross referencing, typically one can define labels below (sub)sections, in figure captions, or in equations, and then refer to these later. Entries in an index can be defined and result in an index at the end for the LaTeX and Sphinx formats. Citations to literature, with an accompanying bibliography in a file, are also supported. The syntax of labels, references, citations, and the bibliography closely resembles that of LaTeX, making it easy for Doconce documents to be integrated in LaTeX projects (manuals, books). For further details on functionality and syntax we refer to the `'docs/manual/manual.do.txt'` file (see the <https://doconce.googlecode.com/hg/trunk/docs/demos/manual/index.html><demo page> for various formats of this document).

# Example on including another Doconce file:

# `#include "_doconce2anything.do.txt"`

==== Demos ====

The current text is generated from a Doconce format stored in the file  
`!bc`  
`docs/tutorial/tutorial.do.txt`  
`!ec`

The file `'make.sh'` in the `'tutorial'` directory of the Doconce source code contains a demo of how to produce a variety of formats. The source of this tutorial, `'tutorial.do.txt'` is the starting point. Running `'make.sh'` and studying the various generated files and comparing them with the original `'tutorial.do.txt'` file, gives a quick introduction to how Doconce is used in a real case. <https://doconce.googlecode.com/hg/trunk/docs/demos/tutorial/index.html><Here> is a sample of how this tutorial looks in different formats.

”

**tutorial.do.txt**

”

There is another demo in the 'docs/manual' directory which translates the more comprehensive documentation, 'manual.do.txt', to various formats. The 'make.sh' script runs a set of translations.

===== Dependencies =====

Doconce depends on the Python package <http://code.google.com/p/preprocess/><preprocess>. To make LaTeX documents (without going through the reStructuredText format) you also need <http://code.google.com/p/ptex2tex/><ptex2tex> and some style files that ptex2tex potentially makes use of. Going from reStructuredText to formats such as XML, OpenOffice, HTML, and LaTeX requires <http://docutils.sourceforge.net/><docutils>. Making Sphinx documents requires of course <http://sphinx.pocoo.org/><sphinx>.

===== Warning/Disclaimer =====

Doconce can be viewed as a unified interface to a variety of typesetting formats. This interface is minimal in the sense that a lot of typesetting features are not supported, for example, footnotes and bibliography. For many documents the simple Doconce format is sufficient, while in other cases you need more sophisticated formats. Then you can just filter the Doconce text to a more appropriate format and continue working in this format only. For example, reStructuredText is a good alternative: it is more tagged than Doconce and cannot be filtered to plain, untagged text, or wiki, and the LaTeX output is not at all as clean, but it also has a lot more typesetting and tagging features than Doconce.

# Doconce: Document Once, Include Anywhere

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<sup>2</sup>University of Oslo

September 10, 2010

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Doconce was particularly written for the following sample applications:

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- Software documentation, primarily Python doc strings, which one wants to appear as plain untagged text for viewing in Pydoc, as reStructured-Text for use with Sphinx, as wiki text when publishing the software at googlecode.com, and as  $\text{\LaTeX}$  integrated in, e.g., a master's thesis.
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## 2 What Does Doconce Look Like?

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- **words in boldface** are surrounded by underscores,
- words from computer code are enclosed in back quotes and then typeset verbatim,
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- blocks of  $\text{\LaTeX}$  mathematics can easily be included,
- there is support for both  $\text{\LaTeX}$  and text-like inline mathematics,
- figures with captions, URLs with links, labels and references are supported,
- comments can be inserted throughout the text,
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```



```
* item 1
* item 2
* item 3
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Lists can also have automatically numbered items instead of bullets,

```
o item 1
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URLs with a link word are possible, as in `http://folk.uio.no/hpl<hpl>`. Just a file link goes like `URL:"tutorial.do.txt"`. References to sections may use logical names as labels (e.g., a "label" command right after the section title), as in the reference to `Chapter ref{my:first:sec}`. Doconce also allows inline comments such as `[hpl: here I will make some remarks to the text]` for allowing authors to make notes. Inline comments can be removed from the output by a command-line argument (see `Chapter ref{doconce2formats}` for an example).

Tables are also supported, e.g.,

time	velocity	acceleration
0.0	1.4186	-5.01
2.0	1.376512	11.919
4.0	1.1E+1	14.717624

# lines beginning with # are comment lines

The Doconce text above results in the following little document:

## 2.1 A Subsection with Sample Text

Ordinary text looks like ordinary text, and the tags used for **boldface** words, *emphasized* words, and computer words look natural in plain text. Lists are typeset as you would do in an email,

- item 1
- item 2
- item 3

Lists can also have numbered items instead of bullets, just use an `o` (for ordered) instead of the asterisk:

1. item 1
2. item 2
3. item 3

URLs with a link word are possible, as in `hpl`. Just a file link goes like `tutorial.do.txt`. References to sections may use logical names as labels (e.g., a "label" command right after the section title), as in the reference to `Chapter 2.1`.

Tables are also supported, e.g.,

time	velocity	acceleration
0.0	1.4186	-5.01
2.0	1.376512	11.919
4.0	1.1E+1	14.717624

## 2.2 Mathematics and Computer Code

Inline mathematics, such as  $\nu = \sin(x)$ , allows the formula to be specified both as  $\LaTeX$  and as plain text. This results in a professional  $\LaTeX$  typesetting, but in other formats the text version normally looks better than raw  $\LaTeX$  mathematics with backslashes. An inline formula like  $\nu = \sin(x)$  is typeset as

$\nu = \sin(x)$

The pipe symbol acts as a delimiter between  $\LaTeX$  code and the plain text version of the formula.

Blocks of mathematics are better typeset with raw  $\LaTeX$ , inside `bt!` and `et!` (begin tex / end tex) instructions. The result looks like this:

$$\frac{\partial u}{\partial t} = \nabla^2 u + f, \quad (1)$$

$$\frac{\partial v}{\partial t} = \nabla \cdot (q(u) \nabla v) + g \quad (2)$$

Of course, such blocks only looks nice in  $\LaTeX$ . The raw  $\LaTeX$  syntax appears in all other formats (but can still be useful for those who can read  $\LaTeX$  syntax).

You can have blocks of computer code, starting and ending with `bc!` and `ec!` instructions, respectively. Such blocks look like

```
from math import sin, pi
def myfunc(x):
    return sin(pi*x)

import integrate
I = integrate.trapezoidal(myfunc, 0, pi, 100)
```

It is possible to add a specification of a (ptex2tex-style) environment for typesetting the verbatim code block, e.g., `bc xxx!` where `xxx` is an identifier like `pycod` for code snippet in Python, `sys` for terminal session, etc. When Doconce is filtered to  $\LaTeX$ , these identifiers are used as in ptex2tex and defined in a configuration file `.ptext2tex.cfg`, while when filtering to Sphinx, one can have a comment line in the Doconce file for mapping the identifiers to legal language names for Sphinx (which equals the legal language names for Pygments):

```
# sphinx code-blocks: pycod=python cod=py cppcod=c++ sys=console
```

By default, `pro` and `cod` are python, `sys` is console, while `xpro` and `xcod` are computer language specific for `x` in `f` (Fortran), `c` (C), `cpp` (C++), and `py` (Python).

One can also copy computer code directly from files, either the complete file or specified parts. Computer code is then never duplicated in the documentation (important for the principle of avoiding copying information!). A complete file is typeset with `bc pro!`, while a part of a file is copied into a `bc cod!` environment. What `pro` and `cod` mean is then defined through a `.ptex2tex.cfg` file for  $\text{\LaTeX}$  and a `sphinx code-blocks` comment for Sphinx.

Another document can be included by writing `#include "mynote.do.txt"` on a line starting with (another) hash sign. Doconce documents have extension `do.txt`. The `do` part stands for doconce, while the trailing `.txt` denotes a text document so that editors gives you the right writing enviroment for plain text.

## 2.3 Macros (Newcommands), Cross-References, Index, and Bibliography

Doconce supports a type of macros via a  $\text{\LaTeX}$ -style *newcommand* construction. The newcommands defined in a file with name `newcommand_replace.tex` are expanded when Doconce is filtered to other formats, except for  $\text{\LaTeX}$  (since  $\text{\LaTeX}$  performs the expansion itself). Newcommands in files with names `newcommands.tex` and `newcommands_keep.tex` are kept unaltered when Doconce text is filtered to other formats, except for the Sphinx format. Since Sphinx understands  $\text{\LaTeX}$  math, but not newcommands if the Sphinx output is HTML, it makes most sense to expand all newcommands. Normally, a user will put all newcommands that appear in math blocks surrounded by `bt!` and `et!` in `newcommands_keep.tex` to keep them unchanged, at least if they contribute to make the raw  $\text{\LaTeX}$  math text easier to read in the formats that cannot render  $\text{\LaTeX}$ . Newcommands used elsewhere throughout the text will usually be placed in `newcommands_replace.tex` and expanded by Doconce. The definitions of newcommands in the `newcommands*.tex` files *must* appear on a single line (multi-line newcommands are too hard to parse with regular expressions).

Recent versions of Doconce also offer cross referencing, typically one can define labels below (sub)sections, in figure captions, or in equations, and then refer to these later. Entries in an index can be defined and result in an index at the end for the  $\text{\LaTeX}$  and Sphinx formats. Citations to literature, with an accompanying bibliography in a file, are also supported. The syntax of labels, references, citations, and the bibliography closely resembles that of  $\text{\LaTeX}$ , making it easy for Doconce documents to be integrated in  $\text{\LaTeX}$  projects (manuals, books). For further details on functionality and syntax we refer to the `docs/manual/manual.do.txt` file (see the demo page for various formats of this document).

## 3 From Doconce to Other Formats

Transformation of a Doconce document to various other formats applies the script `doconce2format`:

---

Terminal

---

```
Unix/DOS> doconce2format format mydoc.do.txt
```

---

The preprocess program is always used to preprocess the file first, and options to preprocess can be added after the filename. For example,

---

Terminal

---

```
Unix/DOS> doconce2format LaTeX mydoc.do.txt -Dextra_sections
```

---

The variable `FORMAT` is always defined as the current format when running preprocess. That is, in the last example, `FORMAT` is defined as `LaTeX`. Inside the Doconce document one can then perform format specific actions through tests like `#if FORMAT == "LaTeX"`.

Inline comments in the text are removed from the output by

---

Terminal

---

```
Unix/DOS> doconce2format LaTeX mydoc.do.txt remove_inline_comments
```

---

One can also remove such comments from the original Doconce file by running a helper script in the `bin` folder of the Doconce source code:

```
Unix/DOS> doconce_remove_inline_comments.py mydoc.do.txt
```

This action is convenient when a Doconce document reaches its final form.

### 3.1 HTML

Making an HTML version of a Doconce file `mydoc.do.txt` is performed by

---

Terminal

---

```
Unix/DOS> doconce2format HTML mydoc.do.txt
```

---

The resulting file `mydoc.html` can be loaded into any web browser for viewing.

### 3.2 $\text{\LaTeX}$

Making a  $\text{\LaTeX}$  file `mydoc.tex` from `mydoc.do.txt` is done in two steps:

**Step 1.** Filter the doconce text to a pre- $\text{\LaTeX}$  form `mydoc.p.tex` for `ptex2tex`:

---

Terminal

---

```
Unix/DOS> doconce2format LaTeX mydoc.do.txt
```

---

$\text{\LaTeX}$ -specific commands ("newcommands") in math formulas and similar can be placed in files `newcommands.tex`, `newcommands_keep.tex`, or `newcommands_replace.tex` (see Section 2.3). If these files are present, they are included in the  $\text{\LaTeX}$  document so that your commands are defined.

**Step 2.** Run `ptex2tex` (if you have it) to make a standard  $\text{\LaTeX}$  file,

---

Terminal

---

```
Unix/DOS> ptex2tex mydoc
```

---

or just perform a plain copy,

---

Terminal

---

```
Unix/DOS> cp mydoc.p.tex mydoc.tex
```

---

Doconce generates a `.p.tex` file with some preprocessor macros. For example, to enable font Helvetica instead of the standard Computer Modern font,

---

Terminal

---

```
Unix/DOS> ptex2tex -DHELVETICA mydoc
```

---

The title, authors, and date are by default typeset in a non-standard way to enable a nicer treatment of multiple authors having institutions in common. The standard  $\text{\LaTeX}$  "maketitle" heading is also available through

---

Terminal

---

```
Unix/DOS> ptex2tex -DTRAD_LATEX_HEADING mydoc
```

---

The `ptex2tex` tool makes it possible to easily switch between many different fancy formattings of computer or verbatim code in  $\text{\LaTeX}$  documents. After any `bc sys!` command in the Doconce source you can insert verbatim block styles as defined in your `.ptex2tex.cfg` file, e.g., `bc sys cod!` for a code snippet, where `cod` is set to a certain environment in `.ptex2tex.cfg` (e.g., `CodeIntended`). There are over 30 styles to choose from.

**Step 3.** Compile `mydoc.tex` and create the PDF file:

---

Terminal

---

```
Unix/DOS> latex mydoc
Unix/DOS> latex mydoc
Unix/DOS> makeindex mydoc    # if index
Unix/DOS> bibitem mydoc      # if bibliography
Unix/DOS> latex mydoc
Unix/DOS> dvipdf mydoc
```

---

If one wishes to use the `Minted_Python`, `Minted_Cpp`, etc., environments in `ptex2tex` for typesetting code, the `minted \text{\LaTeX}` package is needed. This package is included by running `doconce2format` with the `-DMINTED` option:

---

Terminal

---

```
Unix/DOS> ptex2tex -DMINTED mydoc
```

---

In this case, latex must be run with the `-shell-escape` option:

---

Terminal

---

```
Unix/DOS> latex -shell-escape mydoc
Unix/DOS> latex -shell-escape mydoc
Unix/DOS> makeindex mydoc    # if index
Unix/DOS> bibitem mydoc      # if bibliography
Unix/DOS> latex -shell-escape mydoc
Unix/DOS> dvipdf mydoc
```

---

The `-shell-escape` option is required because the `minted.sty` style file runs the `pygments` program to format code, and this program cannot be run from latex without the `-shell-escape` option.

### 3.3 Plain ASCII Text

We can go from Doconce "back to" plain untagged text suitable for viewing in terminal windows, inclusion in email text, or for insertion in computer source code:

---

Terminal

---

```
Unix/DOS> doconce2format plain mydoc.do.txt  # results in mydoc.txt
```

---

### 3.4 reStructuredText

Going from Doconce to reStructuredText gives a lot of possibilities to go to other formats. First we filter the Doconce text to a reStructuredText file `mydoc.rst`:

---

Terminal

---

```
Unix/DOS> doconce2format rst mydoc.do.txt
```

---

We may now produce various other formats:

---

Terminal

---

```
Unix/DOS> rst2html.py  mydoc.rst > mydoc.html # HTML
Unix/DOS> rst2latex.py mydoc.rst > mydoc.tex  # LaTeX
Unix/DOS> rst2xml.py   mydoc.rst > mydoc.xml  # XML
Unix/DOS> rst2odt.py   mydoc.rst > mydoc.odt  # OpenOffice
```

---

The OpenOffice file `mydoc.odt` can be loaded into OpenOffice and saved in, among other things, the RTF format or the Microsoft Word format. That is, one can easily go from Doconce to Microsoft Word.

### 3.5 Sphinx

Sphinx documents can be created from a Doconce source in a few steps.

**Step 1.** Translate Doconce into the Sphinx dialect of the reStructuredText format:

---

Terminal

---

```
Unix/DOS> doconce2format sphinx mydoc.do.txt
```

---

**Step 2.** Create a Sphinx root directory with a `conf.py` file, either manually or by using the interactive `sphinx-quickstart` program. Here is a scripted version of the steps with the latter:

---

Terminal

---

```
mkdir sphinx-rootdir
sphinx-quickstart <<EOF
sphinx-rootdir
n
~
Name of My Sphinx Document
Author
version
version
.rst
index
n
y
n
n
n
n
y
n
n
y
y
y
EOF
```

---

**Step 3.** Move the `tutorial.rst` file to the Sphinx root directory:

---

Terminal

---

```
Unix/DOS> mv mydoc.rst sphinx-rootdir
```

---

If you have figures in your document, the relative paths to those will be invalid when you work with `mydoc.rst` in the `sphinx-rootdir` directory. Either edit `mydoc.rst` so that figure file paths are correct, or simply copy your figure directory to `sphinx-rootdir` (if all figures are located in a subdirectory).

**Step 4.** Edit the generated `index.rst` file so that `mydoc.rst` is included, i.e., add `mydoc` to the `toctree` section so that it becomes

```
.. toctree::
   :maxdepth: 2

   mydoc
```

(The spaces before `mydoc` are important!)

**Step 5.** Generate, for instance, an HTML version of the Sphinx source:

---

Terminal

---

```
make clean    # remove old versions
make html
```

---

Many other formats are also possible.

**Step 6.** View the result:

---

Terminal

---

```
Unix/DOS> firefox _build/html/index.html
```

---

Note that verbatim code blocks can be typeset in a variety of ways depending the argument that follows `code-block`: `python` (in Sphinx syntax) and `cppcode` gives C++, but all such arguments can be customized both for Sphinx and  $\text{\LaTeX}$  output.

### 3.6 Google Code Wiki

There are several different wiki dialects, but Doconce only support the one used by Google Code. The transformation to this format, called `gwiki` to explicitly mark it as the Google Code dialect, is done by

---

Terminal

---

```
Unix/DOS> doconce2format gwiki mydoc.do.txt
```

---

You can then open a new wiki page for your Google Code project, copy the `mydoc.gwiki` output file from `doconce2format` and paste the file contents into the wiki page. Press **Preview** or **Save Page** to see the formatted result.

When the Doconce file contains figures, each figure filename must be replaced by a URL where the figure is available. There are instructions in the file for doing this. Usually, one performs this substitution automatically (see next section).



### 3.7 Tweaking the Doconce Output

Occasionally, one would like to tweak the output in a certain format from Doconce. One example is figure filenames when transforming Doconce to reStructuredText. Since Doconce does not know if the `.rst` file is going to be filtered to  $\text{\LaTeX}$  or HTML, it cannot know if `.eps` or `.png` is the most appropriate image filename. The solution is to use a text substitution command or code with, e.g., `sed`, `perl`, `python`, or `scitools subst`, to automatically edit the output file from Doconce. It is then wise to run Doconce and the editing commands from a script to automate all steps in going from Doconce to the final format(s). The `make.sh` files in `docs/manual` and `docs/tutorial` constitute comprehensive examples on how such scripts can be made.

### 3.8 Demos

The current text is generated from a Doconce format stored in the file

```
docs/tutorial/tutorial.do.txt
```

The file `make.sh` in the `tutorial` directory of the Doconce source code contains a demo of how to produce a variety of formats. The source of this tutorial, `tutorial.do.txt` is the starting point. Running `make.sh` and studying the various generated files and comparing them with the original `tutorial.do.txt` file, gives a quick introduction to how Doconce is used in a real case. Here is a sample of how this tutorial looks in different formats.

There is another demo in the `docs/manual` directory which translates the more comprehensive documentation, `manual.do.txt`, to various formats. The `make.sh` script runs a set of translations.

### 3.9 Dependencies

Doconce depends on the Python package `preprocess`. To make  $\text{\LaTeX}$  documents (without going through the reStructuredText format) you also need `ptex2tex` and some style files that `ptex2tex` potentially makes use of. Going from reStructuredText to formats such as XML, OpenOffice, HTML, and  $\text{\LaTeX}$  requires `docutils`. Making Sphinx documents requires of course `sphinx`.

## 4 Warning/Disclaimer

Doconce can be viewed as a unified interface to a variety of typesetting formats. This interface is minimal in the sense that a lot of typesetting features are not supported, for example, footnotes and bibliography. For many documents the simple Doconce format is sufficient, while in other cases you need more sophisticated formats. Then you can just filter the Doconce text to a more appropriate format and continue working in this format only. For example, reStructuredText

is a good alternative: it is more tagged than Doconce and cannot be filtered to plain, untagged text, or wiki, and the  $\text{\LaTeX}$  output is not at all as clean, but it also has a lot more typesetting and tagging features than Doconce.

# Doconce: Document Once, Include Anywhere

**Author:** Hans Petter Langtangen

**Date:** September 10, 2010

- When writing a note, report, manual, etc., do you find it difficult to choose the typesetting format? That is, to choose between plain (email-like) text, Wiki, Word/OpenOffice, LaTeX, HTML, reStructuredText, Sphinx, XML, etc. Would it be convenient to start with some very simple text-like format that easily converts to the formats listed above, and at some later stage eventually go with a particular format?
- Do you find it problematic that you have the same information scattered around in different documents in different typesetting formats? Would it be a good idea to write things once, in one place, and include it anywhere?

If any of these questions are of interest, you should keep on reading.

## The Doconce Concept

Doconce is two things:

1. Doconce is a working strategy for documenting software in a single place and avoiding duplication of information. The slogan is: “Write once, include anywhere”. This requires that what you write can be transformed to many different formats for a variety of documents (manuals, tutorials, books, doc strings, source code documentation, etc.).
2. Doconce is a simple and minimally tagged markup language that can be used for the above purpose. That is, the Doconce format look like ordinary ASCII text (much like what you would use in an email), but the text can be transformed to numerous other formats, including HTML, Wiki, LaTeX, PDF, reStructuredText (reST), Sphinx, Epytext, and also plain text (where non-obvious formatting/tags are removed for clear reading in, e.g., emails). From reStructuredText you can go to XML, HTML, LaTeX, PDF, OpenOffice, and from the latter to RTF and MS Word.

Doconce was particularly written for the following sample applications:

- Large books written in LaTeX, but where many pieces (computer demos, projects, examples) can be written in Doconce to appear in other contexts in other formats, including plain HTML, Sphinx, or MS Word.
- Software documentation, primarily Python doc strings, which one wants to appear as plain untagged text for viewing in Pydoc, as reStructuredText for use with Sphinx, as wiki text when publishing the software at googlecode.com, and as LaTeX integrated in, e.g., a master’s thesis.

- Quick memos, which start as plain text in email, then some small amount of Doconce tagging is added, before the memos can appear as MS Word documents or in wikis.

## What Does Doconce Look Like?

Doconce text looks like ordinary text, but there are some almost invisible text constructions that allow you to control the formatting. For example,

- bullet lists arise from lines starting with an asterisk,
- *emphasized words* are surrounded by asterisks,
- **words in boldface** are surrounded by underscores,
- words from computer code are enclosed in back quotes and then typeset verbatim,
- blocks of computer code can easily be included, also from source files,
- blocks of LaTeX mathematics can easily be included,
- there is support for both LaTeX and text-like inline mathematics,
- figures with captions, URLs with links, labels and references are supported,
- comments can be inserted throughout the text,
- a preprocessor (much like the C preprocessor) is integrated so other documents (files) can be included and large portions of text can be defined in or out of the text.

Here is an example of some simple text written in the Doconce format:

```
===== A Subsection with Sample Text =====
label{my:first:sec}
```

Ordinary text looks like ordinary text, and the tags used for `_boldface_` words, `*emphasized*` words, and `'computer'` words look natural in plain text. Lists are typeset as you would do in an email,

```
* item 1
* item 2
* item 3
```

Lists can also have automatically numbered items instead of bullets,

```
o item 1
o item 2
o item 3
```

URLs with a link word are possible, as in `http://folk.uio.no/hpl<hpl>`. Just a file link goes like `URL:"tutorial.do.txt"`. References to sections may use logical names as labels (e.g., a `"label"` command right

after the section title), as in the reference to Chapter `ref{my:first:sec}`. Doconce also allows inline comments such as `[hpl: here I will make some remarks to the text]` for allowing authors to make notes. Inline comments can be removed from the output by a command-line argument (see Chapter `ref{doconce2formats}` for an example).

Tables are also supported, e.g.,

time	velocity	acceleration
0.0	1.4186	-5.01
2.0	1.376512	11.919
4.0	1.1E+1	14.717624

# lines beginning with # are comment lines

The Doconce text above results in the following little document:

## A Subsection with Sample Text

Ordinary text looks like ordinary text, and the tags used for **boldface** words, *emphasized* words, and computer words look natural in plain text. Lists are typeset as you would do in an email,

- item 1
- item 2
- item 3

Lists can also have numbered items instead of bullets, just use an `o` (for ordered) instead of the asterisk:

1. item 1
2. item 2
3. item 3

URLs with a link word are possible, as in [hpl](#). Just a file link goes like [tutorial.do.txt](#). References to sections may use logical names as labels (e.g., a “label” command right after the section title), as in the reference to the chapter [A Subsection with Sample Text](#).

Tables are also supported, e.g.,

time	velocity	acceleration
0.0	1.4186	-5.01
2.0	1.376512	11.919
4.0	1.1E+1	14.717624

## Mathematics and Computer Code

Inline mathematics, such as  $v = \sin(x)$ , allows the formula to be specified both as LaTeX and as plain text. This results in a professional LaTeX typesetting, but in other formats the text version normally looks better than raw LaTeX mathematics with backslashes. An inline formula like  $v = \sin(x)$  is typeset as:

```
$\nu = \sin(x)$| $v = \sin(x)$ 
```

The pipe symbol acts as a delimiter between LaTeX code and the plain text version of the formula.

Blocks of mathematics are better typeset with raw LaTeX, inside `!bt` and `!et` (begin tex / end tex) instructions. The result looks like this:

```
\begin{eqnarray}
\{\partial u \over \partial t\} \&\& \nabla^2 u + f, \label{myeq1} \\
\{\partial v \over \partial t\} \&\& \nabla \cdot (q(u) \nabla v) + g
\end{eqnarray}
```

Of course, such blocks only looks nice in LaTeX. The raw LaTeX syntax appears in all other formats (but can still be useful for those who can read LaTeX syntax).

You can have blocks of computer code, starting and ending with `!bc` and `!ec` instructions, respectively. Such blocks look like:

```
from math import sin, pi
def myfunc(x):
    return sin(pi*x)

import integrate
I = integrate.trapezoidal(myfunc, 0, pi, 100)
```

It is possible to add a specification of a (ptex2tex-style) environment for typesetting the verbatim code block, e.g., `!bc xxx` where `xxx` is an identifier like `pycod` for code snippet in Python, `sys` for terminal session, etc. When Doconce is filtered to LaTeX, these identifiers are used as in ptex2tex and defined in a configuration file `.ptext2tex.cfg`, while when filtering to Sphinx, one can have a comment line in the Doconce file for mapping the identifiers to legal language names for Sphinx (which equals the legal language names for Pygments):

```
# sphinx code-blocks: pycod=python cod=py cppcod=c++ sys=console
```

By default, `pro` and `cod` are python, `sys` is console, while `xpro` and `xcod` are computer language specific for `x` in `f` (Fortran), `c` (C), `cpp` (C++), and `py` (Python). .. `rb` (Ruby), `pl` (Perl), and `sh` (Unix shell).

One can also copy computer code directly from files, either the complete file or specified parts. Computer code is then never duplicated in the documentation (important for the principle of avoiding copying information!). A complete file is typeset with `!bc pro`, while a part of a file is copied into a `!bc cod` environment. What `pro` and `cod` mean is then defined through a `.ptex2tex.cfg` file for LaTeX and a `sphinx code-blocks` comment for Sphinx.

Another document can be included by writing `#include "mynote.do.txt"` on a line starting with (another) hash sign. Doconce documents have extension `do.txt`. The `do` part stands for doconce, while the trailing `.txt` denotes a text document so that editors gives you the right writing enviroment for plain text.

## Macros (Newcommands), Cross-References, Index, and Bibliography

Doconce supports a type of macros via a LaTeX-style *newcommand* construction. The newcommands defined in a file with name `newcommand_replace.tex` are expanded when Doconce is filtered to other formats, except for LaTeX (since LaTeX performs the expansion itself). Newcommands in files with names `newcommands.tex` and `newcommands_keep.tex` are kept unaltered when Doconce text is filtered to other formats, except for the Sphinx format. Since Sphinx understands LaTeX math, but not newcommands if the Sphinx output is HTML, it makes most sense to expand all newcommands. Normally, a user will put all newcommands that appear in math blocks surrounded by `!bt` and `!et` in `newcommands_keep.tex` to keep them unchanged, at least if they contribute to make the raw LaTeX math text easier to read in the formats that cannot render LaTeX. Newcommands used elsewhere throughout the text will usually be placed in `newcommands_replace.tex` and expanded by Doconce. The definitions of newcommands in the `newcommands*.tex` files *must* appear on a single line (multi-line newcommands are too hard to parse with regular expressions).

Recent versions of Doconce also offer cross referencing, typically one can define labels below (sub)sections, in figure captions, or in equations, and then refer to these later. Entries in an index can be defined and result in an index at the end for the LaTeX and Sphinx formats. Citations to literature, with an accompanying bibliography in a file, are also supported. The syntax of labels, references, citations, and the bibliography closely resembles that of LaTeX, making it easy for Doconce documents to be integrated in LaTeX projects (manuals, books). For further details on functionality and syntax we refer to the `docs/manual/manual.do.txt` file (see the [demo page](#) for various formats of this document).

## From Doconce to Other Formats

Transformation of a Doconce document to various other formats applies the script `doconce2format`:

```
Unix/DOS> doconce2format format mydoc.do.txt
```

The `preprocess` program is always used to preprocess the file first, and options to `preprocess` can be added after the filename. For example:

```
Unix/DOS> doconce2format LaTeX mydoc.do.txt -Dextra_sections
```

The variable `FORMAT` is always defined as the current format when running `preprocess`. That is, in the last example, `FORMAT` is defined as `LaTeX`. Inside the Doconce document one can then perform format specific actions through tests like `#if FORMAT == "LaTeX"`.

Inline comments in the text are removed from the output by:

```
Unix/DOS> doconce2format LaTeX mydoc.do.txt remove_inline_comments
```

One can also remove such comments from the original Doconce file by running a helper script in the `bin` folder of the Doconce source code:

```
Unix/DOS> doconce_remove_inline_comments.py mydoc.do.txt
```

This action is convenient when a Doconce document reaches its final form.

## HTML

Making an HTML version of a Doconce file `mydoc.do.txt` is performed by:

```
Unix/DOS> doconce2format HTML mydoc.do.txt
```

The resulting file `mydoc.html` can be loaded into any web browser for viewing.

## LaTeX

Making a LaTeX file `mydoc.tex` from `mydoc.do.txt` is done in two steps: ..

Note: putting code blocks inside a list is not successful in many .. formats - the text may be messed up. A better choice is a paragraph .. environment, as used here.

**Step 1. Filter the doconce text to a pre-LaTeX form `mydoc.p.tex` for `ptex2tex`:**

```
Unix/DOS> doconce2format LaTeX mydoc.do.txt
```

LaTeX-specific commands (“newcommands”) in math formulas and similar can be placed in files `newcommands.tex`, `newcommands_keep.tex`, or `newcommands_replace.tex` (see the section [Macros \(Newcommands\), Cross-References, Index, and Bibliography](#)). If these files are present, they are included in the LaTeX document so that your commands are defined.

**Step 2.** Run `ptex2tex` (if you have it) to make a standard LaTeX file:

```
Unix/DOS> ptex2tex mydoc
```

or just perform a plain copy:

```
Unix/DOS> cp mydoc.p.tex mydoc.tex
```

Doconce generates a `.p.tex` file with some preprocessor macros. For example, to enable font Helvetica instead of the standard Computer Modern font:

```
Unix/DOS> ptex2tex -DHELVETICA mydoc
```

The title, authors, and date are by default typeset in a non-standard way to enable a nicer treatment of multiple authors having institutions in common. The standard LaTeX “maketitle” heading is also available through:

```
Unix/DOS> ptex2tex -DTRAD_LATEX_HEADING mydoc
```

The `ptex2tex` tool makes it possible to easily switch between many different fancy formattings of computer or verbatim code in LaTeX documents. After any `!bc sys` command in the Doconce source you can insert verbatim block styles as defined in your `.ptex2tex.cfg` file, e.g., `!bc sys cod` for a code snippet, where `cod` is set to a certain environment in `.ptex2tex.cfg` (e.g., `CodeIntended`). There are over 30 styles to choose from.

**Step 3.** Compile `mydoc.tex` and create the PDF file:

```
Unix/DOS> latex mydoc
Unix/DOS> latex mydoc
Unix/DOS> makeindex mydoc    # if index
Unix/DOS> bibitem mydoc      # if bibliography
Unix/DOS> latex mydoc
Unix/DOS> dvipdf mydoc
```



If one wishes to use the `Minted_Python`, `Minted_Cpp`, etc., environments in `ptex2tex` for typesetting code, the `minted` LaTeX package is needed. This package is included by running `doconce2format` with the `-DMINTED` option:

```
Unix/DOS> ptex2tex -DMINTED mydoc
```

In this case, `latex` must be run with the `-shell-escape` option:

```
Unix/DOS> latex -shell-escape mydoc
Unix/DOS> latex -shell-escape mydoc
Unix/DOS> makeindex mydoc      # if index
Unix/DOS> bibitem mydoc        # if bibliography
Unix/DOS> latex -shell-escape mydoc
Unix/DOS> dvipdf mydoc
```

The `-shell-escape` option is required because the `minted.sty` style file runs the `pygments` program to format code, and this program cannot be run from `latex` without the `-shell-escape` option.

## Plain ASCII Text

We can go from Doconce “back to” plain untagged text suitable for viewing in terminal windows, inclusion in email text, or for insertion in computer source code:

```
Unix/DOS> doconce2format plain mydoc.do.txt # results in mydoc.txt
```

## reStructuredText

Going from Doconce to `reStructuredText` gives a lot of possibilities to go to other formats. First we filter the Doconce text to a `reStructuredText` file `mydoc.rst`:

```
Unix/DOS> doconce2format rst mydoc.do.txt
```

We may now produce various other formats:

```
Unix/DOS> rst2html.py mydoc.rst > mydoc.html # HTML
Unix/DOS> rst2latex.py mydoc.rst > mydoc.tex # LaTeX
Unix/DOS> rst2xml.py mydoc.rst > mydoc.xml # XML
Unix/DOS> rst2odt.py mydoc.rst > mydoc.odt # OpenOffice
```

The OpenOffice file `mydoc.odt` can be loaded into OpenOffice and saved in, among other things, the RTF format or the Microsoft Word format. That is, one can easily go from Doconce to Microsoft Word.

## Sphinx

Sphinx documents can be created from a Doconce source in a few steps.

*Step 1.* Translate Doconce into the Sphinx dialect of the `reStructuredText` format:

```
Unix/DOS> doconce2format sphinx mydoc.do.txt
```

*Step 2.* Create a Sphinx root directory with a `conf.py` file, either manually or by using the interactive `sphinx-quickstart` program. Here is a scripted version of the steps with the latter:

```

mkdir sphinx-rootdir
sphinx-quickstart <<EOF
sphinx-rootdir
n
-
Name of My Sphinx Document
Author
version
version
.rst
index
n
Y
n
n
n
n
Y
n
n
Y
Y
Y
EOF

```

*Step 3.* Move the `tutorial.rst` file to the Sphinx root directory:

```
Unix/DOS> mv mydoc.rst sphinx-rootdir
```

If you have figures in your document, the relative paths to those will be invalid when you work with `mydoc.rst` in the `sphinx-rootdir` directory. Either edit `mydoc.rst` so that figure file paths are correct, or simply copy your figure directory to `sphinx-rootdir` (if all figures are located in a subdirectory).

*Step 4.* Edit the generated `index.rst` file so that `mydoc.rst` is included, i.e., add `mydoc` to the `toctree` section so that it becomes:

```

.. toctree::
   :maxdepth: 2

   mydoc

```

(The spaces before `mydoc` are important!)

*Step 5.* Generate, for instance, an HTML version of the Sphinx source:

```

make clean    # remove old versions
make html

```

Many other formats are also possible.

*Step 6.* View the result:

```
Unix/DOS> firefox _build/html/index.html
```

Note that verbatim code blocks can be typeset in a variety of ways depending the argument that follows `!bc`: `cod` gives Python (code-block:: python in Sphinx syntax) and `cppcod` gives C++, but all such arguments can be customized both for Sphinx and LaTeX output.

## Google Code Wiki

There are several different wiki dialects, but Doconce only support the one used by [Google Code](#). The transformation to this format, called `gwiki` to explicitly mark it as the Google Code dialect, is done by:

```
Unix/DOS> doconce2format gwiki mydoc.do.txt
```

You can then open a new wiki page for your Google Code project, copy the `mydoc.gwiki` output file from `doconce2format` and paste the file contents into the wiki page. Press **Preview** or **Save Page** to see the formatted result.

When the Doconce file contains figures, each figure filename must be replaced by a URL where the figure is available. There are instructions in the file for doing this. Usually, one performs this substitution automatically (see next section).

## Tweaking the Doconce Output

Occasionally, one would like to tweak the output in a certain format from Doconce. One example is figure filenames when transforming Doconce to reStructuredText. Since Doconce does not know if the `.rst` file is going to be filtered to LaTeX or HTML, it cannot know if `.eps` or `.png` is the most appropriate image filename. The solution is to use a text substitution command or code with, e.g., `sed`, `perl`, `python`, or `scitools subst`, to automatically edit the output file from Doconce. It is then wise to run Doconce and the editing commands from a script to automate all steps in going from Doconce to the final format(s). The `make.sh` files in `docs/manual` and `docs/tutorial` constitute comprehensive examples on how such scripts can be made.

## Demos

The current text is generated from a Doconce format stored in the file:

```
docs/tutorial/tutorial.do.txt
```

The file `make.sh` in the `tutorial` directory of the Doconce source code contains a demo of how to produce a variety of formats. The source of this tutorial, `tutorial.do.txt` is the starting point. Running `make.sh` and studying the various generated files and comparing them with the original `tutorial.do.txt` file, gives a quick introduction to how Doconce is used in a real case. [Here](#) is a sample of how this tutorial looks in different formats.

There is another demo in the `docs/manual` directory which translates the more comprehensive documentation, `manual.do.txt`, to various formats. The `make.sh` script runs a set of translations.

## Dependencies

Doconce depends on the Python package [preprocess](#). To make LaTeX documents (without going through the reStructuredText format) you also need [ptex2tex](#) and some style files that `ptex2tex` potentially makes use of. Going from reStructuredText to formats such as XML, OpenOffice, HTML, and LaTeX requires [docutils](#). Making Sphinx documents requires of course [sphinx](#).

## **Warning/Disclaimer**

Doconce can be viewed as a unified interface to a variety of typesetting formats. This interface is minimal in the sense that a lot of typesetting features are not supported, for example, footnotes and bibliography. For many documents the simple Doconce format is sufficient, while in other cases you need more sophisticated formats. Then you can just filter the Doconce text to a more appropriate format and continue working in this format only. For example, reStructuredText is a good alternative: it is more tagged than Doconce and cannot be filtered to plain, untagged text, or wiki, and the LaTeX output is not at all as clean, but it also has a lot more typesetting and tagging features than Doconce.

---

# **Doconce Tutorial Documentation**

***Release 1.0***

**H. P. Langtangen**

October 12, 2010



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Contents:



# DOCONCE: DOCUMENT ONCE, INCLUDE ANYWHERE

**Author** Hans Petter Langtangen

**Date** September 10, 2010

- When writing a note, report, manual, etc., do you find it difficult to choose the typesetting format? That is, to choose between plain (email-like) text, Wiki, Word/OpenOffice, LaTeX, HTML, reStructuredText, Sphinx, XML, etc. Would it be convenient to start with some very simple text-like format that easily converts to the formats listed above, and at some later stage eventually go with a particular format?
- Do you find it problematic that you have the same information scattered around in different documents in different typesetting formats? Would it be a good idea to write things once, in one place, and include it anywhere?

If any of these questions are of interest, you should keep on reading.



# THE DOCONCE CONCEPT

Doconce is two things:

1. Doconce is a working strategy for documenting software in a single place and avoiding duplication of information. The slogan is: “Write once, include anywhere”. This requires that what you write can be transformed to many different formats for a variety of documents (manuals, tutorials, books, doc strings, source code documentation, etc.).
2. Doconce is a simple and minimally tagged markup language that can be used for the above purpose. That is, the Doconce format look like ordinary ASCII text (much like what you would use in an email), but the text can be transformed to numerous other formats, including HTML, Wiki, LaTeX, PDF, reStructuredText (reST), Sphinx, Epytext, and also plain text (where non-obvious formatting/tags are removed for clear reading in, e.g., emails). From reStructuredText you can go to XML, HTML, LaTeX, PDF, OpenOffice, and from the latter to RTF and MS Word.

Doconce was particularly written for the following sample applications:

- Large books written in LaTeX, but where many pieces (computer demos, projects, examples) can be written in Doconce to appear in other contexts in other formats, including plain HTML, Sphinx, or MS Word.
- Software documentation, primarily Python doc strings, which one wants to appear as plain untagged text for viewing in Pydoc, as reStructuredText for use with Sphinx, as wiki text when publishing the software at google-code.com, and as LaTeX integrated in, e.g., a master’s thesis.
- Quick memos, which start as plain text in email, then some small amount of Doconce tagging is added, before the memos can appear as MS Word documents or in wikis.



# WHAT DOES DOCONCE LOOK LIKE?

Doconce text looks like ordinary text, but there are some almost invisible text constructions that allow you to control the formatting. For example,

- bullet lists arise from lines starting with an asterisk,
- *emphasized words* are surrounded by asterisks,
- **words in boldface** are surrounded by underscores,
- words from computer code are enclosed in back quotes and then typeset verbatim,
- blocks of computer code can easily be included, also from source files,
- blocks of LaTeX mathematics can easily be included,
- there is support for both LaTeX and text-like inline mathematics,
- figures with captions, URLs with links, labels and references are supported,
- comments can be inserted throughout the text,
- a preprocessor (much like the C preprocessor) is integrated so other documents (files) can be included and large portions of text can be defined in or out of the text.

Here is an example of some simple text written in the Doconce format:

```
===== A Subsection with Sample Text =====  
label{my:first:sec}
```

Ordinary text looks like ordinary text, and the tags used for `_boldface_` words, `*emphasized*` words, and `'computer'` words look natural in plain text. Lists are typeset as you would do in an email,

- \* item 1
- \* item 2
- \* item 3

Lists can also have automatically numbered items instead of bullets,

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URLs with a link word are possible, as in `http://folk.uio.no/hpl<hpl>`. Just a file link goes like `URL:"tutorial.do.txt"`. References to sections may use logical names as labels (e.g., a `"label"` command right after the section title), as in the reference to

Chapter `ref{my:first:sec}`. Doconce also allows inline comments such as `[hpl: here I will make some remarks to the text]` for allowing authors to make notes. Inline comments can be removed from the output by a command-line argument (see Chapter `ref{doconce2formats}` for an example).

Tables are also supported, e.g.,

```
|-----|
|time   | velocity | acceleration |
|-----|
| 0.0   | 1.4186   | -5.01        |
| 2.0   | 1.376512 | 11.919       |
| 4.0   | 1.1E+1   | 14.717624    |
|-----|
```

# lines beginning with # are comment lines

The Doconce text above results in the following little document:

## 3.1 A Subsection with Sample Text

Ordinary text looks like ordinary text, and the tags used for **boldface** words, *emphasized* words, and computer words look natural in plain text. Lists are typeset as you would do in an email,

- item 1
- item 2
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Lists can also have numbered items instead of bullets, just use an `o` (for ordered) instead of the asterisk:

1. item 1
2. item 2
3. item 3

URLs with a link word are possible, as in `hpl`. Just a file link goes like `tutorial.do.txt`. References to sections may use logical names as labels (e.g., a “`label`” command right after the section title), as in the reference to the chapter [A Subsection with Sample Text](#).

Tables are also supported, e.g.,

time	velocity	acceleration
0.0	1.4186	-5.01
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## 3.2 Mathematics and Computer Code

Inline mathematics, such as  $\nu = \sin(x)$ , allows the formula to be specified both as LaTeX and as plain text. This results in a professional LaTeX typesetting, but in other formats the text version normally looks better than raw LaTeX mathematics with backslashes. An inline formula like  $\nu = \sin(x)$  is typeset as

```
$\nu = \sin(x)$|$\nu = \sin(x)$
```



The pipe symbol acts as a delimiter between LaTeX code and the plain text version of the formula.

Blocks of mathematics are better typeset with raw LaTeX, inside `!bt` and `!et` (`begin tex` / `end tex`) instructions. The result looks like this:

$$\frac{\partial u}{\partial t} = \nabla^2 u + f,$$

$$\frac{\partial v}{\partial t} = \nabla \cdot (q(u) \nabla v) + g$$

Of course, such blocks only looks nice in LaTeX. The raw LaTeX syntax appears in all other formats (but can still be useful for those who can read LaTeX syntax).

You can have blocks of computer code, starting and ending with `!bc` and `!ec` instructions, respectively. Such blocks look like

```
from math import sin, pi
def myfunc(x):
    return sin(pi*x)

import integrate
I = integrate.trapezoidal(myfunc, 0, pi, 100)
```

It is possible to add a specification of a (`ptex2tex`-style) environment for typesetting the verbatim code block, e.g., `!bc xxx` where `xxx` is an identifier like `pycod` for code snippet in Python, `sys` for terminal session, etc. When Doconce is filtered to LaTeX, these identifiers are used as in `ptex2tex` and defined in a configuration file `.ptex2tex.cfg`, while when filtering to Sphinx, one can have a comment line in the Doconce file for mapping the identifiers to legal language names for Sphinx (which equals the legal language names for Pygments):

```
# sphinx code-blocks: pycod=python cod=py cppcod=c++ sys=console
```

By default, `pro` and `cod` are `python`, `sys` is `console`, while `xpro` and `xcod` are computer language specific for `x` in `f` (Fortran), `c` (C), `cpp` (C++), and `py` (Python). .. `rb` (Ruby), `pl` (Perl), and `sh` (Unix shell).

One can also copy computer code directly from files, either the complete file or specified parts. Computer code is then never duplicated in the documentation (important for the principle of avoiding copying information!). A complete file is typeset with `!bc pro`, while a part of a file is copied into a `!bc cod` environment. What `pro` and `cod` mean is then defined through a `.ptex2tex.cfg` file for LaTeX and a `sphinx code-blocks` comment for Sphinx.

Another document can be included by writing `#include "mynote.do.txt"` on a line starting with (another) hash sign. Doconce documents have extension `do.txt`. The `do` part stands for doconce, while the trailing `.txt` denotes a text document so that editors gives you the right writing enviroment for plain text.

### 3.3 Macros (Newcommands), Cross-References, Index, and Bibliography

Doconce supports a type of macros via a LaTeX-style *newcommand* construction. The newcommands defined in a file with name `newcommand_replace.tex` are expanded when Doconce is filtered to other formats, except for LaTeX (since LaTeX performs the expansion itself). Newcommands in files with names `newcommands.tex` and `newcommands_keep.tex` are kept unaltered when Doconce text is filtered to other formats, except for the Sphinx format. Since Sphinx understands LaTeX math, but not newcommands if the Sphinx output is HTML, it makes most sense to expand all newcommands. Normally, a user will put all newcommands that appear in math blocks surrounded by `!bt` and `!et` in `newcommands_keep.tex` to keep them unchanged, at least if they contribute to make the raw LaTeX math text easier to read in the formats that cannot render LaTeX. Newcommands used elsewhere throughout the text will usually be placed in `newcommands_replace.tex` and expanded by Doconce. The definitions of newcommands in the `newcommands*.tex` files *must* appear on a single line (multi-line newcommands are too hard to parse with regular expressions).

Recent versions of Doconce also offer cross referencing, typically one can define labels below (sub)sections, in figure captions, or in equations, and then refer to these later. Entries in an index can be defined and result in an index at the end for the LaTeX and Sphinx formats. Citations to literature, with an accompanying bibliography in a file, are also supported. The syntax of labels, references, citations, and the bibliography closely resembles that of LaTeX, making it easy for Doconce documents to be integrated in LaTeX projects (manuals, books). For further details on functionality and syntax we refer to the `docs/manual/manual.do.txt` file (see the [demo page](#) for various formats of this document).

# FROM DOCONCE TO OTHER FORMATS

Transformation of a Doconce document to various other formats applies the script `doconce2format`:

```
Unix/DOS> doconce2format format mydoc.do.txt
```

The `preprocess` program is always used to preprocess the file first, and options to `preprocess` can be added after the filename. For example,

```
Unix/DOS> doconce2format LaTeX mydoc.do.txt -Dextra_sections
```

The variable `FORMAT` is always defined as the current format when running `preprocess`. That is, in the last example, `FORMAT` is defined as `LaTeX`. Inside the Doconce document one can then perform format specific actions through tests like `#if FORMAT == "LaTeX"`.

Inline comments in the text are removed from the output by

```
Unix/DOS> doconce2format LaTeX mydoc.do.txt remove_inline_comments
```

One can also remove such comments from the original Doconce file by running a helper script in the `bin` folder of the Doconce source code:

```
Unix/DOS> doconce_remove_inline_comments.py mydoc.do.txt
```

This action is convenient when a Doconce document reaches its final form.

## 4.1 HTML

Making an HTML version of a Doconce file `mydoc.do.txt` is performed by

```
Unix/DOS> doconce2format HTML mydoc.do.txt
```

The resulting file `mydoc.html` can be loaded into any web browser for viewing.

## 4.2 LaTeX

Making a LaTeX file `mydoc.tex` from `mydoc.do.txt` is done in two steps: .. Note: putting code blocks inside a list is not successful in many .. formats - the text may be messed up. A better choice is a paragraph .. environment, as used here.

**Step 1.** Filter the doconce text to a pre-LaTeX form `mydoc.p.tex` for `ptex2tex`:

```
Unix/DOS> doconce2format LaTeX mydoc.do.txt
```

LaTeX-specific commands (“newcommands”) in math formulas and similar can be placed in files `newcommands.tex`, `newcommands_keep.tex`, or `newcommands_replace.tex` (see the section *Macros (Newcommands), Cross-References, Index, and Bibliography*). If these files are present, they are included in the LaTeX document so that your commands are defined.

*Step 2.* Run `ptex2tex` (if you have it) to make a standard LaTeX file,

```
Unix/DOS> ptex2tex mydoc
```

or just perform a plain copy,

```
Unix/DOS> cp mydoc.p.tex mydoc.tex
```

Doconce generates a `.p.tex` file with some preprocessor macros. For example, to enable font Helvetica instead of the standard Computer Modern font,

```
Unix/DOS> ptex2tex -DHELVETICA mydoc
```

The title, authors, and date are by default typeset in a non-standard way to enable a nicer treatment of multiple authors having institutions in common. The standard LaTeX “maketitle” heading is also available through

```
Unix/DOS> ptex2tex -DTRAD_LATEX_HEADING mydoc
```

The `ptex2tex` tool makes it possible to easily switch between many different fancy formattings of computer or verbatim code in LaTeX documents. After any `!bc sys` command in the Doconce source you can insert verbatim block styles as defined in your `.ptex2tex.cfg` file, e.g., `!bc sys cod` for a code snippet, where `cod` is set to a certain environment in `.ptex2tex.cfg` (e.g., `CodeIntended`). There are over 30 styles to choose from.

*Step 3.* Compile `mydoc.tex` and create the PDF file:

```
Unix/DOS> latex mydoc
Unix/DOS> latex mydoc
Unix/DOS> makeindex mydoc # if index
Unix/DOS> bibitem mydoc   # if bibliography
Unix/DOS> latex mydoc
Unix/DOS> dvipdf mydoc
```

If one wishes to use the `Minted_Python`, `Minted_Cpp`, etc., environments in `ptex2tex` for typesetting code, the `minted LaTeX` package is needed. This package is included by running `doconce2format` with the `-DMINTED` option:

```
Unix/DOS> ptex2tex -DMINTED mydoc
```

In this case, `latex` must be run with the `-shell-escape` option:

```
Unix/DOS> latex -shell-escape mydoc
Unix/DOS> latex -shell-escape mydoc
Unix/DOS> makeindex mydoc # if index
Unix/DOS> bibitem mydoc   # if bibliography
Unix/DOS> latex -shell-escape mydoc
Unix/DOS> dvipdf mydoc
```

The `-shell-escape` option is required because the `minted.sty` style file runs the `pygments` program to format code, and this program cannot be run from `latex` without the `-shell-escape` option.

## 4.3 Plain ASCII Text

We can go from Doconce “back to” plain untagged text suitable for viewing in terminal windows, inclusion in email text, or for insertion in computer source code:

```
Unix/DOS> doconce2format plain mydoc.do.txt # results in mydoc.txt
```

## 4.4 reStructuredText

Going from Doconce to reStructuredText gives a lot of possibilities to go to other formats. First we filter the Doconce text to a reStructuredText file `mydoc.rst`:

```
Unix/DOS> doconce2format rst mydoc.do.txt
```

We may now produce various other formats:

```
Unix/DOS> rst2html.py mydoc.rst > mydoc.html # HTML
Unix/DOS> rst2latex.py mydoc.rst > mydoc.tex # LaTeX
Unix/DOS> rst2xml.py mydoc.rst > mydoc.xml # XML
Unix/DOS> rst2odt.py mydoc.rst > mydoc.odt # OpenOffice
```

The OpenOffice file `mydoc.odt` can be loaded into OpenOffice and saved in, among other things, the RTF format or the Microsoft Word format. That is, one can easily go from Doconce to Microsoft Word.

## 4.5 Sphinx

Sphinx documents can be created from a Doconce source in a few steps.

*Step 1.* Translate Doconce into the Sphinx dialect of the reStructuredText format:

```
Unix/DOS> doconce2format sphinx mydoc.do.txt
```

*Step 2.* Create a Sphinx root directory with a `conf.py` file, either manually or by using the interactive `sphinx-quickstart` program. Here is a scripted version of the steps with the latter:

```
mkdir sphinx-rootdir
sphinx-quickstart <<EOF
sphinx-rootdir
n
—
Name of My Sphinx Document
Author
version
version
.rst
index
n
y
n
n
n
n
y
n
```

```
n
Y
Y
Y
EOF
```

*Step 3.* Move the `tutorial.rst` file to the Sphinx root directory:

```
Unix/DOS> mv mydoc.rst sphinx-rootdir
```

If you have figures in your document, the relative paths to those will be invalid when you work with `mydoc.rst` in the `sphinx-rootdir` directory. Either edit `mydoc.rst` so that figure file paths are correct, or simply copy your figure directory to `sphinx-rootdir` (if all figures are located in a subdirectory).

*Step 4.* Edit the generated `index.rst` file so that `mydoc.rst` is included, i.e., add `mydoc` to the `toctree` section so that it becomes

```
.. toctree::
    :maxdepth: 2

    mydoc
```

(The spaces before `mydoc` are important!)

*Step 5.* Generate, for instance, an HTML version of the Sphinx source:

```
make clean    # remove old versions
make html
```

Many other formats are also possible.

*Step 6.* View the result:

```
Unix/DOS> firefox _build/html/index.html
```

Note that verbatim code blocks can be typeset in a variety of ways depending the argument that follows `!bc:` `cod` gives Python (code-block:: python in Sphinx syntax) and `cppcod` gives C++, but all such arguments can be customized both for Sphinx and LaTeX output.

## 4.6 Google Code Wiki

There are several different wiki dialects, but Doconce only support the one used by [Google Code](#). The transformation to this format, called `gwiki` to explicitly mark it as the Google Code dialect, is done by

```
Unix/DOS> doconce2format gwiki mydoc.do.txt
```

You can then open a new wiki page for your Google Code project, copy the `mydoc.gwiki` output file from `doconce2format` and paste the file contents into the wiki page. Press **Preview** or **Save Page** to see the formatted result.

When the Doconce file contains figures, each figure filename must be replaced by a URL where the figure is available. There are instructions in the file for doing this. Usually, one performs this substitution automatically (see next section).

## 4.7 Tweaking the Doconce Output

Occasionally, one would like to tweak the output in a certain format from Doconce. One example is figure filenames when transforming Doconce to reStructuredText. Since Doconce does not know if the `.rst` file is going to be filtered

to LaTeX or HTML, it cannot know if `.eps` or `.png` is the most appropriate image filename. The solution is to use a text substitution command or code with, e.g., `sed`, `perl`, `python`, or `scitools subst`, to automatically edit the output file from Doconce. It is then wise to run Doconce and the editing commands from a script to automate all steps in going from Doconce to the final format(s). The `make.sh` files in `docs/manual` and `docs/tutorial` constitute comprehensive examples on how such scripts can be made.

## 4.8 Demos

The current text is generated from a Doconce format stored in the file

```
docs/tutorial/tutorial.do.txt
```

The file `make.sh` in the `tutorial` directory of the Doconce source code contains a demo of how to produce a variety of formats. The source of this tutorial, `tutorial.do.txt` is the starting point. Running `make.sh` and studying the various generated files and comparing them with the original `tutorial.do.txt` file, gives a quick introduction to how Doconce is used in a real case. [Here](#) is a sample of how this tutorial looks in different formats.

There is another demo in the `docs/manual` directory which translates the more comprehensive documentation, `manual.do.txt`, to various formats. The `make.sh` script runs a set of translations.

## 4.9 Dependencies

Doconce depends on the Python package `preprocess`. To make LaTeX documents (without going through the reStructuredText format) you also need `ptex2tex` and some style files that `ptex2tex` potentially makes use of. Going from reStructuredText to formats such as XML, OpenOffice, HTML, and LaTeX requires `docutils`. Making Sphinx documents requires of course `sphinx`.





## **WARNING/DISCLAIMER**

Doconce can be viewed is a unified interface to a variety of typesetting formats. This interface is minimal in the sense that a lot of typesetting features are not supported, for example, footnotes and bibliography. For many documents the simple Doconce format is sufficient, while in other cases you need more sophisticated formats. Then you can just filter the Doconce text to a more appropriate format and continue working in this format only. For example, reStructuredText is a good alternative: it is more tagged than Doconce and cannot be filtered to plain, untagged text, or wiki, and the LaTeX output is not at all as clean, but it also has a lot more typesetting and tagging features than Doconce.



# INDICES AND TABLES

- *genindex*
- *modindex*
- *search*

” **tutorial.txt** ”

Doconce: Document Once, Include Anywhere  
=====

Hans Petter Langtangen [1, 2]

[1] Simula Research Laboratory  
[2] University of Oslo

Date: September 10, 2010

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URLs with a link word are possible, as in `http://folk.uio.no/hpl<hpl>`. Just a file link goes like `URL:"tutorial.do.txt"`. References to sections may use logical names as labels (e.g., a "label" command right after the section title), as in the reference to

## tutorial.txt

Chapter `ref{my:first:sec}`. Doconce also allows inline comments such as `[hpl: here I will make some remarks to the text]` for allowing authors to make notes. Inline comments can be removed from the output by a command-line argument (see Chapter `ref{doconce2formats}` for an example).

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$$\$ \backslash nu = \backslash sin(x) \$ | \$ v = \sin(x) \$$$

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Blocks of mathematics are better typeset with raw LaTeX, inside::

The result looks like this::

```
\begin{eqnarray}
\{\partial u \over \partial t\} \&=& \nabla^2 u + f, \label{myeq1} \\
\{\partial v \over \partial t\} \&=& \nabla \cdot (q(u) \nabla v) + g
\end{eqnarray}
```

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where xxx is an identifier like pycod for code snippet in Python, sys for terminal session, etc. When Doconce is filtered to LaTeX, these identifiers are used as in ptex2tex and defined in a configuration file .ptext2tex.cfg, while when filtering to Sphinx, one can have a comment line in the Doconce file for mapping the identifiers to legal language names for Sphinx (which equals the legal language names for Pygments)::

```
# sphinx code-blocks: pycod=python cod=py cppcod=c++ sys=console
```

By default, pro and cod are python, sys is console, while xpro and xcod are computer language specific for x in f (Fortran), c (C), cpp (C++), and py (Python).

## tutorial.txt

One can also copy computer code directly from files, either the complete file or specified parts. Computer code is then never duplicated in the documentation (important for the principle of avoiding copying information!). A complete file is typeset with::

environment. What `pro` and `cod` mean is then defined through a `.ptex2tex.cfg` file for LaTeX and a sphinx code-blocks comment for Sphinx.

Another document can be included by writing `#include "mynote.do.txt"` on a line starting with (another) hash sign. Doconce documents have extension `do.txt`. The `do` part stands for doconce, while the trailing `.txt` denotes a text document so that editors gives you the right writing enviroment for plain text.

### Macros (Newcommands), Cross-References, Index, and Bibliography

-----

Doconce supports a type of macros via a LaTeX-style `*newcommand*` construction. The newcommands defined in a file with name `newcommand_replace.tex` are expanded when Doconce is filtered to other formats, except for LaTeX (since LaTeX performs the expansion itself). Newcommands in files with names `newcommands.tex` and `newcommands_keep.tex` are kept unaltered when Doconce text is filtered to other formats, except for the Sphinx format. Since Sphinx understands LaTeX math, but not newcommands if the Sphinx output is HTML, it makes most sense to expand all newcommands. Normally, a user will put all newcommands that appear in math blocks surrounded by::

least if they contribute to make the raw LaTeX math text easier to read in the formats that cannot render LaTeX. Newcommands used elsewhere throughout the text will usually be placed in `newcommands_replace.tex` and expanded by Doconce. The definitions of newcommands in the `newcommands*.tex` files *must* appear on a single line (multi-line newcommands are too hard to parse with regular expressions).

Recent versions of Doconce also offer cross referencing, typically one can define labels below (sub)sections, in figure captions, or in equations, and then refer to these later. Entries in an index can be defined and result in an index at the end for the LaTeX and Sphinx formats. Citations to literature, with an accompanying bibliography in a file, are also supported. The syntax of labels, references, citations, and the bibliography closely resembles that of LaTeX, making it easy for Doconce documents to be integrated in LaTeX projects (manuals, books). For further details on functionality and syntax we refer to the `docs/manual/manual.do.txt` file (see the demo

page (<https://doconce.googlecode.com/hg/trunk/docs/demos/manual/index.html>) for various formats of this document).

### From Doconce to Other Formats

=====



” **tutorial.txt** ”

Transformation of a Doconce document to various other formats applies the script `doconce2format::`

```
Unix/DOS> doconce2format format mydoc.do.txt
```

The preprocess program is always used to preprocess the file first, and options to preprocess can be added after the filename. For example::

```
Unix/DOS> doconce2format LaTeX mydoc.do.txt -Dextra_sections
```

The variable `FORMAT` is always defined as the current format when running preprocess. That is, in the last example, `FORMAT` is defined as `LaTeX`. Inside the Doconce document one can then perform format specific actions through tests like `#if FORMAT == "LaTeX"`.

Inline comments in the text are removed from the output by::

```
Unix/DOS> doconce2format LaTeX mydoc.do.txt remove_inline_comments
```

One can also remove such comments from the original Doconce file by running a helper script in the bin folder of the Doconce source code::

```
Unix/DOS> doconce_remove_inline_comments.py mydoc.do.txt
```

This action is convenient when a Doconce document reaches its final form.

## HTML

----

Making an HTML version of a Doconce file `mydoc.do.txt` is performed by::

```
Unix/DOS> doconce2format HTML mydoc.do.txt
```

The resulting file `mydoc.html` can be loaded into any web browser for viewing.

## LaTeX

-----

Making a LaTeX file `mydoc.tex` from `mydoc.do.txt` is done in two steps:

\*Step 1.\* Filter the doconce text to a pre-LaTeX form `mydoc.p.tex` for `ptex2tex::`

```
Unix/DOS> doconce2format LaTeX mydoc.do.txt
```

LaTeX-specific commands ("`newcommands`") in math formulas and similar can be placed in files `newcommands.tex`, `newcommands_keep.tex`, or `newcommands_replace.tex` (see the section "`Macros (Newcommands)`", `Cross-References`, `Index`, and `Bibliography`").

”

**tutorial.txt**

”

If these files are present, they are included in the LaTeX document so that your commands are defined.

\*Step 2.\* Run ptex2tex (if you have it) to make a standard LaTeX file::

```
Unix/DOS> ptex2tex mydoc
```

or just perform a plain copy::

```
Unix/DOS> cp mydoc.p.tex mydoc.tex
```

Doconce generates a .p.tex file with some preprocessor macros. For example, to enable font Helvetica instead of the standard Computer Modern font::

```
Unix/DOS> ptex2tex -DHELVETICA mydoc
```

The title, authors, and date are by default typeset in a non-standard way to enable a nicer treatment of multiple authors having institutions in common. The standard LaTeX "maketitle" heading is also available through::

```
Unix/DOS> ptex2tex -DTRAD_LATEX_HEADING mydoc
```

The ptex2tex tool makes it possible to easily switch between many different fancy formattings of computer or verbatim code in LaTeX documents. After any::

insert verbatim block styles as defined in your .ptex2tex.cfg file, e.g.::

a certain environment in .ptex2tex.cfg (e.g., CodeIntended). There are over 30 styles to choose from.

\*Step 3.\* Compile mydoc.tex and create the PDF file::

```
Unix/DOS> latex mydoc
Unix/DOS> latex mydoc
Unix/DOS> makeindex mydoc    # if index
Unix/DOS> bibitem mydoc      # if bibliography
Unix/DOS> latex mydoc
Unix/DOS> dvipdf mydoc
```

If one wishes to use the Minted\_Python, Minted\_Cpp, etc., environments in ptex2tex for typesetting code, the minted LaTeX package is needed. This package is included by running doconce2format with the -DMINTED option::

```
Unix/DOS> ptex2tex -DMINTED mydoc
```

In this case, latex must be run with the

**tutorial.txt**

`-shell-escape option::`

```

Unix/DOS> latex -shell-escape mydoc
Unix/DOS> latex -shell-escape mydoc
Unix/DOS> makeindex mydoc      # if index
Unix/DOS> bibitem mydoc        # if bibliography
Unix/DOS> latex -shell-escape mydoc
Unix/DOS> dvipdf mydoc

```

The `-shell-escape` option is required because the `minted.sty` style file runs the `pygments` program to format code, and this program cannot be run from `latex` without the `-shell-escape` option.

#### Plain ASCII Text

-----

We can go from Doconce "back to" plain untagged text suitable for viewing in terminal windows, inclusion in email text, or for insertion in computer source code::

```

Unix/DOS> doconce2format plain mydoc.do.txt # results in mydoc.txt

```

#### reStructuredText

-----

Going from Doconce to `reStructuredText` gives a lot of possibilities to go to other formats. First we filter the Doconce text to a `reStructuredText` file `mydoc.rst`::

```

Unix/DOS> doconce2format rst mydoc.do.txt

```

We may now produce various other formats::

```

Unix/DOS> rst2html.py mydoc.rst > mydoc.html # HTML
Unix/DOS> rst2latex.py mydoc.rst > mydoc.tex # LaTeX
Unix/DOS> rst2xml.py mydoc.rst > mydoc.xml # XML
Unix/DOS> rst2odt.py mydoc.rst > mydoc.odt # OpenOffice

```

The OpenOffice file `mydoc.odt` can be loaded into OpenOffice and saved in, among other things, the RTF format or the Microsoft Word format. That is, one can easily go from Doconce to Microsoft Word.

#### Sphinx

-----

Sphinx documents can be created from a Doconce source in a few steps.

**\*Step 1.\*** Translate Doconce into the Sphinx dialect of the `reStructuredText` format::

```

Unix/DOS> doconce2format sphinx mydoc.do.txt

```

” **tutorial.txt** ”

\*Step 2.\* Create a Sphinx root directory with a conf.py file, either manually or by using the interactive sphinx-quickstart program. Here is a scripted version of the steps with the latter::

```
mkdir sphinx-rootdir
sphinx-quickstart <<EOF
sphinx-rootdir
n
-
Name of My Sphinx Document
Author
version
version
.rst
index
n
Y
n
n
n
n
Y
n
n
Y
Y
Y
EOF
```

\*Step 3.\* Move the tutorial.rst file to the Sphinx root directory::

```
Unix/DOS> mv mydoc.rst sphinx-rootdir
```

If you have figures in your document, the relative paths to those will be invalid when you work with mydoc.rst in the sphinx-rootdir directory. Either edit mydoc.rst so that figure file paths are correct, or simply copy your figure directory to sphinx-rootdir (if all figures are located in a subdirectory).

\*Step 4.\* Edit the generated index.rst file so that mydoc.rst is included, i.e., add mydoc to the toctree section so that it becomes::

```
.. toctree::
   :maxdepth: 2

   mydoc
```

(The spaces before mydoc are important!)

\*Step 5.\* Generate, for instance, an HTML version of the Sphinx source::

```
make clean    # remove old versions
make html
```

” **tutorial.txt** ”

Many other formats are also possible.

\*Step 6.\* View the result::

```
Unix/DOS> firefox _build/html/index.html
```

Note that verbatim code blocks can be typeset in a variety of ways depending the argument that follows::

(code-block:: python in Sphinx syntax) and cppcod gives C++, but all such arguments can be customized both for Sphinx and LaTeX output.

Google Code Wiki

-----

There are several different wiki dialects, but Doconce only support the one used by Google Code (<http://code.google.com/p/support/wiki/WikiSyntax>). The transformation to this format, called gwiki to explicitly mark it as the Google Code dialect, is done by::

```
Unix/DOS> doconce2format gwiki mydoc.do.txt
```

You can then open a new wiki page for your Google Code project, copy the mydoc.gwiki output file from doconce2format and paste the file contents into the wiki page. Press `_Preview_` or `_Save Page_` to see the formatted result.

When the Doconce file contains figures, each figure filename must be replaced by a URL where the figure is available. There are instructions in the file for doing this. Usually, one performs this substitution automatically (see next section).

Tweaking the Doconce Output

-----

Occasionally, one would like to tweak the output in a certain format from Doconce. One example is figure filenames when transforming Doconce to reStructuredText. Since Doconce does not know if the .rst file is going to be filtered to LaTeX or HTML, it cannot know if .eps or .png is the most appropriate image filename. The solution is to use a text substitution command or code with, e.g., sed, perl, python, or scitools subst, to automatically edit the output file from Doconce. It is then wise to run Doconce and the editing commands from a script to automate all steps in going from Doconce to the final format(s). The make.sh files in docs/manual and docs/tutorial constitute comprehensive examples on how such scripts can be made.

Demos

-----

The current text is generated from a Doconce format stored in the file::

**tutorial.txt**

docs/tutorial/tutorial.do.txt

The file `make.sh` in the tutorial directory of the Doconce source code contains a demo of how to produce a variety of formats. The source of this tutorial, `tutorial.do.txt` is the starting point. Running `make.sh` and studying the various generated files and comparing them with the original `tutorial.do.txt` file, gives a quick introduction to how Doconce is used in a real case. Here (<https://doconce.googlecode.com/hg/trunk/docs/demos/tutorial/index.html>) is a sample of how this tutorial looks in different formats.

There is another demo in the `docs/manual` directory which translates the more comprehensive documentation, `manual.do.txt`, to various formats. The `make.sh` script runs a set of translations.

#### Dependencies

-----

Doconce depends on the Python package `preprocess` (<http://code.google.com/p/preprocess/>). To make LaTeX documents (without going through the `reStructuredText` format) you also need `ptex2tex` (<http://code.google.com/p/ptex2tex>) and some style files that `ptex2tex` potentially makes use of. Going from `reStructuredText` to formats such as XML, OpenOffice, HTML, and LaTeX requires `docutils` (<http://docutils.sourceforge.net/>). Making Sphinx documents requires of course `sphinx` (<http://sphinx.pocoo.org>).

#### Warning/Disclaimer

=====

Doconce can be viewed as a unified interface to a variety of typesetting formats. This interface is minimal in the sense that a lot of typesetting features are not supported, for example, footnotes and bibliography. For many documents the simple Doconce format is sufficient, while in other cases you need more sophisticated formats. Then you can just filter the Doconce text to a more appropriate format and continue working in this format only. For example, `reStructuredText` is a good alternative: it is more tagged than Doconce and cannot be filtered to plain, untagged text, or wiki, and the LaTeX output is not at all as clean, but it also has a lot more typesetting and tagging features than Doconce.

## tutorial.epytext

TITLE: Doconce: Document Once, Include Anywhere  
 BY: Hans Petter Langtangen (Simula Research Laboratory, and University of Oslo)  
 ATE: September 10, 2010

- When writing a note, report, manual, etc., do you find it difficult to choose the typesetting format? That is, to choose between plain (email-like) text, Wiki, Word/OpenOffice, LaTeX, HTML, reStructuredText, Sphinx, XML, etc. Would it be convenient to start with some very simple text-like format that easily converts to the formats listed above, and at some later stage eventually go with a particular format?
- Do you find it problematic that you have the same information scattered around in different documents in different typesetting formats? Would it be a good idea to write things once, in one place, and include it anywhere?

If any of these questions are of interest, you should keep on reading.

### The Doconce Concept

=====

Doconce is two things:

1. Doconce is a working strategy for documenting software in a single place and avoiding duplication of information. The slogan is: "Write once, include anywhere". This requires that what you write can be transformed to many different formats for a variety of documents (manuals, tutorials, books, doc strings, source code documentation, etc.).
2. Doconce is a simple and minimally tagged markup language that can be used for the above purpose. That is, the Doconce format look like ordinary ASCII text (much like what you would use in an email), but the text can be transformed to numerous other formats, including HTML, Wiki, LaTeX, PDF, reStructuredText (reST), Sphinx, Epytext, and also plain text (where non-obvious formatting/tags are removed for clear reading in, e.g., emails). From reStructuredText you can go to XML, HTML, LaTeX, PDF, OpenOffice, and from the latter to RTF and MS Word.

Doconce was particularly written for the following sample applications:

- Large books written in LaTeX, but where many pieces (computer demos, projects, examples) can be written in Doconce to appear in other contexts in other formats, including plain HTML, Sphinx, or MS Word.
- Software documentation, primarily Python doc strings, which one wants to appear as plain untagged text for viewing in Pydoc, as reStructuredText for use with Sphinx, as wiki text when publishing the software at googlecode.com, and as LaTeX integrated in, e.g., a master's thesis.
- Quick memos, which start as plain text in email, then some small amount of Doconce tagging is added, before the memos can appear as MS Word documents or in wikis.

### What Does Doconce Look Like?

=====

Doconce text looks like ordinary text, but there are some almost invisible text constructions that allow you to control the formatting. For example,

## tutorial.epytext

- bullet lists arise from lines starting with an asterisk,
- I{emphasized words} are surrounded by asterisks,
- B{words in boldface} are surrounded by underscores,
- words from computer code are enclosed in back quotes and then typeset verbatim,
- blocks of computer code can easily be included, also from source files,
- blocks of LaTeX mathematics can easily be included,
- there is support for both LaTeX and text-like inline mathematics,
- figures with captions, URLs with links, labels and references are supported,
- comments can be inserted throughout the text,
- a preprocessor (much like the C preprocessor) is integrated so other documents (files) can be included and large portions of text can be defined in or out of the text.

Here is an example of some simple text written in the Doconce format::

```
===== A Subsection with Sample Text =====
label{my:first:sec}
```

Ordinary text looks like ordinary text, and the tags used for `_boldface_` words, `*emphasized*` words, and `'computer'` words look natural in plain text. Lists are typeset as you would do in an email,

- \* item 1
- \* item 2
- \* item 3

Lists can also have automatically numbered items instead of bullets,

- o item 1
- o item 2
- o item 3

URLs with a link word are possible, as in `http://folk.uio.no/hpl<hpl>`. Just a file link goes like `URL:"tutorial.do.txt"`. References to sections may use logical names as labels (e.g., a `"label"` command right

after the section title), as in the reference to `Chapter ref{my:first:sec}`. Doconce also allows inline comments such as `[hpl: here I will make some remarks to the text]` for allowing authors to make notes. Inline comments can be removed from the output by a command-line argument (see `Chapter ref{doconce2formats}` for an example).

Tables are also supported, e.g.,

time	velocity	acceleration
0.0	1.4186	-5.01
2.0	1.376512	11.919
4.0	1.1E+1	14.717624

# lines beginning with # are comment lines



”

**tutorial.epytext**

”

The Doconce text above results in the following little document:

### A Subsection with Sample Text

-----

Ordinary text looks like ordinary text, and the tags used for `B{boldface}` words, `I{emphasized}` words, and `C{computer}` words look natural in plain text. Lists are typeset as you would do in an email,

- item 1
- item 2
- item 3

Lists can also have numbered items instead of bullets, just use an `C{o}` (for ordered) instead of the asterisk:

1. item 1
2. item 2
3. item 3

URLs with a link word are possible, as in `U{hpl<http://folk.uio.no/hpl>}`. Just a file link goes like `U{tutorial.do.txt<tutorial.do.txt>}`. References to sections may use logical names as labels (e.g., a "label" command right after the section title), as in the reference to the chapter "A Subsection with Sample Text".

Tables are also supported, e.g.,

time	velocity	acceleration
0.0	1.4186	-5.01
2.0	1.376512	11.919
4.0	1.1E+1	14.717624

### Mathematics and Computer Code

-----

Inline mathematics, such as `M{v = sin(x)}`, allows the formula to be specified both as LaTeX and as plain text. This results in a professional LaTeX typesetting, but in other formats the text version normally looks better than raw LaTeX mathematics with backslashes. An inline formula like `M{v = sin(x)}` is typeset as::

NOTE: A verbatim block has been removed because  
it causes problems for Epytext.

The pipe symbol acts as a delimiter between LaTeX code and the plain text version of the formula.

Blocks of mathematics are better typeset with raw LaTeX, inside `C{!bt}` and `C{!et}` (begin tex / end tex) instructions. The result looks like this::

”

”

”

” **tutorial.epytext** ”

NOTE: A verbatim block has been removed because  
it causes problems for Epytext.

Of course, such blocks only looks nice in LaTeX. The raw LaTeX syntax appears in all other formats (but can still be useful for those who can read LaTeX syntax).

You can have blocks of computer code, starting and ending with `C{!bc}` and `C{!ec}` instructions, respectively. Such blocks look like::

```
from math import sin, pi
def myfunc(x):
    return sin(pi*x)

import integrate
I = integrate.trapezoidal(myfunc, 0, pi, 100)
```

It is possible to add a specification of a (ptex2tex-style) environment for typesetting the verbatim code block, e.g., `C{!bc xxx}` where `C{xxx}` is an identifier like `C{pycod}` for code snippet in Python, `C{sys}` for terminal session, etc. When Doconce is filtered to LaTeX, these identifiers are used as in ptex2tex and defined in a configuration file `C{.ptext2tex.cfg}`, while when filtering to Sphinx, one can have a comment line in the Doconce file for mapping the identifiers to legal language names for Sphinx (which equals the legal language names for Pygments)::

```
# sphinx code-blocks: pycod=python cod=py cppcod=c++ sys=console
```

By default, `C{pro}` and `C{cod}` are `C{python}`, `C{sys}` is `C{console}`, while `C{xpro}` and `C{xcod}` are computer language specific for `C{x}` in `C{f}` (Fortran), `C{c}` (C), `C{cpp}` (C++), and `C{py}` (Python).

One can also copy computer code directly from files, either the complete file or specified parts. Computer code is then never duplicated in the documentation (important for the principle of avoiding copying information!). A complete file is typeset with `C{!bc pro}`, while a part of a file is copied into a `C{!bc cod}` environment. What `C{pro}` and `C{cod}` mean is then defined through a `C{.ptex2tex.cfg}` file for LaTeX and a `C{sphinx code-blocks}` comment for Sphinx.

Another document can be included by writing `C{#include "mynote.do.txt"}` on a line starting with (another) hash sign. Doconce documents have extension `C{do.txt}`. The `C{do}` part stands for doconce, while the trailing `C{.txt}` denotes a text document so that editors gives you the right writing enviroment for plain text.

Macros (Newcommands), Cross-References, Index, and Bibliography

-----

Doconce supports a type of macros via a LaTeX-style `I{newcommand}`

” **tutorial.epytext** ”

construction. The newcommands defined in a file with name `C{newcommand_replace.tex}` are expanded when Doconce is filtered to other formats, except for LaTeX (since LaTeX performs the expansion itself). Newcommands in files with names `C{newcommands.tex}` and `C{newcommands_keep.tex}` are kept unaltered when Doconce text is filtered to other formats, except for the Sphinx format. Since Sphinx understands LaTeX math, but not newcommands if the Sphinx output is HTML, it makes most sense to expand all newcommands. Normally, a user will put all newcommands that appear in math blocks surrounded by `C{!bt}` and `C{!et}` in `C{newcommands_keep.tex}` to keep them unchanged, at least if they contribute to make the raw LaTeX math text easier to read in the formats that cannot render LaTeX. Newcommands used elsewhere throughout the text will usually be placed in `C{newcommands_replace.tex}` and expanded by Doconce. The definitions of newcommands in the `C{newcommands*.tex}` files I{must} appear on a single line (multi-line newcommands are too hard to parse with regular expressions).

Recent versions of Doconce also offer cross referencing, typically one can define labels below (sub)sections, in figure captions, or in equations, and then refer to these later. Entries in an index can be defined and result in an index at the end for the LaTeX and Sphinx formats. Citations to literature, with an accompanying bibliography in a file, are also supported. The syntax of labels, references, citations, and the bibliography closely resembles that of LaTeX, making it easy for Doconce documents to be integrated in LaTeX projects (manuals, books). For further details on functionality and syntax we refer to the `C{docs/manual/manual.do.txt}` file (see the U{demo page<<https://doconce.googlecode.com/hg/trunk/docs/demos/manual/index.html>>} for various formats of this document).

#### From Doconce to Other Formats =====

Transformation of a Doconce document to various other formats applies the script `C{doconce2format}`:

```
!bc sys
    Unix/DOS> doconce2format format mydoc.do.txt
```

The `C{preprocess}` program is always used to preprocess the file first, and options to `C{preprocess}` can be added after the filename. For example::

```
    Unix/DOS> doconce2format LaTeX mydoc.do.txt -Dextra_sections
```

The variable `C{FORMAT}` is always defined as the current format when running `C{preprocess}`. That is, in the last example, `C{FORMAT}` is defined as `C{LaTeX}`. Inside the Doconce document one can then perform format specific actions through tests like `C{#if FORMAT == "LaTeX"}`.

Inline comments in the text are removed from the output by::

```
    Unix/DOS> doconce2format LaTeX mydoc.do.txt remove_inline_comments
```

” **tutorial.epytext** ”

One can also remove such comments from the original Doconce file by running a helper script in the C{bin} folder of the Doconce source code::

```
Unix/DOS> doconce_remove_inline_comments.py mydoc.do.txt
```

This action is convenient when a Doconce document reaches its final form.

#### HTML

----

Making an HTML version of a Doconce file C{mydoc.do.txt} is performed by::

```
Unix/DOS> doconce2format HTML mydoc.do.txt
```

The resulting file C{mydoc.html} can be loaded into any web browser for viewing.

#### LaTeX

-----

Making a LaTeX file C{mydoc.tex} from C{mydoc.do.txt} is done in two steps:

I{Step 1.} Filter the doconce text to a pre-LaTeX form C{mydoc.p.tex} for C{ptex2tex}:

```
!bc sys
```

```
Unix/DOS> doconce2format LaTeX mydoc.do.txt
```

LaTeX-specific commands ("newcommands") in math formulas and similar can be placed in files C{newcommands.tex}, C{newcommands\_keep.tex}, or C{newcommands\_replace.tex} (see the section "Macros (Newcommands), Cross-References, Index, and Bibliography").

If these files are present, they are included in the LaTeX document so that your commands are defined.

I{Step 2.} Run C{ptex2tex} (if you have it) to make a standard LaTeX file::

```
Unix/DOS> ptex2tex mydoc
```

or just perform a plain copy::

```
Unix/DOS> cp mydoc.p.tex mydoc.tex
```

Doconce generates a C{.p.tex} file with some preprocessor macros. For example, to enable font Helvetica instead of the standard Computer Modern font::

```
Unix/DOS> ptex2tex -DHELIVETICA mydoc
```

The title, authors, and date are by default typeset in a non-standard way to enable a nicer treatment of multiple authors having

”

**tutorial.epytext**

”

institutions in common. The standard LaTeX "maketitle" heading is also available through::

```
Unix/DOS> ptex2tex -DTRAD_LATEX_HEADING mydoc
```

The C{ptex2tex} tool makes it possible to easily switch between many different fancy formattings of computer or verbatim code in LaTeX documents. After any C{!bc sys} command in the Doconce source you can insert verbatim block styles as defined in your C{.ptex2tex.cfg} file, e.g., C{!bc sys cod} for a code snippet, where C{cod} is set to a certain environment in C{.ptex2tex.cfg} (e.g., C{CodeIntended}). There are over 30 styles to choose from.

I{Step 3.} Compile C{mydoc.tex} and create the PDF file::

```
Unix/DOS> latex mydoc
Unix/DOS> latex mydoc
Unix/DOS> makeindex mydoc    # if index
Unix/DOS> bibitem mydoc      # if bibliography
Unix/DOS> latex mydoc
Unix/DOS> dvipdf mydoc
```

If one wishes to use the C{Minted\_Python}, C{Minted\_Cpp}, etc., environments in C{ptex2tex} for typesetting code, the C{minted} LaTeX package is needed. This package is included by running C{doconce2format} with the C{-DMINTED} option::

```
Unix/DOS> ptex2tex -DMINTED mydoc
```

In this case, C{latex} must be run with the C{-shell-escape} option::

```
Unix/DOS> latex -shell-escape mydoc
Unix/DOS> latex -shell-escape mydoc
Unix/DOS> makeindex mydoc    # if index
Unix/DOS> bibitem mydoc      # if bibliography
Unix/DOS> latex -shell-escape mydoc
Unix/DOS> dvipdf mydoc
```

The C{-shell-escape} option is required because the C{minted.sty} style file runs the C{pygments} program to format code, and this program cannot be run from C{latex} without the C{-shell-escape} option.

Plain ASCII Text  
-----

We can go from Doconce "back to" plain untagged text suitable for viewing in terminal windows, inclusion in email text, or for insertion in computer source code::

```
Unix/DOS> doconce2format plain mydoc.do.txt # results in mydoc.txt
```

## tutorial.epytext

reStructuredText

-----

Going from Doconce to reStructuredText gives a lot of possibilities to go to other formats. First we filter the Doconce text to a reStructuredText file C{mydoc.rst}:

```
!bc sys
    Unix/DOS> doconce2format rst mydoc.do.txt
```

We may now produce various other formats::

```
    Unix/DOS> rst2html.py mydoc.rst > mydoc.html # HTML
    Unix/DOS> rst2latex.py mydoc.rst > mydoc.tex # LaTeX
    Unix/DOS> rst2xml.py mydoc.rst > mydoc.xml # XML
    Unix/DOS> rst2odt.py mydoc.rst > mydoc.odt # OpenOffice
```

The OpenOffice file C{mydoc.odt} can be loaded into OpenOffice and saved in, among other things, the RTF format or the Microsoft Word format. That is, one can easily go from Doconce to Microsoft Word.

Sphinx

-----

Sphinx documents can be created from a Doconce source in a few steps.

I{Step 1.} Translate Doconce into the Sphinx dialect of the reStructuredText format::

```
    Unix/DOS> doconce2format sphinx mydoc.do.txt
```

I{Step 2.} Create a Sphinx root directory with a C{conf.py} file, either manually or by using the interactive C{sphinx-quickstart} program. Here is a scripted version of the steps with the latter::

```
mkdir sphinx-rootdir
sphinx-quickstart <<EOF
sphinx-rootdir
n
-
Name of My Sphinx Document
Author
version
version
.rst
index
n
y
n
n
n
n
y
n
```

”

**tutorial.epytext**

”

```
n
Y
Y
Y
EOF
```

I{Step 3.} Move the C{tutorial.rst} file to the Sphinx root directory::

```
Unix/DOS> mv mydoc.rst sphinx-rootdir
```

If you have figures in your document, the relative paths to those will be invalid when you work with C{mydoc.rst} in the C{sphinx-rootdir} directory. Either edit C{mydoc.rst} so that figure file paths are correct, or simply copy your figure directory to C{sphinx-rootdir} (if all figures are located in a subdirectory).

I{Step 4.} Edit the generated C{index.rst} file so that C{mydoc.rst} is included, i.e., add C{mydoc} to the C{toctree} section so that it becomes::

```
.. toctree::
   :maxdepth: 2

   mydoc
```

(The spaces before C{mydoc} are important!)

I{Step 5.} Generate, for instance, an HTML version of the Sphinx source::

```
make clean    # remove old versions
make html
```

Many other formats are also possible.

I{Step 6.} View the result::

```
Unix/DOS> firefox _build/html/index.html
```

Note that verbatim code blocks can be typeset in a variety of ways depending the argument that follows C{!bc}: C{cod} gives Python (C{code-block:: python} in Sphinx syntax) and C{cppcod} gives C++, but all such arguments can be customized both for Sphinx and LaTeX output.

Google Code Wiki

-----

There are several different wiki dialects, but Doconce only support the one used by U{Google Code<<http://code.google.com/p/support/wiki/WikiSyntax>>}. The transformation to this format, called C{gwiki} to explicitly mark it as the Google Code dialect, is done by::

”

”

”

## tutorial.epytext

```
Unix/DOS> doconce2format gwiki mydoc.do.txt
```

You can then open a new wiki page for your Google Code project, copy the `C{mydoc.gwiki}` output file from `C{doconce2format}` and paste the file contents into the wiki page. Press `B{Preview}` or `B{Save Page}` to see the formatted result.

When the Doconce file contains figures, each figure filename must be replaced by a URL where the figure is available. There are instructions in the file for doing this. Usually, one performs this substitution automatically (see next section).

### Tweaking the Doconce Output

Occasionally, one would like to tweak the output in a certain format from Doconce. One example is figure filenames when transforming Doconce to `reStructuredText`. Since Doconce does not know if the `C{.rst}` file is going to be filtered to LaTeX or HTML, it cannot know if `C{.eps}` or `C{.png}` is the most appropriate image filename. The solution is to use a text substitution command or code with, e.g., `sed`, `perl`, `python`, or `scitools subst`, to automatically edit the output file from Doconce. It is then wise to run Doconce and the editing commands from a script to automate all steps in going from Doconce to the final format(s). The `C{make.sh}` files in `C{docs/manual}` and `C{docs/tutorial}` constitute comprehensive examples on how such scripts can be made.

### Demos

The current text is generated from a Doconce format stored in the file::

```
docs/tutorial/tutorial.do.txt
```

The file `C{make.sh}` in the `C{tutorial}` directory of the Doconce source code contains a demo of how to produce a variety of formats. The source of this tutorial, `C{tutorial.do.txt}` is the starting point. Running `C{make.sh}` and studying the various generated files and comparing them with the original `C{tutorial.do.txt}` file, gives a quick introduction to how Doconce is used in a real case. `U{Here<https://doconce.googlecode.com/hg/trunk/docs/demos/tutorial/index.html>}` is a sample of how this tutorial looks in different formats.

There is another demo in the `C{docs/manual}` directory which translates the more comprehensive documentation, `C{manual.do.txt}`, to various formats. The `C{make.sh}` script runs a set of translations.

### Dependencies

Doconce depends on the Python package `U{preprocess<http://code.google.com/p/preprocess/>}`. To make LaTeX documents (without going through the `reStructuredText` format) you also need `U{ptex2tex<http://code.google.com/p/ptex2tex/>}` and some style files that `ptex2tex` potentially makes use of. Going from `reStructuredText`



”

**tutorial.epytext**

”

to formats such as XML, OpenOffice, HTML, and LaTeX requires `U{docutils<http://docutils.sourceforge.net/>}`. Making Sphinx documents requires of course `U{sphinx<http://sphinx.pocoo.org/>}`.

Warning/Disclaimer

=====

Doconce can be viewed as a unified interface to a variety of typesetting formats. This interface is minimal in the sense that a lot of typesetting features are not supported, for example, footnotes and bibliography. For many documents the simple Doconce format is sufficient, while in other cases you need more sophisticated formats. Then you can just filter the Doconce text to a more appropriate format and continue working in this format only. For example, `reStructuredText` is a good alternative: it is more tagged than Doconce and cannot be filtered to plain, untagged text, or wiki, and the LaTeX output is not at all as clean, but it also has a lot more typesetting and tagging features than Doconce.

## tutorial.gwiki

#summary Doconce: Document Once, Include Anywhere  
 <wiki:toc max\_depth="2" />  
 By \*Hans Petter Langtangen\*

==== September 10, 2010 ====

\* When writing a note, report, manual, etc., do you find it difficult to choose the typesetting format? That is, to choose between plain (email-like) text, Wiki, Word/OpenOffice, LaTeX, HTML, reStructuredText, Sphinx, XML, etc. Would it be convenient to start with some very simple text-like format that easily converts to the formats listed above, and at some later stage eventually go with a particular format?

\* Do you find it problematic that you have the same information scattered around in different documents in different typesetting formats? Would it be a good idea to write things once, in one place, and include it anywhere?

If any of these questions are of interest, you should keep on reading.

== The Doconce Concept ==

Doconce is two things:

# Doconce is a working strategy for documenting software in a single place and avoiding duplication of information. The slogan is: "Write once, include anywhere". This requires that what you write can be transformed to many different formats for a variety of documents (manuals, tutorials, books, doc strings, source code documentation, etc.).

# Doconce is a simple and minimally tagged markup language that can be used for the above purpose. That is, the Doconce format looks like ordinary ASCII text (much like what you would use in an email), but the text can be transformed to numerous other formats, including HTML, Wiki, LaTeX, PDF, reStructuredText (reST), Sphinx, Epytext, and also plain text (where non-obvious formatting/tags are removed for clear reading in, e.g., emails). From reStructuredText you can go to XML, HTML, LaTeX, PDF, OpenOffice, and from the latter to RTF and MS Word.

Doconce was particularly written for the following sample applications:

\* Large books written in LaTeX, but where many pieces (computer demos, projects, examples) can be written in Doconce to appear in other contexts in other formats, including plain HTML, Sphinx, or MS Word.

\* Software documentation, primarily Python doc strings, which one wants to appear as plain untagged text for viewing in Pydoc, as reStructuredText for use with Sphinx, as wiki text when publishing the software at googlecode.com, and as LaTeX integrated in, e.g., a master's thesis.

\* Quick memos, which start as plain text in email, then some small amount of Doconce tagging is added, before the memos can appear as MS Word documents or in wikis.

== What Does Doconce Look Like? ==

Doconce text looks like ordinary text, but there are some almost invisible text constructions that allow you to control the formatting. For example,

## tutorial.gwiki

\* bullet lists arise from lines starting with an asterisk,  
 \* *\*emphasized words\** are surrounded by asterisks,  
 \* **\*words in boldface\*** are surrounded by underscores,  
 \* words from computer code are enclosed in back quotes and then typeset verbatim,  
 \* blocks of computer code can easily be included, also from source files,  
 \* blocks of LaTeX mathematics can easily be included,  
 \* there is support for both LaTeX and text-like inline mathematics,  
 \* figures with captions, URLs with links, labels and references are supported,  
 \* comments can be inserted throughout the text,  
 \* a preprocessor (much like the C preprocessor) is integrated so other documents (files) can be included and large portions of text can be defined in or out of the text.

Here is an example of some simple text written in the Doconce format:

```

{{{
===== A Subsection with Sample Text =====
label{my:first:sec}

```

Ordinary text looks like ordinary text, and the tags used for `_boldface_` words, *\*emphasized\** words, and `'computer'` words look natural in plain text. Lists are typeset as you would do in an email,

- \* item 1
- \* item 2
- \* item 3

Lists can also have automatically numbered items instead of bullets,

- o item 1
- o item 2
- o item 3

URLs with a link word are possible, as in `http://folk.uio.no/hpl<hpl>`. Just a file link goes like `URL:"tutorial.do.txt"`. References to sections may use logical names as labels (e.g., a "label" command right after the section title), as in the reference to `Chapter ref{my:first:sec}`. Doconce also allows inline comments such as `[hpl: here I will make some remarks to the text]` for allowing authors to make notes. Inline comments can be removed from the output by a command-line argument (see `Chapter ref{doconce2formats}` for an example).

Tables are also supported, e.g.,

time	velocity	acceleration
0.0	1.4186	-5.01
2.0	1.376512	11.919
4.0	1.1E+1	14.717624

```

# lines beginning with # are comment lines
}}}

```

The Doconce text above results in the following little document:

## tutorial.gwiki

==== A Subsection with Sample Text ====

Ordinary text looks like ordinary text, and the tags used for *\*boldface\** words, *\*emphasized\** words, and `'computer'` words look natural in plain text. Lists are typeset as you would do in an email,

- \* item 1
- \* item 2
- \* item 3

Lists can also have numbered items instead of bullets, just use an `'o'` (for ordered) instead of the asterisk:

- # item 1
- # item 2
- # item 3

URLs with a link word are possible, as in `[http://folk.uio.no/hpl hpl]`. Just a file link goes like `tutorial.do.txt`. References to sections may use logical names as labels (e.g., a `"label"` command right after the section title), as in the reference to the chapter `[#A_Subsection_with_Sample_Text]`.

Tables are also supported, e.g.,

	<i>*time*</i>		<i>*velocity*</i>		<i>*acceleration*</i>	
	0.0		1.4186		-5.01	
	2.0		1.376512		11.919	
	4.0		1.1E+1		14.717624	

==== Mathematics and Computer Code ====

Inline mathematics, such as `'v = sin(x)'`, allows the formula to be specified both as LaTeX and as plain text. This results in a professional LaTeX typesetting, but in other formats the text version normally looks better than raw LaTeX mathematics with backslashes. An inline formula like `'v = sin(x)'` is typeset as

```
{{{
$\nu = \sin(x)$|$v = sin(x)$
}}}
```

The pipe symbol acts as a delimiter between LaTeX code and the plain text version of the formula.

Blocks of mathematics are better typeset with raw LaTeX, inside `'!bt'` and `'!et'` (begin tex / end tex) instructions.

The result looks like this:

```
{{{
\begin{eqnarray}
\{\partial u\over\partial t\} \&=& \nabla^2 u + f,\label{myeq1}\\
\{\partial v\over\partial t\} \&=& \nabla\cdot(q(u)\nabla v) + g
\end{eqnarray}
}}}
```

Of course, such blocks only looks nice in LaTeX. The raw LaTeX syntax appears in all other formats (but can still be useful for those who can read LaTeX syntax).

## tutorial.gwiki

You can have blocks of computer code, starting and ending with `!bc` and `!ec` instructions, respectively. Such blocks look like

```
{
from math import sin, pi
def myfunc(x):
    return sin(pi*x)

import integrate
I = integrate.trapezoidal(myfunc, 0, pi, 100)
}
```

It is possible to add a specification of a (ptex2tex-style) environment for typesetting the verbatim code block, e.g., `!bc xxx` where `xxx` is an identifier like `pycod` for code snippet in Python, `sys` for terminal session, etc. When Doconce is filtered to LaTeX, these identifiers are used as in ptex2tex and defined in a configuration file `.ptext2tex.cfg`, while when filtering to Sphinx, one can have a comment line in the Doconce file for mapping the identifiers to legal language names for Sphinx (which equals the legal language names for Pygments):

```
{
# sphinx code-blocks: pycod=python cod=py cppcod=c++ sys=console
}
```

By default, `pro` and `cod` are `python`, `sys` is `console`, while `xpro` and `xcod` are computer language specific for `x` in `f` (Fortran), `c` (C), `cpp` (C++), and `py` (Python).

<wiki:comment> `rb` (Ruby), `pl` (Perl), and `sh` (Unix shell). </wiki:comment>

<wiki:comment> (Any sphinx code-block comment, whether inside verbatim code </wiki:comment>

<wiki:comment> blocks or outside, yields a mapping between bc arguments </wiki:comment>

<wiki:comment> and computer languages. In case of multiple definitions, the </wiki:comment>

<wiki:comment> first one is used.) </wiki:comment>

One can also copy computer code directly from files, either the complete file or specified parts. Computer code is then never duplicated in the documentation (important for the principle of avoiding copying information!). A complete file is typeset with `!bc pro`, while a part of a file is copied into a `!bc cod` environment. What `pro` and `cod` mean is then defined through a `.ptex2tex.cfg` file for LaTeX and a `sphinx code-blocks` comment for Sphinx.

Another document can be included by writing `#include "mynote.do.txt"` on a line starting with (another) hash sign. Doconce documents have extension `do.txt`. The `do` part stands for doconce, while the trailing `.txt` denotes a text document so that editors gives you the right writing environment for plain text.

==== Macros (Newcommands), Cross-References, Index, and Bibliography ====

Doconce supports a type of macros via a LaTeX-style `*newcommand*` construction. The newcommands defined in a file with name `newcommand_replace.tex` are expanded when Doconce is filtered to other formats, except for LaTeX (since LaTeX performs the expansion itself). Newcommands in files with names `newcommands.tex` and `newcommands_keep.tex` are kept unaltered when Doconce text is

## tutorial.gwiki

filtered to other formats, except for the Sphinx format. Since Sphinx understands LaTeX math, but not newcommands if the Sphinx output is HTML, it makes most sense to expand all newcommands. Normally, a user will put all newcommands that appear in math blocks surrounded by `'!bt'` and `'!et'` in `'newcommands_keep.tex'` to keep them unchanged, at least if they contribute to make the raw LaTeX math text easier to read in the formats that cannot render LaTeX. Newcommands used elsewhere throughout the text will usually be placed in `'newcommands_replace.tex'` and expanded by Doconce. The definitions of newcommands in the `'newcommands*.tex'` files *must* appear on a single line (multi-line newcommands are too hard to parse with regular expressions).

Recent versions of Doconce also offer cross referencing, typically one can define labels below (sub)sections, in figure captions, or in equations, and then refer to these later. Entries in an index can be defined and result in an index at the end for the LaTeX and Sphinx formats. Citations to literature, with an accompanying bibliography in a file, are also supported. The syntax of labels, references, citations, and the bibliography closely resembles that of LaTeX, making it easy for Doconce documents to be integrated in LaTeX projects (manuals, books). For further details on functionality and syntax we refer to the `'docs/manual/manual.do.txt'` file (see the [https://doconce.googlecode.com/hg/trunk/docs/demos/manual/index.html demo page] for various formats of this document).

<wiki:comment> Example on including another Doconce file: </wiki:comment>

== From Doconce to Other Formats ==

Transformation of a Doconce document to various other formats applies the script `'doconce2format'`:

```
{{{
Unix/DOS> doconce2format format mydoc.do.txt
}}}
```

The `'preprocess'` program is always used to preprocess the file first, and options to `'preprocess'` can be added after the filename. For example,

```
{{{
Unix/DOS> doconce2format LaTeX mydoc.do.txt -Dextra_sections
}}}
```

The variable `'FORMAT'` is always defined as the current format when running `'preprocess'`. That is, in the last example, `'FORMAT'` is defined as `'LaTeX'`. Inside the Doconce document one can then perform format specific actions through tests like `'#if FORMAT == "LaTeX"'`.

Inline comments in the text are removed from the output by

```
{{{
Unix/DOS> doconce2format LaTeX mydoc.do.txt remove_inline_comments
}}}
```

One can also remove such comments from the original Doconce file by running a helper script in the `'bin'` folder of the Doconce source code:

```
{{{
Unix/DOS> doconce_remove_inline_comments.py mydoc.do.txt
}}}
```

This action is convenient when a Doconce document reaches its final form.

## tutorial.gwiki

==== HTML ====

Making an HTML version of a Doconce file 'mydoc.do.txt' is performed by

```
{
{
{
Unix/DOS> doconce2format HTML mydoc.do.txt
}
}
}
```

The resulting file 'mydoc.html' can be loaded into any web browser for viewing.

==== LaTeX ====

Making a LaTeX file 'mydoc.tex' from 'mydoc.do.txt' is done in two steps:

<wiki:comment> Note: putting code blocks inside a list is not successful in many  
</wiki:comment>

<wiki:comment> formats - the text may be messed up. A better choice is a paragraph  
</wiki:comment>

<wiki:comment> environment, as used here. </wiki:comment>

\*Step 1.\* Filter the doconce text to a pre-LaTeX form 'mydoc.p.tex' for  
'ptex2tex':

```
{
{
{
Unix/DOS> doconce2format LaTeX mydoc.do.txt
}
}
}
```

LaTeX-specific commands ("newcommands") in math formulas and similar can be placed in files 'newcommands.tex', 'newcommands\_keep.tex', or 'newcommands\_replace.tex' (see the section [Macros\_(Newcommands),\_Cross-References,\_Index,\_and\_Bibliography]).

If these files are present, they are included in the LaTeX document so that your commands are defined.

\*Step 2.\* Run 'ptex2tex' (if you have it) to make a standard LaTeX file,

```
{
{
{
Unix/DOS> ptex2tex mydoc
}
}
}
```

or just perform a plain copy,

```
{
{
{
Unix/DOS> cp mydoc.p.tex mydoc.tex
}
}
}
```

Doconce generates a '.p.tex' file with some preprocessor macros.

For example, to enable font Helvetica instead of the standard Computer Modern font,

```
{
{
{
Unix/DOS> ptex2tex -DHELIVETICA mydoc
}
}
}
```

The title, authors, and date are by default typeset in a non-standard way to enable a nicer treatment of multiple authors having institutions in common. The standard LaTeX "maketitle" heading is also available through

```
{
{
{
Unix/DOS> ptex2tex -DTRAD_LATEX_HEADING mydoc
}
}
}
```

The 'ptex2tex' tool makes it possible to easily switch between many different fancy formattings of computer or verbatim code in LaTeX documents. After any '!bc sys' command in the Doconce source you can insert verbatim block styles as defined in your '.ptex2tex.cfg' file, e.g., '!bc sys cod' for a code snippet, where 'cod' is set to a certain environment in '.ptex2tex.cfg' (e.g., 'CodeIntended').

## tutorial.gwiki

There are over 30 styles to choose from.

\*Step 3.\* Compile 'mydoc.tex' and create the PDF file:

```
{
{
{
Unix/DOS> latex mydoc
Unix/DOS> latex mydoc
Unix/DOS> makeindex mydoc    # if index
Unix/DOS> bibitem mydoc      # if bibliography
Unix/DOS> latex mydoc
Unix/DOS> dvipdf mydoc
}
}
}
```

If one wishes to use the 'Minted\_Python', 'Minted\_Cpp', etc., environments in 'ptex2tex' for typesetting code, the 'minted' LaTeX package is needed. This package is included by running 'doconce2format' with the

'-DMINTED' option:

```
{
{
{
Unix/DOS> ptex2tex -DMINTED mydoc
}
}
}
```

In this case, 'latex' must be run with the '-shell-escape' option:

```
{
{
{
Unix/DOS> latex -shell-escape mydoc
Unix/DOS> latex -shell-escape mydoc
Unix/DOS> makeindex mydoc    # if index
Unix/DOS> bibitem mydoc      # if bibliography
Unix/DOS> latex -shell-escape mydoc
Unix/DOS> dvipdf mydoc
}
}
}
```

The '-shell-escape' option is required because the 'minted.sty' style file runs the 'pygments' program to format code, and this program cannot be run from 'latex' without the '-shell-escape' option.

==== Plain ASCII Text ====

We can go from Doconce "back to" plain untagged text suitable for viewing in terminal windows, inclusion in email text, or for insertion in computer source code:

```
{
{
{
Unix/DOS> doconce2format plain mydoc.do.txt  # results in mydoc.txt
}
}
}
```

==== reStructuredText ====

Going from Doconce to reStructuredText gives a lot of possibilities to go to other formats. First we filter the Doconce text to a reStructuredText file 'mydoc.rst':

```
{
{
{
Unix/DOS> doconce2format rst mydoc.do.txt
}
}
}
```

We may now produce various other formats:

```
{
{
{
Unix/DOS> rst2html.py  mydoc.rst > mydoc.html # HTML
Unix/DOS> rst2latex.py mydoc.rst > mydoc.tex  # LaTeX
Unix/DOS> rst2xml.py   mydoc.rst > mydoc.xml   # XML
Unix/DOS> rst2odt.py   mydoc.rst > mydoc.odt   # OpenOffice
}
}
}
```

The OpenOffice file 'mydoc.odt' can be loaded into OpenOffice and saved in, among other things, the RTF format or the Microsoft Word format.



## tutorial.gwiki

That is, one can easily go from Doconce to Microsoft Word.

==== Sphinx ====

Sphinx documents can be created from a Doconce source in a few steps.

*\*Step 1.\** Translate Doconce into the Sphinx dialect of the reStructuredText format:

```
{{{
Unix/DOS> doconce2format sphinx mydoc.do.txt
}}}
```

*\*Step 2.\** Create a Sphinx root directory with a 'conf.py' file, either manually or by using the interactive 'sphinx-quickstart' program. Here is a scripted version of the steps with the latter:

```
{{{
mkdir sphinx-rootdir
sphinx-quickstart <<EOF
sphinx-rootdir
n
—
Name of My Sphinx Document
Author
version
version
.rst
index
n
Y
n
n
n
n
Y
n
n
Y
Y
Y
EOF
}}}
```

*\*Step 3.\** Move the 'tutorial.rst' file to the Sphinx root directory:

```
{{{
Unix/DOS> mv mydoc.rst sphinx-rootdir
}}}
```

If you have figures in your document, the relative paths to those will be invalid when you work with 'mydoc.rst' in the 'sphinx-rootdir' directory. Either edit 'mydoc.rst' so that figure file paths are correct, or simply copy your figure directory to 'sphinx-rootdir' (if all figures are located in a subdirectory).

*\*Step 4.\** Edit the generated 'index.rst' file so that 'mydoc.rst' is included, i.e., add 'mydoc' to the 'toctree' section so that it becomes

```
{{{
.. toctree::
   :maxdepth: 2

   mydoc
}}
```

## tutorial.gwiki

```
}}}
```

(The spaces before 'mydoc' are important!)

\*Step 5.\* Generate, for instance, an HTML version of the Sphinx source:

```
{{{
make clean    # remove old versions
make html
}}}
```

Many other formats are also possible.

\*Step 6.\* View the result:

```
{{{
Unix/DOS> firefox _build/html/index.html
}}}
```

Note that verbatim code blocks can be typeset in a variety of ways depending the argument that follows '!bc': 'cod' gives Python ('code-block:: python' in Sphinx syntax) and 'cppcod' gives C++, but all such arguments can be customized both for Sphinx and LaTeX output.

```
<wiki:comment> Desired extension: sphinx can utilize a "pycod" or "c++cod" </wiki:comment>
<wiki:comment> instruction as currently done in latex for ptex2tex and write </wiki:comment>
<wiki:comment> out the right code block name accordingly. </wiki:comment>
```

==== Google Code Wiki ====

There are several different wiki dialects, but Doconce only support the one used by [<http://code.google.com/p/support/wiki/WikiSyntax> Google Code]. The transformation to this format, called 'gwiki' to explicitly mark it as the Google Code dialect, is done by

```
{{{
Unix/DOS> doconce2format gwiki mydoc.do.txt
}}}
```

You can then open a new wiki page for your Google Code project, copy the 'mydoc.gwiki' output file from 'doconce2format' and paste the file contents into the wiki page. Press \*Preview\* or \*Save Page\* to see the formatted result.

When the Doconce file contains figures, each figure filename must be replaced by a URL where the figure is available. There are instructions in the file for doing this. Usually, one performs this substitution automatically (see next section).

==== Tweaking the Doconce Output ====

Occasionally, one would like to tweak the output in a certain format from Doconce. One example is figure filenames when transforming Doconce to reStructuredText. Since Doconce does not know if the '.rst' file is going to be filtered to LaTeX or HTML, it cannot know if '.eps' or '.png' is the most appropriate image filename. The solution is to use a text substitution command or code with, e.g., sed, perl, python, or scitools subst, to automatically edit the output file from Doconce. It is then wise to run Doconce and the editing commands from a script to automate all steps in going from Doconce to the final format(s). The 'make.sh' files in 'docs/manual' and 'docs/tutorial' constitute comprehensive examples on how such scripts can be made.

## tutorial.gwiki

==== Demos ====

The current text is generated from a Doconce format stored in the file

```
{
  docs/tutorial/tutorial.do.txt
}
```

The file 'make.sh' in the 'tutorial' directory of the Doconce source code contains a demo of how to produce a variety of formats. The source of this tutorial, 'tutorial.do.txt' is the starting point. Running 'make.sh' and studying the various generated files and comparing them with the original 'tutorial.do.txt' file, gives a quick introduction to how Doconce is used in a real case. [<https://doconce.googlecode.com/hg/trunk/docs/demos/tutorial/index.html> Here] is a sample of how this tutorial looks in different formats.

There is another demo in the 'docs/manual' directory which translates the more comprehensive documentation, 'manual.do.txt', to various formats. The 'make.sh' script runs a set of translations.

==== Dependencies ====

Doconce depends on the Python package [<http://code.google.com/p/preprocess/> preprocess]. To make LaTeX documents (without going through the reStructuredText format) you also need [<http://code.google.com/p/ptex2tex> ptex2tex] and some style files that ptex2tex potentially makes use of. Going from reStructuredText to formats such as XML, OpenOffice, HTML, and LaTeX requires [<http://docutils.sourceforge.net/> docutils]. Making Sphinx documents requires of course [<http://sphinx.pocoo.org> sphinx].

== Warning/Disclaimer ==

Doconce can be viewed as a unified interface to a variety of typesetting formats. This interface is minimal in the sense that a lot of typesetting features are not supported, for example, footnotes and bibliography. For many documents the simple Doconce format is sufficient, while in other cases you need more sophisticated formats. Then you can just filter the Doconce text to a more appropriate format and continue working in this format only. For example, reStructuredText is a good alternative: it is more tagged than Doconce and cannot be filtered to plain, untagged text, or wiki, and the LaTeX output is not at all as clean, but it also has a lot more typesetting and tagging features than Doconce.

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# **Doconce Tutorial Documentation**

***Release 1.0***

**H. P. Langtangen**

October 12, 2010



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Contents:





# DOCONCE: DOCUMENT ONCE, INCLUDE ANYWHERE

**Author** Hans Petter Langtangen

**Date** September 10, 2010

- When writing a note, report, manual, etc., do you find it difficult to choose the typesetting format? That is, to choose between plain (email-like) text, Wiki, Word/OpenOffice, LaTeX, HTML, reStructuredText, Sphinx, XML, etc. Would it be convenient to start with some very simple text-like format that easily converts to the formats listed above, and at some later stage eventually go with a particular format?
- Do you find it problematic that you have the same information scattered around in different documents in different typesetting formats? Would it be a good idea to write things once, in one place, and include it anywhere?

If any of these questions are of interest, you should keep on reading.



# THE DOCONCE CONCEPT

Doconce is two things:

1. Doconce is a working strategy for documenting software in a single place and avoiding duplication of information. The slogan is: “Write once, include anywhere”. This requires that what you write can be transformed to many different formats for a variety of documents (manuals, tutorials, books, doc strings, source code documentation, etc.).
2. Doconce is a simple and minimally tagged markup language that can be used for the above purpose. That is, the Doconce format look like ordinary ASCII text (much like what you would use in an email), but the text can be transformed to numerous other formats, including HTML, Wiki, LaTeX, PDF, reStructuredText (reST), Sphinx, Epytext, and also plain text (where non-obvious formatting/tags are removed for clear reading in, e.g., emails). From reStructuredText you can go to XML, HTML, LaTeX, PDF, OpenOffice, and from the latter to RTF and MS Word.

Doconce was particularly written for the following sample applications:

- Large books written in LaTeX, but where many pieces (computer demos, projects, examples) can be written in Doconce to appear in other contexts in other formats, including plain HTML, Sphinx, or MS Word.
- Software documentation, primarily Python doc strings, which one wants to appear as plain untagged text for viewing in Pydoc, as reStructuredText for use with Sphinx, as wiki text when publishing the software at google-code.com, and as LaTeX integrated in, e.g., a master’s thesis.
- Quick memos, which start as plain text in email, then some small amount of Doconce tagging is added, before the memos can appear as MS Word documents or in wikis.



# WHAT DOES DOCONCE LOOK LIKE?

Doconce text looks like ordinary text, but there are some almost invisible text constructions that allow you to control the formatting. For example,

- bullet lists arise from lines starting with an asterisk,
- *emphasized words* are surrounded by asterisks,
- **words in boldface** are surrounded by underscores,
- words from computer code are enclosed in back quotes and then typeset verbatim,
- blocks of computer code can easily be included, also from source files,
- blocks of LaTeX mathematics can easily be included,
- there is support for both LaTeX and text-like inline mathematics,
- figures with captions, URLs with links, labels and references are supported,
- comments can be inserted throughout the text,
- a preprocessor (much like the C preprocessor) is integrated so other documents (files) can be included and large portions of text can be defined in or out of the text.

Here is an example of some simple text written in the Doconce format:

```
===== A Subsection with Sample Text =====
label{my:first:sec}
```

Ordinary text looks like ordinary text, and the tags used for `_boldface_` words, `*emphasized*` words, and `'computer'` words look natural in plain text. Lists are typeset as you would do in an email,

- \* item 1
- \* item 2
- \* item 3

Lists can also have automatically numbered items instead of bullets,

- o item 1
- o item 2
- o item 3

URLs with a link word are possible, as in `http://folk.uio.no/hpl<hpl>`. Just a file link goes like `URL:"tutorial.do.txt"`. References to sections may use logical names as labels (e.g., a `"label"` command right after the section title), as in the reference to

Chapter `ref{my:first:sec}`. Doconce also allows inline comments such as `[hpl: here I will make some remarks to the text]` for allowing authors to make notes. Inline comments can be removed from the output by a command-line argument (see Chapter `ref{doconce2formats}` for an example).

Tables are also supported, e.g.,

```
|-----|
|time   | velocity | acceleration |
|-----|
| 0.0   | 1.4186   | -5.01        |
| 2.0   | 1.376512 | 11.919       |
| 4.0   | 1.1E+1   | 14.717624    |
|-----|
```

# lines beginning with # are comment lines

The Doconce text above results in the following little document:

## 3.1 A Subsection with Sample Text

Ordinary text looks like ordinary text, and the tags used for **boldface** words, *emphasized* words, and computer words look natural in plain text. Lists are typeset as you would do in an email,

- item 1
- item 2
- item 3

Lists can also have numbered items instead of bullets, just use an `o` (for ordered) instead of the asterisk:

1. item 1
2. item 2
3. item 3

URLs with a link word are possible, as in `hpl`. Just a file link goes like `tutorial.do.txt`. References to sections may use logical names as labels (e.g., a “label” command right after the section title), as in the reference to the chapter [A Subsection with Sample Text](#).

Tables are also supported, e.g.,

time	velocity	acceleration
0.0	1.4186	-5.01
2.0	1.376512	11.919
4.0	1.1E+1	14.717624

## 3.2 Mathematics and Computer Code

Inline mathematics, such as  $\nu = \sin(x)$ , allows the formula to be specified both as LaTeX and as plain text. This results in a professional LaTeX typesetting, but in other formats the text version normally looks better than raw LaTeX mathematics with backslashes. An inline formula like  $\nu = \sin(x)$  is typeset as

```
 $\nu = \sin(x)$   $\nu = \sin(x)$ 
```

The pipe symbol acts as a delimiter between LaTeX code and the plain text version of the formula.

Blocks of mathematics are better typeset with raw LaTeX, inside `!bt` and `!et` (`begin tex` / `end tex`) instructions. The result looks like this:

$$\frac{\partial u}{\partial t} = \nabla^2 u + f,$$

$$\frac{\partial v}{\partial t} = \nabla \cdot (q(u) \nabla v) + g$$

Of course, such blocks only looks nice in LaTeX. The raw LaTeX syntax appears in all other formats (but can still be useful for those who can read LaTeX syntax).

You can have blocks of computer code, starting and ending with `!bc` and `!ec` instructions, respectively. Such blocks look like

```
from math import sin, pi
def myfunc(x):
    return sin(pi*x)

import integrate
I = integrate.trapezoidal(myfunc, 0, pi, 100)
```

It is possible to add a specification of a (ptex2tex-style) environment for typesetting the verbatim code block, e.g., `!bc xxx` where `xxx` is an identifier like `pycod` for code snippet in Python, `sys` for terminal session, etc. When Doconce is filtered to LaTeX, these identifiers are used as in ptex2tex and defined in a configuration file `.ptext2tex.cfg`, while when filtering to Sphinx, one can have a comment line in the Doconce file for mapping the identifiers to legal language names for Sphinx (which equals the legal language names for Pygments):

```
# sphinx code-blocks: pycod=python cod=py cppcod=c++ sys=console
```

By default, `pro` and `cod` are `python`, `sys` is `console`, while `xpro` and `xcod` are computer language specific for `x` in `f` (Fortran), `c` (C), `cpp` (C++), and `py` (Python). .. `rb` (Ruby), `pl` (Perl), and `sh` (Unix shell).

One can also copy computer code directly from files, either the complete file or specified parts. Computer code is then never duplicated in the documentation (important for the principle of avoiding copying information!). A complete file is typeset with `!bc pro`, while a part of a file is copied into a `!bc cod` environment. What `pro` and `cod` mean is then defined through a `.ptex2tex.cfg` file for LaTeX and a `sphinx code-blocks` comment for Sphinx.

Another document can be included by writing `#include "mynote.do.txt"` on a line starting with (another) hash sign. Doconce documents have extension `do.txt`. The `do` part stands for doconce, while the trailing `.txt` denotes a text document so that editors gives you the right writing enviroment for plain text.

### 3.3 Macros (Newcommands), Cross-References, Index, and Bibliography

Doconce supports a type of macros via a LaTeX-style *newcommand* construction. The newcommands defined in a file with name `newcommand_replace.tex` are expanded when Doconce is filtered to other formats, except for LaTeX (since LaTeX performs the expansion itself). Newcommands in files with names `newcommands.tex` and `newcommands_keep.tex` are kept unaltered when Doconce text is filtered to other formats, except for the Sphinx format. Since Sphinx understands LaTeX math, but not newcommands if the Sphinx output is HTML, it makes most sense to expand all newcommands. Normally, a user will put all newcommands that appear in math blocks surrounded by `!bt` and `!et` in `newcommands_keep.tex` to keep them unchanged, at least if they contribute to make the raw LaTeX math text easier to read in the formats that cannot render LaTeX. Newcommands used elsewhere throughout the text will usually be placed in `newcommands_replace.tex` and expanded by Doconce. The definitions of newcommands in the `newcommands*.tex` files *must* appear on a single line (multi-line newcommands are too hard to parse with regular expressions).



Recent versions of Doconce also offer cross referencing, typically one can define labels below (sub)sections, in figure captions, or in equations, and then refer to these later. Entries in an index can be defined and result in an index at the end for the LaTeX and Sphinx formats. Citations to literature, with an accompanying bibliography in a file, are also supported. The syntax of labels, references, citations, and the bibliography closely resembles that of LaTeX, making it easy for Doconce documents to be integrated in LaTeX projects (manuals, books). For further details on functionality and syntax we refer to the `docs/manual/manual.do.txt` file (see the [demo page](#) for various formats of this document).

# FROM DOCONCE TO OTHER FORMATS

Transformation of a Doconce document to various other formats applies the script `doconce2format`:

```
Unix/DOS> doconce2format format mydoc.do.txt
```

The `preprocess` program is always used to preprocess the file first, and options to `preprocess` can be added after the filename. For example,

```
Unix/DOS> doconce2format LaTeX mydoc.do.txt -Dextra_sections
```

The variable `FORMAT` is always defined as the current format when running `preprocess`. That is, in the last example, `FORMAT` is defined as `LaTeX`. Inside the Doconce document one can then perform format specific actions through tests like `#if FORMAT == "LaTeX"`.

Inline comments in the text are removed from the output by

```
Unix/DOS> doconce2format LaTeX mydoc.do.txt remove_inline_comments
```

One can also remove such comments from the original Doconce file by running a helper script in the `bin` folder of the Doconce source code:

```
Unix/DOS> doconce_remove_inline_comments.py mydoc.do.txt
```

This action is convenient when a Doconce document reaches its final form.

## 4.1 HTML

Making an HTML version of a Doconce file `mydoc.do.txt` is performed by

```
Unix/DOS> doconce2format HTML mydoc.do.txt
```

The resulting file `mydoc.html` can be loaded into any web browser for viewing.

## 4.2 LaTeX

Making a LaTeX file `mydoc.tex` from `mydoc.do.txt` is done in two steps: .. Note: putting code blocks inside a list is not successful in many .. formats - the text may be messed up. A better choice is a paragraph .. environment, as used here.

**Step 1.** Filter the doconce text to a pre-LaTeX form `mydoc.p.tex` for `ptex2tex`:

```
Unix/DOS> doconce2format LaTeX mydoc.do.txt
```

LaTeX-specific commands (“newcommands”) in math formulas and similar can be placed in files `newcommands.tex`, `newcommands_keep.tex`, or `newcommands_replace.tex` (see the section *Macros (Newcommands), Cross-References, Index, and Bibliography*). If these files are present, they are included in the LaTeX document so that your commands are defined.

*Step 2.* Run `ptex2tex` (if you have it) to make a standard LaTeX file,

```
Unix/DOS> ptex2tex mydoc
```

or just perform a plain copy,

```
Unix/DOS> cp mydoc.p.tex mydoc.tex
```

Doconce generates a `.p.tex` file with some preprocessor macros. For example, to enable font Helvetica instead of the standard Computer Modern font,

```
Unix/DOS> ptex2tex -DHELVETICA mydoc
```

The title, authors, and date are by default typeset in a non-standard way to enable a nicer treatment of multiple authors having institutions in common. The standard LaTeX “maketitle” heading is also available through

```
Unix/DOS> ptex2tex -DTRAD_LATEX_HEADING mydoc
```

The `ptex2tex` tool makes it possible to easily switch between many different fancy formattings of computer or verbatim code in LaTeX documents. After any `!bc sys` command in the Doconce source you can insert verbatim block styles as defined in your `.ptex2tex.cfg` file, e.g., `!bc sys cod` for a code snippet, where `cod` is set to a certain environment in `.ptex2tex.cfg` (e.g., `CodeIntended`). There are over 30 styles to choose from.

*Step 3.* Compile `mydoc.tex` and create the PDF file:

```
Unix/DOS> latex mydoc
Unix/DOS> latex mydoc
Unix/DOS> makeindex mydoc # if index
Unix/DOS> bibitem mydoc   # if bibliography
Unix/DOS> latex mydoc
Unix/DOS> dvipdf mydoc
```

If one wishes to use the `Minted_Python`, `Minted_Cpp`, etc., environments in `ptex2tex` for typesetting code, the `minted LaTeX` package is needed. This package is included by running `doconce2format` with the `-DMINTED` option:

```
Unix/DOS> ptex2tex -DMINTED mydoc
```

In this case, `latex` must be run with the `-shell-escape` option:

```
Unix/DOS> latex -shell-escape mydoc
Unix/DOS> latex -shell-escape mydoc
Unix/DOS> makeindex mydoc # if index
Unix/DOS> bibitem mydoc   # if bibliography
Unix/DOS> latex -shell-escape mydoc
Unix/DOS> dvipdf mydoc
```

The `-shell-escape` option is required because the `minted.sty` style file runs the `pygments` program to format code, and this program cannot be run from `latex` without the `-shell-escape` option.

## 4.3 Plain ASCII Text

We can go from Doconce “back to” plain untagged text suitable for viewing in terminal windows, inclusion in email text, or for insertion in computer source code:

```
Unix/DOS> doconce2format plain mydoc.do.txt # results in mydoc.txt
```

## 4.4 reStructuredText

Going from Doconce to reStructuredText gives a lot of possibilities to go to other formats. First we filter the Doconce text to a reStructuredText file `mydoc.rst`:

```
Unix/DOS> doconce2format rst mydoc.do.txt
```

We may now produce various other formats:

```
Unix/DOS> rst2html.py mydoc.rst > mydoc.html # HTML
Unix/DOS> rst2latex.py mydoc.rst > mydoc.tex # LaTeX
Unix/DOS> rst2xml.py mydoc.rst > mydoc.xml # XML
Unix/DOS> rst2odt.py mydoc.rst > mydoc.odt # OpenOffice
```

The OpenOffice file `mydoc.odt` can be loaded into OpenOffice and saved in, among other things, the RTF format or the Microsoft Word format. That is, one can easily go from Doconce to Microsoft Word.

## 4.5 Sphinx

Sphinx documents can be created from a Doconce source in a few steps.

*Step 1.* Translate Doconce into the Sphinx dialect of the reStructuredText format:

```
Unix/DOS> doconce2format sphinx mydoc.do.txt
```

*Step 2.* Create a Sphinx root directory with a `conf.py` file, either manually or by using the interactive `sphinx-quickstart` program. Here is a scripted version of the steps with the latter:

```
mkdir sphinx-rootdir
sphinx-quickstart <<EOF
sphinx-rootdir
n
—
Name of My Sphinx Document
Author
version
version
.rst
index
n
Y
n
n
n
n
Y
n
```

```
n
Y
Y
Y
EOF
```

*Step 3.* Move the `tutorial.rst` file to the Sphinx root directory:

```
Unix/DOS> mv mydoc.rst sphinx-rootdir
```

If you have figures in your document, the relative paths to those will be invalid when you work with `mydoc.rst` in the `sphinx-rootdir` directory. Either edit `mydoc.rst` so that figure file paths are correct, or simply copy your figure directory to `sphinx-rootdir` (if all figures are located in a subdirectory).

*Step 4.* Edit the generated `index.rst` file so that `mydoc.rst` is included, i.e., add `mydoc` to the `toctree` section so that it becomes

```
.. toctree::
    :maxdepth: 2

    mydoc
```

(The spaces before `mydoc` are important!)

*Step 5.* Generate, for instance, an HTML version of the Sphinx source:

```
make clean    # remove old versions
make html
```

Many other formats are also possible.

*Step 6.* View the result:

```
Unix/DOS> firefox _build/html/index.html
```

Note that verbatim code blocks can be typeset in a variety of ways depending the argument that follows `!bc:` `cod` gives Python (code-block:: python in Sphinx syntax) and `cppcod` gives C++, but all such arguments can be customized both for Sphinx and LaTeX output.

## 4.6 Google Code Wiki

There are several different wiki dialects, but Doconce only support the one used by [Google Code](#). The transformation to this format, called `gwiki` to explicitly mark it as the Google Code dialect, is done by

```
Unix/DOS> doconce2format gwiki mydoc.do.txt
```

You can then open a new wiki page for your Google Code project, copy the `mydoc.gwiki` output file from `doconce2format` and paste the file contents into the wiki page. Press **Preview** or **Save Page** to see the formatted result.

When the Doconce file contains figures, each figure filename must be replaced by a URL where the figure is available. There are instructions in the file for doing this. Usually, one performs this substitution automatically (see next section).

## 4.7 Tweaking the Doconce Output

Occasionally, one would like to tweak the output in a certain format from Doconce. One example is figure filenames when transforming Doconce to reStructuredText. Since Doconce does not know if the `.rst` file is going to be filtered

to LaTeX or HTML, it cannot know if `.eps` or `.png` is the most appropriate image filename. The solution is to use a text substitution command or code with, e.g., `sed`, `perl`, `python`, or `scitools subst`, to automatically edit the output file from Doconce. It is then wise to run Doconce and the editing commands from a script to automate all steps in going from Doconce to the final format(s). The `make.sh` files in `docs/manual` and `docs/tutorial` constitute comprehensive examples on how such scripts can be made.

## 4.8 Demos

The current text is generated from a Doconce format stored in the file

```
docs/tutorial/tutorial.do.txt
```

The file `make.sh` in the `tutorial` directory of the Doconce source code contains a demo of how to produce a variety of formats. The source of this tutorial, `tutorial.do.txt` is the starting point. Running `make.sh` and studying the various generated files and comparing them with the original `tutorial.do.txt` file, gives a quick introduction to how Doconce is used in a real case. [Here](#) is a sample of how this tutorial looks in different formats.

There is another demo in the `docs/manual` directory which translates the more comprehensive documentation, `manual.do.txt`, to various formats. The `make.sh` script runs a set of translations.

## 4.9 Dependencies

Doconce depends on the Python package `preprocess`. To make LaTeX documents (without going through the reStructuredText format) you also need `ptex2tex` and some style files that `ptex2tex` potentially makes use of. Going from reStructuredText to formats such as XML, OpenOffice, HTML, and LaTeX requires `docutils`. Making Sphinx documents requires of course `sphinx`.



## **WARNING/DISCLAIMER**

Doconce can be viewed is a unified interface to a variety of typesetting formats. This interface is minimal in the sense that a lot of typesetting features are not supported, for example, footnotes and bibliography. For many documents the simple Doconce format is sufficient, while in other cases you need more sophisticated formats. Then you can just filter the Doconce text to a more appropriate format and continue working in this format only. For example, reStructuredText is a good alternative: it is more tagged than Doconce and cannot be filtered to plain, untagged text, or wiki, and the LaTeX output is not at all as clean, but it also has a lot more typesetting and tagging features than Doconce.





# INDICES AND TABLES

- *genindex*
- *modindex*
- *search*

”	tutorial.xml	”
	<pre> &lt;?xml version="1.0" encoding="utf-8"?&gt; &lt;!DOCTYPE document PUBLIC "-//IDN docutils.sourceforge.net//DTD Docutils Generic //EN//XML" "http://docutils.sourceforge.net/docs/ref/docutils.dtd"&gt; &lt;!-- Generated by Docutils 0.8 --&gt; &lt;document source="tutorial.rst"&gt;&lt;comment xml:space="preserve"&gt;Automatically gene rated reST file from Doconce source (http://code.google.com/p/doconce/)&lt;/comment&gt;&lt;section ids="doconce-document-once -include-anywhere" names="doconce:\ document\ once,\ include\ anywhere"&gt;&lt;title&gt;D oconce: Document Once, Include Anywhere&lt;/title&gt;&lt;field_list&gt;&lt;field&gt;&lt;field_name&gt;Au thor&lt;/field_name&gt;&lt;field_body&gt;&lt;paragraph&gt;Hans Petter Langtangen&lt;/paragraph&gt;&lt;/fiel d_body&gt;&lt;/field&gt;&lt;field&gt;&lt;field_name&gt;Date&lt;/field_name&gt;&lt;field_body&gt;&lt;paragraph&gt;Septem ber 10, 2010&lt;/paragraph&gt;&lt;bullet_list bullet="*"&gt;&lt;list_item&gt;&lt;paragraph&gt;When writi ng a note, report, manual, etc., do you find it difficult to choose the typesetting format? That is, to choose between plain (email-like) text, Wiki, Word/OpenOffice, LaTeX, HTML, reStructuredText, Sphinx, XML, etc. Would it be convenient to start with some very simple text-like format that easily converts to the formats listed above, and at some later stage eventually go with a particular format?&lt;/paragraph&gt;&lt;/list_item&gt;&lt;list_item&gt;&lt;paragraph&gt;Do you fi nd it problematic that you have the same information scattered around in different documents in different typesetting formats? Would it be a good idea to write things once, in one place, and include it anywhere?&lt;/paragraph&gt;&lt;/list_item&gt;&lt;/bullet_list&gt;&lt;/field_bod y&gt;&lt;/field&gt;&lt;/field_list&gt;&lt;paragraph&gt;If any of these questions are of interest, you should keep on reading.&lt;/paragraph&gt;&lt;/section&gt;&lt;section ids="the-doconce-concept" names="the\ doconce\ concept"&gt;&lt;title&gt;The Doconce Concept&lt;/title&gt;&lt;paragraph&gt;Doco nce is two things:&lt;/paragraph&gt;&lt;block_quote&gt;&lt;enumerated_list enumtype="arabic" pr efix="" suffix="."&gt;&lt;list_item&gt;&lt;paragraph&gt;Doconce is a working strategy for docum enting software in a single place and avoiding duplication of information. The slogan is: "Write once, include anywhere". This requires that what you write can be transformed to many different formats for a variety of documents (manuals, tutorials, books, doc strings, source code documentation, etc.).&lt;/paragraph&gt;&lt;/list_item&gt;&lt;list_item&gt;&lt;paragraph&gt;Doconce is a simple and minimally tagged markup language that can be used for the above purpose. That is, the Doconce format look like ordinary ASCII text (much like what you would use in an email), but the text can be transformed to numerous other formats, including HTML, Wiki, LaTeX, PDF, reStructuredText (reST), Sphinx, Epytext, and also plain text (where non-obvious formatting/tags are removed for clear reading in, e.g., emails). From reStructuredText you can go to XML, HTML, LaTeX, PDF, OpenOffice, and from the latter to RTF and MS Word.&lt;/paragraph&gt;&lt;/list_item&gt;&lt;/enumerated_list&gt;&lt;/block_quot e&gt;&lt;paragraph&gt;Doconce was particularly written for the following sample applicati ons:&lt;/paragraph&gt;&lt;block_quote&gt;&lt;bullet_list bullet="*"&gt;&lt;list_item&gt;&lt;paragraph&gt;Large books written in LaTeX, but where many pieces (computer demos, projects, examples) can be written in Doconce to appear in other contexts in other formats, including plain HTML, Sphinx, or MS Word.&lt;/paragraph&gt; &lt;/list_item&gt;&lt;list_item&gt;&lt;paragraph&gt;Software documentation, primarily Python doc s trings, which one wants to appear as plain untagged text for viewing in Pydoc, as reStructuredText for use with Sphinx, as wiki text when publishing the software at googlecode.com, and as LaTeX integrated in, e.g., a master's thesis.&lt;/paragraph&gt; &lt;/list_item&gt;&lt;list_item&gt;&lt;paragraph&gt;Quick memos, which start as plain text in emai l, then some small amount of Doconce tagging is added, before the memos can appear as MS Word documents or in wikis.&lt;/paragraph&gt;&lt;/list_item&gt;&lt;/bullet_list&gt;&lt;/block_quot e&gt;&lt;/section&gt;&lt;section ids="what-does-doconce-look-like" names="what\ does\ doconc e\ look\ like?"&gt;&lt;title&gt;What Does Doconce Look Like?&lt;/title&gt;&lt;paragraph&gt;Doconce te </pre>	

## tutorial.xml

xt looks like ordinary text, but there are some almost invisible text constructions that allow you to control the formatting. For example,

```
<block_quote><bullet_list bullet="*"><list_item><paragraph>bullet lists arise from lines starting with an asterisk,</paragraph></list_item><list_item><paragraph><emphasis>emphasized words</emphasis> are surrounded by asterisks,</paragraph></list_item><list_item><paragraph><strong>words in boldface</strong> are surrounded by underscores,</paragraph></list_item><list_item><paragraph>words from computer code are enclosed in back quotes and then typeset verbatim,</paragraph></list_item><list_item><paragraph>blocks of computer code can easily be included, also from source files,</paragraph></list_item><list_item><paragraph>blocks of LaTeX mathematics can easily be included,</paragraph></list_item><list_item><paragraph>there is support for both LaTeX and text-like inline mathematics,</paragraph></list_item><list_item><paragraph>figures with captions, URLs with links, labels and references are supported,</paragraph></list_item><list_item><paragraph>comments can be inserted throughout the text,</paragraph></list_item><list_item><paragraph>a preprocessor (much like the C preprocessor) is integrated so other documents (files) can be included and large portions of text can be defined in or out of the text.</paragraph></list_item></bullet_list></block_quote><paragraph>Here is an example of some simple text written in the Doconce format:</paragraph><literal_block xml:space="preserve">==== A Subsection with Sample Text =====
label{my:first:sec}
```

Ordinary text looks like ordinary text, and the tags used for `_boldface_` words, `*emphasized*` words, and `'computer'` words look natural in plain text. Lists are typeset as you would do in an email,

```
* item 1
* item 2
* item 3
```

Lists can also have automatically numbered items instead of bullets,

```
o item 1
o item 2
o item 3
```

URLs with a link word are possible, as in `http://folk.uio.no/hpl<hpl>`. Just a file link goes like `URL:&quot;tutorial.do.txt&quot;`. References to sections may use logical names as labels (e.g., a `&quot;label&quot;` command right after the section title), as in the reference to `Chapter ref{my:first:sec}`. Doconce also allows inline comments such as `[hpl: here I will make some remarks to the text]` for allowing authors to make notes. Inline comments can be removed from the output by a command-line argument (see `Chapter ref{doconce2formats}` for an example).

Tables are also supported, e.g.,

time	velocity	acceleration
0.0	1.4186	-5.01
2.0	1.376512	11.919
4.0	1.1E+1	14.717624

# lines beginning with # are comment lines</literal\_block><paragraph>The Doconce

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text above results in the following little document:

```
<target refid="my-first-sec"/><section ids="a-subsection-with-sample-text my-first-sec" names="a\ subsection\ with\ sample\ text my:first:sec"><title>A Subsection with Sample Text</title><paragraph>Ordinary text looks like ordinary text, and the tags used for
<strong>boldface</strong> words, <emphasis>emphasized</emphasis> words, and <literal>computer</literal> words look
natural in plain text. Lists are typeset as you would do in an email,</paragrap
h><block_quote><bullet_list bullet="*"><list_item><paragraph>item 1</paragraph><
/list_item><list_item><paragraph>item 2</paragraph></list_item><list_item><parag
raph>item 3</paragraph></list_item></bullet_list></block_quote><paragraph>Lists
can also have numbered items instead of bullets, just use an <literal>o</literal>
(for ordered) instead of the asterisk:</paragraph><block_quote><enumerated_list
enumtype="arabic" prefix="" suffix="."><list_item><paragraph>item 1</paragraph><
/list_item><list_item><paragraph>item 2</paragraph></list_item><list_item><parag
raph>item 3</paragraph></list_item></enumerated_list></block_quote><paragraph>UR
Ls with a link word are possible, as in <reference name="hpl" refuri="http://fol
k.uio.no/hpl">hpl</reference><target ids="hpl" names="hpl" refuri="http://folk.u
io.no/hpl"/>.
Just a file link goes like <reference name="tutorial.do.txt" refuri="tutorial.do
.txt">tutorial.do.txt</reference><target ids="tutorial-do-txt" names="tutorial.d
o.txt" refuri="tutorial.do.txt"/>. References
to sections may use logical names as labels (e.g., a &quot;label&quot; command r
ight
after the section title), as in the reference to
the chapter <reference name="A Subsection with Sample Text" refid="a-subsection-
with-sample-text">A Subsection with Sample Text</reference>.</paragraph><paragra
ph>Tables are also supported, e.g.,</paragraph><table><tgroup cols="3"><colspec
colwidth="12"/><colspec colwidth="12"/><colspec colwidth="12"/><thead><row><entr
y><paragraph>time</paragraph></entry><entry><paragraph>velocity</paragraph></ent
ry><entry><paragraph>acceleration</paragraph></entry></row></thead><tbody><row><
entry><paragraph>0.0</paragraph></entry><entry><paragraph>1.4186</paragraph></en
try><entry><paragraph>-5.01</paragraph></entry></row><row><entry><paragraph>2.0<
/paragraph></entry><entry><paragraph>1.376512</paragraph></entry><entry><paragra
ph>11.919</paragraph></entry></row><row><entry><paragraph>4.0</paragraph></entry>
<entry><paragraph>1.1E+1</paragraph></entry><entry><paragraph>14.717624</paragr
aph></entry></row></tbody></tgroup></table></section><section ids="mathematics-a
nd-computer-code" names="mathematics\ and\ computer\ code"><title>Mathematics an
d Computer Code</title><paragraph>Inline mathematics, such as  $v = \sin(x)$ ,
allows the formula to be specified both as LaTeX and as plain text.
This results in a professional LaTeX typesetting, but in other formats
the text version normally looks better than raw LaTeX mathematics with
backslashes. An inline formula like  $v = \sin(x)$  is
typeset as:</paragraph><literal_block xml:space="preserve">\nu = \sin(x)$| $v =
\sin(x)$</literal_block><paragraph>The pipe symbol acts as a delimiter between La
TeX code and the plain text
version of the formula.</paragraph><paragraph>Blocks of mathematics are better t
ypeset with raw LaTeX, inside
<literal>!bt</literal> and <literal>!et</literal> (begin tex / end tex) instruct
ions.
The result looks like this:</paragraph><literal_block xml:space="preserve">\begi
n{eqnarray}
{\partial u\over\partial t} \&=\& \nabla^2 u + f,\label{myeq1}\\
{\partial v\over\partial t} \&=\& \nabla\cdot(q(u)\nabla v) + g
\end{eqnarray}</literal_block><paragraph>Of course, such blocks only looks nice
in LaTeX. The raw
LaTeX syntax appears in all other formats (but can still be useful
for those who can read LaTeX syntax).</paragraph><paragraph>You can have blocks
```

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of computer code, starting and ending with `<literal>!bc</literal>` and `<literal>!ec</literal>` instructions, respectively. Such blocks look like:

```
<literal_block xml:space="preserve">from math import sin, pi
def myfunc(x):
    return sin(pi*x)

import integrate
I = integrate.trapezoidal(myfunc, 0, pi, 100)</literal_block>
```

It is possible to add a specification of a (ptex2tex-style) environment for typesetting the verbatim code block, e.g., `<literal>!bc xxx</literal>` where `<literal>xxx</literal>` is an identifier like `<literal>pycod</literal>` for code snippet in Python, `<literal>sys</literal>` for terminal session, etc. When Doconce is filtered to LaTeX, these identifiers are used as in ptex2tex and defined in a configuration file `<literal>.ptex2tex.cfg</literal>`, while when filtering to Sphinx, one can have a comment line in the Doconce file for mapping the identifiers to legal language names for Sphinx (which equals the legal language names for Pygments):

```
<literal_block xml:space="preserve"># sphinx code-blocks: pycod=python cod=py cppcod=c++ sys=console</literal_block>
```

By default, `<literal>pro</literal>` and `<literal>cod</literal>` are `<literal>python</literal>`, `<literal>sys</literal>` is `<literal>console</literal>`, while `<literal>xpro</literal>` and `<literal>xcod</literal>` are computer language specific for `<literal>x</literal>` in `<literal>f</literal>` (Fortran), `<literal>c</literal>` (C), `<literal>cpp</literal>` (C++), and `<literal>py</literal>` (Python). .. `<literal>rb</literal>` (Ruby), `<literal>pl</literal>` (Perl), and `<literal>sh</literal>` (Unix shell).

(Any sphinx code-block comment, whether inside verbatim code blocks or outside, yields a mapping between bc arguments and computer languages. In case of multiple definitions, the first one is used.)

One can also copy computer code directly from files, either the complete file or specified parts. Computer code is then never duplicated in the documentation (important for the principle of avoiding copying information!). A complete file is typeset with `<literal>!bc pro</literal>`, while a part of a file is copied into a `<literal>!bc cod</literal>` environment. What `<literal>pro</literal>` and `<literal>cod</literal>` mean is then defined through a `<literal>.ptex2tex.cfg</literal>` file for LaTeX and a `<literal>sphinx code-blocks</literal>` comment for Sphinx.

Another document can be included by writing `<literal>#include "mynote.do.txt"</literal>` on a line starting with (another) hash sign. Doconce documents have extension `<literal>do.txt</literal>`. The `<literal>do</literal>` part stands for doconce, while the trailing `<literal>.txt</literal>` denotes a text document so that editors gives you the right writing environment for plain text.

## Macros (Newcommands), Cross-References, Index, and Bibliography

Doconce supports a type of macros via a LaTeX-style `<em>newcommand</em>` construction. The newcommands defined in a file with name

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`<literal>newcommand_replace.tex</literal>` are expanded when Doconce is filtered to other formats, except for LaTeX (since LaTeX performs the expansion itself). Newcommands in files with names `<literal>newcommands.tex</literal>` and `<literal>newcommands_keep.tex</literal>` are kept unaltered when Doconce text is filtered to other formats, except for the Sphinx format. Since Sphinx understands LaTeX math, but not newcommands if the Sphinx output is HTML, it makes most sense to expand all newcommands. Normally, a user will put all newcommands that appear in math blocks surrounded by `<literal>!bt</literal>` and `<literal>!et</literal>` in `<literal>newcommands_keep.tex</literal>` to keep them unchanged, at least if they contribute to make the raw LaTeX math text easier to read in the formats that cannot render LaTeX. Newcommands used elsewhere throughout the text will usually be placed in `<literal>newcommands_replace.tex</literal>` and expanded by Doconce. The definitions of newcommands in the `<literal>newcommands*.tex</literal>` files **must** appear on a single line (multi-line newcommands are too hard to parse with regular expressions).

Recent versions of Doconce also offer cross referencing, typically one can define labels below (sub)sections, in figure captions, or in equations, and then refer to these later. Entries in an index can be defined and result in an index at the end for the LaTeX and Sphinx formats. Citations to literature, with an accompanying bibliography in a file, are also supported. The syntax of labels, references, citations, and the bibliography closely resembles that of LaTeX, making it easy for Doconce documents to be integrated in LaTeX projects (manuals, books). For further details on functionality and syntax we refer to the `<literal>docs/manual/manual.do.txt</literal>` file (see the

```
<reference name="demo page" refuri="https://doconce.googlecode.com/hg/trunk/docs/demos/manual/index.html">demo
page</reference><target ids="demo-page" names="demo\ page" refuri="https://doconce.googlecode.com/hg/trunk/docs/demos/manual/index.html"/> for various formats of this document).</paragraph><comment xml:space="preserve">Example on including another Doconce file:</comment><target refid="doconce2formats"/></section></section><section ids="from-doconce-to-other-formats doconce2formats" names="from\ doconce\ to\ other\ formats doconce2formats"><title>From Doconce to Other Formats</title><paragraph>Transformation of a Doconce document to various other formats applies the script <literal>doconce2format</literal>:</paragraph><literal_block xml:space="preserve">Unix/DOS&gt; doconce2format format mydoc.do.txt</literal_block><paragraph>The <literal>preprocess</literal> program is always used to preprocess the file first, and options to <literal>preprocess</literal> can be added after the filename. For example:</paragraph><literal_block xml:space="preserve">Unix/DOS&gt; doconce2format LaTeX mydoc.do.txt -Dextra_sections</literal_block><paragraph>The variable <literal>FORMAT</literal> is always defined as the current format when running <literal>preprocess</literal>. That is, in the last example, <literal>FORMAT</literal> is defined as <literal>LaTeX</literal>. Inside the Doconce document one can then perform format specific actions through tests like <literal>#if FORMAT == &quot;LaTeX&quot;</literal>.</paragraph><paragraph>Inline comments in the text are removed from the output by:</paragraph><literal_block xml:space="preserve">Unix/DOS&gt; doconce2format LaTeX mydoc.do.txt remove_inline_comments</literal_block><paragraph>One can also remove such comments from the original Doconce file by running a helper script in the <literal>bin</literal> folder of the Doconce source code:</paragraph><literal_block xml:space="preserve">Unix/DOS&gt; doconce
```

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```

_remove_inline_comments.py mydoc.do.txt</literal_block><paragraph>This action is
convenient when a Doconce document reaches its final form.</paragraph><section
ids="html" names="html"><title>HTML</title><paragraph>Making an HTML version of
a Doconce file <literal>mydoc.do.txt</literal>
is performed by:</paragraph><literal_block xml:space="preserve">Unix/DOS> doc
once2format HTML mydoc.do.txt</literal_block><paragraph>The resulting file <lite
ral>mydoc.html</literal> can be loaded into any web browser for viewing.</paragr
aph></section><section ids="latex" names="latex"><title>LaTeX</title><paragraph>
Making a LaTeX file <literal>mydoc.tex</literal> from <literal>mydoc.do.txt</lit
eral> is done in two steps:
.. Note: putting code blocks inside a list is not successful in many
.. formats - the text may be messed up. A better choice is a paragraph
.. environment, as used here.</paragraph><definition_list><definition_list_item>
<term><emphasis>Step 1.</emphasis> Filter the doconce text to a pre-LaTeX form <
literal>mydoc.p.tex</literal> for</term><definition><paragraph><literal>ptex2tex
</literal>:</paragraph><literal_block xml:space="preserve">Unix/DOS> doconce2
format LaTeX mydoc.do.txt</literal_block></definition></definition_list_item></d
efinition_list><paragraph>LaTeX-specific commands (&quot;newcommands&quot;) in m
ath formulas and similar
can be placed in files <literal>newcommands.tex</literal>, <literal>newcommands_
keep.tex</literal>, or
<literal>newcommands_replace.tex</literal> (see the section <reference name="Mac
ros (Newcommands), Cross-References, Index, and Bibliography" refid="macros-newc
ommands-cross-references-index-and-bibliography">Macros (Newcommands), Cross-Ref
erences, Index, and Bibliography</reference>).
If these files are present, they are included in the LaTeX document
so that your commands are defined.</paragraph><paragraph><emphasis>Step 2.</emph
asis> Run <literal>ptex2tex</literal> (if you have it) to make a standard LaTeX
file:</paragraph><literal_block xml:space="preserve">Unix/DOS> ptex2tex mydoc
</literal_block><paragraph>or just perform a plain copy:</paragraph><literal_blo
ck xml:space="preserve">Unix/DOS> cp mydoc.p.tex mydoc.tex</literal_block><pa
ragraph>Doconce generates a <literal>.p.tex</literal> file with some preprocesso
r macros.
For example, to enable font Helvetica instead of the standard
Computer Modern font:</paragraph><literal_block xml:space="preserve">Unix/DOS>
; ptex2tex -DHELVETICA mydoc</literal_block><paragraph>The title, authors, and d
ate are by default typeset in a non-standard
way to enable a nicer treatment of multiple authors having
institutions in common. The standard LaTeX &quot;maketitle&quot; heading
is also available through:</paragraph><literal_block xml:space="preserve">Unix/D
OS> ptex2tex -DTRAD_LATEX_HEADING mydoc</literal_block><paragraph>The <litera
l>ptex2tex</literal> tool makes it possible to easily switch between many
different fancy formattings of computer or verbatim code in LaTeX
documents. After any <literal>!bc sys</literal> command in the Doconce source yo
u can
insert verbatim block styles as defined in your <literal>.ptex2tex.cfg</literal>
file, e.g., <literal>!bc sys cod</literal> for a code snippet, where <literal>co
d</literal> is set to
a certain environment in <literal>.ptex2tex.cfg</literal> (e.g., <literal>CodeIn
tended</literal>).
There are over 30 styles to choose from.</paragraph><paragraph><emphasis>Step 3.
</emphasis> Compile <literal>mydoc.tex</literal>
and create the PDF file:</paragraph><literal_block xml:space="preserve">Unix/DOS
> latex mydoc
Unix/DOS> latex mydoc
Unix/DOS> makeindex mydoc      # if index
Unix/DOS> bibitem mydoc       # if bibliography
Unix/DOS> latex mydoc
Unix/DOS> dvipdf mydoc</literal_block><paragraph>If one wishes to use the <li

```



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teral>Minted\_Python</literal>, <literal>Minted\_Cpp</literal>, etc., environments in <literal>ptex2tex</literal> for typesetting code, the <literal>minted</literal> LaTeX package is needed.

This package is included by running <literal>doconce2format</literal> with the <literal>-DMINTED</literal> option:

Unix/DOS> ptex2tex -DMINTED mydoc

In this case, <literal>latex</literal> must be run with the

<literal>-shell-escape</literal> option:

Unix/DOS> latex -shell-escape mydoc

Unix/DOS> latex -shell-escape mydoc

Unix/DOS> makeindex mydoc # if index

Unix/DOS> bibitem mydoc # if bibliography

Unix/DOS> latex -shell-escape mydoc

Unix/DOS> dvipdf mydoc

The <literal>-shell-escape</literal> option is required because the <literal>minted.sty</literal> style file runs the <literal>pygments</literal> program to format code, and this program

cannot be run from <literal>latex</literal> without the <literal>-shell-escape</literal> option.

We can go from Doconce

"back to" plain untagged text suitable for viewing

in terminal windows, inclusion in email text, or for insertion in

computer source code:

Unix/DOS> doconce2format plain mydoc.do.txt # results in mydoc.txt

reStructureText

Going from Doconce to reStructureText gives a lot of possibilities to

go to other formats. First we filter the Doconce text to a

reStructureText file <literal>mydoc.rst</literal>:

Unix/DOS> doconce2format rst mydoc.do.txt

We may now produce various other formats:

Unix/DOS> rst2html.py mydoc.rst > mydoc.html # HTML

Unix/DOS> rst2latex.py mydoc.rst > mydoc.tex # LaTeX

Unix/DOS> rst2xml.py mydoc.rst > mydoc.xml # XML

Unix/DOS> rst2odt.py mydoc.rst > mydoc.odt # OpenOffice

The OpenOffice file <literal>mydoc.odt</literal> can be loaded into OpenOffice and

saved in, among other things, the RTF format or the Microsoft Word format.

That is, one can easily go from Doconce to Microsoft Word.

Sphinx documents can be created from a Doconce source in a few steps.

Step 1. Translate Doconce into the Sphinx dialect of

the reStructureText format:

Unix/DOS> doconce2format sphinx mydoc.do.txt

Step 2. Create a Sphinx root directory with a <literal>conf.py</literal> file,

either manually or by using the interactive <literal>sphinx-quickstart</literal>

program. Here is a scripted version of the steps with the latter:

mkdir sphinx-rootdir

sphinx-quickstart

sphinx-rootdir

n

—

Name of My Sphinx Document

Author

version

version

.rst

index

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```

n
y
n
n
n
n
y
n
n
y
y
y
EOF</literal_block><paragraph><emphasis>Step 3.</emphasis> Move the <literal>tutorial.rst</literal> file to the Sphinx root directory:</paragraph><literal_block
xml:space="preserve">Unix/DOS> mv mydoc.rst sphinx-rootdir</literal_block><para
graph>If you have figures in your document, the relative paths to those will
be invalid when you work with <literal>mydoc.rst</literal> in the <literal>sphinx-rootdir</literal>
directory. Either edit <literal>mydoc.rst</literal> so that figure file paths are
correct,
or simply copy your figure directory to <literal>sphinx-rootdir</literal> (if all
figures
are located in a subdirectory).</paragraph><paragraph><emphasis>Step 4.</emphasi
s> Edit the generated <literal>index.rst</literal> file so that <literal>mydoc.r
st</literal>
is included, i.e., add <literal>mydoc</literal> to the <literal>toctree</literal>
> section so that it becomes:</paragraph><literal_block xml:space="preserve">..
toctree::
    :maxdepth: 2

    mydoc</literal_block><paragraph>(The spaces before <literal>mydoc</literal> are
important!)</paragraph><paragraph><emphasis>Step 5.</emphasis> Generate, for
instance, an HTML version of the Sphinx source:</paragraph><literal_block xml:sp
ace="preserve">make clean    # remove old versions
make html</literal_block><paragraph>Many other formats are also possible.</parag
raph><paragraph><emphasis>Step 6.</emphasis> View the result:</paragraph><litera
l_block xml:space="preserve">Unix/DOS> firefox _build/html/index.html</litera
l_block><paragraph>Note that verbatim code blocks can be typeset in a variety of
ways
depending on the argument that follows <literal>!bc</literal>: <literal>cod</litera
l> gives Python
(<literal>code-block:: python</literal> in Sphinx syntax) and <literal>cppcod</l
iteral> gives C++, but
all such arguments can be customized both for Sphinx and LaTeX output.</paragrap
h><comment xml:space="preserve">Desired extension: sphinx can utilize a &quot;py
cod&quot; or &quot;c++cod&quot;</comment><comment xml:space="preserve">instructi
on as currently done in latex for ptex2tex and write</comment><comment xml:space
="preserve">out the right code block name accordingly.</comment></section><secti
on ids="google-code-wiki" names="google\ code\ wiki"><title>Google Code Wiki</ti
tle><paragraph>There are several different wiki dialects, but Doconce only suppo
rt the
one used by <reference name="Google Code" refuri="http://code.google.com/p/suppo
rt/wiki/WikiSyntax">Google Code</reference><target ids="google-code" names="goog
le\ code" refuri="http://code.google.com/p/support/wiki/WikiSyntax"/>.
The transformation to this format, called <literal>gwiki</literal> to explicitly
mark
it as the Google Code dialect, is done by:</paragraph><literal_block xml:space="
preserve">Unix/DOS> doconce2format gwiki mydoc.do.txt</literal_block><paragra
ph>You can then open a new wiki page for your Google Code project, copy

```

**tutorial.xml**

the `<literal>mydoc.gwiki</literal>` output file from `<literal>doconce2format</literal>` and paste the file contents into the wiki page. Press `<strong>Preview</strong>` or `<strong>Save Page</strong>` to see the formatted result.

When the Doconce file contains figures, each figure filename must be replaced by a URL where the figure is available. There are instructions in the file for doing this. Usually, one performs this substitution automatically (see next section).

### Tweaking the Doconce Output

Occasionally, one would like to tweak the output in a certain format from Doconce. One example is figure filenames when transforming Doconce to reStructuredText. Since Doconce does not know if the `<literal>.rst</literal>` file is going to be filtered to LaTeX or HTML, it cannot know if `<literal>.eps</literal>` or `<literal>.png</literal>` is the most appropriate image filename. The solution is to use a text substitution command or code with, e.g., sed, perl, python, or scitools subst, to automatically edit the output file from Doconce. It is then wise to run Doconce and the editing commands from a script to automate all steps in going from Doconce to the final format(s). The `<literal>make.sh</literal>` files in `<literal>docs/manual</literal>` and `<literal>docs/tutorial</literal>` constitute comprehensive examples on how such scripts can be made.

### Demos

The current text is generated from a Doconce format stored in the file: `<literal_block xml:space="preserve">docs/tutorial/tutorial.do.txt</literal_block>`

The file `<literal>make.sh</literal>` in the `<literal>tutorial</literal>` directory of the Doconce source code contains a demo of how to produce a variety of formats. The source of this tutorial, `<literal>tutorial.do.txt</literal>` is the starting point. Running `<literal>make.sh</literal>` and studying the various generated files and comparing them with the original `<literal>tutorial.do.txt</literal>` file, gives a quick introduction to how Doconce is used in a real case.

[Here](https://doconce.googlecode.com/hg/trunk/docs/demos/tutorial/index.html) is a sample of how this tutorial looks in different formats.

There is another demo in the `<literal>docs/manual</literal>` directory which translates the more comprehensive documentation, `<literal>manual.do.txt</literal>`, to various formats. The `<literal>make.sh</literal>` script runs a set of translation s.

### Dependencies

Doconce depends on the Python package [preprocess](http://code.google.com/p/preprocess/) and [ptex2tex](http://code.google.com/p/ptex2tex/) and some style files that ptex2tex potentially makes use of. Going from reStructuredText to formats such as XML, OpenOffice, HTML, and LaTeX requires [docutils](http://docutils.sourceforge.net/). Making Sphinx documents

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**tutorial.xml**

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requires of course <reference name="sphinx" refuri="http://sphinx.pocoo.org">sphinx</reference><target ids="idl" names="sphinx" refuri="http://sphinx.pocoo.org"/>.</paragraph></section></section><section ids="warning-disclaimer" names="warning/disclaimer"><title>Warning/Disclaimer</title><paragraph>Doconce can be viewed is a unified interface to a variety of typesetting formats. This interface is minimal in the sense that a lot of typesetting features are not supported, for example, footnotes and bibliography. For many documents the simple Doconce format is sufficient, while in other cases you need more sophisticated formats. Then you can just filter the Doconce text to a more appropriate format and continue working in this format only. For example, reStructuredText is a good alternative: it is more tagged than Doconce and cannot be filtered to plain, untagged text, or wiki, and the LaTeX output is not at all as clean, but it also has a lot more typesetting and tagging features than Doconce.</paragraph></section></document>
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