Kinx TT - Kinx Tiny Typesetting

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Abstract

This system is a small typesetting system written in Kinx. Most of people knows the LaTeX[1] is being used for that purpose, but the TeX[2] system is very huge. This system provides only a limited functionality, but supports some of TeX algorithms in this small system. This would be your best partner as long as used for your personal use.

Note that this document describes just a feature but less technical information. Please wait for the technical document, and I will prepare that as soon as possible.

Contents

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[1] Leslie Lamport, https://en.wikipedia.org/wiki/LaTeX
[2] Donald E. Knuth, https://en.wikipedia.org/wiki/TeX

List of Figures

List of Tables

1 Overview

1.1 Goals

The goal of the Kinx Tiny Typesetting is as follows.

・Keeping it small.
・Pretty beautiful.
・Direct output to PDF.

Kinx TT has supported some kind of TEX algorithms, so the final output would be pretty beautiful. You can check it yourself as this document was generated by this system. On the other hand, there are some known bad points below as a trade off.

・Needs a performance improvement.
・Prvides only a limited functionality.

1.2 Features Overview

This system supports following features.

1. Hyphenation & Knuth-Plass Line Breaking Algorithm, and also for some Japanese rules.
2. Widows & Orphans penalty control.
3. Listing items with a bullet or numbering.
4. Math formula & equation like TEX.
5. Tables. The header of table is automatically repeated each page.
6. Images. It can be also put with floating inside paragraph.
7. Colors. CMYK, RGB, and a lot of color names are supported.
8. Writing a program source code.
9. Cross-reference like **Reference to the section 2.5 Table** in the page 3.
10. Autimatic URL hyperlink like https://en.wikipedia.org/wiki/TeX, or link text like TEX.
11. Footnotes[3].
12. Japanese Ruby. 日本語, or 日本語 to be separated for each character.

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[3] This is a footnote example.

2   Features Details

2.1   Hyphenation & Line Breaking

The figure on the right[4] is an example of hyphenation and justification. Hyphenation will be done before applying line-breaking algorithm. The algorithm is based on `Hyper.js`, and it relies on the hyphenation algorithm by Franklin M. Liang commonly known from LaTeX.

And also, this system is supporting **Knuth-Plass Line Breaking Algorithm** for line-break. This is well known algorithm because the TEX uses it. These algorithms are known as the best way so far for a typesetting system.

Kinx TT is also supporting some Japanese hyphenation rules. For example, 「。」, which is like a period in English, is never appeared at the head of line.

Fig 2.1 Hyphenation and justification

2.2   Widows & Orphans

Widows and orphans control is not perfect so far. But normally it is available for a section and a paragraph. Unfortunately it is not available for listing items, images, and so on. Please check it and you can use `\columnbreak` command anywhere you need.

2.3   List Items

You can use an **itemize** and an **enumerate** listing items as follows.

Here is an example of 'itemize'.

- Item level 1-1
- Item level 1-2
  - Item level 2-1
  - Item level 2-2
  - Item level 2-3
    - Item level 3-1
    - Item level 3-2
      * Item level 4-1
      * Item level 4-2

Here is an example of 'enumerate'.

1. Item level 1-1
2. Item level 1-2
   (a) Item level 2-1
   (b) Item level 2-2
   (c) Item level 2-3
       i. Item level 3-1
       ii. Item level 3-2
           A. Item level 4-1
           B. Item level 4-2

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[4] This is also the example of a floating image.

2.4 Math Formula and Equation

Here is an example of Math formula and equation. You will think as if it is LaTeX output. Yes, you are quite right because this is came from TeX output, but it is never using a huge TeX system. Instead, it is using an output of KaTeX, which is included in this system.

$$E = mc^2 \tag{1}$$

$$m = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}} \tag{2}$$

$$\int_{-\infty}^{\infty} f(x)dx = \sqrt{\pi} \tag{3}$$

If you want to write a math formula inline, use `$...$` style directly in paragraph. For example, $E = mc^2$ is written as `$E = mc^2$`, and another example is $\int_{-\infty}^{\infty} f(x)dx = \sqrt{\pi}$ same as (3). As KaTeX does not support `\label` command, the label is being provided by Kinx TT. Therefore note that you need to control it by yourself a little.

If you want to use just "$" in paragraph, use $ with \ as \$.

And also you can use `\displaystyle` keyword. The Math formula can be directly put inside paragraph like $\displaystyle\int_{-\infty}^{\infty} f(x)dx = \sqrt{\pi}$, by `$\displaystyle\int_{-\infty}^{\infty} f(x) dx = \sqrt{\pi}$`.

2.5 Table

Here is an example of table. The ruled line can be selected from no line, a single line, or a double line. And you can set an alignment each column. Besides, the column width is also automatically calculated according to inside text size.

By the way, you can write also a Math formula inside a table cell.

Table 2.1 Table Example Crossing The Page

Left	Center	Right
A1	Aligned to the center[5].	C1
A2	$\int_{-\infty}^{\infty} f(x)dx = \sqrt{\pi}$	Aligned to the right.
A3	Aligned to the center.	On the right.
A4	Aligned to the center.	On the right.

[5] This is a footnote in table.

Left	Center	Right
A5	Aligned to the center.	On the right.
A6	Aligned to the center.	On the right.
A7	Aligned to the center.	On the right.

The table header can be automatically repeated each page.

Tables can be put on a line by using multiple columns. Here is an example of 2 tables in a line. Note that the width will be becoming narrow in this case, and also you should control to break a page yourself if crossing pages.

#	Outline
1	Something
2	Something

#	Overview
1	Something
2	Something
3	$\int_{-\infty}^{\infty} f(x)dx = \sqrt{\pi}$ is an example of Math formula in the table.

2.6 Image

2.6.1 Floating Image

Images can be put around a text, or put on a line as a standalone.

Fig 2.2 Barcode Icon

The first example is for a floating image put around a text. The image on the left, which is a barcode icon example, is wrapped inside text.

And also, the text around a floating image can be separated by multiple paragraphs like this. The line-break algorithm is correctly performed for a different width per line. By this mechanism, the text will wrap around a floating image and you can do it with only writing a paragraph as usual. You will be able to see this line is put under the image automatically.

By the way, the scale for a floating image means the parcentage for the actual image size. Note that it is different from a scale for a non-floating image.

You can also put a reference to an image like Fig 2.1 Hyphenation and justification.

2.6.2   Standalone Image

This is an example of an image scaled at 75%, and the image is put with a caption. This scale for a non-floating image means a parcentage for the area within the margins.

Fig 2.3 Figure Example - Kinx Logo Image

This is an example of an image scaled at 40%.

As you see the example above, the image can be directly put into a paragraph. Note that you can not float an image in this way, and you have to use `\floatimage` command instead.

If you want to multiple images in a line, please see below.

You will see 3 images in a line.

2.7   Colors

Changing a text color is supported by the command of `\color`. You can specify the color by the name like red, or CMYK/RGB values directly. For example, please see below.

1. **Red**. This line should be colored by the name of [red].
2. **Green**. This line should be colored by the name of [green].
3. **Blue**. This line should be colored by the name of [blue].
4. **Cyan**. This line should be colored by the name of [cyan1].
5. **Magenta**. This line should be colored by the name of [magenta1].
6. **Yellow**. This line should be colored by the name of [yellow].
7. **CMYK**. This line should be colored by CMYK value of [C=0.5,M=0.8,Y:0.2,K=0.0].

2.8   Program Code

Here is an example of a source code. This code is a simple Kinx code of fibonacci function. The code is vary basic and it is often used for a benchmark.

```
1  function fib(n) {
2      if (n < 3) return n;
3      return fib(n-2) + fib(n-1);
4  }
5
6  native nfib(n) {
7      if (n < 3) return n;
8      return nfib(n-2) + nfib(n-1);
9  }
10
11 var tmr = new SystemTimer();
12 var r = fib(34);
13 var e = tmr.elapsed();
14 System.println("fib(34) = %8d, Normal Function: elapsed: %f" % r % e);
15
16 tmr.restart();
17 r = nfib(34);
18 e = tmr.elapsed();
19 System.println("fib(34) = %8d, Native Function: elapsed: %f" % r % e);
20
21 # fib(34) =  9227465, Normal Function: elapsed: 0.590539
22 # fib(34) =  9227465, Native Function: elapsed: 0.052000
```

This example is also an example of `native` Keyword in Kinx. The `native` Keyword means the function is directly assembled to x64 machine code, so the performance is very fast. In the above example, the native function is 10 times faster than the normal function.

The code can be also shown with a line number and a box around the code. There are some box line types you can select as follows.

Table 2.2 The Box Line Type

Type	Meaning
Typesetting.BOX_NORMAL	Normal line, by default.
Typesetting.BOX_THIN	Thin line.
Typesetting.BOX_THICK	Thick line.
Typesetting.BOX_SHADOW	The shadow box. This is used the example above.

2.9   Cross Reference

Cross references are supported with \label. The reference will be applied by \ref, \pageref, \textref, and \nameref. \ref means just a number. \pageref means a page number. \textref means a text only. \nameref means a number and a text.

For example, write "\nameref{Sec:Table} in the page \pageref{Sec:Table}", and "2.5 Table in the page 3" will appear.

2.10   Links

Writing just a URL like https://github.com/Kray-G/kinx, it will become a hyperlink automatically. If you want to write a link text instead of directly hyperlink URL, you can use \url command for that. For example, \url[https://github.com/Kray-G/kinx]{Kray-G/kinx} will be Kray-G/kinx with a hyperlink to the web site of https://github.com/Kray-G/kinx.

2.11   Footnotes

You can use **footnote** for some additional explanation of the sentence. For example, this is a main sentence[6] and footnote will appear at the bottom of the page.

2.12   Japanese Ruby

This is an requirement only for Japanese. In Japanese, there is a writing style called "Ruby" which is the style of a small text written on a main sentence to inform how to read a main sentence of Kanji. For example, 「この本はとても面白いです。」, which means that "this book is very interesting". In general, so young children can not read Kanji like 本, so ruby is used like 本 for their children.

Kinx TT provides 2 types of ruby. One of those is like 「素敵」. In this case, the ruby is for total words. Another one is like 「素敵」. In this case, the ruby is for each character one by one.

By the way, 「素敵」 means "wonderful" in Japanese.

As another example, the long ruby like 「狼」 is okay. In an opposite way, the short ruby like 「無花果」 is also okay. You can also use English as a ruby such as 「個人化」, or 「personalization」.

Anyway you can free to use a ruby in your document.

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[6] This is a footnote for the main sentence.