Template @ DIKU, v. 1.1

Datalogisk institut, Copenhagen University (DIKU)
LaTeX

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Contents

1 Math extensions

The math exetensions were inspired as I was making my way through [Concrete Mathematics], and various courses at DIKU. It seems to me that these macros are useful in general.

1.1 Groups

Very often, mathematical expressions make use of grouping constructs such as $\lceil\rceil$, $\lfloor\rfloor$, $()$, etc. These constructs are relatively easy to use in LaTeX(with the `amsmath` package), despite the fact that one has to often distinguish between the left and right connectives, as with e.g. `\lfoor` and `\rfloor`. What makes these groups particularly impractical however, is that the height of the connectives is not automatically adjusted to the content they enclose. To this end, one may resort to using the commands `\left` and `\right`, as respective connective prefixes... Yuk! This lead to the specification of the following macros:

`\ceil{group}`	$\lceil$group$\rceil$	
`\floor{group}`	$\lfloor$group$\rfloor$	
`\set{group}`	$\{$group$\}$	
`\seq{group}`	$[$group$]$	(as in, *sequence*)
`\card{group}`	$\lvert$group$\rvert$	(as in, *cardinality*)
`\chev{group}`	$\langle$group$\rangle$	(as in, *chevrons*)
`\p{group}`	$($group$)$	(as in, *parenstheses*)
`\st{group}`	$\mid$ group	(as in, *such that*)

1.2 Backus-Naur Form

`\nonterm{group}`	<group>
`\term{group}`	‘group’

1.3 Cormen

MERGE-SORT(A, p, r)

```
1  if p < r
2      q = ⌊(p + r)/2⌋
3      MERGE-SORT(A, p, q)
4      MERGE-SORT(A, q + 1, r)
5      MERGE(A, p, q, r)
```

2 Box extensions

I've used ‘`tcolorbox`’ to create a bunch of different boxes that can be used throughout the program. Look in the ‘`boxes.tex`’ file, to see how they're defined and used.

2.1 Sample Syntax Demonstrations

Here we will demonstrate how the syntax box works and is used.

Without example usage:

Syntax §2.1: Syntax for syntax box without usage

```
\newsyntax{<name>}{<label>}{<file>}{<optional file>)}{<optional
    language>}
```

With example usage:

Syntax §2.2: Syntax for syntax box with usage

```
\newsyntax{<name>}{<label>}{<file>}{<optional file>)}{<optional
    language>}
```

Example Usage:

```
\newsyntax{Syntax for syntax box}{syntax label}{syntax/syntax}{
    syntax/syntax}{xml}
```

2.2 Sample Code Demonstrations

These boxes allow you to present various types of code snippets, whether they produce an output or not. We've showcased this flexibility with C and Java code examples. This framework isn't limited to just these languages - if `'lstlisting'` doesn't include your desired language, you have the freedom to create your own set. It's a versatile way to enhance code visibility and comprehension.

2.2.1 C Code Example (No Output)

Code §2.1: A 'C' code example *without* output

```c
#include <stdio.h>
void fun(int a)
{
    printf("Value of a is %d\n", a);
}

int main()
{
    void (*fun_ptr)(int) = &fun;
    (*fun_ptr)(10);
    return 0;
}
```

2.2.2 C Code Example (Includes Output)

Code §2.2: A 'C' code example *with* output

```c
#include <stdio.h>
void fun(int a)
{
    printf("Value of a is %d\n", a);
}

int main()
{
    void (*fun_ptr)(int) = &fun;
    (*fun_ptr)(10);
    return 0;
}
```

Example Output:

```
Value of a is 10
```

2.2.3 Java Code Example (No Output)

Code §2.3: A 'Java' code example *without* output

```java
@FunctionalInterface
interface Printer {
    void print(String msg);
}

public class Main {
    public static void main(String[] args) {
        Printer printer = (String msg) -> {
            System.out.println(msg);
        };

        printer.print("Hello, world!");
    }
}
```

2.3 Sample Definition Demonstrations

2.4 Sample Table Demonstrations

2.5 Making References to the Boxes

3 References

References

[Concrete Mathematics] Ronald L. Graham, Donald E. Knuth, and Oren Patashnik. *Concrete Mathematics: A Foundation for Computer Science*. 1994, 2nd ed. Addison-Wesley Longman Publishing Co., Inc. Boston, USA. ISBN 0201558025.