TikZ - Beginner's Guide

Michael Altenhuber

Introduction

When to use and examples

Setup

Let's start - Workshop time

Q A

Schöne Grafiken mit TikZ - A Beginner's Guide

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Overview

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What is TikZ and what is it good for?

TikZ — TikZ ist kein Zeichenprogramm

▶ LaTeX / PGF-based drawing framework

▶ program your graphics instead of using annoying UI-based tools

▶ TikZ either integrates into your document or creates stand-alone vector graphics.

Public service announcement

This is a git-based workshop, please download/clone/look at
the following repository:
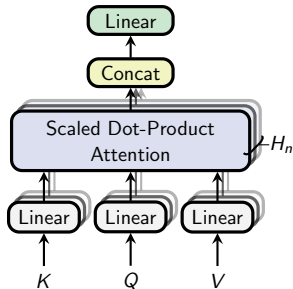https://github.com/tassadarius/TikZ-BeginnersGuide

Pros and Cons
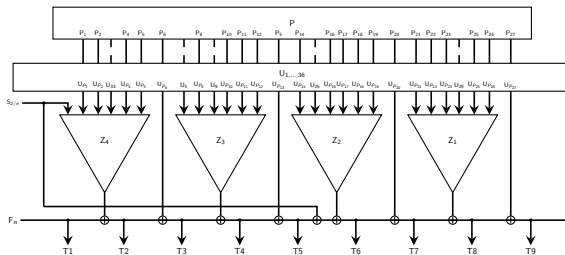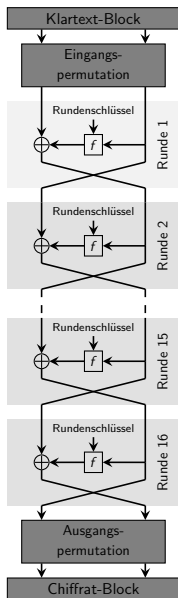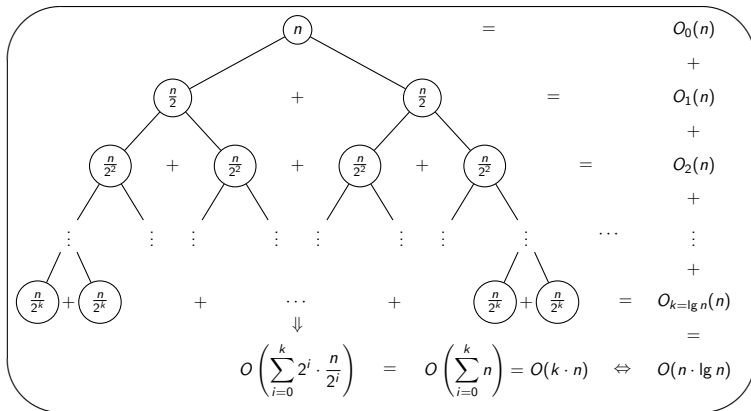
Pros

▶ Integrates seamlessly into LaTeXdocuments

▶ Sharp, precise vector graphics

▶ Usage of variables, loops and other programming stuff
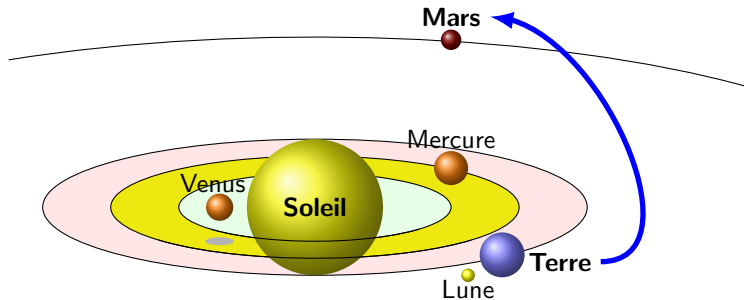
▶ Easily version controllable (git)

Cons

▶ Steep learning curve

▶ drawing takes time

▶ May become hard to keep oversight for larger graphics

▶ It's a little bit like C++, there are just too many ways
to do something

Examples

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Introduction

When to use and examples

Setup

Let's start - Workshop time

Q A

n = $O_0(n)$

$+$

$\frac{n}{2}$ $+$ $\frac{n}{2}$ = $O_1(n)$

$+$

$\frac{n}{2^2}$ $+$ $\frac{n}{2^2}$ $+$ $\frac{n}{2^2}$ $+$ $\frac{n}{2^2}$ = $O_2(n)$

$+$

$\frac{n}{2^k}$ $+$ $\frac{n}{2^k}$ $+$ $\cdots$ $+$ $\frac{n}{2^k}$ $+$ $\frac{n}{2^k}$ = $O_{k=\lg n}(n)$

$\Downarrow$ =

$$O\left(\sum_{i=0}^{k} 2^i \cdot \frac{n}{2^i}\right) \;=\; O\left(\sum_{i=0}^{k} n\right) = O(k \cdot n) \;\Leftrightarrow\; O(n \cdot \lg n)$$

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Guide

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Altenhuber

Introduction

When to use and
examples

Setup

Let's start -
Workshop time

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Mars

Mercure

Venus

Soleil

Terre

Lune

When and when not to use

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Introduction

When to use and examples

Setup

Let's start - Workshop time

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- ▶ Flowcharts
- ▶ Trees
- ▶ Schematic representations
- ▶ Annotate/draw over existing images
- ▶ Bonus (Whatever libraries there may be) - many scientific packages.

When not to use...

- ▶ Plots and charts (use PGPlot, matplotlib or any other plotting library)
- ▶ Quick Drafts
- ▶ Art, Fancy stuff?

Setup ()

LaTeXenvironment

- ▶ Most LaTeXdistributions include TikZ
- ▶ May require install on certain distributions
    1. Miktek: Open Miktek Console → Packages → Install package tikz
    2. Others: Please let google help you
- ▶ Online-Editors like Overleaf usually support out-of-the-box

Preamble

```
\usepackage{tikz}
\usetikzlibrary{tikz.positioning}
```

Create a TikZ image

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When to use and examples

Setup

Let's start - Workshop time

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inline

```
\begin{figure}
  \begin{tikzpicture}[options]
    ...
  \end{tikzpicture}
\end{figure}
```

---

separate file

```
\begin{figure}
  \include{images/separate_image_tex_file}
\end{figure}
```

Let's start with basic commands!

Go to **guide/00_basics/**

Questions and answers

if there are any