Documentation for the Automaton Package

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1 Introduction

The ‘automaton‘ package provides a convenient way to create TikZ-based automatons and Turing machine graphs. It offers an intuitive interface for defining states, transitions, and automaton diagrams.

2 Installation

To use the ‘automaton‘ package, place the ‘automaton.sty‘ file in the same directory as your LaTeX document or in a directory recognized by your LaTeX distribution (e.g., ‘ /texmf/tex/latex/‘).

3 Usage

Include the package in your document with:

```
\usepackage{automaton}
```

3.1 Basic Environment

Use the ‘automaton‘ environment to create an automaton diagram:

```
\begin{automaton}
    % Code for states and transitions
\end{automaton}
```

4 Commands

Here are the main commands provided by the ‘automaton‘ package:

4.1 \state

Creates a standard state. You can optionally give it a name(the id is still used to referr to it in transitions). By default the name will be z_{id}.

Syntax: `\state[optional name]{id}{position}`

Example: `\state[this is a name]{1}{2,0}`

4.2 \startstate

Creates a start state.

Syntax: `\startstate[optional name]{id}{position}`

Example: `\startstate{0}{0,0}`

4.3 \finstate

Creates an end state.

Syntax: `\finstate[optional name]{id}{position}`

Example: `\finstate{2}{4,0}`

4.4 \transition

Defines a transition between states, optionally with a bend direction. The states can also be defined later in the code. When form and to are the same state, you can use the custom bend direction to make it loop either `above` or `below`, defalut beeing above.
The package allows more complex definitions, such as multiple transitions on one arrow using the syntax `a:b,R | c:c,R`

Syntax: `\transition[bendDirection]{from}{to}{label}`

Example: `\transition{0}{1}{a:X,R}`

With direction: `\transition[right]{2}{1}{c:c,L}`

Loop with direction `\transition[below]{1}{1}{c:c,L}`

Multiple transitions `\transition{1}{1}{c:c,L|a:c,L}`

5 Customization

You can adjust the size of the nodes by passing an optional parameter(default 30pt) to the ‘automaton‘ environment:

```
\begin{automaton}[40]
    % Custom-sized diagram
\end{automaton}
```

6 Examples

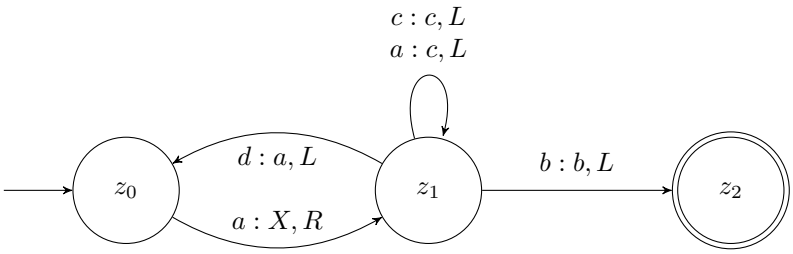
Below is a simple example to demonstrate how to create an automaton diagram:

```
\begin{automaton}[40]% 40pt
    \startstate{0}{0,0}
    \transition{0}{1}{a:X,R}

    \state{1}{2,0}
    \transition{1}{2}{b:b,L}
    \transition[left]{1}{1}{c:c,L|a:c,L}

    \finstate{2}{4,0}
\end{automaton}
```

This code produces this automaton diagram with three states and transitions between them.



7 Package Dependencies

The ‘automaton‘ package depends on the following LaTeX packages:

- `tikz` (with libraries: arrows, decorations, positioning, etc.)
- `xstring`
- `etoolbox`
- `expl3`

8 License

The package is not yet distributed, so it isnt licensed right now
You are free to use it for all non-commertial purposes:).

9 Contact

For questions or contributions, please contact us at matthias5.wagner@gmx.de or through our GitHub.