# 1 Introduction

This document was generated by logisim-evolution. Any part of the TeX sources can be used in your own documents without any problems. In case you want to use all/parts of this generated TeX-sources please (1) do not forget to include the required packages, and (2) include a remark that this source was generated by logisim-evolution.

# 2 Truth table

The table may be way to big to be displayed on the page. At generation time no calculation was done on the size of the table with respect to the width/height of the page.

## 2.1 Compacted truth table

| $curr_state[2..0]$ | | | $w$ | $next_state[2..0]$ | | |
|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| – | 0 | 1 | 0 | 1 | 0 | 1 |
| 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 0 | 1 | 0 | – | – | – | – |
| – | 1 | 1 | 0 | 1 | 1 | 0 |
| – | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | – | 0 | 0 | 1 | 0 | 1 |
| 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 1 | 0 | 1 | 1 | 0 | 0 | 1 |
| 1 | 1 | 0 | 1 | 1 | 0 | 0 |

## 2.2 Complete truth table

| $curr_state[2..0]$ | | | $w$ | $next_state[2..0]$ | | |
|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 0 | 0 | 1 | 0 | 1 | 0 | 1 |
| 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 0 | 1 | 0 | 0 | – | – | – |
| 0 | 1 | 0 | 1 | – | – | – |
| 0 | 1 | 1 | 0 | 1 | 1 | 0 |
| 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 1 | 0 | 1 | 1 | 0 | 0 | 1 |
| 1 | 1 | 0 | 0 | 1 | 0 | 1 |
| 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 0 | 1 | 1 | 0 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 |

# 3 Karnaugh diagrams

This section shows various versions of the Karnaugh diagrams of the given functions.

## 3.1 Empty Karnaugh diagrams

$next_state_2$

| $curr_state_3$, $curr_state_2$ \ $curr_state_1$, $curr_state_0$, $w$ | 00 | 01 | 11 | 10 |
|---|---|---|---|---|
| 00 | | | | |
| 01 | | | | |
| 11 | | | | |
| 10 | | | | |

$next_state_1$

| $curr_state_3$, $curr_state_2$ \ $curr_state_1$, $curr_state_0$, $w$ | 00 | 01 | 11 | 10 |
|---|---|---|---|---|
| 00 | | | | |
| 01 | | | | |
| 11 | | | | |
| 10 | | | | |

$next_state_0$

| $curr_state_3$, $curr_state_2$ \ $curr_state_1$, $curr_state_0$, $w$ | 00 | 01 | 11 | 10 |
|---|---|---|---|---|
| 00 | | | | |
| 01 | | | | |
| 11 | | | | |
| 10 | | | | |

## 3.2 Filled in Karnaugh diagrams

$next_state_2$

| $curr_state_3$, $curr_state_2$ \ $curr_state_1$, $curr_state_0$, $w$ | 00 | 01 | 11 | 10 |
|---|---|---|---|---|
| 00 | 1 | 0 | 0 | 1 |
| 01 | - | - | 1 | 1 |
| 11 | 1 | 1 | 1 | 1 |
| 10 | 1 | 0 | 0 | 1 |

$next_state_1$

| $curr_state_3$, $curr_state_2$ \ $curr_state_1$, $curr_state_0$, $w$ | 00 | 01 | 11 | 10 |
|---|---|---|---|---|
| 00 | 1 | 1 | 0 | 0 |
| 01 | - | - | 1 | 1 |
| 11 | 0 | 0 | 1 | 1 |
| 10 | 0 | 0 | 0 | 0 |

$next_state_0$

| $curr_state_3$, $curr_state_2$ \ $curr_state_1$, $curr_state_0$, $w$ | 00 | 01 | 11 | 10 |
|---|---|---|---|---|
| 00 | 0 | 1 | 0 | 1 |
| 01 | - | - | 1 | 0 |
| 11 | 1 | 0 | 1 | 0 |
| 10 | 1 | 0 | 1 | 1 |

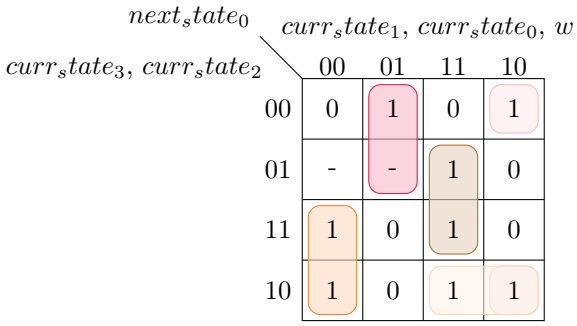
## 3.3 Filled in Karnaugh diagrams with covers

$next_state_2$

| $curr_state_3$, $curr_state_2$ \ $curr_state_1$, $curr_state_0$, $w$ | 00 | 01 | 11 | 10 |
|---|---|---|---|---|
| 00 | 1 | 0 | 0 | 1 |
| 01 | - | - | 1 | 1 |
| 11 | 1 | 1 | 1 | 1 |
| 10 | 1 | 0 | 0 | 1 |

$next_state_1$

| $curr_state_3$, $curr_state_2$ \ $curr_state_1$, $curr_state_0$, $w$ | 00 | 01 | 11 | 10 |
|---|---|---|---|---|
| 00 | 1 | 1 | 0 | 0 |
| 01 | - | - | 1 | 1 |
| 11 | 0 | 0 | 1 | 1 |
| 10 | 0 | 0 | 0 | 0 |




# 4 Minimal expressions

$next_state_2 = \overline{w} + curr_state_1$
$next_state_1 = \overline{curr_state_2} \cdot \overline{curr_state_0} + curr_state_1 \cdot curr_state_0$
$next_state_0 = \overline{curr_state_2} \cdot \overline{curr_state_0} \cdot w + \overline{curr_state_1} \cdot curr_state_0 \cdot \overline{w} + curr_state_1 \cdot curr_state_0 \cdot w + curr_state_2 \cdot \overline{curr_state_0} \cdot \overline{w} + curr_state_2 \cdot \overline{curr_state_1} \cdot curr_state_0$