Partial Orders in Tournaments

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Abstract

We introduce tournaments and partial orderings, and define a partial order on tournaments. We examine the adjacency matrix and the poset matrix. We present an overview of an algorithmic approach to identifying poset matrices that are not realizable by tournaments. We address some deficiencies with this algorithm and provide suggestions for areas of improvement. We present some partial characterizations of poset matrices that are realizable by tournaments. Finally, we introduce some possible directions for further research. Some results were reached in collaboration with Tao Gaede.

1 Introduction

This paper examines a class of graphs called *tournaments* and their relationship to partially ordered sets. Specifically, it asks which partially ordered sets can be represented by tournaments. We begin with the following definitions:

Definition 1.1. A *tournament* is a complete directed graph. We say that a tournament is *transitive* if it is acyclic or, equivalently, if it has a strict total ordering of its vertices. A *king* is a vertex in a tournament that can reach every other vertex in at most two moves. A tournament is *strongly connected* if there exists a directed path from every vertex to every other vertex.

Definition 1.2. A partially ordered set, or *poset*, is a set S and a binary relation \leq satisfying the following properties:

- 1. For any item $a \in S$, $a \preceq a$ (reflexivity);
- 2. For any two items $a, b \in S$, if $a \leq b$ and $b \leq a$, then a = b (antisymmetry);
- 3. For any three items $a, b, c \in S$, if $a \leq b$ and $b \leq c$, then $a \leq c$ (transitivity).

At times, it will be useful to consider posets in matrix form. We define the poset matrix $P_{n,n}$:

Definition 1.3. Let $P = (V, \preceq)$ be a partially ordered set. The poset matrix $P_{n,n}$ is an $n \times n$ transitive binary matrix where $a_{ij} = 1$ if and only if $i \preceq j$ or i = j.

The following theorem is due to Mohammad et al. [1]:

Theorem 1.1. Let M be a square binary matrix. Then M is a poset matrix if and only if M is a transitive upper (or lower) triangular matrix with 1s on the main diagonal.

We define the following partial ordering on the vertex set of tournaments:

Definition 1.4. Let T be a tournament. For any two vertices $u, v \in V(T)$, $u \leq v$ if and only if one of the following two conditions is satisfied:

1. u = v;

2. u cannot reach v in 1 or 2 moves.

We say that a tournament *realizes* a partial ordering (V, \preceq) if (V, \preceq) can be represented by a tournament. We attempt to characterize those partial orders that are realizable by tournaments.

2 The Basics

As suggested above, it will be useful to consider this problem in terms of matrices. We consider the adjacency matrix:

Definition 2.1. The *adjacency matrix* of an *n*-vertex digraph D is an $n \times n$ binary matrix \mathbf{A} , where $a_{ij} = 1$ if and only if $ij \in A(D)$.

Proposition 2.1. Let **A** be the adjacency matrix of an n-vertex tournament *T*. Then for all $0 \le i, j \le n$, $a_{ij} \ne a_{ji}$ (i.e. if $a_{ij} = 0$, then $a_{ji} = 1$, and vice versa).

Theorem 2.2. Let \mathbf{A} be the adjacency matrix for some tournament T. Let $\mathbf{A}^2 = \mathbf{A}\mathbf{A}$ be the matrix product of \mathbf{A} with itself. Then for any cell a_{ij} in \mathbf{A}^2 , $a_{ij} = 0$ if and only if there does not exist a path from i to j in T of length ≤ 2 .

Proof: \implies Suppose $a_{ij} = 0$ in \mathbf{A}^2 . This means that in the scalar product of i and j, no corresponding entries in i and j both had a value of 1. Therefore, there is no way to get from i to j in 2 steps.

 \Leftarrow Suppose there does not exist a path of length 2 or less between vertices *i* and *j* in *T*. Consider row $\mathbf{A}[i]$ and column $\mathbf{A}[j]$. Then no corresponding entries in *i* and *j* can both have value 1. Otherwise, we could find a path of length 2 by traveling between them. Since no corresponding values in *i* and *j* are both equal to 1, their scalar product must equal 0. \Box

Let **A** be the adjacency matrix of a tournament T. Using Theorem 2.1, we define a partial order on T as the matrix **P** where for any cell a_{ij} in **P**, $a_{ij} = 1$ if and only if either i = j or $a_{ij} = 0$ in **A**². Since **P** is a poset matrix, by Theorem 1.1, it can be reconfigured as a transitive, upper triangular matrix. From [1], we can achieve this reconfiguration by iteratively relabelling the rows i and columns j for any i > j where $a_{ij} = 1$.

3 An Algorithmic Approach

We compute the sets of realizable and un-realizable poset matrices for all tournaments of size 1 to 5. These results can be found in Appendix A. The algorithmic approach is simple. Unfortunately, it runs in non-polynomial time, and is intractable for even small tournaments. There exist a number of improvements; we discuss these in the following section.

3.1 Methods

To enumerate and categorize poset matrices for all tournaments on n vertices, we proceed as follows:

- 1. Employing Proposition 2.1, construct adjacency matrices for all $2^{\binom{n}{2}}$ *n*-vertex tournaments.
- 2. Compute the square of each adjacency matrix, and render a poset matrix $\mathbf{P} = (V, \preceq)$ using the above procedure.
- 3. Convert each poset matrix to its upper triangular form through iterative relabelling.
- 4. Construct all transitive upper triangular matrices corresponding to partial orders of n-element sets. Check transitivity by squaring the matrix.
- 5. Let $P = \{\mathbf{P_1}, \mathbf{P_2}, ...\}$ be the set of poset matrices and $A = \{\mathbf{A_1}, \mathbf{A_2}, ...\}$ be the set of adjacency matrices. Then $P \cap A$ gives the set of realizable poset matrices and $P \setminus A$ gives the set of un-realizable poset matrices.

We note the following observations:

This algorithm does not return unique posets, but rather unique poset matrices. For example, all poset matrices with exactly one 1 in the upper triangle represent isomorphic posets with exactly one relation.

However, we believe that enumerating all unique poset matrices is sufficient for identifying those posets that are not realizable by tournaments.

As previously mentioned, this algorithm is intractably slow. Because the number of adjacency matrices grows exponentially, any significant speed-ups will require a substantial re-construction of the algorithm. However, there are some minor improvements that can be made; we will address these in *Improvements*. Whether these are significant enough to compute much larger tournaments is uncertain.

3.2 Results

We summarize our results in the table below:

		Poset ma	trices			
size of T	0	1	2	3	4	5
realizable	1	1	1	2	9	77
un-realizable	0	0	1	5	31	280

Of greatest interest here in the fact that the ratio of un-realizable posets to realizable posets appears to converge towards 0.35 as T increases. Whether this is a significant value requires further research and additional data, which in turn relies upon a significant improvement of the algorithm.

We also note that the powers of realizable posets present a far simpler structure than those of un-realizable posets. Although we were unable to quantify the precise difference, we suggest that this fact warrants further examination.

3.3 Improvements

There are a number of minor improvements to be made to the algorithm. A result regarding isomorphisms in tournaments would allow for a significant speed-up, as the number of labelled tournaments increases exponentially with n. The iterative relabelling process for the poset matrices of tournaments is not efficient, and could possibly be improved. Matrices are constructed and then checked for transitivity, which is a time-consuming process that could be improved by better classifying their characteristics. Finally, there are a number of redundant loops that likely increase the runtime by a (relatively) small factor.

4 Additional Observations

We note some theorems regarding posets and tournaments:

Theorem 4.1. For odd n, there exists a tournament on n vertices where every vertex is a king.

Proof: Let C_n be a directed cycle. We construct an *n*-vertex tournament T by adding chords to C_n as follows. For every vertex v_i , $1 \le i \le n$, add arcs $v_j v_i$ if $i - j \pmod{n}$ is even, and $v_i v_j$ if $i - j \pmod{n}$ is odd. We see that this labelling must produce a legal tournament. To show that every vertex in this tournament is a king, note that in order to travel from some vertex v_i to some vertex v_j , either there exists an arc from v_i to v_j , or there exists an arc from v_i to v_{j-1} and an arc from v_{j-1} to v_j along C_n . \Box

Theorem 4.2. All total orders are realized by tournaments.

Proof: These are given by the so-called *transitive* tournaments. Consider a *n*-vertex tournament with vertices labelled 1 to *n*, and arcs *ij* if and only if i > j. This is clearly a total order, as each vertex cannot reach any vertex above it; the order is equivalent to the set [n] of the first *n* integers and the relation \leq . \Box

Proposition 4.3. The poset matrix representing the total order is an upper triangular matrix with all 1s above the main diagonal.

Theorem 4.4. Let \mathbf{P} be a $n \times n$ poset matrix containing a $(n-1) \times (n-1)$ sub-matrix \mathbf{P}' representing the total order on a set of size n-1. If for every $a_{ij} \in \mathbf{P} - \mathbf{P}'$, $i \neq j$, $a_{ij} = 0$, then \mathbf{P} is realizable by a tournament.

Proof: We present a construction. Note that \mathbf{P}' is the poset matrix representing a transitive tournament on n-1 vertices. We show that it is always possible to add a vertex u to the transitive tournament such that u can reach all other vertices in ≤ 2 steps, and all other vertices can reach u in ≤ 2 steps. Let v_i be a vertex of out-degree i in such a tournament. Add arc uv_n . For all v_i , $1 \leq i < n$, add arcs $v_i u$. Clearly, u is a king, because v_n is adjacent to every vertex. Furthermore, all vertices other than v_n are adjacent to u. Finally, v_n can reach u in 2 steps by passing through any other vertex. \Box

5 Research Questions

We propose the following questions to motivate further research:

- 1. While there exists an odd tournament where every vertex is a king, this is not the case for even tournaments. However, we are not certain which even tournaments do not have this property. It does not hold for tournaments on 2 vertices or 4 vertices, but it *is* possible on tournaments with 6 vertices. We would like to determine for which graphs this property does not hold.
- 2. We presented a construction for finding odd tournaments where every vertex is a king. However, we believe that a stronger claim may be made. Namely, we hypothesize that tournament T such that for all $v \in V(T)$, $d^{-}(v) = d^{+}(v)$, is kingly (i.e. every vertex is a king).
- 3. A tournament's *score sequence* is the list of out-degrees of every vertex. We would like to know if all tournaments with the same score sequence are isomorphic. This holds for tournaments on 4 vertices, but we have not verified it for larger n.

6 References

- Mohammad, S. U., Talukder, M. R. (2020). Poset matrix and recognition of series-parallel posets. Computer Science, 15(1), 107-125.
- Hemasinha, R. (2003). An algorithm to generate tournament score sequences. Mathematical and computer modelling, 37(3-4), 377-382.
- [3] Yibo, Y., Di Junwei, L. M. Kings in Tournaments.

A Appendix A

We provide a list of all realizable and un-realizable poset matrices for tournaments on 1 to 5 vertices.

A.1 1 Vertex

- A.1.1 Realizable
- A.1.2 Un-realizable

A.2 2 Vertices

A.2.1 Realizable

$\begin{bmatrix} 1 \\ 0 \end{bmatrix}$	$\begin{bmatrix} 0\\1 \end{bmatrix}$
$\begin{bmatrix} 1 \\ 0 \end{bmatrix}$	$\begin{bmatrix} 1 \\ 1 \end{bmatrix}$

[1]

- A.2.2 Un-realizable
- A.3 3 Vertices
- A.3.1 Realizable

[1	0	0	[1	0	1]	[1	0	1	[1	1	0	[1	1	1]
0	1	1	0	1	0	0	1	1	0	1	0	0	1	0
$\begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$	0	1	0	0	1	0	0	1	0	0	1	0	0	1

A.3.2 Un-realizable

[1	0	0	[1	1	1
	0	1	0	0	1	1
L	0	0	$\begin{bmatrix} 0\\0\\1 \end{bmatrix}$	0	0	1

A.4 4 Vertices

A.4.1 Realizable

[1	0	0	0	[1	0	0	0	[1	0	0	0	[1	0	0	0	[1	0	0	1]	[1	0	0	1]	[1	0	0	1]
0	1	0	0	0	1	0	1	0	1	1	1	0	1	1	1	0	1	0	0	0	1	0	1	0	1	1	0
0	0	1	0	0	0	1	1	0	0	1	0	0	0	1	1	0	0	1	1	0	0	1	0	0	0	1	0
0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1
[1	0	0	1]	[1	0	0	1]	[1	0	1	0	[1	0	1	0	[1	0	1	0	[1	0	1	1]	[1	0	1	1]
0	1	1	1	0	1	1	1	0	1	0	1	0	1	1	0	0	1	1	1	0	1	0	0	0	1	0	0
0	0	1	0	0	0	1	1	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	1
0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	$\begin{bmatrix} 0 \\ 1 \\ 0 \\ 1 \end{bmatrix}$	0	0	0	1	0	0	0	1
[1	0	1	1]	[1	0	1	1]	[1	0	1	1]	[1	0	1	1]	[1	0	1	1	[1	1	0	0	[1	1	0	1]
0	1	0	1	0	1	0	1	0	1	1	0	0	1	1	1	0	1	1	$\begin{array}{c c}1\\1\end{array}$	0	1	0	0	0	1	0	0
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0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1

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								0	0	$\begin{array}{c} 0 \\ 1 \end{array}$	1 1	0	$\begin{array}{c} 1 \\ 0 \end{array}$	1 1	$\begin{bmatrix} 1\\0\\0\\1\end{bmatrix}$	0 0	0	1	$\begin{bmatrix} 1 \\ 1 \\ 0 \\ 1 \end{bmatrix}$							

A.4.2 Un-realizable

 $\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 & 1 \\ 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$ $\begin{bmatrix} 1 & 1 & 1 & 1 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 1 & 1 & 1 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 1 \end{bmatrix}$

A.5 5 Vertices

A.5.1 Realizable

Γ1	0	0	0	0]	[1	0	0	0] [0	1	0	0	0	[0	[1	0	0	0	0]	[1	0	0	0	0]	[1	0	0	0	0]
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$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$	$\begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\$	$\begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0$	$ \begin{array}{c} 1\\ 0\\ 0\\ 1\\ 0\\ 1\\ 0\\ 1\\ 0\\ 0\\ 0\\ 0\\ 1\\ 0\\ 0\\ 1\\ 0\\ 0\\ 1\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\$	1 1 0 1 1 1 1 0 1 1 0 1 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 1 0 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1	$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ \end{bmatrix} \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$	$\begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\$	$\begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 1 \\ 1$	$ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ $	$ \begin{array}{c} 1\\1\\1\\0\\1\\\end{array}\\1\\1\\0\\1\\0\\1\\0\\1\\0\\1\\0\\1\\1\\\end{array}\right\} $	$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$	0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 1$	$ \begin{array}{c} 1\\ 0\\ 1\\ 0\\ 1\\ 0\\ 1\\ 0\\ 0\\ 1\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\$	1 1 1 1 1 1 1 1 1 1 1 1 1 1	$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ \end{bmatrix} \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$	$\begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\$	$\begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1$	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0$	1 0 0 0 1 1 1 0 0 0 0 0 0 0 1 1 0 0 0 0	$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ \end{bmatrix} \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$	$\begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\$	$\begin{array}{c} 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1$	$ \begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0$	1 0 0 0 1 1 1 1 0 0 0 0 1 1 1 0 0 0 1 1 1 1 0 0 0 1 1 1 1 1 1 1 0 0 0 1 1 1 1 1 1 1 1 1 1 1 0 0 0 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 1	$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$	0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1$	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0$	$ \begin{array}{c} 1\\1\\0\\0\\1\\1\\1\\1\\1\\1\\0\\1\\1\\1\\1\\1\\1\\1\\1\\1$
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$\begin{bmatrix} 1\\ 0\\ 0\\ 0\\ 0\\ 0 \end{bmatrix}$	$ \begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \end{array} $	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 0 \end{array} $	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 1 \\ 0 \end{array} $	0 1 0 0 1	$ \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} $	$ \begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \end{array} $	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 0 \end{array} $	$ \begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 0 \end{array} $	$\begin{array}{c} 0\\ 0\\ 0\\ 0\\ 1 \end{array}$	$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix}$	$ \begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \end{array} $	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 0 \end{array} $	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 1 \\ 0 \\ 0 \end{array} $	$\begin{array}{c} 0\\ 1\\ 0\\ 0\\ 1 \end{array}$	$ \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} $	$ \begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \end{array} $	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \end{array} $	1 1 1 1 0	$\begin{bmatrix} 0 \\ 1 \\ 0 \\ 0 \\ 1 \end{bmatrix}$	$ \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} $	$ \begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \end{array} $	$ \begin{array}{c} 1 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \end{array} $	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 1 \\ 0 \end{array} $	0 1 0 0 1	$ \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} $	$ \begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \end{array} $	$ \begin{array}{c} 1 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \end{array} $	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 1 \\ 0 \end{array} $	$\begin{array}{c} 0\\ 0\\ 0\\ 0\\ 1 \end{array}$
$\begin{bmatrix} 1\\0\\0\\0\\0\\0 \end{bmatrix}$	$egin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \end{array}$	$ \begin{array}{c} 1 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \end{array} $	$egin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 0 \end{array}$	$\begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 1 \end{bmatrix}$	$\begin{bmatrix} 1\\0\\0\\0\\0\\0 \end{bmatrix}$	$egin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{array}$	$egin{array}{c} 1 \\ 1 \\ 1 \\ 0 \\ 0 \end{array}$	$egin{array}{c} 1 \\ 1 \\ 0 \\ 1 \\ 0 \end{array}$	$ \begin{bmatrix} 0 \\ 1 \\ 0 \\ 0 \\ 1 \end{bmatrix} $	$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix}$	$\begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \end{array}$	$egin{array}{c} 1 \\ 1 \\ 1 \\ 0 \\ 0 \end{array}$	$egin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 0 \end{array}$	$ \begin{bmatrix} 0 \\ 1 \\ 0 \\ 0 \\ 1 \end{bmatrix} $	$\begin{bmatrix} 1\\0\\0\\0\\0\\0 \end{bmatrix}$	$egin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{array}$	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \end{array} $	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 1 \\ 0 \end{array} $	$\begin{bmatrix} 1\\0\\0\\0\\1\end{bmatrix}$	$\begin{bmatrix} 1\\0\\0\\0\\0\\0 \end{bmatrix}$	$egin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{array}$	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \end{array} $	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 1 \\ 0 \end{array} $	$ \begin{bmatrix} 1 \\ 0 \\ 0 \\ 1 \\ 1 \end{bmatrix} $	$\begin{bmatrix} 1\\0\\0\\0\\0\\0 \end{bmatrix}$	$egin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \end{array}$	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \end{array} $	$egin{array}{c} 1 \\ 0 \\ 0 \\ 1 \\ 0 \end{array}$	
$\begin{bmatrix} 1\\0\\0\\0\\0\end{bmatrix}$	$egin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{array}$	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 0 \end{array} $	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 1 \\ 0 \end{array} $	1 0 1 1 1	$\begin{bmatrix} 1\\0\\0\\0\\0\\0 \end{bmatrix}$	$egin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{array}$	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 0 \end{array} $	$egin{array}{c} 1 \\ 0 \\ 1 \\ 1 \\ 0 \end{array}$	$\begin{array}{c}1\\0\\0\\0\\1\end{array}$	$\begin{bmatrix} 1\\0\\0\\0\\0\\0 \end{bmatrix}$	$egin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \end{array}$	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 0 \end{array} $	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 1 \\ 0 \end{array} $	$\begin{bmatrix} 1\\0\\1\\0\\1\end{bmatrix}$	$\begin{bmatrix} 1\\0\\0\\0\\0\\0 \end{bmatrix}$	$egin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{array}$	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 0 \end{array} $	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 1 \\ 0 \end{array} $	$\begin{bmatrix} 1\\0\\1\\1\\1\end{bmatrix}$	$\begin{bmatrix} 1\\0\\0\\0\\0\\0 \end{bmatrix}$	$egin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{array}$	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 0 \end{array} $	$egin{array}{c} 1 \\ 0 \\ 0 \\ 1 \\ 0 \end{array}$	$\begin{bmatrix} 1\\1\\0\\0\\1 \end{bmatrix}$	$\begin{bmatrix} 1\\0\\0\\0\\0\\0 \end{bmatrix}$	$egin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{array}$	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 0 \end{array} $	$egin{array}{c} 1 \\ 0 \\ 0 \\ 1 \\ 0 \end{array}$	$\begin{array}{c}1\\1\\0\\1\\1\end{array}$

$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$	$\begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\$	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ $	$ \begin{array}{c} 1\\ 0\\ 0\\ 1\\ 0\\ 1\\ 0\\ 1\\ 0\\ 1\\ 0\\ 1\\ 0\\ 1\\ 0\\ 0\\ 1\\ 0\\ 0\\ 1\\ 0\\ 0\\ 1\\ 0\\ 0\\ 1\\ 0\\ 0\\ 1\\ 0\\ 0\\ 0\\ 1\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\$	$ \begin{array}{c} 1\\1\\1\\0\\1\\0\\1\\1\\1\\1\\1\\1\\1\\1\\1\\0\\0\\1\end{array}\right] $	$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ \end{bmatrix} \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$	$\begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\$	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ $	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 1 \\ $	$ \begin{array}{c} 1\\1\\1\\1\\1\\1\\0\\0\\0\\1\\1\\1\\0\\1\\1\\1\\0\\1\\1\end{array}\right) $	$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$	$\begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\$	$ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 1 \\ 1 \\ 0 \\ 0 0 $	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 1 \\ $	$ \begin{array}{c} 1\\1\\0\\0\\1\\1\\0\\1\\1\\1\\1\\1\\1\\1\\1\\1\\1\\0\\1\end{array}\right] $	$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ \end{bmatrix} \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$	$\begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\$	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 1 \\ 0 \\ $	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ $	$ \begin{array}{c} 1\\1\\1\\0\\1\\1\\1\\1\\1\\1\\1\\1\\1\\1\\1\\1\\1\\1\\1\\1$	$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ \end{bmatrix} \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$	$\begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\$	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ $	$ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ $	$ \begin{array}{c} 1\\1\\1\\1\\1\\1\\1\\0\\1\\1\\1\\0\\0\\0\\1\\1\\0\\0\\0\\1\end{array}\right] $	$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ \end{bmatrix} \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$	$\begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\$	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ $	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0$	$ \begin{array}{c} 1\\0\\0\\0\\1\\1\\1\\1\\0\\0\\1\\1\\0\\0\\0\\1\\1\\0\\0\\0\\1\end{array}\right] $
$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ \end{bmatrix} \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ \end{bmatrix} \begin{bmatrix} 1 \\ 1 \end{bmatrix}$	0 1 0 0 0 1 0 0 0 0 1	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{array} $	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \end{array} $	1 1 0 0 1 1 1 1 1 1 1 1 1 1	$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ \end{bmatrix}$	$\begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\$	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0$	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0$	1 1 0 1 1 0 0 0 1 1 1 1 1 1 1	$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ \end{bmatrix} \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ \end{bmatrix} \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ \end{bmatrix} $	0 1 0 0 1 1 0 0 0 0 1	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0$	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ \end{array} $	1 1 1 0 1 0 0 1 0 1 0 1 1 1	$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ \end{bmatrix}$	$\begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\$	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0$	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ \end{array} $	1 1 1 1 1 1 1 1 0 0 0 1 1 1 1 1	$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ \end{bmatrix}$	0 1 0 0 1 1 0 0 0 1	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0$	$ \begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0$	1 1 0 0 1 1 0 0 0 0 1 1 1	$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ \end{bmatrix}$	0 1 0 0 1 1 0 0 0 1	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0$	$ \begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0$	1 1 1 0 1 1 0 1 1 1 1 1 1
$ \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} $ $ \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} $ $ \begin{bmatrix} 1 \\ 1 \end{bmatrix} $	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ $	$ \begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ $	$egin{array}{ccc} 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \end{array}$	$ \begin{array}{c} 0 \\ 0 \\ 0 \\ 1 \end{array} $ $ \begin{array}{c} 1 \\ 1 \\ 0 \\ 1 \end{array} $ $ \begin{array}{c} 0 \end{array} $	$ \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} $ $ \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} $ $ \begin{bmatrix} 1 \\ 1 \end{bmatrix} $	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ $	$ \begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ $	$egin{array}{c} 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \end{array}$	$ \begin{array}{c} 0 \\ 1 \\ 0 \\ 1 \end{array} $ $ \begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 0 \end{array} $	$ \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} $ $ \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} $ $ \begin{bmatrix} 1 \\ 1 \end{bmatrix} $	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ $	$ \begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ $	$ \begin{array}{c} 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \end{array} $	$ \begin{array}{c} 0\\1\\1\\0\\0\\0\\0\\1\\1\\1\end{array} $	$ \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} $ $ \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} $ $ \begin{bmatrix} 1 \\ 1 \end{bmatrix} $	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ $	$ \begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ $	$egin{array}{ccc} 0 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 1 \end{array}$	$ \begin{array}{c} 1\\0\\1\\1\\0\\0\\1\\\end{array} $	$ \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} $ $ \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} $ $ \begin{bmatrix} 1 \end{bmatrix} $	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ $	$ \begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ $	$egin{array}{c} 0 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \end{array}$	$ \begin{array}{c} 1\\ 1\\ 0\\ 1 \end{array} $ $ \begin{array}{c} 0\\ 0\\ 1\\ 0\\ 1 \end{array} $ $ 1 $	$ \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} $ $ \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} $ $ \begin{bmatrix} 1 \end{bmatrix} $	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ $	$ \begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ $	$egin{array}{c} 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 1$	$ \begin{array}{c} 1\\ 0\\ 0\\ 1\\ 0\\ 0\\ 1\\ 0\\ 1\\ 1\\ 1 \end{array} $
$ \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} $ $ \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} $	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ $	$egin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \end{array}$	$ \begin{array}{c} 1 \\ 1 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 1 \\ 0 \\ 1 \\ $	$\begin{bmatrix} 0 \\ 0 \\ 0 \\ 1 \end{bmatrix}$ $\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 1 \end{bmatrix}$	$\begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ \end{bmatrix}$	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ $	$egin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \end{array}$	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ $	$\begin{bmatrix} 0 \\ 1 \\ 0 \\ 1 \end{bmatrix}$ $\begin{bmatrix} 1 \\ 0 \\ 1 \\ 0 \\ 1 \end{bmatrix}$	$\begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \\ \end{bmatrix}$	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ $	$egin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \end{array}$	$egin{array}{c} 0 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \end{array}$	$\begin{array}{c} 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 1 \\ 1 \\$	$ \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} $ $ \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} $	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ $	$egin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \end{array}$	$egin{array}{c} 0 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \end{array}$	$\begin{bmatrix} 0\\1\\1 \end{bmatrix}$ $\begin{bmatrix} 1\\1\\0\\0 \end{bmatrix}$	$\begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \end{bmatrix}$	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ $	$egin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \end{array}$	$egin{array}{c} 0 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \end{array}$	$\begin{array}{c} 0 \\ 1 \\ 0 \\ 1 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 1 \\$	$\begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ \end{bmatrix}$	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ $	$egin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \end{array}$	$egin{array}{c} 0 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \end{array}$	$\begin{array}{c} 0 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ 1 \\ \end{array}$

$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0$	$\begin{array}{c} 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\$	$ \begin{array}{c} 1\\ 0\\ 0\\ 1\\ 1\\ 1\\ 1\\ 1\\ 1\\ 1\\ 1\\ 1\\ 1\\ 0\\ 0\\ 0\\ 0\\ 1\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\$	$ \begin{array}{c} 1\\1\\1\\1\\1\\1\\1\\0\\0\\0\\1\\1\\0\\0\\0\\1\\1\\1\\0\\0\\0\\1\\1\end{array}\right] $	$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0$	$\begin{array}{c} 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\$	$ \begin{array}{c} 1\\ 0\\ 1\\ 1\\ 0\\ 1\\ 1\\ 1\\ 0\\ 1\\ 1\\ 1\\ 0\\ 0\\ 0\\ 0\\ 1\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\$	$ \begin{array}{c} 1\\1\\0\\0\\1\\1\\0\\1\\1\\1\\1\\0\\1\\1\\1\\0\\0\\1\\1\\1\end{array}\right] $	$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$	$ \begin{array}{c} 1\\1\\0\\0\\0\\1\\1\\0\\0\\0\\1\\1\\0\\0\\0\\1\\1\\0\\0\\0\\1\\1\end{array} $	$\begin{array}{c} 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\$	$ \begin{array}{c} 1\\ 0\\ 1\\ 1\\ 0\\ 1\\ 0\\ 1\\ 1\\ 1\\ 0\\ 0\\ 0\\ 0\\ 1\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\$	1 1 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1	$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0$	$\begin{array}{c} 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\$	$ \begin{array}{c} 1\\ 0\\ 1\\ 1\\ 0\\ 1\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\$	$ \begin{array}{c} 1\\1\\1\\1\\1\\1\\1\\1\\0\\1\\1\\1\\0\\0\\0\\0\\0\\1\\1\\1\\1\\1\\1\\1\end{array}\right] $	$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ \end{bmatrix} \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0$	$\begin{array}{c} 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 1$	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0$	$ \begin{array}{c} 1\\0\\0\\0\\1\\1\\1\\1\\0\\0\\0\\1\\1\\1\\0\\0\\1\\1\\1\\1$	$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ \end{bmatrix} \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0$	$\begin{array}{c} 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1$	$ \begin{array}{c} 1\\ 1\\ 0\\ 1\\ 0\\ 1\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\$	$ \begin{array}{c} 1\\0\\1\\0\\1\\1\\1\\1\\1\\1\\1\\1\\1\\1\\0\\0\\1\\1\\1\\1$
$\begin{bmatrix} 0\\0\\0\\0\\\end{bmatrix}$	1 0 0 0	0 1 0 0	0 0 1 0	1 1 0 1 1	$\begin{bmatrix} 0\\0\\0\\0\\\end{bmatrix} \begin{bmatrix} 1 \end{bmatrix}$	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 0 \\ 1 \end{array} $	0 1 0 0	0 0 1 0	1 1 1 1 1	$\begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix}$	1 0 0 0	1 1 0 0	0 0 1 0	$\begin{bmatrix} 0\\0\\0\\1\end{bmatrix}$	$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ \end{bmatrix}$	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 0 \\ 1 \end{array} $	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 1 \end{array} $	0 0 1 0	$\begin{bmatrix} 0\\0\\1\\1\end{bmatrix}\\0\end{bmatrix}$	$\begin{bmatrix} 0\\0\\0\\0\\\end{bmatrix}$	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 0 \\ 1 \end{array} $	1 1 0 0	$egin{array}{c} 0 \\ 0 \\ 1 \\ 0 \\ 1 \end{array}$	$\begin{bmatrix} 1\\0\\0\\1\end{bmatrix}$	$\begin{bmatrix} 0\\0\\0\\0\\\end{bmatrix}$	1 0 0 0	1 1 0 0	0 0 1 0	$\begin{bmatrix} 1 \\ 0 \\ 1 \\ 1 \end{bmatrix}$
$\begin{bmatrix} 0\\0\\0\\0\\\end{bmatrix} \begin{bmatrix} 1\\0 \end{bmatrix}$	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \end{array} $	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \end{array} $	$ \begin{array}{c} 0 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 1 \\ 0 \\ 1 \\ $	$ \begin{array}{c} 1\\ 1\\ 0\\ 1 \end{array} $ $ \begin{array}{c} 0\\ 0\\ 0 \end{array} $	$\begin{bmatrix} 0\\0\\0\\0\\\end{bmatrix} \begin{bmatrix} 1\\0 \end{bmatrix}$	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \end{array} $	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \end{array} $	0 0 1 0 1 1	$ \begin{array}{c} 1\\ 1\\ 1\\ 1\\ 0\\ 0\\ 0\end{array} $	$\begin{bmatrix} 0\\0\\0\\0\\\end{bmatrix} \begin{bmatrix} 1\\0\\\end{bmatrix}$	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \end{array} $	0 1 0 0 1 1	0 0 1 0 1 1	$\begin{bmatrix} 0\\0\\0\\1\end{bmatrix}$	$\begin{bmatrix} 0\\0\\0\\0\\\end{bmatrix} \begin{bmatrix} 1\\0 \end{bmatrix}$	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \end{array} $	$ \begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \end{array} $	0 1 1 0 1 0	$\begin{bmatrix} 0\\0\\0\\1\end{bmatrix}$ $\begin{bmatrix} 1\\0\end{bmatrix}$	$\begin{bmatrix} 0\\0\\0\\0\\\end{bmatrix} \begin{bmatrix} 1\\0 \end{bmatrix}$	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \end{array} $	$ \begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \end{array} $	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ $	$\begin{bmatrix} 0\\0\\0\\1\end{bmatrix}$ $\begin{bmatrix} 1\\0\end{bmatrix}$	$\begin{bmatrix} 0\\0\\0\\0\\\end{bmatrix} \begin{bmatrix} 1\\0 \end{bmatrix}$	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \end{array} $	$ \begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \end{array} $	$ \begin{array}{c} 1 \\ 1 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \end{array} $	$\begin{bmatrix} 0\\0\\0\\1\end{bmatrix}$ $\begin{bmatrix} 1\\0\end{bmatrix}$
$\begin{bmatrix} 0\\0\\0\\0\\\end{bmatrix}$	0 0 0 1 1	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 1 \\ 0 \end{array} $	0 1 0 1 0	$\begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$ $\begin{bmatrix} 1 \\ 0 \end{bmatrix}$	$\begin{bmatrix} 0\\0\\0\\\end{bmatrix}$	0 0 0 1 1	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 1 \\ 0 \end{array} $	0 1 0 1 0	$\begin{bmatrix} 0\\0\\1\end{bmatrix}\\1\\1\end{bmatrix}$	$\begin{bmatrix} 0\\0\\0\\\end{bmatrix}$	0 0 0 1 1	1 0 0 1 0	1 1 0 1 0	$\begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$ $\begin{bmatrix} 1 \\ 1 \end{bmatrix}$	$\begin{bmatrix} 0 \\ 0 \\ 0 \\ \end{bmatrix}$	0 0 0 1 1	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 1 \\ 0 \end{array} $	0 1 0 1 0	$\begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$ $\begin{bmatrix} 1 \\ 1 \end{bmatrix}$	$\begin{bmatrix} 0\\0\\0\\\end{bmatrix}$	0 0 0 1 1	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 1 \\ 0 \end{array} $	$ \begin{array}{c} 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ \end{array} $	1 1 1] 1] 1]	$\begin{bmatrix} 0\\0\\0\\\end{bmatrix}$	0 0 0 1 1	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 1 \\ 0 \end{array} $	1 1 0 1 0	$\begin{array}{c}1\\0\\1\end{array}\\1\\1\end{array}$
$\begin{bmatrix} 0\\0\\0\\\end{bmatrix}$	0 0 0 1 1	1 0 0 1 0	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \end{array} $	$\begin{bmatrix} 1\\ 1\\ 1\\ 1 \end{bmatrix}$ $\begin{bmatrix} 1\\ 0\\ 1 \end{bmatrix}$	$\begin{bmatrix} 0\\0\\0\\\end{bmatrix}$	0 0 0 1 1	1 0 0 1 0	0 1 0 1 1	$\begin{bmatrix} 0\\1\\1 \end{bmatrix}$ $\begin{bmatrix} 1\\0\\0 \end{bmatrix}$	$\begin{bmatrix} 0\\0\\0 \end{bmatrix}$	0 0 1 1	1 0 0 1 0	0 1 0 1 1	$\begin{bmatrix} 1\\0\\1 \end{bmatrix}$	$\begin{bmatrix} 0\\0\\0 \end{bmatrix}$	0 0 0 1 1	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 1 \end{array} $	1 1 0 1 1	1] 1 1	$\begin{bmatrix} 0\\0\\0\\\end{bmatrix}$	0 0 0 1 1	1 0 0 1 0	1 1 0 1 1	$\begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}$ $\begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$	$\begin{bmatrix} 0\\0\\0\\\end{bmatrix}$	0 0 0 1 1	1 0 0 1 0	1 1 0 1 1	1 1 1] 1 1
$\begin{bmatrix} 0 \\ 0 \\ 0 \\ \end{bmatrix} \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} \begin{bmatrix} 0 \\ 0 \end{bmatrix}$	$egin{array}{c} 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \end{array}$	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \end{array} $	$egin{array}{c} 0 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 0 \end{array}$	$ \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix} $ 1 1 1 1 1	$\begin{bmatrix} 0 \\ 0 \\ 0 \\ \end{bmatrix}$	$egin{array}{c} 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \end{array}$	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ \end{array} $	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 1 \\ 0 \\ \end{array} $	$\begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} \\ \begin{bmatrix} 1 \\ 1 \\ 0 \\ 0 \\ 1 \end{bmatrix}$	$\begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \\ \end{bmatrix}$	$egin{array}{c} 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \end{array}$	$egin{array}{c} 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 0 \end{array}$	$egin{array}{c} 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 1 \\ 1 \\ 0 \end{array}$	$ \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix} $ 1 1 1 0 1]	$\begin{bmatrix} 0 \\ 0 \\ 0 \\ \end{bmatrix}$	$egin{array}{c} 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \end{array}$	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \end{array} $	$egin{array}{c} 0 \\ 1 \\ 0 \\ 1 \\ 1 \\ 1 \\ 1 \\ 0 \end{array}$	$\begin{array}{c} 0 \\ 0 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\$	$\begin{bmatrix} 0 \\ 0 \\ 0 \\ \end{bmatrix}$	$egin{array}{c} 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \end{array}$	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \end{array} $	$egin{array}{c} 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \end{array}$	$\begin{array}{c} 0 \\ 1 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ \end{array}$	$\begin{bmatrix} 0\\0\\0\\\end{bmatrix}$	$egin{array}{c} 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \end{array}$	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \end{array} $	$egin{array}{c} 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \end{array}$	$ \begin{array}{c} 1\\ 0\\ 1\\ 1\\ 1\\ 0\\ 0\\ 1 \end{array} $

$\begin{bmatrix} 1 & 1 \\ 0 & 1 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$	$\begin{array}{cccc} 1 & 1 \\ 1 & 0 \\ 1 & 0 \\ 0 & 1 \\ 0 & 0 \end{array}$	$ \begin{array}{c} 1\\1\\0\\1\\1\\\end{array} \end{array} $ $ \begin{array}{c} 1\\0\\0\\0\\0\\0\\0\\0\\0\\0\\0\\0\\0\\0\\0\\0\\0\\0\\0\\0$	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 0 \end{array} $	$ \begin{array}{c} 1 \\ 1 \\ 1 \\ 0 \\ 0 \end{array} $	$\begin{array}{c} 0 \\ 1 \end{array}$	$ \begin{array}{c} 1\\1\\1\\0\\0\\1\\\end{array} \end{array} $ $ \begin{array}{c} 1\\0\\0\\0\\0\\0\\0\\0\\0\\0\\0\\0\\0\end{array} \end{array} $	$egin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \end{array}$	$egin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 1 \\ 0 \\ 0 \end{array}$	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 1 \\ 0 \\ 1 \\ $	$\begin{bmatrix} 1\\1\\1\\0 \end{bmatrix}$	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{array} $	$egin{array}{c} 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \end{array}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 1\\0\\0\\0\\1\\1\\1\\1\\1\\1\\1\\1\\1\end{array} \end{array} $	$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ \end{bmatrix}$	$egin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \end{array}$	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \end{array} $	$ \begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ $	$ \begin{array}{c} 1\\0\\0\\0\\1\\1\\1\\0\\0\\1\\\end{array} $	$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ \end{bmatrix}$	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ $	$egin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 1 \\ 0 \\ 0 \end{array}$	$egin{array}{c} 1 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 1 \\ 1 \\ 1 \\ 0 \end{array}$	$ \begin{array}{c} 1\\ 1\\ 0\\ 1\\ 1\\ 1\\ 1\\ 1\\ 0\\ 1 \end{array} $
A.5.2	Un-re	ealizal	ole																					
$\begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ \end{bmatrix}$ $\begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ \end{bmatrix}$ $\begin{bmatrix} 1 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ \end{bmatrix}$ $\begin{bmatrix} 1 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ \end{bmatrix}$ $\begin{bmatrix} 1 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ \end{bmatrix}$ $\begin{bmatrix} 1 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ \end{bmatrix}$	$\begin{array}{ccccc} 0 & 0 \\ 0 & 0 \\ 1 & 0 \\ 0 & 1 \\ 0 & 0 \\ 0 & 0 \\ 1 & 1 \\ 0 & 0 \\ 1 & 1 \\ 0 & 0 \\ 0 & 1 \\ 1 & 0 \\ 0 & 0 \\ 1 & 1 \\ 1 & 1 \\ 0 & 0 \\ 1 & 1 \\ 1 & 1 \\ 0 & 0 \\ 1 & 1 \\ 1 & 1 \\ 0 & 0 \\ 1 & 1 \\ 1 & 1 \\ 0 & 0 \\ 1 & 0 \\ 0 & 1 \\ 0 & 0 \\ 0 & 0 \\ 0 &$	$ \begin{smallmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0$	$\begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \end{array} $	$\begin{array}{c} 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1$	$ \begin{smallmatrix} 0 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0$	$\begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$	$\begin{array}{c} 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\$	$\begin{array}{c} 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0$	$ \begin{array}{c} 0\\0\\0\\0\\0\\1\\\end{array}\\ \begin{array}{c} 0\\0\\0\\0\\1\\\end{array}\\ \begin{array}{c} 0\\0\\0\\1\\0\\0\\1\\\end{array}\\ \begin{array}{c} 0\\0\\0\\1\\0\\0\\1\\\end{array}\\ \begin{array}{c} 0\\0\\0\\1\\0\\0\\0\\0\\1\\\end{array}\\ \begin{array}{c} 0\\0\\0\\0\\0\\0\\0\\0\\0\\0\\0\\0\\0\\0\\0\\0\\0\\0\\0\\$	$\begin{array}{c} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\$	$\begin{array}{c} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 0\\ 0\\ 0\\ 0\\ 0\\ 1\\ 0\\ 1\\ 0\\ 0\\ 1\\ 1\\ 0\\ 0\\ 1\\ 1\\ 0\\ 0\\ 1\\ 1\\ 0\\ 0\\ 1\\ 1\\ 0\\ 0\\ 1\\ 1\\ 0\\ 0\\ 1\\ 1\\ 0\\ 0\\ 1\\ 1\\ 0\\ 0\\ 1\\ 1\\ 0\\ 0\\ 1\\ 1\\ 0\\ 0\\ 1\\ 1\\ 0\\ 0\\ 1\\ 1\\ 0\\ 0\\ 1\\ 1\\ 0\\ 0\\ 1\\ 0\\ 0\\ 1\\ 0\\ 0\\ 1\\ 0\\ 0\\ 1\\ 0\\ 0\\ 0\\ 1\\ 0\\ 0\\ 0\\ 1\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\$	$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$	$\begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\$	$\begin{array}{c} 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\$	$\begin{array}{c} 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\$	$ \begin{array}{c} 0 \\ 0 \\ 1 \\ 1 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 1$	$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$	$\begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\$	$\begin{array}{c} 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\$	$\begin{array}{c} 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 1 \\ 0 \\ 0 \\$	$\begin{bmatrix} 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ \end{bmatrix} \begin{bmatrix} 0 \\ 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ \end{bmatrix} \begin{bmatrix} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ \end{bmatrix} \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ \end{bmatrix} \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ \end{bmatrix} \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ \end{bmatrix} \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ \end{bmatrix} \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ \end{bmatrix} \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0$

$\begin{bmatrix} 1\\0\\0\\0\\0\\0 \end{bmatrix}$	0 1 0 0	$egin{array}{c} 0 \\ 0 \\ 1 \\ 0 \\ 0 \end{array}$	$egin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 0 \end{array}$	1 1 1 1 1	$\begin{bmatrix} 1\\0\\0\\0\\0\\0 \end{bmatrix}$	$egin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \end{array}$	$egin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 0 \end{array}$	$egin{array}{c} 0 \\ 0 \\ 0 \\ 1 \\ 0 \end{array}$	0 0	0 0 0	$ \begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{array} $	$egin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 0 \end{array}$	$egin{array}{c} 0 \\ 0 \\ 0 \\ 1 \\ 0 \end{array}$	$\begin{bmatrix} 0 \\ 0 \\ 0 \\ 1 \\ 1 \end{bmatrix}$	$\begin{bmatrix} 1\\0\\0\\0\\0\\0 \end{bmatrix}$	0 1 0 0	$egin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 0 \end{array}$	0 0 0 1 0	$\begin{bmatrix} 0 \\ 1 \\ 0 \\ 0 \\ 1 \end{bmatrix}$	$\begin{bmatrix} 1\\0\\0\\0\\0\\0 \end{bmatrix}$	$egin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \end{array}$	$egin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 0 \end{array}$	0 1 0 1 0	$\begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 1 \end{bmatrix}$	$\begin{bmatrix} 1\\ 0\\ 0\\ 0\\ 0\\ 0 \end{bmatrix}$	0 1 0 0	$egin{array}{c} 1 \\ 1 \\ 1 \\ 0 \\ 0 \end{array}$	$egin{array}{c} 0 \\ 0 \\ 0 \\ 1 \\ 0 \end{array}$	$\begin{bmatrix} 0\\1\\0\\0\\1\end{bmatrix}$
$\begin{bmatrix} 1\\0\\0\\0\\0\\0 \end{bmatrix}$	0 1 0 0	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 0 \end{array} $	$ \begin{array}{c} 0 \\ 1 \\ 0 \\ 1 \\ 0 \end{array} $	$\begin{bmatrix} 0\\0\\0\\0\\1\end{bmatrix}$	$\begin{bmatrix} 1\\0\\0\\0\\0\\0 \end{bmatrix}$	$ \begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{array} $	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \end{array} $	0 0 0 1 0	0 0 1	0 0 0	0 1 0 0 0	1 0 1 0 0	0 0 0 1 0		$\begin{bmatrix} 1\\0\\0\\0\\0\\0 \end{bmatrix}$	0 1 0 0 0	1 0 1 0 0	0 0 0 1 0		$\begin{bmatrix} 1\\0\\0\\0\\0\\0 \end{bmatrix}$	0 1 0 0	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 0 \end{array} $	0 0 0 1 0	1 1 1 1 1	$\begin{bmatrix} 1\\0\\0\\0\\0\end{bmatrix}$	$ \begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{array} $	$ \begin{array}{c} 1 \\ 1 \\ 1 \\ 0 \\ 0 \end{array} $	$egin{array}{c} 0 \\ 0 \\ 0 \\ 1 \\ 0 \end{array}$	$ \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 1 \end{bmatrix} $
$\begin{bmatrix} 1\\0\\0\\0\\0\\0 \end{bmatrix}$	0 1 0 0	1 0 1 0 0	$ \begin{array}{c} 1 \\ 0 \\ 1 \\ 1 \\ 0 \end{array} $	$\begin{bmatrix} 0\\0\\0\\0\\1\end{bmatrix}$	$\begin{bmatrix} 1\\0\\0\\0\\0\\0 \end{bmatrix}$	0 1 0 0 0	$egin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 0 \end{array}$	$egin{array}{c} 1 \\ 1 \\ 0 \\ 1 \\ 0 \end{array}$	0 0 0	0 0 0	0 1 0 0 0	1 1 1 0 0	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 1 \\ 0 \end{array} $	$\begin{bmatrix} 0\\0\\0\\0\\1\end{bmatrix}$	$\begin{bmatrix} 1\\0\\0\\0\\0\\0 \end{bmatrix}$	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{array} $	0 0 1 0 0	0 0 1 0	$\begin{bmatrix} 0\\0\\0\\0\\1\end{bmatrix}$	$\begin{bmatrix} 1\\ 0\\ 0\\ 0\\ 0\\ 0 \end{bmatrix}$	$egin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{array}$	0 0 1 0 0	$\begin{array}{c} 0 \\ 0 \\ 0 \\ 1 \\ 0 \end{array}$	$\begin{bmatrix} 0 \\ 0 \\ 0 \\ 1 \\ 1 \end{bmatrix}$	$\begin{bmatrix} 1\\0\\0\\0\\0\\0 \end{bmatrix}$	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ $	0 0 1 0 0	$egin{array}{c} 0 \\ 0 \\ 0 \\ 1 \\ 0 \end{array}$	$\begin{bmatrix} 0\\0\\1\\0\\1\end{bmatrix}$
$\begin{bmatrix} 1\\0\\0\\0\\0\\0 \end{bmatrix}$	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{array} $	0 0 1 0 0	0 0 1 1 0	$\begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \end{bmatrix}$	$\begin{bmatrix} 1\\0\\0\\0\\0\\0 \end{bmatrix}$	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{array} $	0 0 1 0 0	0 0 0 1 0	0 0 1	0 0 0	1 1 0 0 0	0 0 1 0 0	0 0 0 1 0	1 0 1 0 1	$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix}$	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{array} $	0 0 1 0 0	0 0 0 1 0	$\begin{bmatrix} 1 \\ 1 \\ 0 \\ 0 \\ 1 \end{bmatrix}$	$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix}$	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{array} $	0 0 1 0 0	0 0 0 1 0	1 1 1 1 1 1	$\begin{bmatrix} 1\\ 0\\ 0\\ 0\\ 0\\ 0 \end{bmatrix}$	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{array} $	0 0 1 0 0	$egin{array}{c} 1 \\ 0 \\ 1 \\ 1 \\ 0 \end{array}$	$\begin{bmatrix} 0\\0\\0\\0\\1\end{bmatrix}$
$\begin{bmatrix} 1\\0\\0\\0\\0\\0 \end{bmatrix}$	$egin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 0 \end{array}$	0 0 1 0 0	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 1 \\ 0 \end{array} $	$\begin{bmatrix} 0\\0\\0\\0\\1\end{bmatrix}$	$\begin{bmatrix} 1\\0\\0\\0\\0\\0 \end{bmatrix}$	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{array} $	$egin{array}{c} 1 \\ 1 \\ 1 \\ 0 \\ 0 \end{array}$	0 0 0 1 0	0 0	0 0 0	1 1 0 0 0	$egin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 0 \end{array}$	$egin{array}{c} 1 \\ 0 \\ 0 \\ 1 \\ 0 \end{array}$	1 0 0 1 1	$\begin{bmatrix} 1\\0\\0\\0\\0\\0 \end{bmatrix}$	$egin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 0 \end{array}$	1 0 1 0 0	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 1 \\ 0 \end{array} $	$\begin{bmatrix} 1\\0\\1\\0\\1\end{bmatrix}$	$\begin{bmatrix} 1\\0\\0\\0\\0\\0 \end{bmatrix}$	$egin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 0 \end{array}$	$egin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 0 \end{array}$	$egin{array}{c} 1 \\ 0 \\ 1 \\ 1 \\ 0 \end{array}$	$\begin{bmatrix} 1\\0\\0\\0\\1\end{bmatrix}$	$\begin{bmatrix} 1\\0\\0\\0\\0\\0 \end{bmatrix}$	$egin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 0 \end{array}$	$egin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 0 \end{array}$	$egin{array}{c} 1 \\ 0 \\ 0 \\ 1 \\ 0 \end{array}$	$\begin{bmatrix} 1 \\ 1 \\ 0 \\ 0 \\ 1 \end{bmatrix}$
					$\begin{bmatrix} 1\\0\\0\\0\\0\\0 \end{bmatrix}$	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{array} $	$egin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 0 \end{array}$	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 1 \\ 0 \end{array} $	1 1	0 0 0	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{array} $	$egin{array}{c} 1 \\ 0 \\ 1 \\ 0 \\ 0 \end{array}$	$egin{array}{c} 1 \\ 1 \\ 0 \\ 1 \\ 0 \end{array}$	$ \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 1 \end{bmatrix} $	$\begin{bmatrix} 1\\ 0\\ 0\\ 0\\ 0\\ 0 \end{bmatrix}$	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{array} $	$ \begin{array}{c} 1 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \end{array} $	$egin{array}{c} 1 \\ 0 \\ 0 \\ 1 \\ 0 \end{array}$	$ \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 1 \end{bmatrix} $	$\begin{bmatrix} 1\\ 0\\ 0\\ 0\\ 0\\ 0 \end{bmatrix}$	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{array} $	$egin{array}{c} 1 \\ 1 \\ 1 \\ 0 \\ 0 \end{array}$	$egin{array}{c} 1 \\ 1 \\ 0 \\ 1 \\ 0 \end{array}$	$ \begin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 1 \end{array} $	$\begin{bmatrix} 1\\ 0\\ 0\\ 0\\ 0\\ 0 \end{bmatrix}$	$egin{array}{c} 1 \\ 1 \\ 0 \\ 0 \\ 0 \end{array}$	$egin{array}{c} 1 \\ 1 \\ 1 \\ 0 \\ 0 \end{array}$	$egin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 0 \end{array}$	1 1 1 1 1