PROOF OF THE CONTINUED FRACTION CONJECTURE FOR $(a,b) = (z^4 + z^2, z^3 + z^2 + 1)$

GUO-NIU HAN* AND YINING HU*

Abstract. The continued fraction conjecture claims that the continued fraction defined by the (a,b)-Thue-Morse sequence is algebraic over $\mathbb{F}_2(x)$ for all pairs of distinct elements (a,b) in $\mathbb{F}_2[x] \setminus \mathbb{F}_2$. In this paper we prove the conjecture for $(a,b) = (z^4 + z^2, z^3 + z^2 + 1)$.

1. Introduction

Let $\mathbb{F}_2$ be the finite field of cardinality 2. Given a sequence of polynomials $\mathbf{a} = (a_0(z), a_1(z), a_2(z), \ldots)$ of elements from $\mathbb{F}_2[z] \setminus \mathbb{F}_2$, we define the infinite continued fraction

$$\mathrm{CF}(\mathbf{a}(z)) = \cfrac{1}{a_0(z) + \cfrac{1}{a_1(z) + \cfrac{1}{a_2(z) + \cfrac{1}{\ddots}}}} \tag{1.1}$$

as the limit of the finite continued fractions

$$\mathrm{CF}_n(\mathbf{a}(z)) = \cfrac{1}{a_0(z) + \cfrac{1}{a_1(z) + \cfrac{1}{\ddots + \cfrac{1}{a_n(z)}}}} \in \mathbb{F}_2((1/z)). \tag{1.2}$$

Conversely, each power series in $\mathbb{F}_2[[1/z]]$ without constant term

$$c_{-1}z^{-1} + c_{-2}z^{-2} + c_{-3}z^{-3} + \cdots \tag{1.3}$$

admits a continued fraction expansion of form (1.1).

Let a and b be two distinct elements from $\mathbb{F}_2[z] \setminus \mathbb{F}_2$. We consider the continued fraction (1.1) associated with the (a,b)-Thue-Morse sequence

$$\mathbf{t} = (t_0(z), t_1(z), t_2(z), \ldots) = (a, b, b, a, b, a, a, b, \ldots)$$

that we shall denote

$$\mathrm{CF}(a,b) := \mathrm{CF}(\mathbf{t}). \tag{1.4}$$

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Theorem 1.1. *When* $(a,b)=(z^4+z^2,z^3+z^2+1)$*, the two power series* $\mathrm{CF}(a,b)$ *and* $\mathrm{CF}(b,a)$ *are algebraic over* $\mathbb{F}_2(z)$*, with minimal polynomials of the form*

$$p_4(z)y^4+p_3(z)y^3+p_2(z)y^2+p_1(z)y+p_0(z)=0$$

where, for $\mathrm{CF}(a,b)$*,*

$$\begin{aligned}
p_0(z)&=z^{21}+z^{20}+z^{18}+z^{14}+z^{10}+z^9+z^7+z^5+z^4+z^2+1,\\
p_1(z)&=z^{25}+z^{23}+z^{22}+z^{20}+z^{18}+z^{13}+z^{10}+z^7+z^6+z^2,\\
p_2(z)&=z^{28}+z^{24}+z^{22}+z^{20}+z^{16}+z^{14}+z^8+z^4,\\
p_3(z)&=z^{25}+z^{23}+z^{22}+z^{20}+z^{18}+z^{13}+z^{10}+z^7+z^6+z^2,\\
p_4(z)&=z^{22}+z^{21}+z^{20}+z^{18}+z^{12}+z^{10}+z^9+z^7+z^5+z^2,
\end{aligned}$$

and for $\mathrm{CF}(b,a)$*,*

$$\begin{aligned}
p_0(z)&=z^{21}+z^{20}+z^{18}+z^{16}+z^{14}+z^{12}+z^{10}+z^9+z^7+z^5+z^4+z^2,\\
p_1(z)&=z^{25}+z^{23}+z^{22}+z^{20}+z^{18}+z^{13}+z^{10}+z^7+z^6+z^2,\\
p_2(z)&=z^{28}+z^{24}+z^{22}+z^{20}+z^{16}+z^{14}+z^8+z^4,\\
p_3(z)&=z^{25}+z^{23}+z^{22}+z^{20}+z^{18}+z^{13}+z^{10}+z^7+z^6+z^2,\\
p_4(z)&=z^{22}+z^{21}+z^{20}+z^{18}+z^{16}+z^{10}+z^9+z^7+z^5+z^2+1.
\end{aligned}$$

2. Proof

Define the sequences of polynomials $(P_n(z))_{n\geq 0}$ and $(Q_n(z))_{n\geq 0}$ by

$$\begin{pmatrix} P_n(z) & Q_n(z)\\ P_{n-1}(z) & Q_{n-1}(z)\end{pmatrix} := \begin{pmatrix} t_n(z) & 1\\ 1 & 0\end{pmatrix}\begin{pmatrix} t_{n-1}(z) & 1\\ 1 & 0\end{pmatrix}\cdots\begin{pmatrix} t_0(z) & 1\\ 1 & 0\end{pmatrix}\begin{pmatrix} 0 & 1\\ 1 & 0\end{pmatrix}.$$

By the basic properties of continued fractions, we have

$$\mathrm{CF}_n(a,b)=\frac{P_n(z)}{Q_n(z)}\in\mathbb{F}_2((1/z)). \tag{2.1}$$

As formula (2.1) is not efficient for calculating $\mathrm{CF}_n(a,b)$, a fast method is to be derived and described as follows. Define

$$\begin{aligned}
M_n(x)&=x^{\deg(t_{2^n-1})}\begin{pmatrix} t_{2^n-1}(1/x) & 1\\ 1 & 0\end{pmatrix}\times x^{\deg(t_{2^n-2})}\begin{pmatrix} t_{2^n-2}(1/x) & 1\\ 1 & 0\end{pmatrix}\times\\
&\qquad\cdots\times x^{\deg(t_0)}\begin{pmatrix} t_0(1/x) & 1\\ 1 & 0\end{pmatrix},\\
W_n(x)&=x^{\deg(\bar t_{2^n-1})}\begin{pmatrix} \bar t_{2^n-1}(1/x) & 1\\ 1 & 0\end{pmatrix}\times x^{\deg(\bar t_{2^n-2})}\begin{pmatrix} \bar t_{2^n-2}(1/x) & 1\\ 1 & 0\end{pmatrix}\times\\
&\qquad\cdots\times x^{\deg(\bar t_0)}\begin{pmatrix} \bar t_0(1/x) & 1\\ 1 & 0\end{pmatrix},
\end{aligned}$$

where $\bar{\mathbf{t}}$ is the (b,a)-Thue-Morse sequence. By the properties of the Thue-Morse sequence, we have for $n\geq 0$

$$\begin{aligned}
M_{n+1}(x)&=W_n(x)\cdot M_n(x),\\
W_{n+1}(x)&=M_n(x)\cdot W_n(x).
\end{aligned}$$

Let $x := 1/z$. For each non-zero polynomial $P(z)$, define $\tilde{P}(x)$ to be $P(1/x)$. Then,

$$\mathrm{CF}_n(a,b) = \frac{P_n(z)}{Q_n(z)} = \frac{\tilde{P}_n(x)}{\tilde{Q}_n(x)} \in \mathbb{F}_2((x)) = \mathbb{F}_2((1/z)).$$

Comparing the definition of $M_n(x)$ with the definition of $P_n(x)$ and $Q_n(x)$, we see that

$$M_n(x)_{0,1} = x^{d_n}\tilde{P}_{2^n-1}(x),$$
$$M_n(x)_{0,0} = x^{d_n}\tilde{Q}_{2^n-1}(x),$$

for some positive integer d_n. Hence,

$$\mathrm{CF}_{2^{2n}-1}(a,b) = \frac{\tilde{P}_{2^{2n}-1}(x)}{\tilde{Q}_{2^{2n}-1}(x)} = \frac{M_{2n}(x)_{0,1}}{M_{2n}(x)_{0,0}}. \tag{2.2}$$

Therefore, by the convergence theorem of continued fraction, the algebraicity of $\mathrm{CF}(a,b)$ will be established if it is shown that both $M_{2n}(x)_{0,1}$ and $M_{2n}(x)_{0,0}$ converge to algebraic series in $\mathbb{F}_2[[x]]$.

Actually, we will prove that for all $0 \le i,j \le 1$ the four sequences $(M_{2n}(x)_{i,j})_n$, $(M_{2n+1}(x)_{i,j})_n$, $(W_{2n}(x)_{i,j})_n$, and $(W_{2n+1}(x)_{i,j})_n$ converge to algebraic series in $\mathbb{F}_2[[x]]$. For this purpose, we define four 2×2 matrices M^e, M^o, W^e, W^o as follows: For each $T \in \{M^e, M^o, W^e, W^o\}$ and $0 \le i,j \le 1$, $T_{i,j}$ is defined to be the unique solution in $\mathbb{F}_2[[x]]$ of the polynomial $\phi(T,i,j)$ under certain initial conditions; the polynomials $\phi(T,i,j)$ and initial conditions are given in Section 3. We will prove that these four matrices, whose components are algebraic by definition, are the limits of $(M_{2n}(x))_n$, $(M_{2n+1}(x))_n$, $(W_{2n}(x))_n$, and $(W_{2n+1}(x))_n$.

Let us explain how the polynomials $\phi(T,i,j)$ and initial conditions are found, and why the solutions exist and are unique. For $0 \le i,j \le 1$, the the coefficients of the polynomial $\phi(M^e,i,j)$ (resp. $\phi(M^o,i,j)$, $\phi(W^e,i,j)$, and $\phi(W^o,i,j)$) are the Padé-Hermite approximants of type

$$(175, 175, 175, 175, 175)$$

of the vector

$$(1, T^3, T^6, T^9, T^{12}),$$

where $T = M_{12,i,j}$ (resp. $M_{11,i,j}$, $W_{12,i,j}$, and $W_{11,i,j}$), found by the Derksen algorithm. We take the first 8 terms of $M_{12,i,j}$ (resp. $M_{11,i,j}$, $W_{12,i,j}$, and $W_{11,i,j}$) as initial conditions for $\phi(M^e,i,j)$ (resp. $\phi(M^o,i,j)$, $\phi(W^e,i,j)$, and $\phi(W^o,i,j)$). The following fact will be used to ensure that the solution exists and is unique: let $P(x,y) \in \mathbb{F}_2[x,y]$ and for each series $f(x) = \sum_{n=0}^{\infty} a_n x^n \in \mathbb{F}_2[[x]]$ denote the partial sum $\sum_{j=0}^{n-1} a_j x^j$ by $f_n(x)$ for $n \ge 0$. If for some $n \ge 0$ and $a_0, a_1, \ldots, a_{n-1} \in \mathbb{F}_2$ $P(x, \sum_{j=0}^{n-1} a_j x^j) = O(x^n)$ and $Q(x,y) := P(x, \sum_{j=0}^{n-1} a_j x^j + x^n y)$ can be written as $x^m \sum_{j=0}^{\infty} q_j(x) y^j$ where $q_j(x)$ are polynomials for $j \ge 0$, $q_1(0) = 1$, and $q_j(0) = 0$ for $j > 1$, then there exists a unique solution $f(x) \in \mathbb{F}_2[[x]]$ of $P(x, f(x)) = 0$ that satisfies the initial condition $f_n(x) = \sum_{j=0}^{n-1} a_j x^j$.

We state two lemmas concerning the four matrices M^e, M^o, W^e, W^o. The first one is about relations between them; the second, about the structure of the each matrix.

Lemma 2.1. *We have*

$$M^e = W^o \cdot M^o, \tag{2.3}$$

$$M^o = W^e \cdot M^e, \tag{2.4}$$

$$W^e = M^o \cdot W^o, \tag{2.5}$$

$$W^o = M^e \cdot W^e. \tag{2.6}$$

Proof. We give the proof of the identity

$$M^e_{0,0} = W^o_{0,0} M^o_{0,0} + W^o_{0,1} M^o_{1,0},$$

the proofs of the others being similar.

First, we compute the minimal polynomials of $W^o_{0,0} M^o_{0,0}$ and $W^o_{0,1} M^o_{1,0}$. We know that

$$P(x,y) = \operatorname{Res}_z \left(\phi(W^o,0,0)(x,z),\ z^{12} \cdot \phi(M^o,0,0)(x,y/z)\right)$$

is an annihilating polynomial of $W^o_{0,0} M^o_{0,0}$. We use Padé-Hermite approximation to find a candidate for the minimal polynomial of $W^o_{0,0} M^o_{0,0}$, that will be called $\phi_0(x,y)$. To prove that $\phi_0(x,y)$ is indeed the minimal polynomial, it suffices to prove that it is an irreducible factor of $P(x,y)$ of multiplicity m and that $Q(x,y) := P(x,y)/\phi_0(x,y)^m$ is not an annihilating polynomial of $W^o_{0,0} M^o_{0,0}$. We verify the first point directly. For the second point, we truncate $W^o_{0,0} M^o_{0,0}$ to order 630 and substitute it for y in $Q(x,y)$. We get a series of valuation less than 630, which proves that $Q(x,y)$ is not an annihilating polynomial of $W^o_{0,0} M^o_{0,0}$. We find the minimal polynomial $\phi_1(x,y)$ of $W^o_{0,1} M^o_{1,0}$ in a similar way.

Now we prove that $\phi(M^e,0,0)$ is the minimal polynomial of $W^o_{0,0} M^o_{0,0} + W^o_{0,1} M^o_{1,0}$. We know that

$$S(x,y) = \operatorname{Res}_z \left(\phi_0(x,z),\ \phi_1(x,y+z)\right)$$

is an annihilating of $W^o_{0,0} M^o_{0,0} + W^o_{0,1} M^o_{1,0}$. We verify that $\phi(M^e,0,0)$ is an irreducible factor of $S(x,y)$ of multiplicity μ, and that $Q(x,y) := S(x,y)/\phi(M^e,0,0)^\mu$ is not an annihilating polynomial of $W^o_{0,0} M^o_{0,0} + W^o_{0,1} M^o_{1,0}$. To see the last point, we truncate $W^o_{0,0} M^o_{0,0} + W^o_{0,1} M^o_{1,0}$ to order 770 and substitute it for y in $Q(x,y)$. We get a series of valuation less than 770, and therefore $Q(x,y)$ is not an annihilating polynomial of $W^o_{0,0} M^o_{0,0} + W^o_{0,1} M^o_{1,0}$.

Finally, the first 16 terms of $M^e_{0,0}$ and $W^o_{0,0} M^o_{0,0} + W^o_{0,1} M^o_{1,0}$ coincide. As these first terms determine a unique solution of $\phi(M^e,0,0)$, we know that the two series are one and the same. □

Define

$$R^e = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} \qquad \text{and} \qquad R^o = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}.$$

Lemma 2.2. *For all integers $k \geq 2$ and $u = 2^{2k-1}$, the following identities hold.*

$$\begin{aligned} M^e[:14u] = {} & M^e[:7u] + x^u M^e[:6u] + x^{2u} M^e[:5u] + x^{5u} M^e[:2u] + x^{6u} M^e[:u] \\ & + x^u M^e[:7u] + x^{2u} M^e[:6u] + x^{3u} M^e[:5u] + x^{6u} M^e[:2u] \\ & + x^{7u} M^e[:u] + x^{3u} M^e[:7u] + x^{4u} M^e[:6u] + x^{5u} M^e[:5u] \\ & + x^{8u} M^e[:2u] + x^{9u} M^e[:u] + x^{4u} M^e[:7u] + x^{5u} M^e[:6u] \\ & + x^{6u} M^e[:5u] + x^{9u} M^e[:2u] + x^{10u} M^e[:u] + x^{5u} M^e[:7u] \\ & + x^{6u} M^e[:6u] + x^{7u} M^e[:5u] + x^{10u} M^e[:2u] + x^{11u} M^e[:u] \end{aligned}$$

$$
\begin{aligned}
&+ x^{7u}M^e[:7u] + x^{8u}M^e[:6u] + x^{9u}M^e[:5u] + x^{12u}M^e[:2u] \\
&+ x^{13u}M^e[:u] + (x^{7u} + x^{8u} + x^{10u} + x^{11u} + x^{12u})R^e, \\
W^e[:14u] &= W^e[:7u] + x^{u}W^e[:6u] + x^{2u}W^e[:5u] + x^{5u}W^e[:2u] + x^{6u}W^e[:u] \\
&+ x^{u}W^e[:7u] + x^{2u}W^e[:6u] + x^{3u}W^e[:5u] + x^{6u}W^e[:2u] \\
&+ x^{7u}W^e[:u] + x^{3u}W^e[:7u] + x^{4u}W^e[:6u] + x^{5u}W^e[:5u] \\
&+ x^{8u}W^e[:2u] + x^{9u}W^e[:u] + x^{4u}W^e[:7u] + x^{5u}W^e[:6u] \\
&+ x^{6u}W^e[:5u] + x^{9u}W^e[:2u] + x^{10u}W^e[:u] + x^{5u}W^e[:7u] \\
&+ x^{6u}W^e[:6u] + x^{7u}W^e[:5u] + x^{10u}W^e[:2u] + x^{11u}W^e[:u] \\
&+ x^{7u}W^e[:7u] + x^{8u}W^e[:6u] + x^{9u}W^e[:5u] + x^{12u}W^e[:2u] \\
&+ x^{13u}W^e[:u] + (x^{7u} + x^{8u} + x^{10u} + x^{11u} + x^{12u})R^e.
\end{aligned}
$$

For all integers $k \geq 2$ and $u = 2^{2k}$, the following identities hold.

$$
\begin{aligned}
M^o[:14u] &= M^o[:7u] + x^{u}M^o[:6u] + x^{2u}M^o[:5u] + x^{5u}M^o[:2u] + x^{6u}M^o[:u] \\
&+ x^{u}M^o[:7u] + x^{2u}M^o[:6u] + x^{3u}M^o[:5u] + x^{6u}M^o[:2u] \\
&+ x^{7u}M^o[:u] + x^{3u}M^o[:7u] + x^{4u}M^o[:6u] + x^{5u}M^o[:5u] \\
&+ x^{8u}M^o[:2u] + x^{9u}M^o[:u] + x^{4u}M^o[:7u] + x^{5u}M^o[:6u] \\
&+ x^{6u}M^o[:5u] + x^{9u}M^o[:2u] + x^{10u}M^o[:u] + x^{5u}M^o[:7u] \\
&+ x^{6u}M^o[:6u] + x^{7u}M^o[:5u] + x^{10u}M^o[:2u] + x^{11u}M^o[:u] \\
&+ x^{7u}M^o[:7u] + x^{8u}M^o[:6u] + x^{9u}M^o[:5u] + x^{12u}M^o[:2u] \\
&+ x^{13u}M^o[:u] + (x^{7u} + x^{8u} + x^{10u} + x^{11u} + x^{12u})R^o, \\
W^o[:14u] &= W^o[:7u] + x^{u}W^o[:6u] + x^{2u}W^o[:5u] + x^{5u}W^o[:2u] + x^{6u}W^o[:u] \\
&+ x^{u}W^o[:7u] + x^{2u}W^o[:6u] + x^{3u}W^o[:5u] + x^{6u}W^o[:2u] \\
&+ x^{7u}W^o[:u] + x^{3u}W^o[:7u] + x^{4u}W^o[:6u] + x^{5u}W^o[:5u] \\
&+ x^{8u}W^o[:2u] + x^{9u}W^o[:u] + x^{4u}W^o[:7u] + x^{5u}W^o[:6u] \\
&+ x^{6u}W^o[:5u] + x^{9u}W^o[:2u] + x^{10u}W^o[:u] + x^{5u}W^o[:7u] \\
&+ x^{6u}W^o[:6u] + x^{7u}W^o[:5u] + x^{10u}W^o[:2u] + x^{11u}W^o[:u] \\
&+ x^{7u}W^o[:7u] + x^{8u}W^o[:6u] + x^{9u}W^o[:5u] + x^{12u}W^o[:2u] \\
&+ x^{13u}W^o[:u] + (x^{7u} + x^{8u} + x^{10u} + x^{11u} + x^{12u})R^o.
\end{aligned}
$$

Proof. To prove Lemma 2.2 we first construct an automaton for each sequence concerned, and then transform the conditions on infinitely many k's into finitely many conditions on the states of the automaton. In the following, we will prove that for $T = M^o_{0,0}$, for all integer $k \geq 2$ and $u = 2^{2k}$,

$$
\begin{aligned}
T[:14u] &= T[:7u] + x^{u}T[:6u] + x^{2u}T[:5u] + x^{5u}T[:2u] + x^{6u}T[:u] + x^{u}T[:7u] \\
&+ x^{2u}T[:6u] + x^{3u}T[:5u] + x^{6u}T[:2u] + x^{7u}T[:u] + x^{3u}T[:7u] \\
&+ x^{4u}T[:6u] + x^{5u}T[:5u] + x^{8u}T[:2u] + x^{9u}T[:u] + x^{4u}T[:7u] \\
&+ x^{5u}T[:6u] + x^{6u}T[:5u] + x^{9u}T[:2u] + x^{10u}T[:u] + x^{5u}T[:7u] \\
&+ x^{6u}T[:6u] + x^{7u}T[:5u] + x^{10u}T[:2u] + x^{11u}T[:u] + x^{7u}T[:7u]
\end{aligned}
$$

$$+ x^{8u}T[:6u] + x^{9u}T[:5u] + x^{12u}T[:2u] + x^{13u}T[:u].$$

The proof of the other 15 cases are similar. We break down the above identity into 7 parts:

$$\begin{aligned}
0 &= x^{7u}T[:u] + x^{6u}T[u:2u] + x^{5u}T[2u:3u] + x^{2u}T[5u:6u] + x^{u}T[6u:7u] \\
&\quad + T[7u:8u], \\
0 &= x^{5u}T[3u:4u] + x^{3u}T[5u:6u] + T[8u:9u], \\
0 &= x^{9u}T[:u] + x^{5u}T[4u:5u] + x^{3u}T[6u:7u] + T[9u:10u], \\
0 &= x^{8u}T[2u:3u] + x^{4u}T[6u:7u] + T[10u:11u], \\
0 &= x^{11u}T[:u] + x^{10u}T[u:2u] + x^{9u}T[2u:3u] + x^{8u}T[3u:4u] \\
&\quad + x^{6u}T[5u:6u] + x^{5u}T[6u:7u] + T[11u:12u], \\
0 &= x^{12u}T[:u] + x^{9u}T[3u:4u] + x^{8u}T[4u:5u] + x^{7u}T[5u:6u] \\
&\quad + T[12u:13u], \\
0 &= x^{13u}T[:u] + x^{12u}T[u:2u] + x^{9u}T[4u:5u] + x^{8u}T[5u:6u] \\
&\quad + x^{7u}T[6u:7u] + T[13u:14u],
\end{aligned}$$

which can be rewritten as

$$\begin{aligned}
0 &= T[[w]_2] + T[[1w]_2] + T[[10w]_2] + T[[101w]_2] + T[[110w]_2] \\
&\quad + T[[111w]_2], \tag{2.7}\\
0 &= T[[11w]_2] + T[[101w]_2] + T[[1000w]_2], \tag{2.8}\\
0 &= T[[w]_2] + T[[100w]_2] + T[[110w]_2] + T[[1001w]_2], \tag{2.9}\\
0 &= T[[10w]_2] + T[[110w]_2] + T[[1010w]_2], \tag{2.10}\\
0 &= T[[w]_2] + T[[1w]_2] + T[[10w]_2] + T[[11w]_2] + T[[101w]_2] \\
&\quad + T[[110w]_2] + T[[1011w]_2], \tag{2.11}\\
0 &= T[[w]_2] + T[[11w]_2] + T[[100w]_2] + T[[101w]_2] + T[[1100w]_2], \tag{2.12}\\
0 &= T[[w]_2] + T[[1w]_2] + T[[100w]_2] + T[[101w]_2] + T[[110w]_2] \\
&\quad + T[[1101w]_2], \tag{2.13}
\end{aligned}$$

for all binary word w of length $2k$ and $w \neq 0^{2k}$, and

$$\begin{aligned}
0 &= T[[w]_2] + T[[1w]_2] + T[[10w]_2] + T[[101w]_2] + T[[110w]_2] \\
&\quad + T[[111w]_2], \tag{2.14}\\
0 &= T[[11w]_2] + T[[101w]_2] + T[[1000w]_2], \tag{2.15}\\
0 &= T[[w]_2] + T[[100w]_2] + T[[110w]_2] + T[[1001w]_2], \tag{2.16}\\
0 &= T[[10w]_2] + T[[110w]_2] + T[[1010w]_2], \tag{2.17}\\
0 &= T[[w]_2] + T[[1w]_2] + T[[10w]_2] + T[[11w]_2] + T[[101w]_2] \\
&\quad + T[[110w]_2] + T[[1011w]_2], \tag{2.18}\\
0 &= T[[w]_2] + T[[11w]_2] + T[[100w]_2] + T[[101w]_2] + T[[1100w]_2], \tag{2.19}\\
0 &= T[[w]_2] + T[[1w]_2] + T[[100w]_2] + T[[101w]_2] + T[[110w]_2] \\
&\quad + T[[1101w]_2], \tag{2.20}
\end{aligned}$$

for $w = 0^{2k}$.

First we calculate an 2-automaton that generates T from its minimal polynomial and its first terms. This automaton has 2785 states; its transition function and output function can be found in the annex. Let $A(s,w)$ denote the state reached after reading w from right to left starting from the state s, and τ the output function. Define

$$E_{2k} = \{A(i,w) : |w| = 2k, w \neq 0^{2k}\}.$$

Identities (2.7) through (2.20) can be written as

$$\begin{aligned}
&0 = \tau(A(s,\epsilon)) + \tau(A(s,1)) + \tau(A(s,10)) + \tau(A(s,101)) \\
&\quad + \tau(A(s,110)) + \tau(A(s,111)), && (2.21)\\
&0 = \tau(A(s,11)) + \tau(A(s,101)) + \tau(A(s,1000)), && (2.22)\\
&0 = \tau(A(s,\epsilon)) + \tau(A(s,100)) + \tau(A(s,110)) + \tau(A(s,1001)), && (2.23)\\
&0 = \tau(A(s,10)) + \tau(A(s,110)) + \tau(A(s,1010)), && (2.24)\\
&0 = \tau(A(s,\epsilon)) + \tau(A(s,1)) + \tau(A(s,10)) + \tau(A(s,11)) + \tau(A(s,101)) \\
&\quad + \tau(A(s,110)) + \tau(A(s,1011)), && (2.25)\\
&0 = \tau(A(s,\epsilon)) + \tau(A(s,11)) + \tau(A(s,100)) + \tau(A(s,101)) \\
&\quad + \tau(A(s,1100)), && (2.26)\\
&0 = \tau(A(s,\epsilon)) + \tau(A(s,1)) + \tau(A(s,100)) + \tau(A(s,101)) \\
&\quad + \tau(A(s,110)) + \tau(A(s,1101)), && (2.27)
\end{aligned}$$

for all $s \in E_{2k}$, and

$$\begin{aligned}
&0 = \tau(A(s,\epsilon)) + \tau(A(s,1)) + \tau(A(s,10)) + \tau(A(s,101)) \\
&\quad + \tau(A(s,110)) + \tau(A(s,111)), && (2.28)\\
&0 = \tau(A(s,11)) + \tau(A(s,101)) + \tau(A(s,1000)), && (2.29)\\
&0 = \tau(A(s,\epsilon)) + \tau(A(s,100)) + \tau(A(s,110)) + \tau(A(s,1001)), && (2.30)\\
&0 = \tau(A(s,10)) + \tau(A(s,110)) + \tau(A(s,1010)), && (2.31)\\
&0 = \tau(A(s,\epsilon)) + \tau(A(s,1)) + \tau(A(s,10)) + \tau(A(s,11)) + \tau(A(s,101)) \\
&\quad + \tau(A(s,110)) + \tau(A(s,1011)), && (2.32)\\
&0 = \tau(A(s,\epsilon)) + \tau(A(s,11)) + \tau(A(s,100)) + \tau(A(s,101)) \\
&\quad + \tau(A(s,1100)), && (2.33)\\
&0 = \tau(A(s,\epsilon)) + \tau(A(s,1)) + \tau(A(s,100)) + \tau(A(s,101)) \\
&\quad + \tau(A(s,110)) + \tau(A(s,1101)), && (2.34)
\end{aligned}$$

for $s = A(i, 0^{2k})$. We find that $(A(i, 0^{50}), E_{50}) = (A(i, 0^{20}), E_{20})$, so that we only have to verify that identities (2.21) through (2.34) hold for $2 \leq k \leq 25$, which turns out to be true. $\square$

In the following lemma, we express M_{2k}, M_{2k+1}, W_{2k}, and W_{2k+1} in terms of M^e, M^o, W^e, and W^o.

Lemma 2.3. *For all integer $k \geq 2$, and $u = 2^{2k-1}$,*

$$\begin{aligned}
M_{2k} = {} & M^e[:7u] + x^u M^e[:6u] + x^{2u} M^e[:5u] + x^{5u} M^e[:2u] + x^{6u} M^e[:u] \\
& + x^{7u} R^e,
\end{aligned}$$

$$\begin{aligned}W_{2k} = {}& W^e[:7u] + x^u W^e[:6u] + x^{2u} W^e[:5u] + x^{5u} W^e[:2u] + x^{6u} W^e[:u] \\ &+ x^{7u} R^e.\end{aligned}$$

For all integer $k \geq 2$, and $u = 2^{2k}$,

$$\begin{aligned}M_{2k+1} = {}& M^o[:7u] + x^u M^o[:6u] + x^{2u} M^o[:5u] + x^{5u} M^o[:2u] + x^{6u} M^o[:u] \\ &+ x^{7u} R^o, \\ W_{2k+1} = {}& W^o[:7u] + x^u W^o[:6u] + x^{2u} W^o[:5u] + x^{5u} W^o[:2u] + x^{6u} W^o[:u] \\ &+ x^{7u} R^o.\end{aligned}$$

Proof. We call the four identities in Lemma 2.3 also by the name M_{2k}, W_{2k}, M_{2k+1}, and W_{2k+1}. For $n = 2$, the identities can be verified directly. For $n \geq 2$, we claim that

$$\begin{aligned}M_{2k} \wedge W_{2k} &\Rightarrow M_{2k+1} \wedge W_{2k+1}, \\ M_{2k+1} \wedge W_{2k+1} &\Rightarrow M_{2k+2} \wedge W_{2k+2}.\end{aligned}$$

We give the proof of

$$M_{2k} \wedge W_{2k} \Rightarrow M_{2k+1},$$

the other ones being similar. Set $u = 2^{2k}$ and $v = 2^{2k-1}$. By definition and induction hypothesis, the left side of identity M_{2k+1} is equal to

$$\begin{aligned}W_{2k} M_{2k} = {}& \big(W^e[:7v] + x^v W^e[:6v] + x^{2v} W^e[:5v] + x^{5v} W^e[:2v] + x^{6v} W^e[:v] \\ &+ x^{7u} R^e\big) \times \big(M^e[:7v] + x^v M^e[:6v] + x^{2v} M^e[:5v] + x^{5v} M^e[:2v] \\ &+ x^{6v} M^e[:v] + x^{7u} R^e\big);\end{aligned} \tag{2.35}$$

Call this expression lhs. Note that both sides of identity M_{2k+1} have the same term of highest degree $x^{14v} R^o$. Therefore we only need to prove that their difference is $O(x^{14v})$. Using Lemma 2.1 it can be seen that the right side of identity M_{2k+1} is congruent, modulo x^{14v}, to

$$\begin{aligned}W^e[:14v] M^e[:14v] + x^{2v} W^e[:12v] M^e[:12v] + x^{4v} W^e[:10v] M^e[:10v] \\ + x^{10v} W^e[:4v] M^e[:4v] + x^{12v} W^e[:2v] M^e[:2v].\end{aligned}$$

For all $n \leq 14$, replace the occurrences of $W^e[:n \cdot v]$ and $M^e[:n \cdot v]$ in the above expression by the reduction modulo $x^{n \cdot v}$ of the right side of the corresponding identity in Lemma 2.2 and get a new expression, which we call rhs. Define

$$\begin{aligned}X &:= x^v, \\ a_n &:= W^e[n \cdot v : (n+1) \cdot v] / X^n, \\ b_n &:= M^e[n \cdot v : (n+1) \cdot v] / X^n, \\ c &:= R^e.\end{aligned}$$

Using the notation introduced above, we can represent the expressions lhs (2.35) and rhs as polynomials in $\mathbb{F}_2[a_1, ..., a_{14}, b_1, ..., b_{14}, c][X]$. Note that it is not a problem that a_j commutes with b_k while W^e does not commute with M^e, because in the expressions concerned, the products of W^e-terms and M^e-terms are always in the same order. We let the computer do the simplification and check that the difference between these two polynomials is indeed $O(X^{14})$, which completes the proof. □

Proof of Theorem 1.1. We prove the theorem for $\mathrm{CF}(a,b)$; for $\mathrm{CF}(b,a)$, the proof is similar. By Lemma 2.3, we have For all $0 \le j,k \le 1$,

$$\lim_{n\to\infty} M_{2n,j,k} = M^e_{j,k},$$
$$\lim_{n\to\infty} M_{2n+1,j,k} = M^o_{j,k},$$
$$\lim_{n\to\infty} W_{2n,j,k} = W^e_{j,k},$$
$$\lim_{n\to\infty} W_{2n+1,j,k} = W^o_{j,k}.$$

Let $z = 1/x$. By the convergence theorem and identity (2.2),

$$\mathrm{CF}(a,b) = \frac{M^e_{0,1}(x)}{M^e_{0,0}(x)}.$$

By definition, $\phi(M^e,0,1)$ and $\phi(M^e,0,0)$ are minimal polynomials of $M^e_{0,1}$ and $M^e_{0,0}$. Therefore

$$P(x,y) = \mathrm{Res}_t\left(\phi(M^e,0,1)(x,t), y^{12}\phi(M^e,0,1)(x,t/y)\right)$$

is an annihilating polynomial of $f(x) = M^e_{0,1}/M^e_{0,0}$.

Define

$$Q(x,y) = q_4(x)y^4 + q_3(x)y^3 + q_2(x)y^2 + q_1(x)y + q_0(x),$$

where

$$q_0(x) = x^{28} + x^{26} + x^{24} + x^{23} + x^{21} + x^{19} + x^{18} + x^{14} + x^{10} + x^8 + x^7,$$
$$q_1(x) = x^{26} + x^{22} + x^{21} + x^{18} + x^{15} + x^{10} + x^8 + x^6 + x^5 + x^3,$$
$$q_2(x) = x^{24} + x^{20} + x^{14} + x^{12} + x^8 + x^6 + x^4 + 1,$$
$$q_3(x) = x^{26} + x^{22} + x^{21} + x^{18} + x^{15} + x^{10} + x^8 + x^6 + x^5 + x^3,$$
$$q_4(x) = x^{26} + x^{23} + x^{21} + x^{19} + x^{18} + x^{16} + x^{10} + x^8 + x^7 + x^6.$$

The polynomial $Q(x,y)$ is the candidate for the minimal polynomial of $f(x)$ found by Padé-Hermite approximation. To prove that it is indeed the minimal polynomial of $f(x)$, we only need to prove that it is an irreducible factor of $P(x,y)$ of multiplicity m and $R(x,y) := P(x,y)/Q(x,y)^m$ is not an annihilating polynomial of $f(x)$. We verify the first point directly. For the second point, we find that when we truncate $f(x)$ to order 216, and substitute it for y in $R(z,y)$, we get a series with valuation smaller than 216, which proves that $R(z,y)$ is not an annihilating polynomial of $f(x)$. Finally, $z^{12}Q(1/z,y)$ is the minimal polynomial of $\mathrm{CF}(a,b) = f(1/z)$. □

3. Annexe

All 16 polynomials are of the form

$$p_0(x) + p_3(x)y^3 + p_6(x)y^6 + p_9(x)y^9 + p_{12}(x)y^{12}.$$

The coefficients $p_j(x)$ and the 16 initial terms to determine the solutions uniquely are given below.

For $\phi(M^e,0,0)$:

$$\begin{aligned} p_0(x) = {} & x^{144} + x^{140} + x^{138} + x^{132} + x^{128} + x^{122} + x^{118} + x^{116} + x^{114} + x^{110} \\ & + x^{108} + x^{104} + x^{98} + x^{96} + x^{94} + x^{92} + x^{90} + x^{84} + x^{80} + x^{72} + x^{70} \\ & + x^{62} + x^{58} + x^{56} + x^{52} + x^{50} + x^{48} + x^{44} + x^{40} + x^{38} + x^{36}, \end{aligned}$$

$$
\begin{aligned}
p_3(x) &= x^{136} + x^{134} + x^{132} + x^{130} + x^{124} + x^{122} + x^{120} + x^{116} + x^{112} + x^{110} \\
&\quad + x^{108} + x^{96} + x^{92} + x^{80} + x^{78} + x^{74} + x^{72} + x^{70} + x^{68} + x^{60} + x^{58} \\
&\quad + x^{54} + x^{52} + x^{46} + x^{40} + x^{38} + x^{34} + x^{32} + x^{30} + x^{24} + x^{22} + x^{20}, \\
p_6(x) &= x^{134} + x^{128} + x^{124} + x^{122} + x^{120} + x^{116} + x^{114} + x^{112} + x^{108} + x^{104} \\
&\quad + x^{100} + x^{96} + x^{92} + x^{90} + x^{88} + x^{86} + x^{82} + x^{78} + x^{76} + x^{74} + x^{68} \\
&\quad + x^{66} + x^{64} + x^{62} + x^{56} + x^{50} + x^{44} + x^{32} + x^{30} + x^{28} + x^{24} + x^{22} \\
&\quad + x^{16} + x^{12} + x^{8} + x^{6} + x^{4} + 1, \\
p_9(x) &= x^{140} + x^{126} + x^{124} + x^{122} + x^{120} + x^{114} + x^{110} + x^{108} + x^{104} + x^{100} \\
&\quad + x^{96} + x^{94} + x^{92} + x^{82} + x^{80} + x^{78} + x^{76} + x^{72} + x^{62} + x^{58} + x^{52} \\
&\quad + x^{46} + x^{44} + x^{42} + x^{34} + x^{28} + x^{24} + x^{16} + x^{14} + x^{6}, \\
p_{12}(x) &= x^{140} + x^{136} + x^{124} + x^{120} + x^{116} + x^{112} + x^{108} + x^{104} + x^{84} + x^{80} \\
&\quad + x^{68} + x^{64} + x^{52} + x^{48} + x^{36} + x^{32} + x^{20} + x^{16} + x^{12} + x^{8} + x^{4} + 1,
\end{aligned}
$$

and the initial terms are [1, 0, 0, 0, 0, 0, 1, 0, 1, 0, 1, 0, 1, 0, 0, 0].

For $\phi(M^e, 0, 1)$:

$$
\begin{aligned}
p_0(x) &= x^{147} + x^{145} + x^{143} + x^{142} + x^{140} + x^{139} + x^{136} + x^{135} + x^{134} + x^{133} \\
&\quad + x^{131} + x^{130} + x^{129} + x^{128} + x^{125} + x^{124} + x^{121} + x^{120} + x^{119} \\
&\quad + x^{117} + x^{116} + x^{113} + x^{111} + x^{110} + x^{109} + x^{107} + x^{106} + x^{104} \\
&\quad + x^{100} + x^{99} + x^{98} + x^{94} + x^{93} + x^{91} + x^{90} + x^{87} + x^{85} + x^{83} + x^{79} \\
&\quad + x^{78} + x^{76} + x^{75} + x^{73} + x^{72} + x^{71} + x^{68} + x^{67} + x^{65} + x^{64} + x^{63} \\
&\quad + x^{60} + x^{59} + x^{58} + x^{56} + x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{47} + x^{45} \\
&\quad + x^{43} + x^{41} + x^{40} + x^{39}, \\
p_3(x) &= x^{143} + x^{140} + x^{136} + x^{135} + x^{133} + x^{131} + x^{130} + x^{129} + x^{128} + x^{127} \\
&\quad + x^{125} + x^{122} + x^{121} + x^{119} + x^{117} + x^{116} + x^{114} + x^{113} + x^{112} \\
&\quad + x^{109} + x^{108} + x^{106} + x^{105} + x^{104} + x^{100} + x^{99} + x^{95} + x^{92} + x^{88} \\
&\quad + x^{85} + x^{84} + x^{83} + x^{82} + x^{81} + x^{79} + x^{76} + x^{75} + x^{69} + x^{67} + x^{66} \\
&\quad + x^{65} + x^{64} + x^{60} + x^{59} + x^{55} + x^{52} + x^{48} + x^{47} + x^{45} + x^{43} + x^{42} \\
&\quad + x^{41} + x^{40} + x^{37} + x^{36} + x^{34} + x^{33} + x^{32} + x^{28} + x^{27}, \\
p_6(x) &= x^{141} + x^{138} + x^{137} + x^{136} + x^{133} + x^{131} + x^{130} + x^{127} + x^{124} + x^{122} \\
&\quad + x^{120} + x^{118} + x^{116} + x^{114} + x^{113} + x^{112} + x^{105} + x^{103} + x^{102} \\
&\quad + x^{101} + x^{98} + x^{96} + x^{94} + x^{93} + x^{92} + x^{89} + x^{87} + x^{86} + x^{85} + x^{82} \\
&\quad + x^{80} + x^{79} + x^{78} + x^{75} + x^{72} + x^{71} + x^{70} + x^{65} + x^{63} + x^{62} + x^{61} \\
&\quad + x^{59} + x^{58} + x^{55} + x^{53} + x^{52} + x^{43} + x^{41} + x^{40} + x^{35} + x^{33} + x^{32} \\
&\quad + x^{29} + x^{26} + x^{25} + x^{24} + x^{23} + x^{20} + x^{19} + x^{18}, \\
p_9(x) &= x^{139} + x^{136} + x^{132} + x^{128} + x^{127} + x^{125} + x^{123} + x^{122} + x^{121} + x^{120} \\
&\quad + x^{116} + x^{115} + x^{105} + x^{102} + x^{101} + x^{97} + x^{94} + x^{93} + x^{87} + x^{85}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{84} + x^{83} + x^{82} + x^{78} + x^{75} + x^{74} + x^{72} + x^{71} + x^{70} + x^{69} + x^{63}\\
&+ x^{60} + x^{59} + x^{55} + x^{53} + x^{52} + x^{51} + x^{50} + x^{49} + x^{41} + x^{39} + x^{38}\\
&+ x^{36} + x^{35} + x^{34} + x^{33} + x^{31} + x^{29} + x^{28} + x^{27} + x^{26} + x^{23} + x^{22}\\
&+ x^{20} + x^{19} + x^{18} + x^{17} + x^{13} + x^{10} + x^{9},\\
p_{12}(x) &= x^{137} + x^{134} + x^{133} + x^{132} + x^{125} + x^{122} + x^{120} + x^{118} + x^{116} + x^{114}\\
&+ x^{113} + x^{112} + x^{105} + x^{102} + x^{101} + x^{100} + x^{93} + x^{90} + x^{89} + x^{88}\\
&+ x^{85} + x^{82} + x^{81} + x^{80} + x^{77} + x^{74} + x^{73} + x^{72} + x^{69} + x^{66} + x^{65}\\
&+ x^{64} + x^{61} + x^{58} + x^{57} + x^{56} + x^{53} + x^{50} + x^{49} + x^{48} + x^{45} + x^{42}\\
&+ x^{41} + x^{40} + x^{37} + x^{34} + x^{33} + x^{32} + x^{29} + x^{26} + x^{25} + x^{24} + x^{21}\\
&+ x^{18} + x^{17} + x^{16} + x^{13} + x^{10} + x^{8} + x^{6} + x^{4} + x^{2} + x + 1,
\end{aligned}
$$

and the initial terms are [0, 0, 0, 0, 1, 0, 1, 0, 1, 0, 0, 1, 0, 1, 0, 0].

For $\phi(M^e, 1, 0)$:

$$
\begin{aligned}
p_0(x) &= x^{147} + x^{145} + x^{143} + x^{142} + x^{140} + x^{139} + x^{136} + x^{135} + x^{134} + x^{133}\\
&+ x^{131} + x^{130} + x^{129} + x^{128} + x^{125} + x^{124} + x^{121} + x^{120} + x^{119}\\
&+ x^{117} + x^{116} + x^{113} + x^{111} + x^{110} + x^{109} + x^{107} + x^{106} + x^{104}\\
&+ x^{100} + x^{99} + x^{98} + x^{94} + x^{93} + x^{91} + x^{90} + x^{87} + x^{85} + x^{83} + x^{79}\\
&+ x^{78} + x^{76} + x^{75} + x^{73} + x^{72} + x^{71} + x^{68} + x^{67} + x^{65} + x^{64} + x^{63}\\
&+ x^{60} + x^{59} + x^{58} + x^{56} + x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{47} + x^{45}\\
&+ x^{43} + x^{41} + x^{40} + x^{39},\\
p_3(x) &= x^{143} + x^{140} + x^{136} + x^{135} + x^{133} + x^{131} + x^{130} + x^{129} + x^{128} + x^{127}\\
&+ x^{125} + x^{122} + x^{121} + x^{119} + x^{117} + x^{116} + x^{114} + x^{113} + x^{112}\\
&+ x^{109} + x^{108} + x^{106} + x^{105} + x^{104} + x^{100} + x^{99} + x^{95} + x^{92} + x^{88}\\
&+ x^{85} + x^{84} + x^{83} + x^{82} + x^{81} + x^{79} + x^{76} + x^{75} + x^{69} + x^{67} + x^{66}\\
&+ x^{65} + x^{64} + x^{60} + x^{59} + x^{55} + x^{52} + x^{48} + x^{47} + x^{45} + x^{43} + x^{42}\\
&+ x^{41} + x^{40} + x^{37} + x^{36} + x^{34} + x^{33} + x^{32} + x^{28} + x^{27},\\
p_6(x) &= x^{141} + x^{138} + x^{137} + x^{136} + x^{133} + x^{131} + x^{130} + x^{127} + x^{124} + x^{122}\\
&+ x^{120} + x^{118} + x^{116} + x^{114} + x^{113} + x^{112} + x^{105} + x^{103} + x^{102}\\
&+ x^{101} + x^{98} + x^{96} + x^{94} + x^{93} + x^{92} + x^{89} + x^{87} + x^{86} + x^{85} + x^{82}\\
&+ x^{80} + x^{79} + x^{78} + x^{75} + x^{72} + x^{71} + x^{70} + x^{65} + x^{63} + x^{62} + x^{61}\\
&+ x^{59} + x^{58} + x^{55} + x^{53} + x^{52} + x^{43} + x^{41} + x^{40} + x^{35} + x^{33} + x^{32}\\
&+ x^{29} + x^{26} + x^{25} + x^{24} + x^{23} + x^{20} + x^{19} + x^{18},\\
p_9(x) &= x^{139} + x^{136} + x^{132} + x^{128} + x^{127} + x^{125} + x^{123} + x^{122} + x^{121} + x^{120}\\
&+ x^{116} + x^{115} + x^{105} + x^{102} + x^{101} + x^{97} + x^{94} + x^{93} + x^{87} + x^{85}\\
&+ x^{84} + x^{83} + x^{82} + x^{78} + x^{75} + x^{74} + x^{72} + x^{71} + x^{70} + x^{69} + x^{63}\\
&+ x^{60} + x^{59} + x^{55} + x^{53} + x^{52} + x^{51} + x^{50} + x^{49} + x^{41} + x^{39} + x^{38}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{36} + x^{35} + x^{34} + x^{33} + x^{31} + x^{29} + x^{28} + x^{27} + x^{26} + x^{23} + x^{22}\\
&+ x^{20} + x^{19} + x^{18} + x^{17} + x^{13} + x^{10} + x^{9},\\
p_{12}(x) = {}& x^{137} + x^{134} + x^{133} + x^{132} + x^{125} + x^{122} + x^{120} + x^{118} + x^{116} + x^{114}\\
&+ x^{113} + x^{112} + x^{105} + x^{102} + x^{101} + x^{100} + x^{93} + x^{90} + x^{89} + x^{88}\\
&+ x^{85} + x^{82} + x^{81} + x^{80} + x^{77} + x^{74} + x^{73} + x^{72} + x^{69} + x^{66} + x^{65}\\
&+ x^{64} + x^{61} + x^{58} + x^{57} + x^{56} + x^{53} + x^{50} + x^{49} + x^{48} + x^{45} + x^{42}\\
&+ x^{41} + x^{40} + x^{37} + x^{34} + x^{33} + x^{32} + x^{29} + x^{26} + x^{25} + x^{24} + x^{21}\\
&+ x^{18} + x^{17} + x^{16} + x^{13} + x^{10} + x^{8} + x^{6} + x^{4} + x^{2} + x + 1,
\end{aligned}
$$

and the initial terms are [0, 0, 0, 0, 1, 0, 1, 0, 1, 0, 0, 1, 0, 1, 0, 0].

For $\phi(M^e, 1, 1)$:

$$
\begin{aligned}
p_0(x) = {}& x^{150} + x^{144} + x^{142} + x^{138} + x^{134} + x^{126} + x^{120} + x^{118} + x^{114} + x^{112}\\
&+ x^{110} + x^{108} + x^{104} + x^{100} + x^{96} + x^{94} + x^{90} + x^{86} + x^{84} + x^{74}\\
&+ x^{72} + x^{60} + x^{58} + x^{56} + x^{42},\\
p_3(x) = {}& x^{138} + x^{134} + x^{132} + x^{122} + x^{118} + x^{116} + x^{114} + x^{112} + x^{110} + x^{106}\\
&+ x^{98} + x^{96} + x^{90} + x^{82} + x^{80} + x^{76} + x^{74} + x^{68} + x^{62} + x^{60} + x^{58}\\
&+ x^{54} + x^{52} + x^{50} + x^{48} + x^{46} + x^{42} + x^{40} + x^{36} + x^{34} + x^{32} + x^{30}\\
&+ x^{28} + x^{26} + x^{22} + x^{18},\\
p_6(x) = {}& x^{138} + x^{132} + x^{128} + x^{122} + x^{120} + x^{102} + x^{98} + x^{96} + x^{94} + x^{92}\\
&+ x^{90} + x^{86} + x^{84} + x^{78} + x^{76} + x^{70} + x^{68} + x^{66} + x^{62} + x^{58} + x^{50}\\
&+ x^{44} + x^{42} + x^{40} + x^{38} + x^{36} + x^{32} + x^{28} + x^{20} + x^{16} + x^{14} + x^{12}\\
&+ x^{10} + x^{8} + x^{2} + 1,\\
p_9(x) = {}& x^{134} + x^{128} + x^{124} + x^{118} + x^{110} + x^{104} + x^{98} + x^{94} + x^{92} + x^{90}\\
&+ x^{82} + x^{80} + x^{78} + x^{76} + x^{74} + x^{70} + x^{68} + x^{66} + x^{64} + x^{62} + x^{60}\\
&+ x^{58} + x^{52} + x^{46} + x^{36} + x^{34} + x^{20} + x^{16} + x^{14} + x^{10} + x^{8} + x^{6},\\
p_{12}(x) = {}& x^{134} + x^{130} + x^{128} + x^{118} + x^{114} + x^{112} + x^{102} + x^{98} + x^{96} + x^{6} + x^{2}\\
&+ 1,
\end{aligned}
$$

and the initial terms are [0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 1, 0, 1, 0].

For $\phi(W^e, 0, 0)$:

$$
\begin{aligned}
p_0(x) = {}& x^{150} + x^{144} + x^{136} + x^{134} + x^{130} + x^{120} + x^{110} + x^{106} + x^{102} + x^{92}\\
&+ x^{86} + x^{72} + x^{68} + x^{66} + x^{64} + x^{60} + x^{58} + x^{56} + x^{54} + x^{40} + x^{36},\\
p_3(x) = {}& x^{138} + x^{134} + x^{132} + x^{130} + x^{126} + x^{124} + x^{122} + x^{120} + x^{118} + x^{114}\\
&+ x^{108} + x^{98} + x^{96} + x^{94} + x^{88} + x^{86} + x^{84} + x^{82} + x^{80} + x^{78} + x^{74}\\
&+ x^{72} + x^{70} + x^{56} + x^{52} + x^{50} + x^{48} + x^{42} + x^{36} + x^{34} + x^{30} + x^{28}\\
&+ x^{24} + x^{20},\\
p_6(x) = {}& x^{138} + x^{132} + x^{130} + x^{128} + x^{124} + x^{120} + x^{116} + x^{112} + x^{110} + x^{108}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{100} + x^{98} + x^{96} + x^{92} + x^{90} + x^{88} + x^{86} + x^{84} + x^{82} + x^{76} + x^{74} \\
&+ x^{58} + x^{48} + x^{46} + x^{44} + x^{38} + x^{32} + x^{26} + x^{20} + x^{16} + x^{10} + x^{8} \\
&+ x^{2} + 1, \\
p_9(x) &= x^{134} + x^{128} + x^{124} + x^{118} + x^{110} + x^{104} + x^{98} + x^{94} + x^{92} + x^{90} \\
&+ x^{82} + x^{80} + x^{78} + x^{76} + x^{74} + x^{70} + x^{68} + x^{66} + x^{64} + x^{62} + x^{60} \\
&+ x^{58} + x^{52} + x^{46} + x^{36} + x^{34} + x^{20} + x^{16} + x^{14} + x^{10} + x^{8} + x^{6}, \\
p_{12}(x) &= x^{134} + x^{130} + x^{128} + x^{118} + x^{114} + x^{112} + x^{102} + x^{98} + x^{96} + x^{6} + x^{2} \\
&+ 1,
\end{aligned}
$$

and the initial terms are [1, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 1, 0].

For $\phi(W^e, 0, 1)$:

$$
\begin{aligned}
p_0(x) &= x^{147} + x^{138} + x^{137} + x^{136} + x^{135} + x^{133} + x^{129} + x^{127} + x^{126} + x^{124} \\
&+ x^{123} + x^{122} + x^{114} + x^{113} + x^{111} + x^{110} + x^{105} + x^{104} + x^{100} \\
&+ x^{98} + x^{97} + x^{94} + x^{93} + x^{92} + x^{91} + x^{90} + x^{89} + x^{85} + x^{84} + x^{83} \\
&+ x^{82} + x^{81} + x^{80} + x^{78} + x^{77} + x^{76} + x^{74} + x^{72} + x^{70} + x^{67} + x^{60} \\
&+ x^{59} + x^{58} + x^{57} + x^{56} + x^{55} + x^{54} + x^{53} + x^{51} + x^{50} + x^{49} + x^{48} \\
&+ x^{47} + x^{46} + x^{44} + x^{43} + x^{41} + x^{40} + x^{39}, \\
p_3(x) &= x^{143} + x^{140} + x^{136} + x^{135} + x^{133} + x^{131} + x^{130} + x^{129} + x^{128} + x^{127} \\
&+ x^{125} + x^{122} + x^{121} + x^{119} + x^{117} + x^{116} + x^{114} + x^{113} + x^{112} \\
&+ x^{109} + x^{108} + x^{106} + x^{105} + x^{104} + x^{100} + x^{99} + x^{95} + x^{92} + x^{88} \\
&+ x^{85} + x^{84} + x^{83} + x^{82} + x^{81} + x^{79} + x^{76} + x^{75} + x^{69} + x^{67} + x^{66} \\
&+ x^{65} + x^{64} + x^{60} + x^{59} + x^{55} + x^{52} + x^{48} + x^{47} + x^{45} + x^{43} + x^{42} \\
&+ x^{41} + x^{40} + x^{37} + x^{36} + x^{34} + x^{33} + x^{32} + x^{28} + x^{27}, \\
p_6(x) &= x^{141} + x^{138} + x^{137} + x^{136} + x^{133} + x^{131} + x^{130} + x^{127} + x^{124} + x^{122} \\
&+ x^{120} + x^{118} + x^{116} + x^{114} + x^{113} + x^{112} + x^{105} + x^{103} + x^{102} \\
&+ x^{101} + x^{98} + x^{96} + x^{94} + x^{93} + x^{92} + x^{89} + x^{87} + x^{86} + x^{85} + x^{82} \\
&+ x^{80} + x^{79} + x^{78} + x^{75} + x^{72} + x^{71} + x^{70} + x^{65} + x^{63} + x^{62} + x^{61} \\
&+ x^{59} + x^{58} + x^{55} + x^{53} + x^{52} + x^{43} + x^{41} + x^{40} + x^{35} + x^{33} + x^{32} \\
&+ x^{29} + x^{26} + x^{25} + x^{24} + x^{23} + x^{20} + x^{19} + x^{18}, \\
p_9(x) &= x^{139} + x^{136} + x^{132} + x^{128} + x^{127} + x^{125} + x^{123} + x^{122} + x^{121} + x^{120} \\
&+ x^{116} + x^{115} + x^{105} + x^{102} + x^{101} + x^{97} + x^{94} + x^{93} + x^{87} + x^{85} \\
&+ x^{84} + x^{83} + x^{82} + x^{78} + x^{75} + x^{74} + x^{72} + x^{71} + x^{70} + x^{69} + x^{63} \\
&+ x^{60} + x^{59} + x^{55} + x^{53} + x^{52} + x^{51} + x^{50} + x^{49} + x^{41} + x^{39} + x^{38} \\
&+ x^{36} + x^{35} + x^{34} + x^{33} + x^{31} + x^{29} + x^{28} + x^{27} + x^{26} + x^{23} + x^{22} \\
&+ x^{20} + x^{19} + x^{18} + x^{17} + x^{13} + x^{10} + x^{9}, \\
p_{12}(x) &= x^{137} + x^{134} + x^{133} + x^{132} + x^{125} + x^{122} + x^{120} + x^{118} + x^{116} + x^{114}
\end{aligned}
$$

$$+ x^{113} + x^{112} + x^{105} + x^{102} + x^{101} + x^{100} + x^{93} + x^{90} + x^{89} + x^{88}$$
$$+ x^{85} + x^{82} + x^{81} + x^{80} + x^{77} + x^{74} + x^{73} + x^{72} + x^{69} + x^{66} + x^{65}$$
$$+ x^{64} + x^{61} + x^{58} + x^{57} + x^{56} + x^{53} + x^{50} + x^{49} + x^{48} + x^{45} + x^{42}$$
$$+ x^{41} + x^{40} + x^{37} + x^{34} + x^{33} + x^{32} + x^{29} + x^{26} + x^{25} + x^{24} + x^{21}$$
$$+ x^{18} + x^{17} + x^{16} + x^{13} + x^{10} + x^{8} + x^{6} + x^{4} + x^{2} + x + 1,$$

and the initial terms are [0, 0, 0, 1, 1, 1, 0, 1, 0, 0, 0, 0, 0, 1, 0, 1].

For $\phi(W^e, 1, 0)$:

$$\begin{aligned}
p_0(x) = {} & x^{147} + x^{138} + x^{137} + x^{136} + x^{135} + x^{133} + x^{129} + x^{127} + x^{126} + x^{124} \\
& + x^{123} + x^{122} + x^{114} + x^{113} + x^{111} + x^{110} + x^{105} + x^{104} + x^{100} \\
& + x^{98} + x^{97} + x^{94} + x^{93} + x^{92} + x^{91} + x^{90} + x^{89} + x^{85} + x^{84} + x^{83} \\
& + x^{82} + x^{81} + x^{80} + x^{78} + x^{77} + x^{76} + x^{74} + x^{72} + x^{70} + x^{67} + x^{60} \\
& + x^{59} + x^{58} + x^{57} + x^{56} + x^{55} + x^{54} + x^{53} + x^{51} + x^{50} + x^{49} + x^{48} \\
& + x^{47} + x^{46} + x^{44} + x^{43} + x^{41} + x^{40} + x^{39}, \\
p_3(x) = {} & x^{143} + x^{140} + x^{136} + x^{135} + x^{133} + x^{131} + x^{130} + x^{129} + x^{128} + x^{127} \\
& + x^{125} + x^{122} + x^{121} + x^{119} + x^{117} + x^{116} + x^{114} + x^{113} + x^{112} \\
& + x^{109} + x^{108} + x^{106} + x^{105} + x^{104} + x^{100} + x^{99} + x^{95} + x^{92} + x^{88} \\
& + x^{85} + x^{84} + x^{83} + x^{82} + x^{81} + x^{79} + x^{76} + x^{75} + x^{69} + x^{67} + x^{66} \\
& + x^{65} + x^{64} + x^{60} + x^{59} + x^{55} + x^{52} + x^{48} + x^{47} + x^{45} + x^{43} + x^{42} \\
& + x^{41} + x^{40} + x^{37} + x^{36} + x^{34} + x^{33} + x^{32} + x^{28} + x^{27}, \\
p_6(x) = {} & x^{141} + x^{138} + x^{137} + x^{136} + x^{133} + x^{131} + x^{130} + x^{127} + x^{124} + x^{122} \\
& + x^{120} + x^{118} + x^{116} + x^{114} + x^{113} + x^{112} + x^{105} + x^{103} + x^{102} \\
& + x^{101} + x^{98} + x^{96} + x^{94} + x^{93} + x^{92} + x^{89} + x^{87} + x^{86} + x^{85} + x^{82} \\
& + x^{80} + x^{79} + x^{78} + x^{75} + x^{72} + x^{71} + x^{70} + x^{65} + x^{63} + x^{62} + x^{61} \\
& + x^{59} + x^{58} + x^{55} + x^{53} + x^{52} + x^{43} + x^{41} + x^{40} + x^{35} + x^{33} + x^{32} \\
& + x^{29} + x^{26} + x^{25} + x^{24} + x^{23} + x^{20} + x^{19} + x^{18}, \\
p_9(x) = {} & x^{139} + x^{136} + x^{132} + x^{128} + x^{127} + x^{125} + x^{123} + x^{122} + x^{121} + x^{120} \\
& + x^{116} + x^{115} + x^{105} + x^{102} + x^{101} + x^{97} + x^{94} + x^{93} + x^{87} + x^{85} \\
& + x^{84} + x^{83} + x^{82} + x^{78} + x^{75} + x^{74} + x^{72} + x^{71} + x^{70} + x^{69} + x^{63} \\
& + x^{60} + x^{59} + x^{55} + x^{53} + x^{52} + x^{51} + x^{50} + x^{49} + x^{41} + x^{39} + x^{38} \\
& + x^{36} + x^{35} + x^{34} + x^{33} + x^{31} + x^{29} + x^{28} + x^{27} + x^{26} + x^{23} + x^{22} \\
& + x^{20} + x^{19} + x^{18} + x^{17} + x^{13} + x^{10} + x^{9}, \\
p_{12}(x) = {} & x^{137} + x^{134} + x^{133} + x^{132} + x^{125} + x^{122} + x^{120} + x^{118} + x^{116} + x^{114} \\
& + x^{113} + x^{112} + x^{105} + x^{102} + x^{101} + x^{100} + x^{93} + x^{90} + x^{89} + x^{88} \\
& + x^{85} + x^{82} + x^{81} + x^{80} + x^{77} + x^{74} + x^{73} + x^{72} + x^{69} + x^{66} + x^{65} \\
& + x^{64} + x^{61} + x^{58} + x^{57} + x^{56} + x^{53} + x^{50} + x^{49} + x^{48} + x^{45} + x^{42}
\end{aligned}$$

$$
\begin{aligned}
&+ x^{41} + x^{40} + x^{37} + x^{34} + x^{33} + x^{32} + x^{29} + x^{26} + x^{25} + x^{24} + x^{21}\\
&+ x^{18} + x^{17} + x^{16} + x^{13} + x^{10} + x^{8} + x^{6} + x^{4} + x^{2} + x + 1,
\end{aligned}
$$

and the initial terms are [0, 0, 0, 1, 1, 1, 0, 1, 0, 0, 0, 0, 0, 1, 0, 1].

For $\phi(W^e, 1, 1)$:

$$
\begin{aligned}
p_0(x) &= x^{144} + x^{138} + x^{132} + x^{130} + x^{128} + x^{122} + x^{120} + x^{110} + x^{102} + x^{100}\\
&\quad + x^{98} + x^{92} + x^{88} + x^{86} + x^{82} + x^{80} + x^{74} + x^{72} + x^{70} + x^{68} + x^{66}\\
&\quad + x^{62} + x^{60} + x^{56} + x^{54} + x^{50} + x^{48} + x^{44} + x^{42},\\
p_3(x) &= x^{134} + x^{130} + x^{126} + x^{124} + x^{118} + x^{110} + x^{108} + x^{104} + x^{98} + x^{88}\\
&\quad + x^{86} + x^{84} + x^{82} + x^{80} + x^{78} + x^{72} + x^{70} + x^{66} + x^{64} + x^{62} + x^{56}\\
&\quad + x^{54} + x^{50} + x^{48} + x^{36} + x^{34} + x^{30} + x^{22} + x^{20} + x^{18},\\
p_6(x) &= x^{136} + x^{134} + x^{126} + x^{124} + x^{118} + x^{114} + x^{112} + x^{108} + x^{104} + x^{100}\\
&\quad + x^{98} + x^{96} + x^{90} + x^{88} + x^{80} + x^{78} + x^{60} + x^{58} + x^{56} + x^{52} + x^{46}\\
&\quad + x^{38} + x^{32} + x^{30} + x^{28} + x^{24} + x^{22} + x^{18} + x^{8} + x^{6} + x^{4} + 1,\\
p_9(x) &= x^{140} + x^{126} + x^{124} + x^{122} + x^{120} + x^{114} + x^{110} + x^{108} + x^{104} + x^{100}\\
&\quad + x^{96} + x^{94} + x^{92} + x^{82} + x^{80} + x^{78} + x^{76} + x^{72} + x^{62} + x^{58} + x^{52}\\
&\quad + x^{46} + x^{44} + x^{42} + x^{34} + x^{28} + x^{24} + x^{16} + x^{14} + x^{6},\\
p_{12}(x) &= x^{140} + x^{136} + x^{124} + x^{120} + x^{116} + x^{112} + x^{108} + x^{104} + x^{84} + x^{80}\\
&\quad + x^{68} + x^{64} + x^{52} + x^{48} + x^{36} + x^{32} + x^{20} + x^{16} + x^{12} + x^{8} + x^{4} + 1,
\end{aligned}
$$

and the initial terms are [0, 0, 0, 0, 0, 0, 1, 0, 1, 0, 1, 0, 0, 0, 0, 0].

For $\phi(M^o, 0, 0)$:

$$
\begin{aligned}
p_0(x) &= x^{147} + x^{145} + x^{142} + x^{140} + x^{137} + x^{136} + x^{135} + x^{134} + x^{133} + x^{132}\\
&\quad + x^{131} + x^{130} + x^{129} + x^{128} + x^{126} + x^{123} + x^{122} + x^{120} + x^{118}\\
&\quad + x^{117} + x^{115} + x^{114} + x^{113} + x^{112} + x^{111} + x^{110} + x^{109} + x^{106}\\
&\quad + x^{105} + x^{104} + x^{103} + x^{102} + x^{101} + x^{100} + x^{96} + x^{94} + x^{92} + x^{90}\\
&\quad + x^{85} + x^{84} + x^{83} + x^{82} + x^{80} + x^{78} + x^{75} + x^{74} + x^{73} + x^{72} + x^{69}\\
&\quad + x^{61} + x^{56} + x^{54} + x^{51} + x^{50} + x^{49} + x^{43} + x^{39} + x^{37} + x^{36},\\
p_3(x) &= x^{145} + x^{143} + x^{142} + x^{140} + x^{139} + x^{138} + x^{136} + x^{134} + x^{132} + x^{129}\\
&\quad + x^{128} + x^{125} + x^{123} + x^{121} + x^{120} + x^{119} + x^{114} + x^{111} + x^{107}\\
&\quad + x^{106} + x^{104} + x^{103} + x^{102} + x^{100} + x^{99} + x^{98} + x^{97} + x^{94} + x^{93}\\
&\quad + x^{91} + x^{90} + x^{89} + x^{88} + x^{84} + x^{76} + x^{75} + x^{74} + x^{73} + x^{70} + x^{69}\\
&\quad + x^{68} + x^{66} + x^{63} + x^{55} + x^{51} + x^{49} + x^{46} + x^{45} + x^{44} + x^{43} + x^{42}\\
&\quad + x^{40} + x^{39} + x^{38} + x^{36} + x^{33} + x^{32} + x^{29} + x^{28} + x^{27} + x^{25} + x^{24},\\
p_6(x) &= x^{145} + x^{143} + x^{142} + x^{140} + x^{139} + x^{138} + x^{136} + x^{135} + x^{134} + x^{133}\\
&\quad + x^{132} + x^{131} + x^{130} + x^{129} + x^{126} + x^{124} + x^{123} + x^{122} + x^{120}\\
&\quad + x^{119} + x^{118} + x^{116} + x^{114} + x^{112} + x^{111} + x^{110} + x^{108} + x^{107}
\end{aligned}
$$

$$+ x^{106} + x^{103} + x^{102} + x^{101} + x^{96} + x^{95} + x^{90} + x^{88} + x^{87} + x^{86}$$
$$+ x^{85} + x^{84} + x^{81} + x^{80} + x^{79} + x^{78} + x^{76} + x^{75} + x^{74} + x^{72} + x^{71}$$
$$+ x^{69} + x^{68} + x^{67} + x^{66} + x^{65} + x^{64} + x^{63} + x^{60} + x^{59} + x^{56} + x^{55}$$
$$+ x^{54} + x^{53} + x^{52} + x^{51} + x^{49} + x^{47} + x^{46} + x^{44} + x^{38} + x^{37} + x^{34}$$
$$+ x^{33} + x^{31} + x^{30} + x^{27} + x^{24} + x^{23} + x^{21} + x^{18} + x^{15} + x^{12} + x^{10}$$
$$+ x^{8} + x^{6} + x^{4} + x^{2} + x + 1,$$
$$p_9(x) = x^{145} + x^{142} + x^{141} + x^{140} + x^{133} + x^{130} + x^{128} + x^{126} + x^{125} + x^{124}$$
$$+ x^{113} + x^{110} + x^{109} + x^{108} + x^{101} + x^{98} + x^{97} + x^{96} + x^{85} + x^{82}$$
$$+ x^{81} + x^{80} + x^{69} + x^{66} + x^{65} + x^{64} + x^{53} + x^{50} + x^{49} + x^{48} + x^{37}$$
$$+ x^{34} + x^{33} + x^{32} + x^{21} + x^{18} + x^{16} + x^{14} + x^{13} + x^{12},$$
$$p_{12}(x) = x^{145} + x^{142} + x^{141} + x^{140} + x^{137} + x^{134} + x^{132} + x^{130} + x^{128} + x^{126}$$
$$+ x^{124} + x^{122} + x^{120} + x^{118} + x^{116} + x^{114} + x^{112} + x^{110} + x^{109}$$
$$+ x^{108} + x^{105} + x^{102} + x^{100} + x^{98} + x^{97} + x^{96} + x^{93} + x^{90} + x^{89}$$
$$+ x^{88} + x^{77} + x^{74} + x^{73} + x^{72} + x^{61} + x^{58} + x^{57} + x^{56} + x^{45} + x^{42}$$
$$+ x^{41} + x^{40} + x^{29} + x^{26} + x^{25} + x^{24} + x^{17} + x^{14} + x^{12} + x^{10} + x^{8}$$
$$+ x^{6} + x^{4} + x^{2} + x + 1,$$

and the initial terms are [1, 0, 0, 0, 0, 0, 1, 1, 1, 0, 0, 1, 0, 0, 1, 0].

For $\phi(M^o, 0, 1)$:

$$p_0(x) = x^{156} + x^{150} + x^{148} + x^{147} + x^{146} + x^{145} + x^{143} + x^{140} + x^{139} + x^{135}$$
$$+ x^{134} + x^{132} + x^{131} + x^{130} + x^{127} + x^{126} + x^{125} + x^{121} + x^{120}$$
$$+ x^{117} + x^{116} + x^{112} + x^{110} + x^{109} + x^{107} + x^{104} + x^{103} + x^{100}$$
$$+ x^{99} + x^{98} + x^{96} + x^{95} + x^{92} + x^{86} + x^{83} + x^{82} + x^{81} + x^{80} + x^{77}$$
$$+ x^{69} + x^{68} + x^{67} + x^{63} + x^{57} + x^{56} + x^{54} + x^{53} + x^{52} + x^{51} + x^{50}$$
$$+ x^{49} + x^{46} + x^{45} + x^{43} + x^{39},$$
$$p_3(x) = x^{142} + x^{137} + x^{133} + x^{132} + x^{131} + x^{130} + x^{128} + x^{126} + x^{124} + x^{122}$$
$$+ x^{120} + x^{118} + x^{116} + x^{114} + x^{112} + x^{108} + x^{106} + x^{105} + x^{104}$$
$$+ x^{102} + x^{101} + x^{99} + x^{94} + x^{89} + x^{86} + x^{85} + x^{84} + x^{83} + x^{82} + x^{81}$$
$$+ x^{80} + x^{77} + x^{75} + x^{73} + x^{70} + x^{69} + x^{68} + x^{67} + x^{66} + x^{65} + x^{64}$$
$$+ x^{62} + x^{61} + x^{59} + x^{54} + x^{49} + x^{45} + x^{44} + x^{43} + x^{42} + x^{40} + x^{36}$$
$$+ x^{34} + x^{33} + x^{32} + x^{30} + x^{29} + x^{27},$$
$$p_6(x) = x^{144} + x^{134} + x^{132} + x^{126} + x^{116} + x^{112} + x^{108} + x^{106} + x^{102} + x^{100}$$
$$+ x^{96} + x^{90} + x^{86} + x^{84} + x^{82} + x^{70} + x^{68} + x^{66} + x^{60} + x^{56} + x^{54}$$
$$+ x^{52} + x^{46} + x^{44} + x^{42} + x^{40} + x^{38} + x^{36} + x^{34} + x^{26} + x^{24} + x^{18},$$
$$p_9(x) = x^{146} + x^{141} + x^{137} + x^{135} + x^{134} + x^{132} + x^{131} + x^{130} + x^{127} + x^{126}$$
$$+ x^{125} + x^{124} + x^{123} + x^{121} + x^{114} + x^{109} + x^{105} + x^{103} + x^{102}$$

$$+ x^{100} + x^{99} + x^{95} + x^{94} + x^{92} + x^{91} + x^{87} + x^{86} + x^{84} + x^{83} + x^{79} + x^{78} + x^{76} + x^{75} + x^{71} + x^{70} + x^{68} + x^{67} + x^{63} + x^{62} + x^{60} + x^{59} + x^{55} + x^{54} + x^{52} + x^{51} + x^{47} + x^{46} + x^{44} + x^{43} + x^{39} + x^{38} + x^{36} + x^{35} + x^{31} + x^{30} + x^{28} + x^{27} + x^{23} + x^{22} + x^{20} + x^{19} + x^{18} + x^{15} + x^{14} + x^{13} + x^{12} + x^{11} + x^{9},$$

$$p_{12}(x) = x^{148} + x^{136} + x^{112} + x^{104} + x^{100} + x^{88} + x^{80} + x^{72} + x^{64} + x^{56} + x^{48} + x^{40} + x^{32} + x^{24} + x^{20} + x^{16} + x^{4} + 1,$$

and the initial terms are [0, 0, 0, 0, 1, 0, 1, 0, 1, 0, 0, 0, 0, 0, 1, 0].

For $\phi(M^o, 1, 0)$:

$$p_0(x) = x^{148} + x^{146} + x^{144} + x^{143} + x^{141} + x^{140} + x^{138} + x^{137} + x^{136} + x^{133} + x^{129} + x^{123} + x^{121} + x^{120} + x^{116} + x^{113} + x^{112} + x^{109} + x^{108} + x^{107} + x^{104} + x^{103} + x^{102} + x^{101} + x^{100} + x^{98} + x^{97} + x^{91} + x^{88} + x^{85} + x^{74} + x^{73} + x^{70} + x^{64} + x^{63} + x^{62} + x^{60} + x^{58} + x^{55} + x^{54} + x^{53} + x^{52} + x^{49} + x^{48} + x^{46} + x^{45} + x^{44} + x^{39},$$

$$p_3(x) = x^{146} + x^{141} + x^{137} + x^{136} + x^{135} + x^{132} + x^{130} + x^{129} + x^{128} + x^{125} + x^{123} + x^{121} + x^{118} + x^{117} + x^{116} + x^{115} + x^{113} + x^{112} + x^{107} + x^{104} + x^{103} + x^{102} + x^{101} + x^{99} + x^{98} + x^{93} + x^{90} + x^{89} + x^{88} + x^{87} + x^{85} + x^{84} + x^{79} + x^{76} + x^{75} + x^{73} + x^{71} + x^{70} + x^{69} + x^{64} + x^{63} + x^{62} + x^{61} + x^{59} + x^{58} + x^{53} + x^{49} + x^{48} + x^{47} + x^{44} + x^{41} + x^{40} + x^{35} + x^{32} + x^{31} + x^{30} + x^{29} + x^{27},$$

$$p_6(x) = x^{148} + x^{138} + x^{130} + x^{128} + x^{126} + x^{124} + x^{110} + x^{106} + x^{104} + x^{98} + x^{80} + x^{76} + x^{70} + x^{68} + x^{66} + x^{62} + x^{60} + x^{58} + x^{54} + x^{52} + x^{50} + x^{48} + x^{46} + x^{44} + x^{42} + x^{40} + x^{36} + x^{34} + x^{32} + x^{30} + x^{28} + x^{24} + x^{22} + x^{18},$$

$$p_9(x) = x^{150} + x^{145} + x^{141} + x^{139} + x^{136} + x^{135} + x^{134} + x^{133} + x^{131} + x^{128} + x^{126} + x^{124} + x^{123} + x^{121} + x^{118} + x^{113} + x^{109} + x^{107} + x^{104} + x^{103} + x^{101} + x^{99} + x^{97} + x^{96} + x^{94} + x^{93} + x^{92} + x^{89} + x^{88} + x^{87} + x^{85} + x^{83} + x^{81} + x^{80} + x^{78} + x^{77} + x^{76} + x^{73} + x^{72} + x^{71} + x^{69} + x^{67} + x^{65} + x^{64} + x^{62} + x^{61} + x^{60} + x^{57} + x^{56} + x^{55} + x^{53} + x^{51} + x^{49} + x^{48} + x^{46} + x^{45} + x^{44} + x^{41} + x^{40} + x^{39} + x^{37} + x^{35} + x^{33} + x^{32} + x^{30} + x^{29} + x^{28} + x^{25} + x^{24} + x^{23} + x^{22} + x^{21} + x^{19} + x^{16} + x^{14} + x^{12} + x^{11} + x^{9},$$

$$p_{12}(x) = x^{152} + x^{132} + x^{128} + x^{124} + x^{120} + x^{112} + x^{104} + x^{100} + x^{96} + x^{92} + x^{88} + x^{84} + x^{76} + x^{72} + x^{68} + x^{60} + x^{56} + x^{52} + x^{44} + x^{40} + x^{36} + x^{28} + x^{20} + x^{12} + 1,$$

and the initial terms are [0, 0, 0, 1, 1, 1, 0, 1, 0, 1, 0, 0, 1, 0, 0, 0].

For $\phi(M^o, 1, 1)$:

$$\begin{aligned}
p_0(x) &= x^{147} + x^{143} + x^{141} + x^{134} + x^{133} + x^{132} + x^{131} + x^{126} + x^{124} + x^{123} \\
&\quad + x^{119} + x^{117} + x^{115} + x^{113} + x^{111} + x^{109} + x^{108} + x^{105} + x^{102} \\
&\quad + x^{99} + x^{97} + x^{96} + x^{94} + x^{91} + x^{90} + x^{89} + x^{88} + x^{87} + x^{86} + x^{85} \\
&\quad + x^{84} + x^{83} + x^{82} + x^{75} + x^{74} + x^{73} + x^{70} + x^{69} + x^{67} + x^{66} + x^{63} \\
&\quad + x^{61} + x^{60} + x^{59} + x^{58} + x^{56} + x^{55} + x^{54} + x^{52} + x^{51} + x^{48} + x^{46} \\
&\quad + x^{45} + x^{43} + x^{42}, \\
p_3(x) &= x^{145} + x^{143} + x^{142} + x^{141} + x^{140} + x^{139} + x^{133} + x^{131} + x^{127} + x^{124} \\
&\quad + x^{121} + x^{118} + x^{117} + x^{115} + x^{108} + x^{104} + x^{102} + x^{99} + x^{96} + x^{94} \\
&\quad + x^{91} + x^{89} + x^{86} + x^{83} + x^{82} + x^{81} + x^{79} + x^{78} + x^{77} + x^{76} + x^{75} \\
&\quad + x^{72} + x^{70} + x^{69} + x^{68} + x^{67} + x^{66} + x^{65} + x^{64} + x^{60} + x^{58} + x^{57} \\
&\quad + x^{56} + x^{55} + x^{53} + x^{51} + x^{50} + x^{49} + x^{48} + x^{42} + x^{41} + x^{38} + x^{35} \\
&\quad + x^{34} + x^{33} + x^{32} + x^{31} + x^{29} + x^{27} + x^{26}, \\
p_6(x) &= x^{145} + x^{143} + x^{142} + x^{141} + x^{140} + x^{139} + x^{135} + x^{133} + x^{127} + x^{124} \\
&\quad + x^{123} + x^{122} + x^{121} + x^{120} + x^{119} + x^{113} + x^{111} + x^{110} + x^{109} \\
&\quad + x^{108} + x^{107} + x^{105} + x^{104} + x^{102} + x^{101} + x^{100} + x^{98} + x^{97} + x^{95} \\
&\quad + x^{90} + x^{89} + x^{88} + x^{84} + x^{82} + x^{81} + x^{76} + x^{74} + x^{70} + x^{68} + x^{67} \\
&\quad + x^{61} + x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{47} + x^{43} + x^{42} + x^{41} + x^{36} \\
&\quad + x^{35} + x^{34} + x^{33} + x^{32} + x^{31} + x^{29} + x^{28} + x^{27} + x^{24} + x^{20} + x^{19} \\
&\quad + x^{18} + x^{16} + x^{15} + x^{14} + x^{13} + x^{10} + x^{8} + x^{6} + x^{4} + x^{2} + x + 1, \\
p_9(x) &= x^{145} + x^{142} + x^{141} + x^{140} + x^{133} + x^{130} + x^{128} + x^{126} + x^{125} + x^{124} \\
&\quad + x^{113} + x^{110} + x^{109} + x^{108} + x^{101} + x^{98} + x^{97} + x^{96} + x^{85} + x^{82} \\
&\quad + x^{81} + x^{80} + x^{69} + x^{66} + x^{65} + x^{64} + x^{53} + x^{50} + x^{49} + x^{48} + x^{37} \\
&\quad + x^{34} + x^{33} + x^{32} + x^{21} + x^{18} + x^{16} + x^{14} + x^{13} + x^{12}, \\
p_{12}(x) &= x^{145} + x^{142} + x^{141} + x^{140} + x^{137} + x^{134} + x^{132} + x^{130} + x^{128} + x^{126} \\
&\quad + x^{124} + x^{122} + x^{120} + x^{118} + x^{116} + x^{114} + x^{112} + x^{110} + x^{109} \\
&\quad + x^{108} + x^{105} + x^{102} + x^{100} + x^{98} + x^{97} + x^{96} + x^{93} + x^{90} + x^{89} \\
&\quad + x^{88} + x^{77} + x^{74} + x^{73} + x^{72} + x^{61} + x^{58} + x^{57} + x^{56} + x^{45} + x^{42} \\
&\quad + x^{41} + x^{40} + x^{29} + x^{26} + x^{25} + x^{24} + x^{17} + x^{14} + x^{12} + x^{10} + x^{8} \\
&\quad + x^{6} + x^{4} + x^{2} + x + 1,
\end{aligned}$$

and the initial terms are [0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 1, 1, 1, 0, 0, 0].

For $\phi(W^o, 0, 0)$:

$$\begin{aligned}
p_0(x) &= x^{147} + x^{145} + x^{142} + x^{140} + x^{137} + x^{136} + x^{135} + x^{134} + x^{133} + x^{132} \\
&\quad + x^{131} + x^{130} + x^{129} + x^{128} + x^{126} + x^{123} + x^{122} + x^{120} + x^{118}
\end{aligned}$$

$$
\begin{aligned}
&+ x^{117} + x^{115} + x^{114} + x^{113} + x^{112} + x^{111} + x^{110} + x^{109} + x^{106}\\
&+ x^{105} + x^{104} + x^{103} + x^{102} + x^{101} + x^{100} + x^{96} + x^{94} + x^{92} + x^{90}\\
&+ x^{85} + x^{84} + x^{83} + x^{82} + x^{80} + x^{78} + x^{75} + x^{74} + x^{73} + x^{72} + x^{69}\\
&+ x^{61} + x^{56} + x^{54} + x^{51} + x^{50} + x^{49} + x^{43} + x^{39} + x^{37} + x^{36},\\
p_3(x) &= x^{145} + x^{143} + x^{142} + x^{140} + x^{139} + x^{138} + x^{136} + x^{134} + x^{132} + x^{129}\\
&+ x^{128} + x^{125} + x^{123} + x^{121} + x^{120} + x^{119} + x^{114} + x^{111} + x^{107}\\
&+ x^{106} + x^{104} + x^{103} + x^{102} + x^{100} + x^{99} + x^{98} + x^{97} + x^{94} + x^{93}\\
&+ x^{91} + x^{90} + x^{89} + x^{88} + x^{84} + x^{76} + x^{75} + x^{74} + x^{73} + x^{70} + x^{69}\\
&+ x^{68} + x^{66} + x^{63} + x^{55} + x^{51} + x^{49} + x^{46} + x^{45} + x^{44} + x^{43} + x^{42}\\
&+ x^{40} + x^{39} + x^{38} + x^{36} + x^{33} + x^{32} + x^{29} + x^{28} + x^{27} + x^{25} + x^{24},\\
p_6(x) &= x^{145} + x^{143} + x^{142} + x^{140} + x^{139} + x^{138} + x^{136} + x^{135} + x^{134} + x^{133}\\
&+ x^{132} + x^{131} + x^{130} + x^{129} + x^{126} + x^{124} + x^{123} + x^{122} + x^{120}\\
&+ x^{119} + x^{118} + x^{116} + x^{114} + x^{112} + x^{111} + x^{110} + x^{108} + x^{107}\\
&+ x^{106} + x^{103} + x^{102} + x^{101} + x^{96} + x^{95} + x^{90} + x^{88} + x^{87} + x^{86}\\
&+ x^{85} + x^{84} + x^{81} + x^{80} + x^{79} + x^{78} + x^{76} + x^{75} + x^{74} + x^{72} + x^{71}\\
&+ x^{69} + x^{68} + x^{67} + x^{66} + x^{65} + x^{64} + x^{63} + x^{60} + x^{59} + x^{56} + x^{55}\\
&+ x^{54} + x^{53} + x^{52} + x^{51} + x^{49} + x^{47} + x^{46} + x^{44} + x^{38} + x^{37} + x^{34}\\
&+ x^{33} + x^{31} + x^{30} + x^{27} + x^{24} + x^{23} + x^{21} + x^{18} + x^{15} + x^{12} + x^{10}\\
&+ x^{8} + x^{6} + x^{4} + x^{2} + x + 1,\\
p_9(x) &= x^{145} + x^{142} + x^{141} + x^{140} + x^{133} + x^{130} + x^{128} + x^{126} + x^{125} + x^{124}\\
&+ x^{113} + x^{110} + x^{109} + x^{108} + x^{101} + x^{98} + x^{97} + x^{96} + x^{85} + x^{82}\\
&+ x^{81} + x^{80} + x^{69} + x^{66} + x^{65} + x^{64} + x^{53} + x^{50} + x^{49} + x^{48} + x^{37}\\
&+ x^{34} + x^{33} + x^{32} + x^{21} + x^{18} + x^{16} + x^{14} + x^{13} + x^{12},\\
p_{12}(x) &= x^{145} + x^{142} + x^{141} + x^{140} + x^{137} + x^{134} + x^{132} + x^{130} + x^{128} + x^{126}\\
&+ x^{124} + x^{122} + x^{120} + x^{118} + x^{116} + x^{114} + x^{112} + x^{110} + x^{109}\\
&+ x^{108} + x^{105} + x^{102} + x^{100} + x^{98} + x^{97} + x^{96} + x^{93} + x^{90} + x^{89}\\
&+ x^{88} + x^{77} + x^{74} + x^{73} + x^{72} + x^{61} + x^{58} + x^{57} + x^{56} + x^{45} + x^{42}\\
&+ x^{41} + x^{40} + x^{29} + x^{26} + x^{25} + x^{24} + x^{17} + x^{14} + x^{12} + x^{10} + x^{8}\\
&+ x^{6} + x^{4} + x^{2} + x + 1,
\end{aligned}
$$

and the initial terms are [1, 0, 0, 0, 0, 0, 1, 1, 1, 0, 0, 1, 0, 0, 1, 0].

For $\phi(W^o, 0, 1)$:

$$
\begin{aligned}
p_0(x) &= x^{148} + x^{146} + x^{144} + x^{143} + x^{141} + x^{140} + x^{138} + x^{137} + x^{136} + x^{133}\\
&+ x^{129} + x^{123} + x^{121} + x^{120} + x^{116} + x^{113} + x^{112} + x^{109} + x^{108}\\
&+ x^{107} + x^{104} + x^{103} + x^{102} + x^{101} + x^{100} + x^{98} + x^{97} + x^{91} + x^{88}\\
&+ x^{85} + x^{74} + x^{73} + x^{70} + x^{64} + x^{63} + x^{62} + x^{60} + x^{58} + x^{55} + x^{54}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{53} + x^{52} + x^{49} + x^{48} + x^{46} + x^{45} + x^{44} + x^{39},\\
p_3(x) &= x^{146} + x^{141} + x^{137} + x^{136} + x^{135} + x^{132} + x^{130} + x^{129} + x^{128} + x^{125}\\
&+ x^{123} + x^{121} + x^{118} + x^{117} + x^{116} + x^{115} + x^{113} + x^{112} + x^{107}\\
&+ x^{104} + x^{103} + x^{102} + x^{101} + x^{99} + x^{98} + x^{93} + x^{90} + x^{89} + x^{88}\\
&+ x^{87} + x^{85} + x^{84} + x^{79} + x^{76} + x^{75} + x^{73} + x^{71} + x^{70} + x^{69} + x^{64}\\
&+ x^{63} + x^{62} + x^{61} + x^{59} + x^{58} + x^{53} + x^{49} + x^{48} + x^{47} + x^{44} + x^{41}\\
&+ x^{40} + x^{35} + x^{32} + x^{31} + x^{30} + x^{29} + x^{27},\\
p_6(x) &= x^{148} + x^{138} + x^{130} + x^{128} + x^{126} + x^{124} + x^{110} + x^{106} + x^{104} + x^{98}\\
&+ x^{80} + x^{76} + x^{70} + x^{68} + x^{66} + x^{62} + x^{60} + x^{58} + x^{54} + x^{52} + x^{50}\\
&+ x^{48} + x^{46} + x^{44} + x^{42} + x^{40} + x^{36} + x^{34} + x^{32} + x^{30} + x^{28} + x^{24}\\
&+ x^{22} + x^{18},\\
p_9(x) &= x^{150} + x^{145} + x^{141} + x^{139} + x^{136} + x^{135} + x^{134} + x^{133} + x^{131} + x^{128}\\
&+ x^{126} + x^{124} + x^{123} + x^{121} + x^{118} + x^{113} + x^{109} + x^{107} + x^{104}\\
&+ x^{103} + x^{101} + x^{99} + x^{97} + x^{96} + x^{94} + x^{93} + x^{92} + x^{89} + x^{88} + x^{87}\\
&+ x^{85} + x^{83} + x^{81} + x^{80} + x^{78} + x^{77} + x^{76} + x^{73} + x^{72} + x^{71} + x^{69}\\
&+ x^{67} + x^{65} + x^{64} + x^{62} + x^{61} + x^{60} + x^{57} + x^{56} + x^{55} + x^{53} + x^{51}\\
&+ x^{49} + x^{48} + x^{46} + x^{45} + x^{44} + x^{41} + x^{40} + x^{39} + x^{37} + x^{35} + x^{33}\\
&+ x^{32} + x^{30} + x^{29} + x^{28} + x^{25} + x^{24} + x^{23} + x^{22} + x^{21} + x^{19} + x^{16}\\
&+ x^{14} + x^{12} + x^{11} + x^{9},\\
p_{12}(x) &= x^{152} + x^{132} + x^{128} + x^{124} + x^{120} + x^{112} + x^{104} + x^{100} + x^{96} + x^{92}\\
&+ x^{88} + x^{84} + x^{76} + x^{72} + x^{68} + x^{60} + x^{56} + x^{52} + x^{44} + x^{40} + x^{36}\\
&+ x^{28} + x^{20} + x^{12} + 1,
\end{aligned}
$$

and the initial terms are [0, 0, 0, 1, 1, 1, 0, 1, 0, 1, 0, 0, 1, 0, 0, 0].
For $\phi(W^o, 1, 0)$:

$$
\begin{aligned}
p_0(x) &= x^{156} + x^{150} + x^{148} + x^{147} + x^{146} + x^{145} + x^{143} + x^{140} + x^{139} + x^{135}\\
&+ x^{134} + x^{132} + x^{131} + x^{130} + x^{127} + x^{126} + x^{125} + x^{121} + x^{120}\\
&+ x^{117} + x^{116} + x^{112} + x^{110} + x^{109} + x^{107} + x^{104} + x^{103} + x^{100}\\
&+ x^{99} + x^{98} + x^{96} + x^{95} + x^{92} + x^{86} + x^{83} + x^{82} + x^{81} + x^{80} + x^{77}\\
&+ x^{69} + x^{68} + x^{67} + x^{63} + x^{57} + x^{56} + x^{54} + x^{53} + x^{52} + x^{51} + x^{50}\\
&+ x^{49} + x^{46} + x^{45} + x^{43} + x^{39},\\
p_3(x) &= x^{142} + x^{137} + x^{133} + x^{132} + x^{131} + x^{130} + x^{128} + x^{126} + x^{124} + x^{122}\\
&+ x^{120} + x^{118} + x^{116} + x^{114} + x^{112} + x^{108} + x^{106} + x^{105} + x^{104}\\
&+ x^{102} + x^{101} + x^{99} + x^{94} + x^{89} + x^{86} + x^{85} + x^{84} + x^{83} + x^{82} + x^{81}\\
&+ x^{80} + x^{77} + x^{75} + x^{73} + x^{70} + x^{69} + x^{68} + x^{67} + x^{66} + x^{65} + x^{64}\\
&+ x^{62} + x^{61} + x^{59} + x^{54} + x^{49} + x^{45} + x^{44} + x^{43} + x^{42} + x^{40} + x^{36}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{34} + x^{33} + x^{32} + x^{30} + x^{29} + x^{27},\\
p_6(x) &= x^{144} + x^{134} + x^{132} + x^{126} + x^{116} + x^{112} + x^{108} + x^{106} + x^{102} + x^{100}\\
&+ x^{96} + x^{90} + x^{86} + x^{84} + x^{82} + x^{70} + x^{68} + x^{66} + x^{60} + x^{56} + x^{54}\\
&+ x^{52} + x^{46} + x^{44} + x^{42} + x^{40} + x^{38} + x^{36} + x^{34} + x^{26} + x^{24} + x^{18},\\
p_9(x) &= x^{146} + x^{141} + x^{137} + x^{135} + x^{134} + x^{132} + x^{131} + x^{130} + x^{127} + x^{126}\\
&+ x^{125} + x^{124} + x^{123} + x^{121} + x^{114} + x^{109} + x^{105} + x^{103} + x^{102}\\
&+ x^{100} + x^{99} + x^{95} + x^{94} + x^{92} + x^{91} + x^{87} + x^{86} + x^{84} + x^{83} + x^{79}\\
&+ x^{78} + x^{76} + x^{75} + x^{71} + x^{70} + x^{68} + x^{67} + x^{63} + x^{62} + x^{60} + x^{59}\\
&+ x^{55} + x^{54} + x^{52} + x^{51} + x^{47} + x^{46} + x^{44} + x^{43} + x^{39} + x^{38} + x^{36}\\
&+ x^{35} + x^{31} + x^{30} + x^{28} + x^{27} + x^{23} + x^{22} + x^{20} + x^{19} + x^{18} + x^{15}\\
&+ x^{14} + x^{13} + x^{12} + x^{11} + x^{9},\\
p_{12}(x) &= x^{148} + x^{136} + x^{112} + x^{104} + x^{100} + x^{88} + x^{80} + x^{72} + x^{64} + x^{56} + x^{48}\\
&+ x^{40} + x^{32} + x^{24} + x^{20} + x^{16} + x^{4} + 1,
\end{aligned}
$$

and the initial terms are [0, 0, 0, 0, 1, 0, 1, 0, 1, 0, 0, 0, 0, 0, 1, 0].
For $\phi(W^o, 1, 1)$:

$$
\begin{aligned}
p_0(x) &= x^{147} + x^{143} + x^{141} + x^{134} + x^{133} + x^{132} + x^{131} + x^{126} + x^{124} + x^{123}\\
&+ x^{119} + x^{117} + x^{115} + x^{113} + x^{111} + x^{109} + x^{108} + x^{105} + x^{102}\\
&+ x^{99} + x^{97} + x^{96} + x^{94} + x^{91} + x^{90} + x^{89} + x^{88} + x^{87} + x^{86} + x^{85}\\
&+ x^{84} + x^{83} + x^{82} + x^{75} + x^{74} + x^{73} + x^{70} + x^{69} + x^{67} + x^{66} + x^{63}\\
&+ x^{61} + x^{60} + x^{59} + x^{58} + x^{56} + x^{55} + x^{54} + x^{52} + x^{51} + x^{48} + x^{46}\\
&+ x^{45} + x^{43} + x^{42},\\
p_3(x) &= x^{145} + x^{143} + x^{142} + x^{141} + x^{140} + x^{139} + x^{133} + x^{131} + x^{127} + x^{124}\\
&+ x^{121} + x^{118} + x^{117} + x^{115} + x^{108} + x^{104} + x^{102} + x^{99} + x^{96} + x^{94}\\
&+ x^{91} + x^{89} + x^{86} + x^{83} + x^{82} + x^{81} + x^{79} + x^{78} + x^{77} + x^{76} + x^{75}\\
&+ x^{72} + x^{70} + x^{69} + x^{68} + x^{67} + x^{66} + x^{65} + x^{64} + x^{60} + x^{58} + x^{57}\\
&+ x^{56} + x^{55} + x^{53} + x^{51} + x^{50} + x^{49} + x^{48} + x^{42} + x^{41} + x^{38} + x^{35}\\
&+ x^{34} + x^{33} + x^{32} + x^{31} + x^{29} + x^{27} + x^{26},\\
p_6(x) &= x^{145} + x^{143} + x^{142} + x^{141} + x^{140} + x^{139} + x^{135} + x^{133} + x^{127} + x^{124}\\
&+ x^{123} + x^{122} + x^{121} + x^{120} + x^{119} + x^{113} + x^{111} + x^{110} + x^{109}\\
&+ x^{108} + x^{107} + x^{105} + x^{104} + x^{102} + x^{101} + x^{100} + x^{98} + x^{97} + x^{95}\\
&+ x^{90} + x^{89} + x^{88} + x^{84} + x^{82} + x^{81} + x^{76} + x^{74} + x^{70} + x^{68} + x^{67}\\
&+ x^{61} + x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{47} + x^{43} + x^{42} + x^{41} + x^{36}\\
&+ x^{35} + x^{34} + x^{33} + x^{32} + x^{31} + x^{29} + x^{28} + x^{27} + x^{24} + x^{20} + x^{19}\\
&+ x^{18} + x^{16} + x^{15} + x^{14} + x^{13} + x^{10} + x^{8} + x^{6} + x^{4} + x^{2} + x + 1,\\
p_9(x) &= x^{145} + x^{142} + x^{141} + x^{140} + x^{133} + x^{130} + x^{128} + x^{126} + x^{125} + x^{124}
\end{aligned}
$$

$$+ x^{113} + x^{110} + x^{109} + x^{108} + x^{101} + x^{98} + x^{97} + x^{96} + x^{85} + x^{82} + x^{81} + x^{80} + x^{69} + x^{66} + x^{65} + x^{64} + x^{53} + x^{50} + x^{49} + x^{48} + x^{37} + x^{34} + x^{33} + x^{32} + x^{21} + x^{18} + x^{16} + x^{14} + x^{13} + x^{12},$$

$$\begin{aligned} p_{12}(x) = & x^{145} + x^{142} + x^{141} + x^{140} + x^{137} + x^{134} + x^{132} + x^{130} + x^{128} + x^{126} \\ & + x^{124} + x^{122} + x^{120} + x^{118} + x^{116} + x^{114} + x^{112} + x^{110} + x^{109} \\ & + x^{108} + x^{105} + x^{102} + x^{100} + x^{98} + x^{97} + x^{96} + x^{93} + x^{90} + x^{89} \\ & + x^{88} + x^{77} + x^{74} + x^{73} + x^{72} + x^{61} + x^{58} + x^{57} + x^{56} + x^{45} + x^{42} \\ & + x^{41} + x^{40} + x^{29} + x^{26} + x^{25} + x^{24} + x^{17} + x^{14} + x^{12} + x^{10} + x^{8} \\ & + x^{6} + x^{4} + x^{2} + x + 1, \end{aligned}$$

and the initial terms are [0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 1, 1, 1, 0, 0, 0].

Below is the transition function and output function of an 2-automaton that generates $T = M^o_{0,0}$:

Transition function $(n, j) \mapsto \delta(n, j)$ $(\Lambda(n) := [\delta(n, 0), \delta(n, 1)])$:

n	$\Lambda(n)$	n	$\Lambda(n)$	n	$\Lambda(n)$	n	$\Lambda(n)$
0	[1, 2]	697	[351, 1138]	1394	[1926, 1927]	2091	[2461, 523]
1	[3, 4]	698	[1035, 83]	1395	[1855, 1928]	2092	[2462, 766]
2	[5, 6]	699	[1139, 1104]	1396	[1880, 1929]	2093	[1511, 2463]
3	[7, 8]	700	[1140, 1141]	1397	[1179, 817]	2094	[1571, 785]
4	[9, 10]	701	[1142, 1143]	1398	[375, 1930]	2095	[1363, 57]
5	[11, 12]	702	[998, 1144]	1399	[1931, 1932]	2096	[2464, 2359]
6	[13, 14]	703	[1070, 964]	1400	[1933, 1934]	2097	[592, 1385]
7	[15, 16]	704	[868, 369]	1401	[1935, 1936]	2098	[2465, 1586]
8	[17, 18]	705	[1145, 1059]	1402	[913, 959]	2099	[714, 697]
9	[19, 20]	706	[1146, 1147]	1403	[854, 844]	2100	[2454, 2367]
10	[21, 22]	707	[1072, 1148]	1404	[1937, 284]	2101	[2466, 2430]
11	[23, 24]	708	[826, 1149]	1405	[1938, 878]	2102	[1732, 2280]
12	[25, 26]	709	[1150, 381]	1406	[1939, 938]	2103	[1530, 1666]
13	[27, 28]	710	[1151, 1152]	1407	[1940, 1941]	2104	[2467, 1618]
14	[29, 30]	711	[1153, 1154]	1408	[1025, 1942]	2105	[2468, 2431]
15	[31, 32]	712	[1155, 1156]	1409	[1943, 311]	2106	[1585, 2469]
16	[33, 34]	713	[1157, 1158]	1410	[1168, 1924]	2107	[2470, 1502]
17	[35, 36]	714	[1159, 1098]	1411	[1944, 1091]	2108	[1388, 53]
18	[37, 38]	715	[1160, 338]	1412	[1945, 1052]	2109	[2246, 2444]
19	[39, 40]	716	[1161, 441]	1413	[428, 907]	2110	[1496, 2471]
20	[41, 42]	717	[1162, 1163]	1414	[1902, 1057]	2111	[1609, 2443]
21	[43, 44]	718	[1164, 1165]	1415	[1029, 1946]	2112	[2472, 251]
22	[45, 46]	719	[1166, 1167]	1416	[847, 1947]	2113	[1295, 57]
23	[47, 48]	720	[955, 1168]	1417	[1948, 1102]	2114	[2455, 43]
24	[49, 50]	721	[1169, 78]	1418	[1949, 1096]	2115	[219, 2415]
25	[51, 52]	722	[950, 1170]	1419	[1182, 1199]	2116	[2446, 721]
26	[53, 54]	723	[1171, 1172]	1420	[1950, 912]	2117	[2473, 11]

27	[55, 56]	724	[1173, 452]	1421	[1929, 833]	2118	[2283, 1338]
28	[57, 58]	725	[1174, 879]	1422	[98, 1219]	2119	[1418, 1638]
29	[59, 60]	726	[1175, 888]	1423	[1951, 1144]	2120	[1696, 2370]
30	[61, 62]	727	[1176, 1177]	1424	[1952, 1251]	2121	[2474, 565]
31	[63, 64]	728	[1178, 447]	1425	[319, 1168]	2122	[2475, 727]
32	[65, 66]	729	[1179, 1180]	1426	[1953, 290]	2123	[2476, 1265]
33	[67, 68]	730	[1181, 1182]	1427	[1954, 1905]	2124	[2477, 766]
34	[69, 70]	731	[444, 927]	1428	[325, 1955]	2125	[2269, 1337]
35	[71, 72]	732	[1183, 1184]	1429	[1933, 812]	2126	[2478, 1690]
36	[73, 74]	733	[1185, 275]	1430	[1956, 874]	2127	[2479, 59]
37	[75, 76]	734	[1186, 1056]	1431	[1957, 1796]	2128	[2480, 2481]
38	[77, 78]	735	[74, 832]	1432	[1958, 1842]	2129	[1428, 2482]
39	[79, 80]	736	[1187, 1188]	1433	[1959, 1081]	2130	[2483, 520]
40	[81, 82]	737	[1189, 1190]	1434	[958, 1960]	2131	[1574, 2391]
41	[83, 84]	738	[878, 1191]	1435	[1812, 1829]	2132	[2484, 2395]
42	[85, 86]	739	[1192, 1014]	1436	[1102, 1961]	2133	[1680, 1663]
43	[87, 88]	740	[1193, 440]	1437	[442, 1167]	2134	[2485, 1601]
44	[89, 90]	741	[1194, 912]	1438	[1888, 1962]	2135	[2486, 1700]
45	[91, 92]	742	[452, 1195]	1439	[1140, 984]	2136	[2487, 680]
46	[93, 94]	743	[1094, 1196]	1440	[1963, 100]	2137	[2252, 1469]
47	[95, 96]	744	[1197, 1198]	1441	[1964, 936]	2138	[626, 1483]
48	[97, 98]	745	[1199, 1074]	1442	[1965, 346]	2139	[516, 2488]
49	[99, 100]	746	[1200, 1201]	1443	[1094, 1966]	2140	[2331, 171]
50	[101, 102]	747	[1202, 1203]	1444	[1954, 1967]	2141	[2489, 1742]
51	[103, 104]	748	[386, 1204]	1445	[1968, 64]	2142	[1596, 1602]
52	[105, 106]	749	[1205, 1206]	1446	[401, 1969]	2143	[1277, 2251]
53	[107, 108]	750	[1207, 826]	1447	[996, 435]	2144	[2490, 2491]
54	[109, 110]	751	[273, 810]	1448	[1970, 1971]	2145	[1738, 2282]
55	[111, 112]	752	[1208, 1209]	1449	[1972, 987]	2146	[2244, 2492]
56	[113, 114]	753	[1210, 1211]	1450	[1973, 942]	2147	[2493, 1757]
57	[115, 116]	754	[1105, 1212]	1451	[1974, 1975]	2148	[2494, 1580]
58	[117, 118]	755	[890, 1213]	1452	[1976, 1977]	2149	[2495, 547]
59	[119, 120]	756	[1214, 428]	1453	[1967, 1978]	2150	[723, 663]
60	[121, 122]	757	[936, 1215]	1454	[1979, 1965]	2151	[2496, 1365]
61	[123, 124]	758	[1216, 901]	1455	[1980, 124]	2152	[2497, 584]
62	[125, 126]	759	[970, 1204]	1456	[1066, 1981]	2153	[31, 55]
63	[48, 127]	760	[1217, 71]	1457	[1982, 417]	2154	[1457, 2498]
64	[128, 129]	761	[1218, 1219]	1458	[845, 1983]	2155	[518, 2276]
65	[130, 131]	762	[1220, 1047]	1459	[1984, 1157]	2156	[168, 2499]
66	[132, 133]	763	[414, 828]	1460	[1985, 992]	2157	[716, 579]
67	[134, 135]	764	[84, 969]	1461	[1086, 894]	2158	[2500, 1561]
68	[136, 137]	765	[1221, 283]	1462	[1986, 1949]	2159	[2501, 2300]
69	[138, 139]	766	[1222, 1087]	1463	[1987, 1988]	2160	[243, 1454]
70	[140, 141]	767	[1223, 88]	1464	[1989, 1019]	2161	[1597, 1393]

71	[142, 10]	768	[1224, 341]	1465	[379, 1981]	2162	[2502, 651]
72	[143, 144]	769	[1225, 1195]	1466	[1790, 1990]	2163	[570, 2368]
73	[145, 146]	770	[1226, 256]	1467	[1991, 86]	2164	[1754, 216]
74	[147, 148]	771	[1227, 1228]	1468	[1992, 1832]	2165	[193, 1354]
75	[149, 150]	772	[1229, 331]	1469	[1993, 1920]	2166	[2271, 2390]
76	[151, 152]	773	[1096, 1230]	1470	[977, 1994]	2167	[571, 2503]
77	[153, 154]	774	[1231, 409]	1471	[1102, 1015]	2168	[2504, 2391]
78	[155, 156]	775	[1232, 943]	1472	[1995, 1172]	2169	[2392, 1630]
79	[157, 158]	776	[1233, 1211]	1473	[1996, 1011]	2170	[2378, 2297]
80	[159, 160]	777	[1234, 1235]	1474	[1997, 873]	2171	[1316, 1739]
81	[161, 162]	778	[1086, 1236]	1475	[1998, 1136]	2172	[568, 1745]
82	[163, 164]	779	[1237, 1039]	1476	[114, 1999]	2173	[740, 2400]
83	[165, 166]	780	[1238, 1239]	1477	[1034, 5]	2174	[2505, 1524]
84	[167, 168]	781	[1240, 1241]	1478	[894, 1896]	2175	[2503, 1584]
85	[169, 170]	782	[1242, 378]	1479	[1872, 2000]	2176	[2506, 1622]
86	[171, 172]	783	[1243, 1067]	1480	[818, 1874]	2177	[36, 159]
87	[173, 174]	784	[1244, 1245]	1481	[96, 2001]	2178	[2507, 2269]
88	[175, 176]	785	[1246, 1183]	1482	[325, 2002]	2179	[1714, 1758]
89	[177, 178]	786	[1247, 284]	1483	[844, 2003]	2180	[2508, 1424]
90	[179, 180]	787	[1248, 1249]	1484	[2004, 2005]	2181	[2509, 2510]
91	[181, 182]	788	[1250, 1251]	1485	[271, 640]	2182	[2369, 1697]
92	[183, 181]	789	[1252, 1253]	1486	[900, 2006]	2183	[2301, 2348]
93	[184, 185]	790	[1254, 938]	1487	[2007, 1867]	2184	[2511, 1284]
94	[186, 187]	791	[1255, 939]	1488	[2008, 373]	2185	[471, 130]
95	[188, 189]	792	[1256, 923]	1489	[398, 1255]	2186	[1750, 2512]
96	[190, 191]	793	[1257, 1023]	1490	[2009, 368]	2187	[1355, 681]
97	[192, 193]	794	[406, 1258]	1491	[1848, 2010]	2188	[1571, 2385]
98	[194, 195]	795	[1259, 1260]	1492	[2011, 1013]	2189	[610, 1541]
99	[196, 197]	796	[1261, 887]	1493	[2012, 1927]	2190	[2513, 2341]
100	[198, 199]	797	[780, 1262]	1494	[2013, 2014]	2191	[1481, 557]
101	[200, 201]	798	[1263, 225]	1495	[1167, 1230]	2192	[2514, 1321]
102	[202, 203]	799	[1264, 1265]	1496	[2015, 2016]	2193	[1689, 2515]
103	[204, 205]	800	[1266, 653]	1497	[2017, 2018]	2194	[2516, 1750]
104	[206, 207]	801	[1267, 1268]	1498	[1079, 864]	2195	[1695, 2503]
105	[208, 209]	802	[1269, 1270]	1499	[311, 2019]	2196	[2517, 2266]
106	[210, 211]	803	[12, 574]	1500	[2020, 362]	2197	[2344, 1367]
107	[212, 213]	804	[1271, 1272]	1501	[2021, 269]	2198	[2518, 1291]
108	[214, 215]	805	[1273, 1274]	1502	[1236, 2006]	2199	[1539, 1309]
109	[216, 217]	806	[1275, 1276]	1503	[1930, 29]	2200	[2243, 1738]
110	[218, 219]	807	[1277, 1278]	1504	[2022, 1917]	2201	[1518, 783]
111	[220, 221]	808	[1279, 1280]	1505	[434, 997]	2202	[1353, 1729]
112	[222, 223]	809	[1281, 605]	1506	[1213, 2023]	2203	[2519, 2414]
113	[224, 225]	810	[507, 1282]	1507	[2024, 79]	2204	[2520, 1297]
114	[226, 227]	811	[1283, 1284]	1508	[1800, 2025]	2205	[2521, 214]

115	[228, 229]	812	[168, 1285]	1509	[2026, 1133]	2206	[2522, 1360]
116	[230, 231]	813	[1286, 1287]	1510	[1799, 2027]	2207	[2523, 1691]
117	[232, 233]	814	[1288, 1289]	1511	[2028, 117]	2208	[2389, 714]
118	[234, 235]	815	[1290, 1291]	1512	[2029, 1890]	2209	[2524, 1370]
119	[236, 237]	816	[1292, 1293]	1513	[837, 2030]	2210	[2525, 2463]
120	[238, 239]	817	[1294, 795]	1514	[872, 2031]	2211	[8, 1286]
121	[240, 241]	818	[164, 1295]	1515	[948, 406]	2212	[1625, 1373]
122	[242, 243]	819	[1296, 568]	1516	[267, 28]	2213	[2526, 1581]
123	[244, 245]	820	[1297, 1298]	1517	[64, 2032]	2214	[796, 1530]
124	[246, 247]	821	[1299, 1300]	1518	[2033, 2001]	2215	[2501, 2527]
125	[248, 249]	822	[1301, 1302]	1519	[2034, 866]	2216	[2528, 1640]
126	[250, 251]	823	[1303, 1304]	1520	[1192, 101]	2217	[2529, 2491]
127	[252, 121]	824	[1305, 1306]	1521	[2035, 1889]	2218	[2530, 725]
128	[253, 254]	825	[1307, 1308]	1522	[2036, 2037]	2219	[2284, 2451]
129	[255, 256]	826	[1309, 648]	1523	[2038, 1100]	2220	[580, 2343]
130	[257, 258]	827	[1310, 1311]	1524	[875, 2039]	2221	[155, 2488]
131	[259, 260]	828	[187, 1312]	1525	[2040, 2041]	2222	[2531, 1657]
132	[261, 262]	829	[634, 734]	1526	[2042, 1773]	2223	[2532, 769]
133	[92, 263]	830	[1312, 639]	1527	[2043, 426]	2224	[230, 2322]
134	[264, 265]	831	[490, 638]	1528	[2044, 2045]	2225	[1322, 2471]
135	[266, 267]	832	[1313, 1314]	1529	[1780, 2046]	2226	[2533, 2534]
136	[268, 269]	833	[681, 1315]	1530	[2047, 1805]	2227	[2535, 230]
137	[270, 271]	834	[1295, 1316]	1531	[1935, 1861]	2228	[2236, 1266]
138	[272, 273]	835	[1317, 1318]	1532	[1104, 1982]	2229	[2064, 919]
139	[274, 275]	836	[1319, 477]	1533	[2048, 1820]	2230	[2536, 857]
140	[276, 277]	837	[1320, 1321]	1534	[2049, 26]	2231	[1149, 110]
141	[278, 279]	838	[1322, 1323]	1535	[2050, 957]	2232	[1797, 2537]
142	[280, 281]	839	[1324, 52]	1536	[2051, 281]	2233	[2538, 1811]
143	[282, 283]	840	[1325, 520]	1537	[2052, 1086]	2234	[2192, 4]
144	[284, 285]	841	[1326, 1327]	1538	[2053, 2054]	2235	[2539, 1816]
145	[286, 287]	842	[1328, 782]	1539	[2055, 1076]	2236	[2540, 2541]
146	[288, 289]	843	[1329, 1330]	1540	[2056, 2040]	2237	[1085, 903]
147	[290, 291]	844	[671, 1331]	1541	[1937, 1046]	2238	[2542, 819]
148	[292, 293]	845	[1332, 1333]	1542	[2057, 377]	2239	[2543, 954]
149	[294, 295]	846	[1334, 1335]	1543	[919, 2058]	2240	[2544, 365]
150	[296, 297]	847	[1336, 250]	1544	[2059, 1043]	2241	[1790, 2545]
151	[298, 299]	848	[1337, 1338]	1545	[945, 1942]	2242	[2139, 2546]
152	[300, 301]	849	[1339, 1340]	1546	[1926, 2060]	2243	[1923, 2547]
153	[302, 303]	850	[1341, 1342]	1547	[2056, 1218]	2244	[2548, 289]
154	[304, 305]	851	[1343, 1344]	1548	[1088, 2061]	2245	[300, 1818]
155	[306, 307]	852	[1345, 594]	1549	[2062, 1834]	2246	[329, 1213]
156	[308, 309]	853	[1346, 515]	1550	[2063, 459]	2247	[1974, 339]
157	[310, 311]	854	[1344, 1347]	1551	[1781, 2064]	2248	[2166, 2549]
158	[312, 313]	855	[763, 629]	1552	[1865, 1158]	2249	[2147, 2061]

159	[314, 315]	856	[669, 1348]	1553	[1820, 868]	2250	[2550, 1771]
160	[74, 316]	857	[780, 1349]	1554	[1953, 1128]	2251	[1997, 2134]
161	[29, 317]	858	[1350, 1300]	1555	[2065, 1919]	2252	[2551, 977]
162	[318, 319]	859	[1351, 1352]	1556	[2066, 2067]	2253	[2099, 801]
163	[320, 321]	860	[1353, 1354]	1557	[2068, 1007]	2254	[2552, 1222]
164	[322, 323]	861	[1355, 1356]	1558	[2069, 1157]	2255	[867, 966]
165	[324, 325]	862	[1357, 631]	1559	[955, 75]	2256	[2553, 345]
166	[326, 327]	863	[1358, 1359]	1560	[2013, 2070]	2257	[2554, 1177]
167	[328, 329]	864	[1360, 155]	1561	[2071, 1890]	2258	[82, 2555]
168	[330, 331]	865	[1361, 1362]	1562	[1818, 1842]	2259	[463, 2026]
169	[332, 333]	866	[7, 1363]	1563	[417, 1225]	2260	[264, 2556]
170	[334, 335]	867	[617, 1364]	1564	[1213, 2072]	2261	[2557, 116]
171	[336, 337]	868	[1365, 1306]	1565	[995, 897]	2262	[822, 83]
172	[338, 339]	869	[1366, 1367]	1566	[2073, 468]	2263	[2558, 2559]
173	[340, 341]	870	[1368, 244]	1567	[2074, 2075]	2264	[2560, 1798]
174	[342, 343]	871	[1369, 740]	1568	[2076, 2031]	2265	[2561, 2181]
175	[344, 294]	872	[1370, 59]	1569	[2077, 930]	2266	[1777, 2020]
176	[345, 346]	873	[1371, 1372]	1570	[2078, 299]	2267	[2562, 1095]
177	[105, 254]	874	[1373, 1363]	1571	[2079, 308]	2268	[2138, 406]
178	[347, 348]	875	[1374, 1375]	1572	[2080, 2081]	2269	[2563, 1863]
179	[349, 327]	876	[1376, 1377]	1573	[2082, 2083]	2270	[2564, 372]
180	[350, 351]	877	[1378, 776]	1574	[2084, 1901]	2271	[2565, 1110]
181	[352, 353]	878	[1379, 1380]	1575	[1180, 317]	2272	[2133, 2174]
182	[354, 355]	879	[1381, 1382]	1576	[2085, 92]	2273	[2062, 2210]
183	[356, 357]	880	[1383, 1384]	1577	[2086, 1066]	2274	[2566, 798]
184	[358, 359]	881	[179, 1385]	1578	[1129, 391]	2275	[2567, 1069]
185	[263, 360]	882	[1386, 1387]	1579	[307, 965]	2276	[2568, 1840]
186	[361, 362]	883	[1281, 470]	1580	[2087, 954]	2277	[939, 1111]
187	[363, 364]	884	[1388, 1389]	1581	[2088, 431]	2278	[2569, 367]
188	[113, 365]	885	[1376, 1390]	1582	[965, 1999]	2279	[1897, 1859]
189	[366, 367]	886	[1391, 1392]	1583	[278, 1803]	2280	[965, 2570]
190	[368, 369]	887	[1393, 144]	1584	[2089, 2090]	2281	[2571, 1779]
191	[370, 371]	888	[1394, 1395]	1585	[311, 2091]	2282	[951, 872]
192	[372, 373]	889	[1396, 1335]	1586	[1817, 301]	2283	[2572, 1823]
193	[374, 375]	890	[1397, 559]	1587	[2092, 447]	2284	[2573, 2048]
194	[376, 377]	891	[148, 498]	1588	[365, 1941]	2285	[826, 1029]
195	[378, 379]	892	[1302, 131]	1589	[995, 2093]	2286	[2574, 2575]
196	[380, 381]	893	[1398, 1399]	1590	[1069, 306]	2287	[819, 1072]
197	[382, 383]	894	[1400, 1401]	1591	[2094, 950]	2288	[2576, 2577]
198	[384, 385]	895	[192, 1402]	1592	[2095, 27]	2289	[2578, 1885]
199	[26, 386]	896	[1403, 623]	1593	[273, 303]	2290	[2026, 2027]
200	[387, 388]	897	[1404, 143]	1594	[2096, 285]	2291	[2579, 2580]
201	[389, 357]	898	[1405, 722]	1595	[2097, 862]	2292	[799, 1851]
202	[390, 391]	899	[1406, 135]	1596	[1165, 841]	2293	[380, 2581]

203	[392, 393]	900	[1407, 533]	1597	[413, 901]	2294	[1231, 2028]
204	[394, 270]	901	[1408, 1409]	1598	[2098, 466]	2295	[2582, 1198]
205	[395, 396]	902	[551, 1410]	1599	[409, 2099]	2296	[2583, 312]
206	[397, 398]	903	[1411, 1412]	1600	[927, 2100]	2297	[2584, 2541]
207	[399, 400]	904	[770, 146]	1601	[2101, 1069]	2298	[1163, 1831]
208	[401, 402]	905	[1271, 219]	1602	[2102, 404]	2299	[1128, 1947]
209	[403, 404]	906	[646, 1413]	1603	[2103, 1894]	2300	[394, 271]
210	[405, 293]	907	[1414, 1415]	1604	[2104, 958]	2301	[2585, 1228]
211	[406, 407]	908	[1416, 655]	1605	[70, 1836]	2302	[2586, 2587]
212	[408, 409]	909	[1293, 482]	1606	[2105, 2106]	2303	[2588, 1992]
213	[410, 411]	910	[1364, 1417]	1607	[2107, 1911]	2304	[2589, 814]
214	[412, 287]	911	[1418, 1419]	1608	[2108, 2109]	2305	[1070, 113]
215	[413, 414]	912	[1420, 34]	1609	[2110, 2025]	2306	[2590, 25]
216	[415, 416]	913	[643, 1421]	1610	[2110, 1801]	2307	[2591, 1839]
217	[120, 417]	914	[127, 1422]	1611	[1074, 851]	2308	[1787, 467]
218	[418, 312]	915	[1423, 1424]	1612	[2111, 2112]	2309	[2592, 2593]
219	[419, 420]	916	[1425, 1426]	1613	[2113, 972]	2310	[1108, 360]
220	[421, 29]	917	[542, 1427]	1614	[2114, 927]	2311	[1823, 2135]
221	[422, 423]	918	[1428, 1429]	1615	[2115, 1780]	2312	[2594, 1223]
222	[424, 22]	919	[1430, 534]	1616	[2116, 413]	2313	[2595, 2185]
223	[112, 425]	920	[680, 1356]	1617	[2027, 1971]	2314	[2596, 1163]
224	[84, 426]	921	[1431, 1329]	1618	[2117, 2118]	2315	[2597, 262]
225	[427, 428]	922	[1432, 526]	1619	[2119, 2026]	2316	[266, 2593]
226	[429, 430]	923	[793, 546]	1620	[2000, 425]	2317	[2217, 451]
227	[431, 432]	924	[1433, 1434]	1621	[2117, 2120]	2318	[1143, 834]
228	[433, 323]	925	[531, 576]	1622	[2121, 321]	2319	[1138, 2193]
229	[434, 435]	926	[1435, 476]	1623	[2122, 1206]	2320	[346, 2598]
230	[436, 361]	927	[1436, 168]	1624	[2123, 1946]	2321	[1252, 2599]
231	[20, 319]	928	[43, 1437]	1625	[2124, 1083]	2322	[2600, 838]
232	[437, 438]	929	[1352, 1438]	1626	[2125, 1128]	2323	[1163, 1047]
233	[439, 368]	930	[639, 637]	1627	[2089, 1883]	2324	[2116, 410]
234	[440, 328]	931	[1439, 601]	1628	[1840, 908]	2325	[2198, 1864]
235	[441, 383]	932	[1440, 176]	1629	[2126, 2127]	2326	[2601, 441]
236	[442, 443]	933	[1441, 1442]	1630	[1147, 1944]	2327	[1839, 2091]
237	[444, 65]	934	[247, 624]	1631	[1212, 1225]	2328	[1844, 898]
238	[445, 446]	935	[641, 633]	1632	[1199, 300]	2329	[1770, 2602]
239	[447, 448]	936	[1443, 551]	1633	[2128, 397]	2330	[2552, 259]
240	[449, 450]	937	[1444, 170]	1634	[1003, 2129]	2331	[284, 69]
241	[451, 452]	938	[1445, 1446]	1635	[2130, 1003]	2332	[1931, 1201]
242	[453, 351]	939	[667, 743]	1636	[1981, 939]	2333	[2603, 978]
243	[454, 24]	940	[1361, 1447]	1637	[1234, 960]	2334	[2604, 909]
244	[455, 18]	941	[1448, 622]	1638	[2131, 807]	2335	[2605, 2016]
245	[456, 457]	942	[1449, 545]	1639	[2132, 1071]	2336	[835, 2186]
246	[458, 350]	943	[1450, 585]	1640	[2133, 1220]	2337	[952, 2580]

247	[459, 460]	944	[1451, 1452]	1641	[2134, 2135]	2338	[2042, 419]
248	[461, 462]	945	[1453, 1454]	1642	[2136, 919]	2339	[1251, 1010]
249	[463, 464]	946	[1455, 1456]	1643	[2137, 2138]	2340	[2606, 2607]
250	[465, 466]	947	[1457, 1458]	1644	[808, 1002]	2341	[1153, 993]
251	[467, 468]	948	[1459, 679]	1645	[2139, 2140]	2342	[1825, 1906]
252	[469, 470]	949	[1417, 539]	1646	[2141, 2142]	2343	[2608, 2609]
253	[471, 472]	950	[1460, 1401]	1647	[2143, 20]	2344	[2610, 1870]
254	[473, 474]	951	[1461, 1462]	1648	[2144, 914]	2345	[1218, 1000]
255	[475, 476]	952	[1463, 761]	1649	[331, 2145]	2346	[1249, 836]
256	[477, 478]	953	[1464, 689]	1650	[1087, 2102]	2347	[28, 1990]
257	[479, 480]	954	[1327, 149]	1651	[2143, 2146]	2348	[2611, 2612]
258	[481, 482]	955	[1465, 537]	1652	[2125, 290]	2349	[121, 2613]
259	[483, 484]	956	[1466, 547]	1653	[2147, 1089]	2350	[2614, 1042]
260	[485, 486]	957	[1467, 1468]	1654	[2148, 2101]	2351	[2615, 1899]
261	[487, 488]	958	[1469, 1470]	1655	[260, 2102]	2352	[1181, 2616]
262	[487, 489]	959	[539, 1471]	1656	[2149, 294]	2353	[2617, 2075]
263	[182, 490]	960	[1472, 775]	1657	[1812, 403]	2354	[270, 270]
264	[491, 492]	961	[1473, 645]	1658	[272, 906]	2355	[334, 125]
265	[493, 494]	962	[1474, 1475]	1659	[1047, 2150]	2356	[2618, 2619]
266	[495, 496]	963	[1476, 1462]	1660	[2151, 867]	2357	[2620, 1776]
267	[497, 498]	964	[782, 1477]	1661	[2152, 2153]	2358	[2141, 2621]
268	[499, 500]	965	[587, 607]	1662	[378, 398]	2359	[1224, 2622]
269	[501, 502]	966	[1478, 1479]	1663	[1795, 2154]	2360	[1081, 2216]
270	[503, 504]	967	[1364, 1480]	1664	[2155, 2048]	2361	[2048, 439]
271	[504, 505]	968	[48, 1481]	1665	[2156, 1056]	2362	[2623, 2624]
272	[506, 507]	969	[166, 1482]	1666	[2157, 350]	2363	[125, 2625]
273	[508, 509]	970	[623, 1483]	1667	[951, 429]	2364	[2084, 2626]
274	[510, 511]	971	[136, 1484]	1668	[351, 2122]	2365	[979, 2134]
275	[512, 513]	972	[1485, 1415]	1669	[2158, 2072]	2366	[2102, 1871]
276	[514, 515]	973	[535, 1486]	1670	[2159, 440]	2367	[2627, 2169]
277	[516, 156]	974	[1487, 1341]	1671	[2160, 325]	2368	[375, 2219]
278	[517, 484]	975	[1488, 1489]	1672	[1120, 2161]	2369	[1014, 1961]
279	[518, 519]	976	[1490, 1491]	1673	[2162, 2163]	2370	[1792, 2628]
280	[520, 521]	977	[1492, 139]	1674	[2164, 1833]	2371	[3, 948]
281	[522, 523]	978	[1493, 717]	1675	[1259, 2081]	2372	[104, 1135]
282	[524, 525]	979	[498, 1494]	1676	[2165, 896]	2373	[2629, 2040]
283	[228, 526]	980	[1495, 1496]	1677	[2166, 2167]	2374	[301, 852]
284	[527, 140]	981	[1497, 1498]	1678	[1254, 1819]	2375	[2176, 1788]
285	[528, 529]	982	[158, 1499]	1679	[2168, 2169]	2376	[2576, 454]
286	[530, 531]	983	[1475, 728]	1680	[925, 2076]	2377	[2630, 1772]
287	[532, 533]	984	[1307, 1359]	1681	[2170, 2171]	2378	[2631, 277]
288	[534, 535]	985	[535, 1383]	1682	[992, 1154]	2379	[1867, 916]
289	[536, 537]	986	[1500, 754]	1683	[1034, 2101]	2380	[318, 1257]
290	[538, 539]	987	[1501, 54]	1684	[2172, 305]	2381	[2589, 2632]

291	[32, 540]	988	[1502, 1503]	1685	[2173, 2174]	2382	[2633, 862]
292	[541, 542]	989	[1504, 1453]	1686	[2175, 295]	2383	[373, 2598]
293	[543, 544]	990	[1505, 683]	1687	[1164, 2176]	2384	[1018, 989]
294	[545, 546]	991	[1506, 1507]	1688	[2177, 827]	2385	[28, 2545]
295	[547, 38]	992	[1508, 1302]	1689	[398, 2089]	2386	[2634, 1904]
296	[548, 549]	993	[1409, 1509]	1690	[2178, 1239]	2387	[2127, 1930]
297	[550, 56]	994	[1510, 1511]	1691	[2179, 1825]	2388	[2611, 2587]
298	[551, 552]	995	[1512, 657]	1692	[2007, 437]	2389	[891, 1040]
299	[553, 133]	996	[1513, 1514]	1693	[2180, 2089]	2390	[2635, 2628]
300	[554, 555]	997	[1515, 130]	1694	[934, 880]	2391	[1881, 1143]
301	[556, 557]	998	[1385, 1304]	1695	[1123, 2181]	2392	[2174, 1992]
302	[558, 559]	999	[1516, 695]	1696	[800, 329]	2393	[2636, 378]
303	[560, 561]	1000	[1510, 244]	1697	[319, 75]	2394	[2637, 1891]
304	[562, 245]	1001	[1517, 189]	1698	[2169, 1105]	2395	[2068, 1845]
305	[563, 192]	1002	[1518, 602]	1699	[2182, 2183]	2396	[1778, 2638]
306	[564, 565]	1003	[1519, 35]	1700	[2184, 108]	2397	[2076, 2639]
307	[241, 566]	1004	[546, 671]	1701	[936, 2185]	2398	[2024, 104]
308	[567, 568]	1005	[1520, 1375]	1702	[6, 306]	2399	[1184, 1191]
309	[569, 570]	1006	[1316, 1287]	1703	[1249, 2186]	2400	[2640, 337]
310	[571, 572]	1007	[1521, 562]	1704	[1130, 292]	2401	[2111, 2106]
311	[573, 574]	1008	[1522, 740]	1705	[2187, 1929]	2402	[2641, 453]
312	[575, 576]	1009	[1475, 516]	1706	[1228, 2188]	2403	[2216, 335]
313	[577, 578]	1010	[1523, 1524]	1707	[2189, 879]	2404	[1905, 2642]
314	[171, 579]	1011	[35, 646]	1708	[2190, 987]	2405	[1008, 1922]
315	[580, 152]	1012	[1525, 1526]	1709	[2191, 1966]	2406	[2643, 1112]
316	[146, 581]	1013	[1527, 1528]	1710	[943, 973]	2407	[1120, 2644]
317	[582, 136]	1014	[695, 1529]	1711	[803, 113]	2408	[2645, 292]
318	[583, 584]	1015	[1530, 1386]	1712	[2192, 2138]	2409	[2646, 2647]
319	[40, 585]	1016	[1531, 1532]	1713	[24, 2193]	2410	[1979, 372]
320	[586, 587]	1017	[788, 1533]	1714	[2194, 835]	2411	[2211, 1960]
321	[145, 588]	1018	[1534, 796]	1715	[80, 2195]	2412	[2152, 1092]
322	[589, 151]	1019	[1535, 1278]	1716	[2196, 923]	2413	[2648, 1148]
323	[590, 591]	1020	[1536, 1537]	1717	[2197, 459]	2414	[963, 1009]
324	[246, 592]	1021	[1538, 1539]	1718	[2198, 2199]	2415	[2649, 2171]
325	[593, 594]	1022	[1540, 747]	1719	[1841, 920]	2416	[331, 990]
326	[595, 596]	1023	[42, 764]	1720	[2200, 932]	2417	[2650, 1810]
327	[251, 597]	1024	[590, 1541]	1721	[399, 805]	2418	[2651, 2100]
328	[598, 148]	1025	[1542, 592]	1722	[2094, 924]	2419	[2652, 1107]
329	[599, 509]	1026	[1543, 1544]	1723	[824, 1029]	2420	[833, 1907]
330	[600, 601]	1027	[1545, 1546]	1724	[2052, 903]	2421	[1012, 2653]
331	[602, 60]	1028	[572, 1547]	1725	[2201, 2202]	2422	[2222, 328]
332	[603, 604]	1029	[1548, 548]	1726	[1965, 839]	2423	[2082, 808]
333	[469, 605]	1030	[1549, 580]	1727	[280, 2203]	2424	[2630, 393]
334	[606, 250]	1031	[1550, 1542]	1728	[2204, 1978]	2425	[2169, 1982]

335	[607, 13]	1032	[1551, 1552]	1729	[373, 1846]	2426	[2623, 2183]
336	[608, 609]	1033	[1527, 1553]	1730	[1170, 2076]	2427	[872, 2639]
337	[610, 591]	1034	[1554, 249]	1731	[980, 2205]	2428	[2571, 2638]
338	[611, 504]	1035	[1555, 1556]	1732	[446, 855]	2429	[2654, 2205]
339	[472, 211]	1036	[1557, 587]	1733	[2206, 1955]	2430	[2655, 2191]
340	[612, 613]	1037	[1558, 1559]	1734	[2207, 430]	2431	[2656, 109]
341	[614, 615]	1038	[1560, 1446]	1735	[2208, 2070]	2432	[1232, 322]
342	[616, 617]	1039	[1561, 1562]	1736	[338, 1975]	2433	[2063, 2657]
343	[618, 481]	1040	[1413, 1563]	1737	[2209, 951]	2434	[420, 2658]
344	[619, 620]	1041	[542, 1564]	1738	[2210, 988]	2435	[2659, 1863]
345	[621, 534]	1042	[1565, 191]	1739	[948, 2211]	2436	[2090, 1111]
346	[622, 623]	1043	[1566, 793]	1740	[2212, 2045]	2437	[89, 1241]
347	[624, 625]	1044	[1289, 1477]	1741	[1139, 119]	2438	[823, 1833]
348	[520, 626]	1045	[769, 1419]	1742	[1839, 2019]	2439	[820, 2644]
349	[614, 627]	1046	[1377, 1482]	1743	[1212, 278]	2440	[2660, 2120]
350	[628, 629]	1047	[1567, 716]	1744	[2213, 2041]	2441	[2652, 898]
351	[630, 631]	1048	[1525, 1568]	1745	[2214, 2018]	2442	[2661, 265]
352	[632, 490]	1049	[1432, 229]	1746	[1001, 809]	2443	[2138, 2211]
353	[633, 223]	1050	[217, 1413]	1747	[422, 1797]	2444	[821, 975]
354	[488, 132]	1051	[133, 184]	1748	[1043, 2215]	2445	[2662, 1165]
355	[634, 635]	1052	[489, 186]	1749	[2160, 382]	2446	[2663, 950]
356	[553, 636]	1053	[639, 641]	1750	[2093, 386]	2447	[2664, 1834]
357	[46, 187]	1054	[1569, 633]	1751	[2216, 125]	2448	[2616, 2196]
358	[45, 132]	1055	[133, 1312]	1752	[1826, 388]	2449	[2566, 1044]
359	[637, 638]	1056	[1570, 185]	1753	[2217, 1212]	2450	[2665, 882]
360	[181, 639]	1057	[488, 46]	1754	[2218, 120]	2451	[1823, 2666]
361	[635, 640]	1058	[185, 641]	1755	[2012, 2060]	2452	[1819, 439]
362	[641, 487]	1059	[1569, 487]	1756	[1858, 1194]	2453	[2667, 2599]
363	[223, 186]	1060	[734, 734]	1757	[2127, 2219]	2454	[2635, 1793]
364	[638, 489]	1061	[694, 1571]	1758	[2220, 1780]	2455	[2668, 442]
365	[642, 643]	1062	[1572, 477]	1759	[2221, 2222]	2456	[2669, 462]
366	[644, 232]	1063	[210, 1573]	1760	[1209, 313]	2457	[2670, 2671]
367	[645, 646]	1064	[1574, 1497]	1761	[1987, 2188]	2458	[2672, 2064]
368	[647, 648]	1065	[1575, 1576]	1762	[2223, 1067]	2459	[1782, 908]
369	[649, 171]	1066	[1577, 677]	1763	[2224, 431]	2460	[1986, 442]
370	[650, 651]	1067	[1578, 566]	1764	[1929, 1891]	2461	[974, 822]
371	[652, 653]	1068	[534, 1579]	1765	[403, 1871]	2462	[2066, 1223]
372	[654, 655]	1069	[1580, 241]	1766	[1073, 300]	2463	[2027, 2673]
373	[656, 657]	1070	[1581, 226]	1767	[2225, 906]	2464	[2128, 1065]
374	[658, 659]	1071	[1582, 1352]	1768	[2226, 2227]	2465	[420, 1091]
375	[660, 661]	1072	[1583, 237]	1769	[2228, 2140]	2466	[2221, 1103]
376	[501, 662]	1073	[791, 556]	1770	[1326, 796]	2467	[2593, 1038]
377	[663, 664]	1074	[154, 1584]	1771	[1495, 2229]	2468	[1091, 2153]
378	[665, 233]	1075	[1585, 1586]	1772	[1626, 2230]	2469	[2674, 2609]

379	[666, 667]	1076	[1587, 1588]	1773	[713, 1649]	2470	[816, 2195]
380	[668, 175]	1077	[1385, 1589]	1774	[2231, 2232]	2471	[2675, 2676]
381	[669, 670]	1078	[1590, 1360]	1775	[1396, 1624]	2472	[2677, 1116]
382	[588, 671]	1079	[1591, 1280]	1776	[2233, 1364]	2473	[2212, 2678]
383	[672, 673]	1080	[670, 1427]	1777	[2234, 209]	2474	[1168, 2547]
384	[674, 675]	1081	[1592, 607]	1778	[2235, 1759]	2475	[1202, 2607]
385	[676, 677]	1082	[1593, 1594]	1779	[2236, 1596]	2476	[1841, 2058]
386	[678, 679]	1083	[1389, 701]	1780	[581, 1331]	2477	[2679, 2167]
387	[680, 681]	1084	[1595, 1596]	1781	[2237, 1430]	2478	[2680, 322]
388	[682, 683]	1085	[1597, 1407]	1782	[2238, 1293]	2479	[2681, 121]
389	[684, 44]	1086	[1598, 1315]	1783	[1480, 630]	2480	[1820, 966]
390	[685, 686]	1087	[213, 1599]	1784	[1358, 1308]	2481	[896, 2093]
391	[687, 502]	1088	[1582, 528]	1785	[2239, 544]	2482	[1786, 410]
392	[688, 166]	1089	[684, 1437]	1786	[2240, 2241]	2483	[2646, 1042]
393	[220, 689]	1090	[1390, 1491]	1787	[1763, 2242]	2484	[2123, 1030]
394	[690, 691]	1091	[1600, 42]	1788	[2243, 2244]	2485	[2083, 1873]
395	[692, 693]	1092	[1601, 1602]	1789	[2245, 1561]	2486	[2004, 859]
396	[694, 695]	1093	[645, 36]	1790	[496, 647]	2487	[2682, 1883]
397	[696, 697]	1094	[1603, 1344]	1791	[2246, 2247]	2488	[2650, 1249]
398	[698, 699]	1095	[1604, 1470]	1792	[1596, 2248]	2489	[2550, 2602]
399	[570, 700]	1096	[1605, 1311]	1793	[2249, 2250]	2490	[2046, 2215]
400	[701, 660]	1097	[1606, 1552]	1794	[1363, 1316]	2491	[1171, 2683]
401	[702, 703]	1098	[1607, 741]	1795	[1535, 2251]	2492	[888, 2684]
402	[704, 705]	1099	[1608, 1475]	1796	[2252, 1700]	2493	[2574, 2037]
403	[706, 707]	1100	[1609, 1610]	1797	[2253, 2254]	2494	[1105, 451]
404	[486, 708]	1101	[1611, 1612]	1798	[1647, 1537]	2495	[2647, 77]
405	[709, 710]	1102	[1613, 518]	1799	[2255, 2256]	2496	[2685, 1829]
406	[711, 712]	1103	[1614, 548]	1800	[1502, 507]	2497	[860, 2109]
407	[679, 713]	1104	[1615, 1298]	1801	[2257, 581]	2498	[104, 816]
408	[242, 714]	1105	[1616, 129]	1802	[2258, 706]	2499	[2038, 2686]
409	[715, 716]	1106	[1617, 1618]	1803	[2259, 1546]	2500	[1834, 1876]
410	[717, 141]	1107	[1619, 1409]	1804	[1497, 2260]	2501	[852, 1079]
411	[636, 181]	1108	[749, 1489]	1805	[2261, 497]	2502	[2067, 2555]
412	[718, 719]	1109	[54, 1366]	1806	[2262, 1432]	2503	[2687, 905]
413	[720, 551]	1110	[1620, 673]	1807	[2263, 598]	2504	[2688, 1797]
414	[721, 722]	1111	[1621, 776]	1808	[741, 1480]	2505	[2689, 2576]
415	[723, 213]	1112	[1622, 1349]	1809	[2264, 48]	2506	[2690, 884]
416	[724, 203]	1113	[1623, 193]	1810	[2265, 2266]	2507	[5, 842]
417	[725, 518]	1114	[235, 1471]	1811	[2267, 1468]	2508	[2591, 2121]
418	[146, 577]	1115	[1334, 1624]	1812	[2268, 2254]	2509	[2225, 273]
419	[726, 727]	1116	[1625, 1562]	1813	[2269, 497]	2510	[2691, 437]
420	[728, 729]	1117	[1626, 220]	1814	[2270, 197]	2511	[1079, 96]
421	[730, 174]	1118	[1627, 1392]	1815	[507, 1758]	2512	[443, 2199]
422	[731, 732]	1119	[1628, 1629]	1816	[2271, 1559]	2513	[933, 888]

423	[733, 486]	1120	[707, 1630]	1817	[2272, 2273]	2514	[2219, 817]
424	[132, 636]	1121	[1545, 1631]	1818	[2274, 1329]	2515	[2617, 2692]
425	[734, 635]	1122	[1632, 1633]	1819	[2275, 647]	2516	[1166, 443]
426	[735, 140]	1123	[1634, 1635]	1820	[2276, 693]	2517	[1208, 963]
427	[736, 500]	1124	[219, 1636]	1821	[1688, 485]	2518	[2600, 2030]
428	[737, 549]	1125	[1637, 686]	1822	[2277, 596]	2519	[1774, 448]
429	[738, 739]	1126	[769, 1638]	1823	[2278, 729]	2520	[2693, 846]
430	[740, 741]	1127	[1441, 1452]	1824	[1485, 2279]	2521	[426, 1934]
431	[742, 743]	1128	[1639, 1640]	1825	[1486, 2280]	2522	[1776, 2694]
432	[744, 745]	1129	[1641, 550]	1826	[1293, 2281]	2523	[1151, 333]
433	[746, 747]	1130	[1642, 543]	1827	[1611, 2282]	2524	[2695, 119]
434	[748, 749]	1131	[663, 1643]	1828	[2283, 2284]	2525	[2658, 1813]
435	[750, 751]	1132	[776, 1644]	1829	[2285, 2286]	2526	[2696, 889]
436	[750, 752]	1133	[1638, 773]	1830	[2287, 706]	2527	[858, 2005]
437	[753, 667]	1134	[150, 1387]	1831	[1348, 2288]	2528	[2096, 69]
438	[675, 754]	1135	[1645, 1646]	1832	[2289, 1623]	2529	[1183, 1010]
439	[755, 542]	1136	[1291, 545]	1833	[2290, 1479]	2530	[2697, 877]
440	[756, 217]	1137	[1647, 1648]	1834	[2291, 143]	2531	[2146, 955]
441	[523, 757]	1138	[773, 1649]	1835	[1496, 1323]	2532	[2698, 1182]
442	[758, 712]	1139	[1650, 1651]	1836	[185, 637]	2533	[2044, 2678]
443	[759, 207]	1140	[577, 1652]	1837	[2292, 2293]	2534	[1227, 2175]
444	[760, 761]	1141	[1303, 1589]	1838	[1636, 2294]	2535	[820, 2161]
445	[762, 763]	1142	[1562, 1295]	1839	[2295, 226]	2536	[2699, 1669]
446	[683, 764]	1143	[197, 192]	1840	[2296, 160]	2537	[1544, 780]
447	[765, 239]	1144	[619, 1653]	1841	[2297, 2298]	2538	[2700, 1343]
448	[766, 767]	1145	[139, 752]	1842	[555, 757]	2539	[1414, 2279]
449	[768, 769]	1146	[1654, 1655]	1843	[2299, 2300]	2540	[38, 2276]
450	[770, 588]	1147	[1656, 50]	1844	[1662, 749]	2541	[1456, 1563]
451	[771, 201]	1148	[568, 701]	1845	[1402, 708]	2542	[2701, 1297]
452	[129, 215]	1149	[1308, 1657]	1846	[655, 1498]	2543	[2309, 1362]
453	[772, 773]	1150	[1386, 1658]	1847	[2301, 1753]	2544	[2702, 2534]
454	[774, 775]	1151	[1659, 1566]	1848	[2249, 732]	2545	[498, 2703]
455	[776, 777]	1152	[1660, 602]	1849	[2302, 2303]	2546	[670, 1564]
456	[560, 778]	1153	[1661, 1556]	1850	[2304, 218]	2547	[603, 2510]
457	[779, 780]	1154	[1662, 750]	1851	[2305, 550]	2548	[655, 2260]
458	[234, 630]	1155	[519, 1663]	1852	[2306, 11]	2549	[1636, 1499]
459	[781, 782]	1156	[1664, 626]	1853	[472, 1573]	2550	[744, 2242]
460	[783, 513]	1157	[1665, 1421]	1854	[521, 1533]	2551	[2360, 1390]
461	[784, 785]	1158	[1666, 195]	1855	[521, 789]	2552	[1356, 1526]
462	[786, 787]	1159	[493, 162]	1856	[54, 660]	2553	[2704, 622]
463	[788, 789]	1160	[1515, 472]	1857	[543, 2307]	2554	[1467, 666]
464	[199, 150]	1161	[1667, 525]	1858	[2308, 1532]	2555	[2513, 2705]
465	[790, 791]	1162	[1668, 1669]	1859	[2229, 227]	2556	[668, 573]
466	[792, 793]	1163	[1670, 1380]	1860	[189, 238]	2557	[1455, 159]

467	[794, 795]	1164	[1671, 1333]	1861	[2309, 1447]	2558	[2472, 1708]
468	[796, 199]	1165	[1672, 1673]	1862	[1368, 1511]	2559	[2504, 1497]
469	[797, 798]	1166	[1674, 1539]	1863	[2310, 1599]	2560	[2706, 1296]
470	[799, 800]	1167	[1272, 158]	1864	[2311, 1712]	2561	[2353, 2707]
471	[117, 801]	1168	[1675, 1676]	1865	[1503, 13]	2562	[1549, 1605]
472	[802, 803]	1169	[1677, 1678]	1866	[2312, 1678]	2563	[566, 1558]
473	[804, 805]	1170	[1679, 1680]	1867	[2313, 699]	2564	[1544, 656]
474	[806, 807]	1171	[1681, 127]	1868	[2314, 1650]	2565	[143, 2708]
475	[808, 809]	1172	[1682, 1393]	1869	[701, 1366]	2566	[1664, 521]
476	[302, 810]	1173	[1683, 1340]	1870	[2315, 1330]	2567	[2709, 1581]
477	[811, 416]	1174	[1684, 1383]	1871	[2316, 562]	2568	[675, 2710]
478	[426, 812]	1175	[1685, 1642]	1872	[2317, 2]	2569	[2440, 2424]
479	[813, 814]	1176	[1686, 1687]	1873	[1366, 2318]	2570	[566, 742]
480	[815, 816]	1177	[1688, 1623]	1874	[1542, 247]	2571	[2413, 2267]
481	[817, 818]	1178	[1689, 1594]	1875	[2319, 1727]	2572	[2398, 627]
482	[819, 820]	1179	[1690, 164]	1876	[2320, 1665]	2573	[201, 2711]
483	[821, 822]	1180	[1691, 1453]	1877	[2321, 1718]	2574	[2712, 1703]
484	[823, 824]	1181	[539, 1692]	1878	[10, 2322]	2575	[2351, 1422]
485	[825, 826]	1182	[1693, 154]	1879	[612, 1384]	2576	[2713, 2421]
486	[827, 80]	1183	[180, 625]	1880	[481, 2281]	2577	[1635, 1716]
487	[411, 828]	1184	[1694, 1525]	1881	[615, 62]	2578	[1468, 1558]
488	[829, 830]	1185	[1695, 572]	1882	[2314, 2297]	2579	[1493, 43]
489	[831, 363]	1186	[638, 488]	1883	[2323, 1673]	2580	[2456, 2230]
490	[353, 831]	1187	[1696, 1697]	1884	[477, 2324]	2581	[519, 2425]
491	[371, 832]	1188	[1698, 739]	1885	[705, 1706]	2582	[1337, 2284]
492	[833, 834]	1189	[1699, 719]	1886	[1359, 777]	2583	[687, 662]
493	[835, 836]	1190	[1700, 137]	1887	[2325, 1655]	2584	[705, 2711]
494	[837, 838]	1191	[1701, 737]	1888	[1451, 1442]	2585	[2239, 2307]
495	[345, 839]	1192	[1702, 1703]	1889	[1709, 1426]	2586	[1682, 1407]
496	[840, 841]	1193	[1704, 598]	1890	[2326, 234]	2587	[2714, 1381]
497	[842, 803]	1194	[1705, 643]	1891	[2327, 1412]	2588	[2715, 2289]
498	[843, 844]	1195	[201, 1706]	1892	[679, 744]	2589	[1539, 1535]
499	[845, 846]	1196	[36, 1456]	1893	[202, 2328]	2590	[2431, 53]
500	[847, 848]	1197	[32, 659]	1894	[658, 540]	2591	[1449, 145]
501	[849, 102]	1198	[1707, 578]	1895	[2329, 1370]	2592	[786, 2716]
502	[822, 850]	1199	[1708, 1318]	1896	[2330, 1610]	2593	[2717, 1722]
503	[851, 852]	1200	[1709, 1710]	1897	[2331, 1420]	2594	[150, 1658]
504	[853, 835]	1201	[1711, 1712]	1898	[2332, 1694]	2595	[2718, 1725]
505	[852, 854]	1202	[1713, 496]	1899	[1534, 1327]	2596	[2719, 1348]
506	[464, 855]	1203	[1714, 1282]	1900	[2333, 205]	2597	[474, 2499]
507	[856, 857]	1204	[177, 1274]	1901	[1671, 1767]	2598	[2720, 214]
508	[858, 859]	1205	[1715, 1399]	1902	[2334, 529]	2599	[1737, 2244]
509	[860, 861]	1206	[1716, 597]	1903	[704, 531]	2600	[2486, 1469]
510	[862, 863]	1207	[1717, 1718]	1904	[762, 230]	2601	[2714, 672]

511	[95, 864]	1208	[1313, 1719]	1905	[2335, 707]	2602	[2340, 2705]
512	[865, 866]	1209	[1720, 1680]	1906	[1758, 2336]	2603	[2721, 2381]
513	[867, 868]	1210	[1373, 8]	1907	[2337, 787]	2604	[2722, 2409]
514	[869, 870]	1211	[506, 1503]	1908	[2338, 480]	2605	[2723, 569]
515	[871, 872]	1212	[1298, 1529]	1909	[2339, 1518]	2606	[2337, 2716]
516	[873, 874]	1213	[1721, 1722]	1910	[2340, 2341]	2607	[2374, 561]
517	[875, 876]	1214	[1723, 1414]	1911	[1588, 1579]	2608	[1572, 1577]
518	[877, 878]	1215	[139, 751]	1912	[1552, 2229]	2609	[1356, 1568]
519	[879, 880]	1216	[1724, 1725]	1913	[1464, 221]	2610	[1393, 2708]
520	[881, 882]	1217	[1726, 1727]	1914	[1453, 2342]	2611	[2724, 2439]
521	[883, 884]	1218	[1728, 12]	1915	[1700, 1484]	2612	[243, 2342]
522	[885, 876]	1219	[193, 1729]	1916	[151, 2343]	2613	[2423, 2441]
523	[886, 887]	1220	[1730, 1525]	1917	[2344, 2318]	2614	[2509, 604]
524	[888, 889]	1221	[1731, 672]	1918	[2345, 678]	2615	[2416, 1761]
525	[890, 891]	1222	[1579, 1732]	1919	[2346, 1576]	2616	[2725, 2434]
526	[83, 892]	1223	[1733, 61]	1920	[716, 172]	2617	[2726, 2241]
527	[417, 278]	1224	[1734, 543]	1921	[2347, 1270]	2618	[522, 687]
528	[893, 420]	1225	[239, 1732]	1922	[1752, 2348]	2619	[1769, 580]
529	[894, 895]	1226	[1735, 32]	1923	[2349, 2256]	2620	[2727, 694]
530	[896, 897]	1227	[1516, 1571]	1924	[537, 1636]	2621	[1735, 55]
531	[898, 263]	1228	[1736, 555]	1925	[2350, 609]	2622	[1338, 2703]
532	[899, 900]	1229	[1737, 1738]	1926	[2351, 2352]	2623	[2728, 1690]
533	[901, 902]	1230	[1286, 1739]	1927	[2353, 1268]	2624	[2729, 516]
534	[903, 900]	1231	[783, 1740]	1928	[1684, 1486]	2625	[2465, 2469]
535	[904, 905]	1232	[1741, 1742]	1929	[2354, 136]	2626	[1419, 713]
536	[906, 907]	1233	[627, 1458]	1930	[2355, 61]	2627	[2730, 1276]
537	[908, 909]	1234	[1743, 492]	1931	[2356, 1430]	2628	[1468, 742]
538	[910, 911]	1235	[1744, 1716]	1932	[2357, 1309]	2629	[2731, 2431]
539	[912, 913]	1236	[1745, 1434]	1933	[2358, 2359]	2630	[2732, 2293]
540	[64, 914]	1237	[1746, 1365]	1934	[2360, 1377]	2631	[1288, 1750]
541	[915, 916]	1238	[1747, 1372]	1935	[1347, 1651]	2632	[2235, 2336]
542	[917, 911]	1239	[50, 149]	1936	[39, 570]	2633	[672, 2733]
543	[918, 450]	1240	[1748, 1518]	1937	[1351, 528]	2634	[649, 1420]
544	[919, 920]	1241	[491, 1749]	1938	[2361, 2362]	2635	[2261, 1337]
545	[921, 922]	1242	[1750, 1687]	1939	[2259, 1631]	2636	[2267, 666]
546	[923, 851]	1243	[1751, 1429]	1940	[2363, 2364]	2637	[2734, 2735]
547	[924, 925]	1244	[1752, 1753]	1941	[225, 478]	2638	[2299, 2527]
548	[926, 16]	1245	[1754, 645]	1942	[2333, 2365]	2639	[2719, 670]
549	[927, 928]	1246	[1456, 1755]	1943	[2366, 511]	2640	[2535, 763]
550	[929, 930]	1247	[1756, 1757]	1944	[1655, 1601]	2641	[2736, 1635]
551	[931, 932]	1248	[1758, 1759]	1945	[2367, 552]	2642	[2516, 1289]
552	[933, 934]	1249	[1760, 556]	1946	[1306, 2368]	2643	[2737, 2362]
553	[935, 352]	1250	[1632, 1761]	1947	[2369, 2370]	2644	[562, 2738]
554	[69, 936]	1251	[1762, 35]	1948	[198, 1530]	2645	[1383, 613]

555	[937, 385]	1252	[1413, 1755]	1949	[2371, 1286]	2646	[2739, 1566]
556	[938, 867]	1253	[1763, 745]	1950	[2372, 2364]	2647	[2740, 155]
557	[939, 347]	1254	[1764, 617]	1951	[1473, 216]	2648	[2741, 725]
558	[308, 940]	1255	[233, 624]	1952	[2373, 1694]	2649	[1500, 2710]
559	[941, 942]	1256	[1765, 1343]	1953	[1601, 2248]	2650	[2303, 2267]
560	[943, 944]	1257	[1766, 151]	1954	[2374, 778]	2651	[2742, 2433]
561	[945, 946]	1258	[1332, 1767]	1955	[1743, 1749]	2652	[2743, 1514]
562	[947, 948]	1259	[1768, 2]	1956	[2375, 2269]	2653	[2393, 1386]
563	[949, 913]	1260	[1352, 1509]	1957	[569, 40]	2654	[1440, 2744]
564	[950, 951]	1261	[1769, 1605]	1958	[2376, 1507]	2655	[2745, 703]
565	[952, 953]	1262	[1770, 1771]	1959	[741, 1417]	2656	[2746, 218]
566	[954, 955]	1263	[392, 1772]	1960	[10, 231]	2657	[1282, 14]
567	[956, 957]	1264	[1773, 1238]	1961	[2377, 1528]	2658	[727, 2492]
568	[4, 958]	1265	[63, 1774]	1962	[2378, 1650]	2659	[225, 2324]
569	[335, 959]	1266	[1775, 1776]	1963	[2379, 2247]	2660	[2377, 1553]
570	[960, 961]	1267	[1777, 338]	1964	[2380, 2381]	2661	[2747, 1473]
571	[962, 963]	1268	[1778, 1779]	1965	[2382, 2298]	2662	[2748, 1326]
572	[964, 965]	1269	[1780, 77]	1966	[204, 2365]	2663	[547, 1679]
573	[966, 967]	1270	[1781, 1782]	1967	[2383, 2286]	2664	[175, 2744]
574	[24, 968]	1271	[1783, 315]	1968	[1716, 2384]	2665	[1620, 2733]
575	[969, 364]	1272	[1784, 1785]	1969	[784, 2385]	2666	[627, 2498]
576	[897, 970]	1273	[1786, 413]	1970	[2386, 49]	2667	[559, 1379]
577	[971, 972]	1274	[1787, 989]	1971	[161, 494]	2668	[218, 1272]
578	[289, 973]	1275	[431, 1788]	1972	[2387, 1502]	2669	[37, 1679]
579	[974, 975]	1276	[1789, 1790]	1973	[1536, 1648]	2670	[1607, 2400]
580	[976, 359]	1277	[1791, 1142]	1974	[2388, 691]	2671	[1751, 2482]
581	[287, 925]	1278	[1776, 396]	1975	[1487, 474]	2672	[1425, 1710]
582	[977, 978]	1279	[1792, 1793]	1976	[158, 2294]	2673	[2256, 573]
583	[979, 873]	1280	[461, 1794]	1977	[2389, 243]	2674	[2749, 2481]
584	[980, 981]	1281	[1795, 1796]	1978	[2303, 1578]	2675	[235, 1692]
585	[80, 982]	1282	[855, 1134]	1979	[1558, 2390]	2676	[1650, 2407]
586	[983, 984]	1283	[1797, 1798]	1980	[1389, 1745]	2677	[2750, 694]
587	[985, 986]	1284	[1799, 1133]	1981	[1576, 1382]	2678	[1593, 2515]
588	[987, 988]	1285	[329, 891]	1982	[2391, 2232]	2679	[779, 656]
589	[989, 990]	1286	[16, 291]	1983	[1734, 2392]	2680	[2720, 590]
590	[991, 922]	1287	[1800, 1801]	1984	[2393, 1666]	2681	[2751, 242]
591	[992, 993]	1288	[1802, 1803]	1985	[2394, 2395]	2682	[2752, 1519]
592	[994, 995]	1289	[1804, 1805]	1986	[1306, 700]	2683	[244, 2738]
593	[996, 997]	1290	[1806, 921]	1987	[2396, 2273]	2684	[1642, 2392]
594	[998, 999]	1291	[1807, 1808]	1988	[530, 705]	2685	[2753, 1296]
595	[98, 1000]	1292	[1809, 961]	1989	[2397, 1629]	2686	[1623, 1402]
596	[1001, 1002]	1293	[1810, 1811]	1990	[2398, 615]	2687	[2519, 1547]
597	[1003, 348]	1294	[259, 1812]	1991	[2399, 675]	2688	[2754, 1544]
598	[1004, 843]	1295	[1239, 1813]	1992	[2400, 234]	2689	[1267, 2707]

599	[1005, 977]	1296	[1814, 1142]	1993	[2401, 2402]	2690	[2755, 242]
600	[1006, 1007]	1297	[1815, 1816]	1994	[1390, 2403]	2691	[127, 2352]
601	[1008, 1009]	1298	[1188, 1179]	1995	[251, 2384]	2692	[1490, 2403]
602	[1010, 1011]	1299	[1817, 1818]	1996	[2404, 2289]	2693	[2756, 1326]
603	[1012, 1013]	1300	[1819, 1820]	1997	[1561, 1373]	2694	[2437, 1653]
604	[1014, 1015]	1301	[1821, 259]	1998	[2405, 680]	2695	[1587, 238]
605	[1016, 1017]	1302	[1822, 1823]	1999	[731, 2250]	2696	[2757, 1519]
606	[1018, 467]	1303	[1824, 1825]	2000	[2406, 1342]	2697	[618, 1379]
607	[1007, 1019]	1304	[1826, 1827]	2001	[189, 1588]	2698	[250, 1708]
608	[456, 1020]	1305	[1828, 375]	2002	[592, 180]	2699	[1825, 2642]
609	[1021, 407]	1306	[1829, 819]	2003	[1347, 2407]	2700	[1235, 863]
610	[1022, 1023]	1307	[1830, 1812]	2004	[473, 1341]	2701	[2126, 1188]
611	[289, 944]	1308	[1831, 1832]	2005	[2367, 1410]	2702	[2165, 25]
612	[1024, 986]	1309	[1833, 109]	2006	[1412, 664]	2703	[803, 964]
613	[1025, 946]	1310	[975, 353]	2007	[766, 2314]	2704	[1789, 1038]
614	[1026, 1027]	1311	[1834, 1835]	2008	[2408, 2409]	2705	[1247, 1046]
615	[1028, 74]	1312	[94, 1836]	2009	[2410, 710]	2706	[2758, 402]
616	[1029, 1030]	1313	[1837, 84]	2010	[38, 519]	2707	[404, 820]
617	[1031, 818]	1314	[1838, 1839]	2011	[2289, 485]	2708	[2074, 2692]
618	[1032, 82]	1315	[1840, 1841]	2012	[2411, 2314]	2709	[871, 429]
619	[1033, 1034]	1316	[1842, 843]	2013	[512, 1740]	2710	[2586, 2612]
620	[1035, 850]	1317	[1843, 1808]	2014	[1359, 1644]	2711	[2759, 397]
621	[1036, 307]	1318	[466, 1073]	2015	[2311, 2412]	2712	[395, 2694]
622	[423, 1037]	1319	[1844, 1107]	2016	[2413, 1578]	2713	[1859, 2216]
623	[1038, 1039]	1320	[1845, 940]	2017	[1738, 1612]	2714	[2760, 1103]
624	[297, 1040]	1321	[346, 1846]	2018	[2411, 767]	2715	[2577, 2122]
625	[368, 1041]	1322	[1847, 1147]	2019	[572, 2414]	2716	[1845, 309]
626	[1042, 1043]	1323	[1158, 6]	2020	[2230, 505]	2717	[2691, 1867]
627	[1044, 1045]	1324	[1848, 1027]	2021	[2320, 1414]	2718	[2162, 2619]
628	[1046, 93]	1325	[1849, 1020]	2022	[537, 2415]	2719	[2641, 2576]
629	[1047, 1048]	1326	[1850, 967]	2023	[2416, 1633]	2720	[1107, 992]
630	[1049, 827]	1327	[1851, 296]	2024	[2417, 1292]	2721	[2761, 2150]
631	[328, 1050]	1328	[1852, 1034]	2025	[2418, 1314]	2722	[2675, 2559]
632	[1051, 1052]	1329	[1853, 352]	2026	[2419, 1676]	2723	[342, 1122]
633	[1053, 361]	1330	[798, 1854]	2027	[2420, 2421]	2724	[1976, 2054]
634	[1054, 1055]	1331	[851, 1004]	2028	[2422, 2288]	2725	[2762, 98]
635	[1056, 1057]	1332	[1855, 1127]	2029	[2423, 2424]	2726	[2144, 2032]
636	[1058, 1059]	1333	[970, 1856]	2030	[1723, 1665]	2727	[815, 1135]
637	[359, 66]	1334	[1857, 1062]	2031	[1680, 2425]	2728	[2608, 2763]
638	[1052, 93]	1335	[1858, 1859]	2032	[674, 2315]	2729	[2764, 1179]
639	[357, 411]	1336	[1860, 1861]	2033	[2426, 1595]	2730	[1158, 842]
640	[640, 640]	1337	[1862, 258]	2034	[2427, 1465]	2731	[409, 1919]
641	[1060, 112]	1338	[1863, 1037]	2035	[2428, 1642]	2732	[2765, 2766]
642	[1061, 1062]	1339	[443, 1864]	2036	[1505, 202]	2733	[2634, 1017]

643	[1063, 1055]	1340	[1852, 1865]	2037	[2399, 2315]	2734	[1248, 1810]
644	[864, 1064]	1341	[1866, 1199]	2038	[2418, 1719]	2735	[1061, 2767]
645	[1065, 1066]	1342	[1867, 1868]	2039	[474, 1285]	2736	[466, 2196]
646	[1067, 1045]	1343	[1869, 1870]	2040	[2429, 2430]	2737	[844, 1064]
647	[839, 1068]	1344	[1871, 1120]	2041	[2431, 1389]	2738	[2593, 1790]
648	[1069, 1070]	1345	[1872, 392]	2042	[1707, 1652]	2739	[20, 1257]
649	[901, 1071]	1346	[1246, 877]	2043	[2432, 2433]	2740	[2768, 308]
650	[404, 1072]	1347	[1870, 1873]	2044	[1338, 1494]	2741	[2201, 870]
651	[1073, 1074]	1348	[30, 1874]	2045	[1681, 1481]	2742	[2674, 2763]
652	[1075, 1076]	1349	[1251, 1184]	2046	[2415, 2434]	2743	[2655, 921]
653	[862, 1077]	1350	[1875, 1876]	2047	[1588, 535]	2744	[2053, 1977]
654	[1078, 1079]	1351	[305, 894]	2048	[2435, 58]	2745	[1838, 2121]
655	[1080, 1081]	1352	[1877, 1785]	2049	[2436, 678]	2746	[2769, 419]
656	[1082, 1083]	1353	[1878, 1879]	2050	[2437, 620]	2747	[2770, 2621]
657	[1043, 1084]	1354	[1880, 1881]	2051	[1622, 1262]	2748	[1103, 1851]
658	[850, 831]	1355	[1882, 1840]	2052	[2438, 2439]	2749	[2657, 2613]
659	[1085, 1086]	1356	[1883, 1003]	2053	[1291, 145]	2750	[2771, 2625]
660	[108, 1087]	1357	[1884, 1885]	2054	[2440, 2441]	2751	[2772, 454]
661	[1081, 949]	1358	[1021, 1258]	2055	[2442, 791]	2752	[897, 71]
662	[1088, 1089]	1359	[1886, 1094]	2056	[2330, 2443]	2753	[2137, 4]
663	[1090, 355]	1360	[1887, 1245]	2057	[2257, 577]	2754	[1147, 1238]
664	[1091, 1092]	1361	[1888, 1889]	2058	[2379, 2444]	2755	[2158, 2023]
665	[1050, 297]	1362	[1837, 892]	2059	[2445, 1595]	2756	[317, 2766]
666	[1093, 1094]	1363	[1890, 117]	2060	[1480, 235]	2757	[1228, 1988]
667	[1095, 1096]	1364	[1891, 68]	2061	[2446, 2367]	2758	[1701, 1432]
668	[1097, 1098]	1365	[1892, 1879]	2062	[1552, 1496]	2759	[1319, 1577]
669	[1099, 1100]	1366	[1893, 1894]	2063	[1660, 783]	2760	[1595, 1266]
670	[1101, 1102]	1367	[324, 382]	2064	[2447, 1646]	2761	[2773, 2449]
671	[1023, 76]	1368	[1895, 1896]	2065	[2448, 2449]	2762	[1412, 1643]
672	[892, 363]	1369	[1897, 1194]	2066	[2256, 175]	2763	[212, 663]
673	[1103, 800]	1370	[1898, 1899]	2067	[2450, 2451]	2764	[2774, 1691]
674	[1104, 1105]	1371	[1900, 1901]	2068	[2357, 1535]	2765	[2775, 2735]
675	[285, 94]	1372	[1005, 1902]	2069	[724, 2328]	2766	[1731, 1381]
676	[1106, 72]	1373	[1903, 1190]	2070	[2262, 737]	2767	[1686, 2512]
677	[1107, 1108]	1374	[1016, 1904]	2071	[2452, 232]	2768	[2776, 569]
678	[1109, 1110]	1375	[1905, 1906]	2072	[559, 481]	2769	[2729, 728]
679	[1111, 1112]	1376	[1143, 1907]	2073	[2453, 1542]	2770	[2521, 590]
680	[1113, 1114]	1377	[1908, 995]	2074	[2454, 721]	2771	[2777, 1580]
681	[1115, 1116]	1378	[1909, 808]	2075	[2455, 717]	2772	[2778, 49]
682	[1117, 392]	1379	[1910, 1911]	2076	[1434, 661]	2773	[347, 2129]
683	[1118, 1095]	1380	[82, 1912]	2077	[1312, 182]	2774	[2779, 1967]
684	[1119, 1120]	1381	[1913, 830]	2078	[187, 184]	2775	[1155, 2671]
685	[1121, 1122]	1382	[317, 1914]	2079	[1711, 2412]	2776	[2780, 960]
686	[1123, 1124]	1383	[1915, 27]	2080	[2456, 220]	2777	[798, 2227]

687	[1125, 296]	1384	[305, 1236]	2081	[748, 750]	2778	[2781, 101]
688	[1126, 1127]	1385	[1916, 1917]	2082	[1273, 178]	2779	[2782, 2303]
689	[1128, 848]	1386	[385, 438]	2083	[767, 1347]	2780	[2783, 1473]
690	[370, 1129]	1387	[386, 1856]	2084	[2457, 1292]	2781	[682, 202]
691	[1130, 395]	1388	[1918, 1068]	2085	[1409, 1438]	2782	[2784, 1129]
692	[1131, 1114]	1389	[1919, 1920]	2086	[2458, 2402]	2783	[2759, 1065]
693	[878, 1132]	1390	[1921, 460]	2087	[2459, 1465]	2784	[2461, 687]
694	[1133, 1134]	1391	[963, 1922]	2088	[1419, 744]		
695	[1135, 1136]	1392	[1923, 1924]	2089	[2460, 1395]		
696	[1137, 345]	1393	[1925, 446]	2090	[1424, 1622]		

Output function $n \mapsto \tau(n)$:

n	$\tau(n)$	n	$\tau(n)$	n	$\tau(n)$	n	$\tau(n)$	n	$\tau(n)$	n	$\tau(n)$
0	0	465	0	930	0	1395	0	1860	1	2325	1
1	0	466	0	931	0	1396	1	1861	1	2326	0
2	0	467	0	932	0	1397	0	1862	1	2327	1
3	0	468	1	933	1	1398	1	1863	0	2328	0
4	0	469	1	934	1	1399	1	1864	0	2329	1
5	0	470	1	935	0	1400	0	1865	0	2330	1
6	1	471	1	936	1	1401	0	1866	1	2331	0
7	0	472	1	937	1	1402	0	1867	0	2332	1
8	1	473	1	938	1	1403	0	1868	0	2333	0
9	0	474	0	939	1	1404	0	1869	0	2334	0
10	0	475	0	940	0	1405	1	1870	0	2335	1
11	0	476	1	941	1	1406	1	1871	0	2336	0
12	1	477	0	942	0	1407	0	1872	1	2337	0
13	1	478	1	943	0	1408	1	1873	0	2338	1
14	1	479	0	944	0	1409	1	1874	1	2339	0
15	0	480	0	945	0	1410	0	1875	0	2340	0
16	0	481	1	946	1	1411	0	1876	1	2341	0
17	1	482	0	947	1	1412	1	1877	0	2342	0
18	1	483	1	948	0	1413	0	1878	0	2343	1
19	0	484	1	949	0	1414	0	1879	0	2344	1
20	0	485	0	950	1	1415	1	1880	1	2345	1
21	0	486	1	951	1	1416	1	1881	1	2346	1
22	0	487	1	952	0	1417	0	1882	0	2347	0
23	0	488	1	953	0	1418	0	1883	1	2348	0
24	1	489	0	954	0	1419	0	1884	0	2349	1
25	1	490	0	955	0	1420	1	1885	0	2350	1
26	0	491	0	956	1	1421	0	1886	1	2351	0
27	1	492	0	957	1	1422	0	1887	1	2352	1
28	0	493	0	958	0	1423	1	1888	0	2353	0
29	1	494	0	959	1	1424	0	1889	0	2354	0
30	0	495	0	960	0	1425	1	1890	0	2355	0

31	0	496	1	961	1	1426	1	1891	1	2356	1
32	0	497	0	962	0	1427	1	1892	1	2357	0
33	0	498	1	963	0	1428	0	1893	0	2358	0
34	0	499	0	964	1	1429	0	1894	1	2359	1
35	1	500	1	965	1	1430	1	1895	1	2360	0
36	0	501	0	966	0	1431	1	1896	1	2361	1
37	1	502	0	967	1	1432	1	1897	0	2362	1
38	1	503	0	968	0	1433	0	1898	1	2363	0
39	0	504	1	969	0	1434	0	1899	0	2364	1
40	1	505	1	970	0	1435	1	1900	0	2365	1
41	0	506	0	971	0	1436	1	1901	1	2366	1
42	0	507	1	972	1	1437	1	1902	0	2367	1
43	0	508	0	973	1	1438	0	1903	1	2368	1
44	0	509	0	974	0	1439	0	1904	0	2369	0
45	0	510	0	975	1	1440	0	1905	1	2370	0
46	0	511	0	976	1	1441	1	1906	1	2371	0
47	0	512	0	977	1	1442	1	1907	0	2372	1
48	0	513	0	978	1	1443	1	1908	1	2373	0
49	1	514	0	979	1	1444	1	1909	0	2374	1
50	1	515	0	980	1	1445	1	1910	0	2375	1
51	1	516	0	981	0	1446	0	1911	1	2376	1
52	0	517	0	982	0	1447	0	1912	0	2377	0
53	0	518	0	983	1	1448	1	1913	0	2378	1
54	1	519	0	984	0	1449	0	1914	0	2379	0
55	1	520	1	985	1	1450	0	1915	1	2380	1
56	0	521	0	986	0	1451	0	1916	0	2381	1
57	0	522	1	987	1	1452	0	1917	1	2382	1
58	1	523	0	988	1	1453	0	1918	1	2383	0
59	1	524	0	989	1	1454	1	1919	1	2384	0
60	1	525	0	990	1	1455	1	1920	1	2385	0
61	0	526	0	991	0	1456	1	1921	0	2386	1
62	0	527	0	992	1	1457	1	1922	0	2387	0
63	0	528	1	993	1	1458	0	1923	1	2388	0
64	1	529	0	994	0	1459	0	1924	1	2389	1
65	0	530	0	995	1	1460	1	1925	1	2390	1
66	1	531	1	996	0	1461	1	1926	0	2391	1
67	0	532	1	997	0	1462	1	1927	0	2392	1
68	0	533	1	998	0	1463	0	1928	0	2393	0
69	0	534	0	999	0	1464	0	1929	0	2394	1
70	0	535	1	1000	0	1465	0	1930	0	2395	0
71	1	536	1	1001	1	1466	1	1931	1	2396	0
72	0	537	1	1002	1	1467	1	1932	0	2397	0
73	0	538	1	1003	1	1468	1	1933	0	2398	0
74	1	539	1	1004	0	1469	0	1934	0	2399	1

75	1	540	1	1005	1	1470	1	1935	0	2400	1
76	0	541	1	1006	1	1471	1	1936	0	2401	0
77	1	542	0	1007	1	1472	0	1937	0	2402	0
78	1	543	0	1008	1	1473	1	1938	1	2403	1
79	0	544	1	1009	1	1474	0	1939	1	2404	1
80	0	545	1	1010	0	1475	1	1940	0	2405	1
81	1	546	0	1011	1	1476	0	1941	1	2406	0
82	1	547	0	1012	0	1477	1	1942	0	2407	0
83	0	548	1	1013	1	1478	0	1943	1	2408	1
84	0	549	1	1014	0	1479	1	1944	0	2409	0
85	0	550	0	1015	1	1480	1	1945	1	2410	1
86	0	551	0	1016	0	1481	0	1946	1	2411	1
87	0	552	1	1017	1	1482	0	1947	0	2412	0
88	1	553	0	1018	0	1483	0	1948	0	2413	1
89	0	554	0	1019	0	1484	1	1949	0	2414	0
90	1	555	1	1020	0	1485	1	1950	1	2415	0
91	0	556	1	1021	1	1486	0	1951	1	2416	0
92	0	557	1	1022	1	1487	0	1952	0	2417	0
93	0	558	1	1023	0	1488	1	1953	1	2418	0
94	1	559	1	1024	0	1489	1	1954	1	2419	1
95	0	560	0	1025	1	1490	1	1955	1	2420	0
96	0	561	0	1026	1	1491	0	1956	1	2421	0
97	0	562	1	1027	0	1492	1	1957	1	2422	1
98	0	563	0	1028	1	1493	1	1958	1	2423	1
99	1	564	1	1029	1	1494	0	1959	0	2424	0
100	0	565	0	1030	0	1495	1	1960	0	2425	1
101	1	566	0	1031	0	1496	0	1961	0	2426	1
102	0	567	1	1032	0	1497	0	1962	1	2427	1
103	1	568	0	1033	1	1498	1	1963	0	2428	1
104	1	569	1	1034	1	1499	0	1964	1	2429	0
105	0	570	0	1035	1	1500	0	1965	1	2430	1
106	0	571	0	1036	0	1501	1	1966	1	2431	0
107	0	572	1	1037	1	1502	1	1967	0	2432	1
108	1	573	0	1038	0	1503	0	1968	1	2433	0
109	1	574	1	1039	0	1504	1	1969	0	2434	1
110	0	575	0	1040	0	1505	1	1970	1	2435	1
111	1	576	0	1041	0	1506	0	1971	1	2436	0
112	1	577	0	1042	1	1507	0	1972	0	2437	0
113	0	578	1	1043	1	1508	1	1973	0	2438	1
114	0	579	0	1044	0	1509	1	1974	0	2439	1
115	0	580	1	1045	1	1510	0	1975	0	2440	0
116	1	581	1	1046	1	1511	1	1976	0	2441	1
117	1	582	1	1047	1	1512	1	1977	1	2442	1
118	0	583	1	1048	0	1513	0	1978	0	2443	1

119	1	584	1	1049	1	1514	1	1979	1	2444	1
120	0	585	0	1050	0	1515	0	1980	1	2445	0
121	1	586	1	1051	0	1516	0	1981	1	2446	0
122	0	587	1	1052	0	1517	1	1982	1	2447	1
123	0	588	1	1053	0	1518	1	1983	1	2448	1
124	0	589	1	1054	1	1519	1	1984	0	2449	0
125	0	590	0	1055	0	1520	1	1985	1	2450	0
126	0	591	1	1056	1	1521	1	1986	1	2451	0
127	1	592	0	1057	1	1522	1	1987	0	2452	0
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129	0	594	0	1059	1	1524	0	1989	0	2454	1
130	0	595	0	1060	0	1525	0	1990	0	2455	0
131	1	596	1	1061	1	1526	1	1991	1	2456	1
132	1	597	1	1062	1	1527	1	1992	1	2457	1
133	0	598	0	1063	0	1528	0	1993	0	2458	1
134	0	599	1	1064	1	1529	1	1994	0	2459	0
135	0	600	1	1065	0	1530	1	1995	0	2460	1
136	0	601	1	1066	1	1531	0	1996	1	2461	0
137	0	602	0	1067	1	1532	0	1997	0	2462	0
138	0	603	0	1068	0	1533	1	1998	1	2463	0
139	0	604	0	1069	0	1534	0	1999	1	2464	1
140	0	605	0	1070	0	1535	0	2000	0	2465	1
141	0	606	0	1071	1	1536	0	2001	1	2466	1
142	1	607	1	1072	0	1537	1	2002	0	2467	1
143	0	608	0	1073	0	1538	1	2003	0	2468	1
144	0	609	1	1074	1	1539	1	2004	1	2469	0
145	0	610	1	1075	0	1540	1	2005	1	2470	1
146	0	611	1	1076	0	1541	0	2006	1	2471	0
147	1	612	0	1077	0	1542	1	2007	0	2472	1
148	1	613	1	1078	0	1543	1	2008	1	2473	1
149	1	614	1	1079	1	1544	0	2009	1	2474	0
150	1	615	1	1080	1	1545	0	2010	1	2475	1
151	0	616	1	1081	0	1546	0	2011	1	2476	0
152	0	617	0	1082	0	1547	1	2012	1	2477	1
153	1	618	0	1083	1	1548	1	2013	0	2478	0
154	1	619	1	1084	0	1549	0	2014	1	2479	0
155	1	620	1	1085	0	1550	0	2015	0	2480	1
156	1	621	0	1086	1	1551	0	2016	1	2481	0
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158	0	623	0	1088	1	1553	1	2018	1	2483	0
159	0	624	0	1089	1	1554	1	2019	1	2484	0
160	1	625	0	1090	0	1555	1	2020	0	2485	1
161	1	626	1	1091	1	1556	0	2021	1	2486	1
162	1	627	0	1092	1	1557	0	2022	1	2487	0

163	1	628	1	1093	0	1558	1	2023	0	2488	0
164	1	629	1	1094	1	1559	0	2024	0	2489	0
165	0	630	1	1095	1	1560	0	2025	0	2490	0
166	0	631	0	1096	0	1561	0	2026	1	2491	1
167	0	632	0	1097	1	1562	0	2027	0	2492	0
168	1	633	0	1098	1	1563	0	2028	1	2493	0
169	0	634	1	1099	1	1564	0	2029	1	2494	0
170	0	635	1	1100	0	1565	1	2030	0	2495	0
171	0	636	1	1101	1	1566	1	2031	1	2496	0
172	1	637	1	1102	1	1567	1	2032	0	2497	0
173	0	638	0	1103	0	1568	0	2033	1	2498	1
174	1	639	0	1104	0	1569	1	2034	1	2499	0
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176	0	641	0	1106	0	1571	1	2036	1	2501	1
177	0	642	1	1107	0	1572	1	2037	1	2502	0
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180	1	645	0	1110	0	1575	0	2040	0	2505	1
181	0	646	1	1111	1	1576	1	2041	0	2506	1
182	1	647	0	1112	0	1577	1	2042	1	2507	0
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185	1	650	1	1115	0	1580	0	2045	1	2510	1
186	1	651	0	1116	1	1581	0	2046	0	2511	1
187	1	652	0	1117	0	1582	1	2047	1	2512	0
188	0	653	0	1118	1	1583	0	2048	1	2513	1
189	1	654	0	1119	1	1584	1	2049	0	2514	1
190	0	655	1	1120	0	1585	0	2050	0	2515	0
191	1	656	0	1121	0	1586	1	2051	0	2516	0
192	0	657	1	1122	1	1587	0	2052	1	2517	1
193	1	658	1	1123	1	1588	1	2053	1	2518	1
194	0	659	0	1124	0	1589	1	2054	0	2519	0
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196	1	661	0	1126	1	1591	1	2056	1	2521	1
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205	0	670	1	1135	0	1600	1	2065	1	2530	0
206	1	671	0	1136	1	1601	1	2066	0	2531	1

207	0	672	1	1137	1	1602	1	2067	0	2532	0
208	0	673	0	1138	0	1603	1	2068	0	2533	0
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211	0	676	0	1141	1	1606	1	2071	0	2536	0
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214	1	679	1	1144	1	1609	0	2074	1	2539	0
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216	1	681	0	1146	0	1611	1	2076	0	2541	1
217	0	682	0	1147	0	1612	0	2077	1	2542	0
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221	1	686	1	1151	1	1616	0	2081	1	2546	1
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225	1	690	1	1155	0	1620	0	2085	1	2550	0
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236	1	701	0	1166	0	1631	1	2096	1	2561	0
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243	1	708	1	1173	1	1638	1	2103	1	2568	1
244	0	709	0	1174	0	1639	0	2104	1	2569	0
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247	1	712	0	1177	0	1642	0	2107	1	2572	0
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249	1	714	0	1179	0	1644	0	2109	1	2574	0
250	0	715	0	1180	0	1645	0	2110	0	2575	0

251	0	716	1	1181	1	1646	0	2111	0	2576	1
252	1	717	1	1182	0	1647	1	2112	1	2577	0
253	1	718	1	1183	1	1648	0	2113	1	2578	1
254	1	719	0	1184	1	1649	0	2114	0	2579	1
255	0	720	0	1185	1	1650	1	2115	0	2580	1
256	0	721	0	1186	0	1651	1	2116	0	2581	0
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258	1	723	1	1188	1	1653	0	2118	0	2583	1
259	1	724	1	1189	0	1654	0	2119	0	2584	0
260	0	725	0	1190	1	1655	0	2120	1	2585	1
261	1	726	0	1191	1	1656	0	2121	0	2586	1
262	1	727	0	1192	1	1657	1	2122	1	2587	0
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265	0	730	1	1195	1	1660	0	2125	0	2590	0
266	0	731	1	1196	0	1661	0	2126	0	2591	0
267	0	732	1	1197	0	1662	0	2127	0	2592	1
268	0	733	1	1198	1	1663	0	2128	1	2593	1
269	0	734	0	1199	1	1664	0	2129	0	2594	1
270	0	735	1	1200	0	1665	1	2130	0	2595	0
271	1	736	1	1201	1	1666	1	2131	1	2596	0
272	0	737	0	1202	1	1667	1	2132	0	2597	0
273	0	738	0	1203	0	1668	1	2133	1	2598	0
274	0	739	1	1204	0	1669	1	2134	1	2599	0
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276	0	741	0	1206	1	1671	1	2136	0	2601	0
277	0	742	0	1207	1	1672	0	2137	0	2602	0
278	0	743	1	1208	1	1673	0	2138	1	2603	0
279	0	744	0	1209	1	1674	0	2139	0	2604	0
280	1	745	1	1210	1	1675	0	2140	0	2605	1
281	1	746	0	1211	0	1676	1	2141	0	2606	0
282	0	747	1	1212	1	1677	0	2142	0	2607	1
283	0	748	1	1213	0	1678	0	2143	1	2608	1
284	0	749	0	1214	0	1679	0	2144	0	2609	1
285	1	750	1	1215	0	1680	1	2145	0	2610	1
286	0	751	0	1216	1	1681	1	2146	1	2611	0
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289	1	754	0	1219	1	1684	0	2149	0	2614	1
290	1	755	0	1220	0	1685	0	2150	1	2615	0
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294	1	759	0	1224	1	1689	1	2154	1	2619	1

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301	1	766	0	1231	1	1696	1	2161	0	2626	0
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303	0	768	1	1233	0	1698	1	2163	0	2628	1
304	1	769	1	1234	1	1699	0	2164	0	2629	0
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306	1	771	0	1236	1	1701	1	2166	0	2631	1
307	0	772	0	1237	1	1702	1	2167	0	2632	0
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309	1	774	1	1239	1	1704	0	2169	1	2634	1
310	0	775	1	1240	1	1705	0	2170	1	2635	1
311	0	776	0	1241	0	1706	1	2171	1	2636	0
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313	0	778	1	1243	1	1708	1	2173	0	2638	0
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316	0	781	1	1246	1	1711	1	2176	1	2641	0
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320	1	785	1	1250	1	1715	0	2180	0	2645	1
321	0	786	1	1251	0	1716	1	2181	1	2646	0
322	1	787	1	1252	0	1717	1	2182	0	2647	0
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324	0	789	0	1254	0	1719	0	2184	1	2649	0
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326	0	791	0	1256	0	1721	0	2186	1	2651	0
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331	0	796	1	1261	1	1726	1	2191	0	2656	0
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334	0	799	1	1264	1	1729	0	2194	0	2659	1
335	1	800	1	1265	0	1730	0	2195	1	2660	0
336	0	801	1	1266	1	1731	1	2196	1	2661	1
337	1	802	1	1267	1	1732	1	2197	1	2662	0
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339	1	804	1	1269	1	1734	1	2199	1	2664	1
340	0	805	1	1270	0	1735	1	2200	1	2665	0
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342	1	807	1	1272	1	1737	0	2202	0	2667	1
343	0	808	0	1273	1	1738	0	2203	0	2668	0
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345	0	810	1	1275	0	1740	1	2205	1	2670	1
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355	1	820	1	1285	1	1750	1	2215	1	2680	0
356	0	821	1	1286	0	1751	1	2216	1	2681	0
357	0	822	0	1287	1	1752	0	2217	1	2682	0
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362	0	827	1	1292	1	1757	0	2222	1	2687	0
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366	1	831	0	1296	0	1761	0	2226	0	2691	1
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368	0	833	0	1298	1	1763	1	2228	1	2693	1
369	1	834	1	1299	1	1764	0	2229	1	2694	0
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371	0	836	0	1301	0	1766	0	2231	0	2696	1
372	0	837	0	1302	1	1767	1	2232	0	2697	0
373	0	838	1	1303	1	1768	0	2233	1	2698	0
374	1	839	0	1304	0	1769	1	2234	1	2699	0
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376	0	841	1	1306	1	1771	1	2236	1	2701	0
377	0	842	0	1307	0	1772	0	2237	0	2702	1
378	0	843	1	1308	0	1773	1	2238	0	2703	1
379	0	844	0	1309	1	1774	0	2239	1	2704	0
380	1	845	0	1310	1	1775	1	2240	1	2705	1
381	1	846	0	1311	1	1776	1	2241	1	2706	1
382	1	847	1	1312	1	1777	1	2242	0	2707	1

383	1	848	1	1313	1	1778	0	2243	1	2708	1
384	0	849	0	1314	1	1779	1	2244	1	2709	0
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386	1	851	0	1316	1	1781	0	2246	1	2711	0
387	1	852	1	1317	0	1782	0	2247	0	2712	0
388	0	853	1	1318	0	1783	1	2248	0	2713	1
389	1	854	0	1319	0	1784	1	2249	0	2714	0
390	0	855	0	1320	0	1785	1	2250	0	2715	0
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395	0	860	0	1325	1	1790	1	2255	0	2720	0
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461	0	926	1	1391	0	1856	1	2321	0		
462	1	927	1	1392	1	1857	0	2322	1		
463	1	928	0	1393	1	1858	1	2323	1		
464	0	929	0	1394	0	1859	1	2324	0		

Université de Strasbourg, CNRS, IRMA UMR 7501, F-67000 Strasbourg, France
Email address: guoniu.han@unistra.fr

School of Mathematics and Statistics, Huazhong University of Science and Technology, Wuhan, PR China
Email address: huyining@hust.edu.cn