PROOF OF THE CONTINUED FRACTION CONJECTURE FOR $(a, b) = (z, z^6 + z^5 + z^4 + z^2 + z + 1)$

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 $(a, b) = (z, z^6 + z^5 + z^4 + z^2 + z + 1)$.

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* $(a,b)=(z,z^6+z^5+z^4+z^2+z+1)$*, 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 $\mathrm{CF}(a,b)$*,*

$$\begin{aligned}
p_0(z)&=z^{24}+z^{21}+z^{19}+z^{17}+z^9+z^8+z^7+z^4+z+1,\\
p_1(z)&=z^{27}+z^{25}+z^{23}+z^{22}+z^{20}+z^{19}+z^{18}+z^{11}+z^{10}+z^9+z^8+z^7+z^5\\
&\quad+z^3+z^2+z,\\
p_2(z)&=z^{28}+z^{26}+z^{24}+z^{22}+z^{20}+z^{18}+z^{16}+z^{14}+z^{10}+z^2,\\
p_3(z)&=z^{27}+z^{25}+z^{23}+z^{22}+z^{20}+z^{19}+z^{18}+z^{11}+z^{10}+z^9+z^8+z^7+z^5\\
&\quad+z^3+z^2+z,\\
p_4(z)&=z^{26}+z^{22}+z^{21}+z^{20}+z^{19}+z^{18}+z^{17}+z^{14}+z^{12}+z^{10}+z^9+z^8+z^7\\
&\quad+z^2+z,
\end{aligned}$$

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

$$\begin{aligned}
p_0(z)&=z^{21}+z^{20}+z^{19}+z^{17}+z^{16}+z^9+z^7+z^4+z,\\
p_1(z)&=z^{27}+z^{25}+z^{23}+z^{22}+z^{20}+z^{19}+z^{18}+z^{11}+z^{10}+z^9+z^8+z^7+z^5\\
&\quad+z^3+z^2+z,\\
p_2(z)&=z^{28}+z^{26}+z^{24}+z^{22}+z^{20}+z^{18}+z^{16}+z^{14}+z^{10}+z^2,\\
p_3(z)&=z^{27}+z^{25}+z^{23}+z^{22}+z^{20}+z^{19}+z^{18}+z^{11}+z^{10}+z^9+z^8+z^7+z^5\\
&\quad+z^3+z^2+z,\\
p_4(z)&=z^{26}+z^{24}+z^{22}+z^{21}+z^{19}+z^{18}+z^{17}+z^{16}+z^{14}+z^{12}+z^{10}+z^9\\
&\quad+z^7+z^2+z+1.
\end{aligned}$$

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

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

$$\cdots \times x^{\deg(\bar{t}_0)} \begin{pmatrix} \bar{t}_0(1/x) & 1 \\ 1 & 0 \end{pmatrix},$$

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

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

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 $0 \leq i,j \leq 1$ 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 $0 \leq i,j \leq 1$, $T_{i,j}$ 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 $0 \leq i,j \leq 1$, 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 $n \geq 0$. If for some $n \geq 0$ 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 $j \geq 0$, $q_1(0) = 1$, 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

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

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

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

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. $\square$

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.*

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

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

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

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

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

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

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 $u = 2^{2k}$,

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

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

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

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

which can be rewritten as

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

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

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

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

First we calculate an 2-automaton that generates T from its minimal polynomial and its first terms. This automaton has 2556 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

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

$$\begin{aligned}0 &= \tau(A(s,1)) + \tau(A(s,11)) + \tau(A(s,100)) + \tau(A(s,101)) \\ &\quad + \tau(A(s,110)) + \tau(A(s,1101)),\end{aligned} \tag{2.27}$$

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

$$0 = \tau(A(s,11)) + \tau(A(s,100)) + \tau(A(s,110)) + \tau(A(s,111)), \tag{2.28}$$

$$\begin{aligned}0 &= \tau(A(s,\epsilon)) + \tau(A(s,11)) + \tau(A(s,101)) + \tau(A(s,110)) \\ &\quad + \tau(A(s,1000)),\end{aligned} \tag{2.29}$$

$$0 = \tau(A(s,1)) + \tau(A(s,11)) + \tau(A(s,1001)), \tag{2.30}$$

$$0 = \tau(A(s,10)) + \tau(A(s,100)) + \tau(A(s,1010)), \tag{2.31}$$

$$0 = \tau(A(s,11)) + \tau(A(s,101)) + \tau(A(s,1011)), \tag{2.32}$$

$$0 = \tau(A(s,\epsilon)) + \tau(A(s,100)) + \tau(A(s,110)) + \tau(A(s,1100)), \tag{2.33}$$

$$\begin{aligned}0 &= \tau(A(s,1)) + \tau(A(s,11)) + \tau(A(s,100)) + \tau(A(s,101)) \\ &\quad + \tau(A(s,110)) + \tau(A(s,1101)),\end{aligned} \tag{2.34}$$

for $s = A(i, 0^{2k})$. We find that $(A(i, 0^{28}), E_{28}) = (A(i, 0^{22}), E_{22})$, so that we only have to verify that identities (2.21) through (2.34) hold for $2 \le k \le 14$, which turns out to be true. □

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 $k \ge 2$, and $u = 2^{2k-1}$,*

$$\begin{aligned}M_{2k} &= M^e[:7u] + x^u M^e[:6u] + x^{3u} M^e[:4u] + x^{4u} M^e[:3u] + x^{7u} R^e, \\ W_{2k} &= W^e[:7u] + x^u W^e[:6u] + x^{3u} W^e[:4u] + x^{4u} W^e[:3u] + x^{7u} R^e.\end{aligned}$$

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

$$\begin{aligned}M_{2k+1} &= M^o[:7u] + x^u M^o[:6u] + x^{3u} M^o[:4u] + x^{4u} M^o[:3u] + x^{7u} R^o, \\ W_{2k+1} &= W^o[:7u] + x^u W^o[:6u] + x^{3u} W^o[:4u] + x^{4u} W^o[:3u] + x^{7u} R^o.\end{aligned}$$

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 $n \ge 2$, 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

$$\begin{aligned}W_{2k} M_{2k} &= \big(W^e[:7v] + x^v W^e[:6v] + x^{3v} W^e[:4v] + x^{4v} W^e[:3v] + x^{7u} R^e\big) \times \big(\\ &\qquad M^e[:7v] + x^v M^e[:6v] + x^{3v} M^e[:4v] + x^{4v} M^e[:3v] + x^{7u} R^e\big);\end{aligned} \tag{2.35}$$

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

$$W^e[:14v]M^e[:14v] + x^{2v}W^e[:12v]M^e[:12v] + x^{6v}W^e[:8v]M^e[:8v] + x^{8v}W^e[:6v]M^e[:6v].$$

For all $n \le 14$, 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. $\square$

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 $0 \le j,k \le 1$,

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

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

$$\begin{aligned} q_0(x) &= x^{28}+x^{27}+x^{24}+x^{21}+x^{20}+x^{19}+x^{11}+x^9+x^7+x^4, \\ q_1(x) &= x^{27}+x^{26}+x^{25}+x^{23}+x^{21}+x^{20}+x^{19}+x^{18}+x^{17}+x^{10}+x^9+x^8 \\ &\quad +x^6+x^5+x^3+x, \\ q_2(x) &= x^{26}+x^{18}+x^{14}+x^{12}+x^{10}+x^8+x^6+x^4+x^2+1, \\ q_3(x) &= x^{27}+x^{26}+x^{25}+x^{23}+x^{21}+x^{20}+x^{19}+x^{18}+x^{17}+x^{10}+x^9+x^8 \\ &\quad +x^6+x^5+x^3+x, \\ q_4(x) &= x^{27}+x^{26}+x^{21}+x^{20}+x^{19}+x^{18}+x^{16}+x^{14}+x^{11}+x^{10}+x^9+x^8 \end{aligned}$$

$$+ x^7 + x^6 + x^2.$$

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

$$\begin{aligned}
p_0(x) = {} & x^{162} + x^{160} + x^{158} + x^{156} + x^{150} + x^{148} + x^{142} + x^{138} + x^{136} + x^{134} \\
& + x^{116} + x^{112} + x^{108} + x^{102} + x^{98} + x^{94} + x^{90} + x^{88} + x^{80} + x^{78} \\
& + x^{76} + x^{74} + x^{72} + x^{70} + x^{66} + x^{64} + x^{60} + x^{58} + x^{56} + x^{54} + x^{48} \\
& + x^{44} + x^{38} + x^{36} + x^{32} + x^{30} + x^{26} + x^{24} + x^{22} + x^{20} + x^{12}, \\
p_3(x) = {} & x^{158} + x^{156} + x^{154} + x^{150} + x^{146} + x^{144} + x^{140} + x^{128} + x^{122} + x^{116} \\
& + x^{114} + x^{110} + x^{106} + x^{104} + x^{102} + x^{100} + x^{98} + x^{88} + x^{86} + x^{84} \\
& + x^{76} + x^{74} + x^{72} + x^{68} + x^{66} + x^{64} + x^{62} + x^{60} + x^{56} + x^{48} + x^{46} \\
& + x^{44} + x^{42} + x^{38} + x^{36} + x^{34} + x^{32} + x^{28} + x^{26} + x^{24} + x^{20} + x^{18} \\
& + x^{16} + x^{8}, \\
p_6(x) = {} & x^{142} + x^{140} + x^{136} + x^{130} + x^{124} + x^{122} + x^{118} + x^{116} + x^{114} + x^{110} \\
& + x^{106} + x^{104} + x^{102} + x^{92} + x^{90} + x^{88} + x^{76} + x^{72} + x^{64} + x^{62} + x^{60} \\
& + x^{40} + x^{38} + x^{34} + x^{32} + x^{30} + x^{26} + x^{22} + x^{16} + x^{12} + x^{8} + x^{4} + x^{2} \\
& + 1, \\
p_9(x) = {} & x^{160} + x^{158} + x^{154} + x^{152} + x^{150} + x^{146} + x^{144} + x^{142} + x^{138} + x^{136} \\
& + x^{132} + x^{128} + x^{126} + x^{120} + x^{118} + x^{112} + x^{110} + x^{108} + x^{106} \\
& + x^{104} + x^{100} + x^{96} + x^{94} + x^{86} + x^{84} + x^{80} + x^{74} + x^{70} + x^{68} + x^{66} \\
& + x^{64} + x^{56} + x^{46} + x^{42} + x^{40} + x^{30} + x^{26} + x^{24} + x^{22} + x^{20} + x^{18} \\
& + x^{16} + x^{14} + x^{12} + x^{8} + x^{6} + x^{4} + x^{2}, \\
p_{12}(x) = {} & x^{160} + x^{152} + x^{136} + x^{120} + x^{112} + x^{96} + x^{88} + x^{72} + x^{56} + x^{40} + x^{32} \\
& + x^{16} + x^{8} + 1,
\end{aligned}$$

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

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

$$p_0(x) = x^{147} + x^{146} + x^{144} + x^{143} + x^{142} + x^{141} + x^{138} + x^{137} + x^{136} + x^{132}$$

$$
\begin{aligned}
&+x^{129}+x^{128}+x^{127}+x^{125}+x^{123}+x^{121}+x^{120}+x^{118}+x^{116}\\
&+x^{114}+x^{113}+x^{112}+x^{111}+x^{110}+x^{109}+x^{108}+x^{105}+x^{104}\\
&+x^{103}+x^{101}+x^{100}+x^{99}+x^{98}+x^{96}+x^{95}+x^{94}+x^{92}+x^{90}+x^{85}\\
&+x^{83}+x^{82}+x^{80}+x^{79}+x^{77}+x^{74}+x^{71}+x^{70}+x^{69}+x^{66}+x^{63}\\
&+x^{62}+x^{60}+x^{58}+x^{56}+x^{54}+x^{53}+x^{50}+x^{48}+x^{47}+x^{44}+x^{41}\\
&+x^{37}+x^{36}+x^{32}+x^{31}+x^{30}+x^{28}+x^{27}+x^{26}+x^{25}+x^{24}+x^{21}\\
&+x^{20}+x^{19}+x^{18},\\
p_3(x)={}&x^{145}+x^{143}+x^{141}+x^{140}+x^{139}+x^{133}+x^{129}+x^{128}+x^{126}+x^{125}\\
&+x^{124}+x^{122}+x^{119}+x^{117}+x^{116}+x^{115}+x^{109}+x^{104}+x^{103}\\
&+x^{102}+x^{99}+x^{98}+x^{97}+x^{93}+x^{89}+x^{88}+x^{86}+x^{85}+x^{84}+x^{82}\\
&+x^{79}+x^{77}+x^{76}+x^{75}+x^{73}+x^{71}+x^{68}+x^{67}+x^{65}+x^{64}+x^{62}\\
&+x^{60}+x^{58}+x^{56}+x^{54}+x^{53}+x^{52}+x^{50}+x^{49}+x^{33}+x^{31}+x^{29}\\
&+x^{28}+x^{27}+x^{21}+x^{17}+x^{16}+x^{14}+x^{13}+x^{12}+x^{10}+x^{9},\\
p_6(x)={}&x^{144}+x^{143}+x^{141}+x^{140}+x^{138}+x^{137}+x^{136}+x^{130}+x^{129}+x^{128}\\
&+x^{124}+x^{123}+x^{122}+x^{116}+x^{115}+x^{114}+x^{112}+x^{111}+x^{110}\\
&+x^{108}+x^{107}+x^{106}+x^{104}+x^{103}+x^{102}+x^{100}+x^{99}+x^{98}+x^{96}\\
&+x^{95}+x^{94}+x^{90}+x^{89}+x^{87}+x^{85}+x^{84}+x^{82}+x^{81}+x^{80}+x^{78}\\
&+x^{77}+x^{76}+x^{72}+x^{71}+x^{69}+x^{68}+x^{66}+x^{65}+x^{63}+x^{62}+x^{52}\\
&+x^{51}+x^{50}+x^{46}+x^{45}+x^{43}+x^{41}+x^{40}+x^{38}+x^{37}+x^{35}+x^{34}\\
&+x^{30}+x^{29}+x^{27}+x^{25}+x^{23}+x^{21}+x^{19}+x^{17}+x^{15}+x^{14}+x^{12}\\
&+x^{11}+x^{10}+x^{8}+x^{7}+x^{6},\\
p_9(x)={}&x^{143}+x^{139}+x^{138}+x^{137}+x^{136}+x^{135}+x^{134}+x^{131}+x^{130}+x^{125}\\
&+x^{124}+x^{122}+x^{121}+x^{120}+x^{118}+x^{117}+x^{113}+x^{108}+x^{107}\\
&+x^{106}+x^{105}+x^{103}+x^{102}+x^{100}+x^{98}+x^{96}+x^{95}+x^{94}+x^{92}\\
&+x^{91}+x^{81}+x^{76}+x^{74}+x^{73}+x^{71}+x^{66}+x^{64}+x^{61}+x^{59}+x^{58}\\
&+x^{57}+x^{55}+x^{53}+x^{50}+x^{46}+x^{45}+x^{43}+x^{42}+x^{40}+x^{38}+x^{37}\\
&+x^{36}+x^{34}+x^{31}+x^{28}+x^{27}+x^{25}+x^{24}+x^{22}+x^{21}+x^{20}+x^{18}\\
&+x^{15}+x^{13}+x^{12}+x^{6}+x^{4}+x^{3},\\
p_{12}(x)={}&x^{142}+x^{141}+x^{140}+x^{130}+x^{129}+x^{128}+x^{110}+x^{109}+x^{108}+x^{98}\\
&+x^{97}+x^{96}+x^{94}+x^{93}+x^{92}+x^{82}+x^{81}+x^{80}+x^{62}+x^{61}+x^{60}\\
&+x^{50}+x^{49}+x^{48}+x^{30}+x^{29}+x^{28}+x^{18}+x^{17}+x^{16}+x^{14}+x^{13}\\
&+x^{12}+x^{2}+x+1,
\end{aligned}
$$

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

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

$$p_0(x)=x^{147}+x^{146}+x^{144}+x^{143}+x^{142}+x^{141}+x^{138}+x^{137}+x^{136}+x^{132}$$

$$
\begin{aligned}
&+ x^{129} + x^{128} + x^{127} + x^{125} + x^{123} + x^{121} + x^{120} + x^{118} + x^{116}\\
&+ x^{114} + x^{113} + x^{112} + x^{111} + x^{110} + x^{109} + x^{108} + x^{105} + x^{104}\\
&+ x^{103} + x^{101} + x^{100} + x^{99} + x^{98} + x^{96} + x^{95} + x^{94} + x^{92} + x^{90} + x^{85}\\
&+ x^{83} + x^{82} + x^{80} + x^{79} + x^{77} + x^{74} + x^{71} + x^{70} + x^{69} + x^{66} + x^{63}\\
&+ x^{62} + x^{60} + x^{58} + x^{56} + x^{54} + x^{53} + x^{50} + x^{48} + x^{47} + x^{44} + x^{41}\\
&+ x^{37} + x^{36} + x^{32} + x^{31} + x^{30} + x^{28} + x^{27} + x^{26} + x^{25} + x^{24} + x^{21}\\
&+ x^{20} + x^{19} + x^{18},\\
p_3(x) = {}& x^{145} + x^{143} + x^{141} + x^{140} + x^{139} + x^{133} + x^{129} + x^{128} + x^{126} + x^{125}\\
&+ x^{124} + x^{122} + x^{119} + x^{117} + x^{116} + x^{115} + x^{109} + x^{104} + x^{103}\\
&+ x^{102} + x^{99} + x^{98} + x^{97} + x^{93} + x^{89} + x^{88} + x^{86} + x^{85} + x^{84} + x^{82}\\
&+ x^{79} + x^{77} + x^{76} + x^{75} + x^{73} + x^{71} + x^{68} + x^{67} + x^{65} + x^{64} + x^{62}\\
&+ x^{60} + x^{58} + x^{56} + x^{54} + x^{53} + x^{52} + x^{50} + x^{49} + x^{33} + x^{31} + x^{29}\\
&+ x^{28} + x^{27} + x^{21} + x^{17} + x^{16} + x^{14} + x^{13} + x^{12} + x^{10} + x^{9},\\
p_6(x) = {}& x^{144} + x^{143} + x^{141} + x^{140} + x^{138} + x^{137} + x^{136} + x^{130} + x^{129} + x^{128}\\
&+ x^{124} + x^{123} + x^{122} + x^{116} + x^{115} + x^{114} + x^{112} + x^{111} + x^{110}\\
&+ x^{108} + x^{107} + x^{106} + x^{104} + x^{103} + x^{102} + x^{100} + x^{99} + x^{98} + x^{96}\\
&+ x^{95} + x^{94} + x^{90} + x^{89} + x^{87} + x^{85} + x^{84} + x^{82} + x^{81} + x^{80} + x^{78}\\
&+ x^{77} + x^{76} + x^{72} + x^{71} + x^{69} + x^{68} + x^{66} + x^{65} + x^{63} + x^{62} + x^{52}\\
&+ x^{51} + x^{50} + x^{46} + x^{45} + x^{43} + x^{41} + x^{40} + x^{38} + x^{37} + x^{35} + x^{34}\\
&+ x^{30} + x^{29} + x^{27} + x^{25} + x^{23} + x^{21} + x^{19} + x^{17} + x^{15} + x^{14} + x^{12}\\
&+ x^{11} + x^{10} + x^{8} + x^{7} + x^{6},\\
p_9(x) = {}& x^{143} + x^{139} + x^{138} + x^{137} + x^{136} + x^{135} + x^{134} + x^{131} + x^{130} + x^{125}\\
&+ x^{124} + x^{122} + x^{121} + x^{120} + x^{118} + x^{117} + x^{113} + x^{108} + x^{107}\\
&+ x^{106} + x^{105} + x^{103} + x^{102} + x^{100} + x^{98} + x^{96} + x^{95} + x^{94} + x^{92}\\
&+ x^{91} + x^{81} + x^{76} + x^{74} + x^{73} + x^{71} + x^{66} + x^{64} + x^{61} + x^{59} + x^{58}\\
&+ x^{57} + x^{55} + x^{53} + x^{50} + x^{46} + x^{45} + x^{43} + x^{42} + x^{40} + x^{38} + x^{37}\\
&+ x^{36} + x^{34} + x^{31} + x^{28} + x^{27} + x^{25} + x^{24} + x^{22} + x^{21} + x^{20} + x^{18}\\
&+ x^{15} + x^{13} + x^{12} + x^{6} + x^{4} + x^{3},\\
p_{12}(x) = {}& x^{142} + x^{141} + x^{140} + x^{130} + x^{129} + x^{128} + x^{110} + x^{109} + x^{108} + x^{98}\\
&+ x^{97} + x^{96} + x^{94} + x^{93} + x^{92} + x^{82} + x^{81} + x^{80} + x^{62} + x^{61} + x^{60}\\
&+ x^{50} + x^{49} + x^{48} + x^{30} + x^{29} + x^{28} + x^{18} + x^{17} + x^{16} + x^{14} + x^{13}\\
&+ x^{12} + x^{2} + x + 1,
\end{aligned}
$$

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

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

$$
p_0(x) = x^{132} + x^{128} + x^{126} + x^{124} + x^{116} + x^{112} + x^{108} + x^{104} + x^{100} + x^{98}
$$

$$
\begin{aligned}
&+ x^{92} + x^{90} + x^{88} + x^{86} + x^{82} + x^{78} + x^{76} + x^{74} + x^{72} + x^{70} + x^{62}\\
&+ x^{60} + x^{58} + x^{54} + x^{44} + x^{42} + x^{40} + x^{38} + x^{32} + x^{30} + x^{28} + x^{26}\\
&+ x^{24},\\
p_3(x) &= x^{126} + x^{122} + x^{118} + x^{116} + x^{114} + x^{110} + x^{104} + x^{102} + x^{92} + x^{90}\\
&+ x^{88} + x^{84} + x^{82} + x^{80} + x^{78} + x^{74} + x^{70} + x^{64} + x^{62} + x^{54} + x^{52}\\
&+ x^{48} + x^{44} + x^{40} + x^{36} + x^{14} + x^{10} + x^{6},\\
p_6(x) &= x^{126} + x^{124} + x^{122} + x^{118} + x^{116} + x^{110} + x^{108} + x^{106} + x^{102} + x^{98}\\
&+ x^{96} + x^{88} + x^{86} + x^{80} + x^{78} + x^{70} + x^{68} + x^{60} + x^{56} + x^{44} + x^{42}\\
&+ x^{36} + x^{26} + x^{22} + x^{20} + x^{18} + x^{8} + 1,\\
p_9(x) &= x^{124} + x^{114} + x^{108} + x^{106} + x^{100} + x^{98} + x^{94} + x^{92} + x^{86} + x^{76} + x^{72}\\
&+ x^{70} + x^{68} + x^{66} + x^{58} + x^{56} + x^{54} + x^{52} + x^{48} + x^{44} + x^{42} + x^{36}\\
&+ x^{34} + x^{32} + x^{30} + x^{20} + x^{16} + x^{8} + x^{6} + x^{2},\\
p_{12}(x) &= x^{124} + x^{122} + x^{120} + x^{116} + x^{114} + x^{112} + x^{108} + x^{106} + x^{104} + x^{100}\\
&+ x^{98} + x^{96} + x^{76} + x^{74} + x^{72} + x^{68} + x^{66} + x^{64} + x^{60} + x^{58} + x^{56}\\
&+ x^{52} + x^{50} + x^{48} + x^{12} + x^{10} + x^{8} + x^{4} + x^{2} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{132} + x^{124} + x^{118} + x^{116} + x^{114} + x^{112} + x^{110} + x^{108} + x^{106} + x^{104}\\
&+ x^{102} + x^{100} + x^{98} + x^{86} + x^{84} + x^{80} + x^{74} + x^{72} + x^{70} + x^{68} + x^{60}\\
&+ x^{54} + x^{38} + x^{34} + x^{30} + x^{26} + x^{22} + x^{20} + x^{18} + x^{14} + x^{12},\\
p_3(x) &= x^{126} + x^{118} + x^{116} + x^{112} + x^{108} + x^{106} + x^{102} + x^{96} + x^{94} + x^{92}\\
&+ x^{82} + x^{76} + x^{74} + x^{72} + x^{64} + x^{62} + x^{52} + x^{48} + x^{46} + x^{42} + x^{38}\\
&+ x^{34} + x^{28} + x^{26} + x^{24} + x^{16} + x^{14} + x^{8},\\
p_6(x) &= x^{126} + x^{124} + x^{120} + x^{116} + x^{108} + x^{106} + x^{102} + x^{98} + x^{94} + x^{92}\\
&+ x^{88} + x^{86} + x^{84} + x^{74} + x^{72} + x^{70} + x^{60} + x^{56} + x^{54} + x^{52} + x^{50}\\
&+ x^{44} + x^{36} + x^{34} + x^{32} + x^{30} + x^{28} + x^{26} + x^{22} + x^{20} + x^{18} + x^{16}\\
&+ x^{10} + x^{8} + x^{4} + 1,\\
p_9(x) &= x^{124} + x^{114} + x^{108} + x^{106} + x^{100} + x^{98} + x^{94} + x^{92} + x^{86} + x^{76} + x^{72}\\
&+ x^{70} + x^{68} + x^{66} + x^{58} + x^{56} + x^{54} + x^{52} + x^{48} + x^{44} + x^{42} + x^{36}\\
&+ x^{34} + x^{32} + x^{30} + x^{20} + x^{16} + x^{8} + x^{6} + x^{2},\\
p_{12}(x) &= x^{124} + x^{122} + x^{120} + x^{116} + x^{114} + x^{112} + x^{108} + x^{106} + x^{104} + x^{100}\\
&+ x^{98} + x^{96} + x^{76} + x^{74} + x^{72} + x^{68} + x^{66} + x^{64} + x^{60} + x^{58} + x^{56}\\
&+ x^{52} + x^{50} + x^{48} + x^{12} + x^{10} + x^{8} + x^{4} + x^{2} + 1,
\end{aligned}
$$

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

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

$$\begin{aligned}
p_0(x) &= x^{147} + x^{144} + x^{143} + x^{135} + x^{134} + x^{133} + x^{132} + x^{128} + x^{127} + x^{125} \\
&\quad + x^{122} + x^{121} + x^{120} + x^{119} + x^{118} + x^{116} + x^{113} + x^{112} + x^{106} \\
&\quad + x^{103} + x^{102} + x^{101} + x^{100} + x^{98} + x^{96} + x^{93} + x^{90} + x^{89} + x^{88} \\
&\quad + x^{84} + x^{82} + x^{81} + x^{78} + x^{77} + x^{71} + x^{70} + x^{69} + x^{68} + x^{67} + x^{65} \\
&\quad + x^{64} + x^{60} + x^{59} + x^{57} + x^{56} + x^{54} + x^{53} + x^{51} + x^{50} + x^{49} + x^{46} \\
&\quad + x^{45} + x^{44} + x^{42} + x^{39} + x^{37} + x^{32} + x^{29} + x^{27}, \\
p_3(x) &= x^{145} + x^{143} + x^{141} + x^{140} + x^{139} + x^{133} + x^{129} + x^{128} + x^{126} + x^{125} \\
&\quad + x^{124} + x^{122} + x^{119} + x^{117} + x^{116} + x^{115} + x^{109} + x^{104} + x^{103} \\
&\quad + x^{102} + x^{99} + x^{98} + x^{97} + x^{93} + x^{89} + x^{88} + x^{86} + x^{85} + x^{84} + x^{82} \\
&\quad + x^{79} + x^{77} + x^{76} + x^{75} + x^{73} + x^{71} + x^{68} + x^{67} + x^{65} + x^{64} + x^{62} \\
&\quad + x^{60} + x^{58} + x^{56} + x^{54} + x^{53} + x^{52} + x^{50} + x^{49} + x^{33} + x^{31} + x^{29} \\
&\quad + x^{28} + x^{27} + x^{21} + x^{17} + x^{16} + x^{14} + x^{13} + x^{12} + x^{10} + x^{9}, \\
p_6(x) &= x^{144} + x^{143} + x^{141} + x^{140} + x^{138} + x^{137} + x^{136} + x^{130} + x^{129} + x^{128} \\
&\quad + x^{124} + x^{123} + x^{122} + x^{116} + x^{115} + x^{114} + x^{112} + x^{111} + x^{110} \\
&\quad + x^{108} + x^{107} + x^{106} + x^{104} + x^{103} + x^{102} + x^{100} + x^{99} + x^{98} + x^{96} \\
&\quad + x^{95} + x^{94} + x^{90} + x^{89} + x^{87} + x^{85} + x^{84} + x^{82} + x^{81} + x^{80} + x^{78} \\
&\quad + x^{77} + x^{76} + x^{72} + x^{71} + x^{69} + x^{68} + x^{66} + x^{65} + x^{63} + x^{62} + x^{52} \\
&\quad + x^{51} + x^{50} + x^{46} + x^{45} + x^{43} + x^{41} + x^{40} + x^{38} + x^{37} + x^{35} + x^{34} \\
&\quad + x^{30} + x^{29} + x^{27} + x^{25} + x^{23} + x^{21} + x^{19} + x^{17} + x^{15} + x^{14} + x^{12} \\
&\quad + x^{11} + x^{10} + x^{8} + x^{7} + x^{6}, \\
p_9(x) &= x^{143} + x^{139} + x^{138} + x^{137} + x^{136} + x^{135} + x^{134} + x^{131} + x^{130} + x^{125} \\
&\quad + x^{124} + x^{122} + x^{121} + x^{120} + x^{118} + x^{117} + x^{113} + x^{108} + x^{107} \\
&\quad + x^{106} + x^{105} + x^{103} + x^{102} + x^{100} + x^{98} + x^{96} + x^{95} + x^{94} + x^{92} \\
&\quad + x^{91} + x^{81} + x^{76} + x^{74} + x^{73} + x^{71} + x^{66} + x^{64} + x^{61} + x^{59} + x^{58} \\
&\quad + x^{57} + x^{55} + x^{53} + x^{50} + x^{46} + x^{45} + x^{43} + x^{42} + x^{40} + x^{38} + x^{37} \\
&\quad + x^{36} + x^{34} + x^{31} + x^{28} + x^{27} + x^{25} + x^{24} + x^{22} + x^{21} + x^{20} + x^{18} \\
&\quad + x^{15} + x^{13} + x^{12} + x^{6} + x^{4} + x^{3}, \\
p_{12}(x) &= x^{142} + x^{141} + x^{140} + x^{130} + x^{129} + x^{128} + x^{110} + x^{109} + x^{108} + x^{98} \\
&\quad + x^{97} + x^{96} + x^{94} + x^{93} + x^{92} + x^{82} + x^{81} + x^{80} + x^{62} + x^{61} + x^{60} \\
&\quad + x^{50} + x^{49} + x^{48} + x^{30} + x^{29} + x^{28} + x^{18} + x^{17} + x^{16} + x^{14} + x^{13} \\
&\quad + x^{12} + x^{2} + x + 1,
\end{aligned}$$

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

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

$$p_0(x) = x^{147} + x^{144} + x^{143} + x^{135} + x^{134} + x^{133} + x^{132} + x^{128} + x^{127} + x^{125}$$

$$
\begin{aligned}
&+ x^{122} + x^{121} + x^{120} + x^{119} + x^{118} + x^{116} + x^{113} + x^{112} + x^{106}\\
&+ x^{103} + x^{102} + x^{101} + x^{100} + x^{98} + x^{96} + x^{93} + x^{90} + x^{89} + x^{88}\\
&+ x^{84} + x^{82} + x^{81} + x^{78} + x^{77} + x^{71} + x^{70} + x^{69} + x^{68} + x^{67} + x^{65}\\
&+ x^{64} + x^{60} + x^{59} + x^{57} + x^{56} + x^{54} + x^{53} + x^{51} + x^{50} + x^{49} + x^{46}\\
&+ x^{45} + x^{44} + x^{42} + x^{39} + x^{37} + x^{32} + x^{29} + x^{27},\\
p_3(x) = {}& x^{145} + x^{143} + x^{141} + x^{140} + x^{139} + x^{133} + x^{129} + x^{128} + x^{126} + x^{125}\\
&+ x^{124} + x^{122} + x^{119} + x^{117} + x^{116} + x^{115} + x^{109} + x^{104} + x^{103}\\
&+ x^{102} + x^{99} + x^{98} + x^{97} + x^{93} + x^{89} + x^{88} + x^{86} + x^{85} + x^{84} + x^{82}\\
&+ x^{79} + x^{77} + x^{76} + x^{75} + x^{73} + x^{71} + x^{68} + x^{67} + x^{65} + x^{64} + x^{62}\\
&+ x^{60} + x^{58} + x^{56} + x^{54} + x^{53} + x^{52} + x^{50} + x^{49} + x^{33} + x^{31} + x^{29}\\
&+ x^{28} + x^{27} + x^{21} + x^{17} + x^{16} + x^{14} + x^{13} + x^{12} + x^{10} + x^{9},\\
p_6(x) = {}& x^{144} + x^{143} + x^{141} + x^{140} + x^{138} + x^{137} + x^{136} + x^{130} + x^{129} + x^{128}\\
&+ x^{124} + x^{123} + x^{122} + x^{116} + x^{115} + x^{114} + x^{112} + x^{111} + x^{110}\\
&+ x^{108} + x^{107} + x^{106} + x^{104} + x^{103} + x^{102} + x^{100} + x^{99} + x^{98} + x^{96}\\
&+ x^{95} + x^{94} + x^{90} + x^{89} + x^{87} + x^{85} + x^{84} + x^{82} + x^{81} + x^{80} + x^{78}\\
&+ x^{77} + x^{76} + x^{72} + x^{71} + x^{69} + x^{68} + x^{66} + x^{65} + x^{63} + x^{62} + x^{52}\\
&+ x^{51} + x^{50} + x^{46} + x^{45} + x^{43} + x^{41} + x^{40} + x^{38} + x^{37} + x^{35} + x^{34}\\
&+ x^{30} + x^{29} + x^{27} + x^{25} + x^{23} + x^{21} + x^{19} + x^{17} + x^{15} + x^{14} + x^{12}\\
&+ x^{11} + x^{10} + x^{8} + x^{7} + x^{6},\\
p_9(x) = {}& x^{143} + x^{139} + x^{138} + x^{137} + x^{136} + x^{135} + x^{134} + x^{131} + x^{130} + x^{125}\\
&+ x^{124} + x^{122} + x^{121} + x^{120} + x^{118} + x^{117} + x^{113} + x^{108} + x^{107}\\
&+ x^{106} + x^{105} + x^{103} + x^{102} + x^{100} + x^{98} + x^{96} + x^{95} + x^{94} + x^{92}\\
&+ x^{91} + x^{81} + x^{76} + x^{74} + x^{73} + x^{71} + x^{66} + x^{64} + x^{61} + x^{59} + x^{58}\\
&+ x^{57} + x^{55} + x^{53} + x^{50} + x^{46} + x^{45} + x^{43} + x^{42} + x^{40} + x^{38} + x^{37}\\
&+ x^{36} + x^{34} + x^{31} + x^{28} + x^{27} + x^{25} + x^{24} + x^{22} + x^{21} + x^{20} + x^{18}\\
&+ x^{15} + x^{13} + x^{12} + x^{6} + x^{4} + x^{3},\\
p_{12}(x) = {}& x^{142} + x^{141} + x^{140} + x^{130} + x^{129} + x^{128} + x^{110} + x^{109} + x^{108} + x^{98}\\
&+ x^{97} + x^{96} + x^{94} + x^{93} + x^{92} + x^{82} + x^{81} + x^{80} + x^{62} + x^{61} + x^{60}\\
&+ x^{50} + x^{49} + x^{48} + x^{30} + x^{29} + x^{28} + x^{18} + x^{17} + x^{16} + x^{14} + x^{13}\\
&+ x^{12} + x^{2} + x + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) = {}& x^{162} + x^{156} + x^{146} + x^{144} + x^{134} + x^{120} + x^{112} + x^{110} + x^{108} + x^{106}\\
&+ x^{98} + x^{96} + x^{94} + x^{90} + x^{86} + x^{84} + x^{80} + x^{78} + x^{76} + x^{72} + x^{70}\\
&+ x^{68} + x^{66} + x^{64} + x^{56} + x^{50} + x^{48} + x^{44} + x^{42},
\end{aligned}
$$

$$
\begin{aligned}
p_3(x) &= x^{154} + x^{152} + x^{150} + x^{144} + x^{142} + x^{140} + x^{138} + x^{136} + x^{132} + x^{130} \\
&\quad + x^{126} + x^{124} + x^{118} + x^{116} + x^{108} + x^{104} + x^{100} + x^{98} + x^{92} + x^{90} \\
&\quad + x^{84} + x^{82} + x^{80} + x^{78} + x^{76} + x^{74} + x^{72} + x^{70} + x^{68} + x^{66} + x^{64} \\
&\quad + x^{62} + x^{60} + x^{56} + x^{48} + x^{42} + x^{40} + x^{26} + x^{24} + x^{20} + x^{8} + x^{6}, \\
p_6(x) &= x^{158} + x^{146} + x^{144} + x^{138} + x^{136} + x^{126} + x^{120} + x^{112} + x^{104} + x^{96} \\
&\quad + x^{92} + x^{88} + x^{86} + x^{82} + x^{80} + x^{78} + x^{72} + x^{70} + x^{68} + x^{64} + x^{62} \\
&\quad + x^{60} + x^{46} + x^{40} + x^{30} + x^{28} + x^{26} + x^{24} + x^{22} + x^{20} + x^{18} + x^{12} \\
&\quad + x^{8} + x^{6} + x^{2} + 1, \\
p_9(x) &= x^{160} + x^{158} + x^{154} + x^{152} + x^{150} + x^{146} + x^{144} + x^{142} + x^{138} + x^{136} \\
&\quad + x^{132} + x^{128} + x^{126} + x^{120} + x^{118} + x^{112} + x^{110} + x^{108} + x^{106} \\
&\quad + x^{104} + x^{100} + x^{96} + x^{94} + x^{86} + x^{84} + x^{80} + x^{74} + x^{70} + x^{68} + x^{66} \\
&\quad + x^{64} + x^{56} + x^{46} + x^{42} + x^{40} + x^{30} + x^{26} + x^{24} + x^{22} + x^{20} + x^{18} \\
&\quad + x^{16} + x^{14} + x^{12} + x^{8} + x^{6} + x^{4} + x^{2}, \\
p_{12}(x) &= x^{160} + x^{152} + x^{136} + x^{120} + x^{112} + x^{96} + x^{88} + x^{72} + x^{56} + x^{40} + x^{32} \\
&\quad + x^{16} + x^{8} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{147} + x^{146} + x^{145} + x^{144} + x^{143} + x^{142} + x^{140} + x^{138} + x^{136} + x^{135} \\
&\quad + x^{131} + x^{129} + x^{123} + x^{122} + x^{121} + x^{118} + x^{116} + x^{114} + x^{111} \\
&\quad + x^{107} + x^{105} + x^{101} + x^{97} + x^{96} + x^{95} + x^{94} + x^{91} + x^{89} + x^{84} + x^{83} \\
&\quad + x^{79} + x^{78} + x^{76} + x^{75} + x^{73} + x^{70} + x^{69} + x^{67} + x^{64} + x^{63} + x^{61} \\
&\quad + x^{59} + x^{56} + x^{55} + x^{53} + x^{52} + x^{48} + x^{47} + x^{45} + x^{44} + x^{42} + x^{40} \\
&\quad + x^{37} + x^{36} + x^{34} + x^{31} + x^{30} + x^{26} + x^{25} + x^{23} + x^{22} + x^{21} + x^{20} \\
&\quad + x^{17} + x^{15} + x^{13} + x^{12}, \\
p_3(x) &= x^{146} + x^{143} + x^{141} + x^{140} + x^{138} + x^{137} + x^{135} + x^{134} + x^{133} + x^{131} \\
&\quad + x^{130} + x^{128} + x^{127} + x^{126} + x^{125} + x^{123} + x^{122} + x^{121} + x^{116} \\
&\quad + x^{115} + x^{113} + x^{111} + x^{110} + x^{109} + x^{108} + x^{105} + x^{104} + x^{103} \\
&\quad + x^{98} + x^{97} + x^{95} + x^{92} + x^{91} + x^{89} + x^{88} + x^{85} + x^{84} + x^{82} + x^{79} \\
&\quad + x^{78} + x^{76} + x^{75} + x^{74} + x^{73} + x^{70} + x^{62} + x^{61} + x^{59} + x^{57} + x^{55} \\
&\quad + x^{54} + x^{53} + x^{51} + x^{49} + x^{47} + x^{45} + x^{43} + x^{42} + x^{40} + x^{39} + x^{37} \\
&\quad + x^{36} + x^{33} + x^{32} + x^{31} + x^{30} + x^{21} + x^{19} + x^{18} + x^{16} + x^{15} + x^{14} \\
&\quad + x^{13} + x^{11} + x^{9} + x^{8}, \\
p_6(x) &= x^{146} + x^{143} + x^{139} + x^{136} + x^{133} + x^{132} + x^{130} + x^{129} + x^{126} + x^{125} \\
&\quad + x^{123} + x^{121} + x^{120} + x^{119} + x^{117} + x^{116} + x^{113} + x^{112} + x^{111} \\
&\quad + x^{109} + x^{108} + x^{105} + x^{102} + x^{101} + x^{100} + x^{97} + x^{96} + x^{95} + x^{92}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{88} + x^{87} + x^{85} + x^{84} + x^{79} + x^{78} + x^{77} + x^{75} + x^{74} + x^{73} + x^{72}\\
&+ x^{68} + x^{66} + x^{65} + x^{63} + x^{61} + x^{58} + x^{56} + x^{55} + x^{52} + x^{50} + x^{48}\\
&+ x^{44} + x^{43} + x^{41} + x^{40} + x^{37} + x^{35} + x^{33} + x^{32} + x^{31} + x^{30} + x^{28}\\
&+ x^{26} + x^{25} + x^{24} + x^{21} + x^{19} + x^{14} + x^{10} + x^{8} + x^{7} + x^{5} + x^{4} + x^{2}\\
&+ x + 1,\\
p_9(x) = {}& x^{146} + x^{145} + x^{144} + x^{142} + x^{141} + x^{140} + x^{138} + x^{137} + x^{136} + x^{134}\\
&+ x^{133} + x^{132} + x^{126} + x^{125} + x^{124} + x^{122} + x^{121} + x^{120} + x^{114}\\
&+ x^{113} + x^{112} + x^{102} + x^{101} + x^{100} + x^{98} + x^{97} + x^{96} + x^{94} + x^{93}\\
&+ x^{92} + x^{90} + x^{89} + x^{88} + x^{86} + x^{85} + x^{84} + x^{78} + x^{77} + x^{76} + x^{74}\\
&+ x^{73} + x^{72} + x^{66} + x^{65} + x^{64} + x^{54} + x^{53} + x^{52} + x^{34} + x^{33} + x^{32}\\
&+ x^{30} + x^{29} + x^{28} + x^{26} + x^{25} + x^{24} + x^{22} + x^{21} + x^{20} + x^{18} + x^{17}\\
&+ x^{16} + x^{6} + x^{5} + x^{4},\\
p_{12}(x) = {}& x^{146} + x^{145} + x^{144} + x^{138} + x^{137} + x^{136} + x^{134} + x^{133} + x^{132} + x^{130}\\
&+ x^{129} + x^{128} + x^{126} + x^{125} + x^{124} + x^{122} + x^{121} + x^{120} + x^{114}\\
&+ x^{113} + x^{112} + x^{110} + x^{109} + x^{108} + x^{102} + x^{101} + x^{100} + x^{90} + x^{89}\\
&+ x^{88} + x^{86} + x^{85} + x^{84} + x^{82} + x^{81} + x^{80} + x^{78} + x^{77} + x^{76} + x^{74}\\
&+ x^{73} + x^{72} + x^{66} + x^{65} + x^{64} + x^{62} + x^{61} + x^{60} + x^{54} + x^{53} + x^{52}\\
&+ x^{50} + x^{49} + x^{48} + x^{34} + x^{33} + x^{32} + x^{26} + x^{25} + x^{24} + x^{22} + x^{21}\\
&+ x^{20} + x^{14} + x^{13} + x^{12} + x^{6} + x^{5} + x^{4} + x^{2} + x + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) = {}& x^{144} + x^{141} + x^{139} + x^{137} + x^{136} + x^{133} + x^{132} + x^{131} + x^{128} + x^{126}\\
&+ x^{124} + x^{121} + x^{120} + x^{119} + x^{118} + x^{113} + x^{112} + x^{110} + x^{106}\\
&+ x^{104} + x^{103} + x^{102} + x^{101} + x^{100} + x^{98} + x^{97} + x^{95} + x^{94} + x^{93}\\
&+ x^{91} + x^{90} + x^{88} + x^{86} + x^{85} + x^{83} + x^{79} + x^{78} + x^{76} + x^{75} + x^{74}\\
&+ x^{73} + x^{72} + x^{71} + x^{69} + x^{68} + x^{67} + x^{66} + x^{64} + x^{60} + x^{56} + x^{54}\\
&+ x^{51} + x^{50} + x^{47} + x^{40} + x^{39} + x^{38} + x^{36} + x^{35} + x^{33} + x^{29} + x^{26}\\
&+ x^{24} + x^{23} + x^{22} + x^{21} + x^{20} + x^{18},\\
p_3(x) = {}& x^{137} + x^{136} + x^{135} + x^{132} + x^{130} + x^{129} + x^{127} + x^{126} + x^{125} + x^{121}\\
&+ x^{113} + x^{112} + x^{111} + x^{108} + x^{106} + x^{105} + x^{103} + x^{102} + x^{101}\\
&+ x^{96} + x^{95} + x^{92} + x^{90} + x^{89} + x^{87} + x^{86} + x^{85} + x^{81} + x^{73} + x^{72}\\
&+ x^{71} + x^{68} + x^{66} + x^{64} + x^{62} + x^{61} + x^{60} + x^{58} + x^{55} + x^{54} + x^{53}\\
&+ x^{49} + x^{25} + x^{24} + x^{23} + x^{20} + x^{18} + x^{17} + x^{15} + x^{14} + x^{13} + x^{9},\\
p_6(x) = {}& x^{138} + x^{136} + x^{134} + x^{130} + x^{126} + x^{124} + x^{122} + x^{120} + x^{116} + x^{112}\\
&+ x^{110} + x^{108} + x^{104} + x^{102} + x^{100} + x^{96} + x^{94} + x^{92} + x^{88} + x^{82}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{80} + x^{78} + x^{74} + x^{72} + x^{70} + x^{68} + x^{60} + x^{58} + x^{56} + x^{54} + x^{52} \\
&+ x^{50} + x^{48} + x^{44} + x^{38} + x^{36} + x^{34} + x^{24} + x^{22} + x^{16} + x^{14} + x^{6}, \\
p_9(x) = {}& x^{139} + x^{138} + x^{136} + x^{133} + x^{131} + x^{129} + x^{128} + x^{126} + x^{125} + x^{124} \\
&+ x^{123} + x^{122} + x^{121} + x^{119} + x^{117} + x^{113} + x^{112} + x^{110} + x^{109} \\
&+ x^{108} + x^{105} + x^{104} + x^{103} + x^{99} + x^{91} + x^{90} + x^{88} + x^{85} + x^{83} \\
&+ x^{81} + x^{80} + x^{78} + x^{77} + x^{76} + x^{75} + x^{74} + x^{73} + x^{71} + x^{69} + x^{65} \\
&+ x^{64} + x^{62} + x^{61} + x^{60} + x^{57} + x^{56} + x^{55} + x^{51} + x^{27} + x^{26} + x^{24} \\
&+ x^{21} + x^{19} + x^{17} + x^{16} + x^{14} + x^{13} + x^{12} + x^{9} + x^{8} + x^{7} + x^{3}, \\
p_{12}(x) = {}& x^{140} + x^{136} + x^{128} + x^{120} + x^{108} + x^{96} + x^{92} + x^{88} + x^{80} + x^{72} + x^{60} \\
&+ x^{48} + x^{28} + x^{24} + x^{16} + x^{12} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) = {}& x^{162} + x^{161} + x^{160} + x^{158} + x^{157} + x^{155} + x^{154} + x^{153} + x^{148} + x^{146} \\
&+ x^{144} + x^{143} + x^{140} + x^{139} + x^{134} + x^{133} + x^{130} + x^{129} + x^{125} \\
&+ x^{124} + x^{123} + x^{122} + x^{121} + x^{119} + x^{118} + x^{117} + x^{116} + x^{115} \\
&+ x^{112} + x^{106} + x^{105} + x^{104} + x^{97} + x^{94} + x^{93} + x^{92} + x^{86} + x^{83} \\
&+ x^{81} + x^{78} + x^{77} + x^{76} + x^{74} + x^{71} + x^{69} + x^{67} + x^{62} + x^{61} + x^{60} \\
&+ x^{59} + x^{58} + x^{56} + x^{55} + x^{51} + x^{50} + x^{49} + x^{44} + x^{42} + x^{36} + x^{35} \\
&+ x^{30} + x^{28} + x^{27}, \\
p_3(x) = {}& x^{161} + x^{160} + x^{159} + x^{157} + x^{155} + x^{154} + x^{148} + x^{147} + x^{144} + x^{142} \\
&+ x^{141} + x^{139} + x^{138} + x^{136} + x^{135} + x^{133} + x^{132} + x^{130} + x^{129} \\
&+ x^{127} + x^{126} + x^{124} + x^{123} + x^{119} + x^{118} + x^{113} + x^{105} + x^{104} \\
&+ x^{103} + x^{101} + x^{99} + x^{98} + x^{97} + x^{96} + x^{95} + x^{93} + x^{92} + x^{90} + x^{88} \\
&+ x^{86} + x^{85} + x^{84} + x^{82} + x^{81} + x^{80} + x^{78} + x^{77} + x^{76} + x^{74} + x^{73} \\
&+ x^{72} + x^{70} + x^{69} + x^{68} + x^{66} + x^{63} + x^{62} + x^{60} + x^{59} + x^{55} + x^{54} \\
&+ x^{48} + x^{47} + x^{45} + x^{43} + x^{42} + x^{36} + x^{35} + x^{32} + x^{30} + x^{29} + x^{27} \\
&+ x^{26} + x^{25} + x^{20} + x^{19} + x^{17} + x^{15} + x^{14} + x^{9}, \\
p_6(x) = {}& x^{162} + x^{160} + x^{156} + x^{154} + x^{152} + x^{150} + x^{148} + x^{144} + x^{128} + x^{118} \\
&+ x^{110} + x^{108} + x^{104} + x^{96} + x^{90} + x^{86} + x^{84} + x^{78} + x^{76} + x^{74} + x^{72} \\
&+ x^{70} + x^{68} + x^{62} + x^{60} + x^{58} + x^{48} + x^{44} + x^{42} + x^{40} + x^{30} + x^{28} \\
&+ x^{22} + x^{20} + x^{18} + x^{16} + x^{10} + x^{6}, \\
p_9(x) = {}& x^{163} + x^{162} + x^{160} + x^{159} + x^{158} + x^{157} + x^{156} + x^{154} + x^{151} + x^{150} \\
&+ x^{149} + x^{147} + x^{146} + x^{145} + x^{144} + x^{143} + x^{142} + x^{137} + x^{136} \\
&+ x^{130} + x^{128} + x^{127} + x^{126} + x^{125} + x^{124} + x^{122} + x^{119} + x^{118} \\
&+ x^{117} + x^{113} + x^{109} + x^{108} + x^{106} + x^{105} + x^{104} + x^{103} + x^{102}
\end{aligned}
$$

$$
\begin{aligned}
&+x^{101}+x^{98}+x^{97}+x^{96}+x^{95}+x^{94}+x^{89}+x^{88}+x^{82}+x^{80}+x^{79}\\
&+x^{78}+x^{77}+x^{76}+x^{74}+x^{71}+x^{70}+x^{69}+x^{67}+x^{66}+x^{65}+x^{64}\\
&+x^{63}+x^{62}+x^{57}+x^{56}+x^{50}+x^{48}+x^{47}+x^{46}+x^{45}+x^{44}+x^{42}\\
&+x^{39}+x^{38}+x^{37}+x^{33}+x^{29}+x^{28}+x^{26}+x^{25}+x^{24}+x^{23}+x^{22}\\
&+x^{21}+x^{18}+x^{17}+x^{16}+x^{15}+x^{14}+x^{9}+x^{8}+x^{3},\\
p_{12}(x)=&\,x^{164}+x^{140}+x^{136}+x^{128}+x^{116}+x^{108}+x^{104}+x^{100}+x^{96}+x^{92}\\
&+x^{88}+x^{80}+x^{60}+x^{56}+x^{48}+x^{36}+x^{28}+x^{24}+x^{20}+x^{16}+x^{12}\\
&+x^{8}+x^{4}+1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x)=&\,x^{147}+x^{145}+x^{143}+x^{142}+x^{141}+x^{140}+x^{138}+x^{136}+x^{135}+x^{132}\\
&+x^{131}+x^{127}+x^{126}+x^{125}+x^{120}+x^{119}+x^{118}+x^{114}+x^{110}\\
&+x^{109}+x^{108}+x^{107}+x^{105}+x^{104}+x^{102}+x^{100}+x^{97}+x^{95}+x^{94}\\
&+x^{93}+x^{92}+x^{90}+x^{89}+x^{88}+x^{87}+x^{83}+x^{78}+x^{77}+x^{76}+x^{75}\\
&+x^{73}+x^{70}+x^{69}+x^{66}+x^{64}+x^{63}+x^{60}+x^{59}+x^{58}+x^{57}+x^{55}\\
&+x^{52}+x^{48}+x^{46}+x^{44}+x^{42}+x^{38}+x^{36}+x^{33},\\
p_3(x)=&\,x^{146}+x^{144}+x^{142}+x^{141}+x^{139}+x^{137}+x^{135}+x^{134}+x^{133}+x^{132}\\
&+x^{130}+x^{129}+x^{127}+x^{126}+x^{125}+x^{124}+x^{122}+x^{119}+x^{118}\\
&+x^{114}+x^{113}+x^{111}+x^{110}+x^{109}+x^{107}+x^{104}+x^{102}+x^{96}+x^{95}\\
&+x^{85}+x^{83}+x^{82}+x^{81}+x^{73}+x^{72}+x^{71}+x^{66}+x^{65}+x^{64}+x^{62}\\
&+x^{61}+x^{59}+x^{57}+x^{55}+x^{54}+x^{53}+x^{52}+x^{48}+x^{47}+x^{45}+x^{43}\\
&+x^{42}+x^{40}+x^{39}+x^{37}+x^{36}+x^{33}+x^{28}+x^{27}+x^{26}+x^{21}+x^{20}\\
&+x^{18}+x^{17}+x^{15}+x^{14}+x^{13}+x^{12},\\
p_6(x)=&\,x^{146}+x^{144}+x^{142}+x^{139}+x^{136}+x^{133}+x^{132}+x^{128}+x^{122}+x^{121}\\
&+x^{120}+x^{119}+x^{118}+x^{116}+x^{115}+x^{114}+x^{113}+x^{110}+x^{109}\\
&+x^{107}+x^{106}+x^{105}+x^{104}+x^{103}+x^{101}+x^{99}+x^{98}+x^{97}+x^{94}\\
&+x^{92}+x^{86}+x^{85}+x^{84}+x^{79}+x^{76}+x^{75}+x^{72}+x^{71}+x^{69}+x^{62}\\
&+x^{61}+x^{57}+x^{55}+x^{54}+x^{53}+x^{52}+x^{51}+x^{48}+x^{42}+x^{41}+x^{40}\\
&+x^{37}+x^{36}+x^{31}+x^{29}+x^{28}+x^{27}+x^{26}+x^{24}+x^{23}+x^{22}+x^{21}\\
&+x^{20}+x^{17}+x^{15}+x^{14}+x^{13}+x^{11}+x^{10}+x^{9}+x^{8}+x^{2}+x+1,\\
p_9(x)=&\,x^{146}+x^{145}+x^{144}+x^{142}+x^{141}+x^{140}+x^{138}+x^{137}+x^{136}+x^{134}\\
&+x^{133}+x^{132}+x^{126}+x^{125}+x^{124}+x^{122}+x^{121}+x^{120}+x^{114}\\
&+x^{113}+x^{112}+x^{102}+x^{101}+x^{100}+x^{98}+x^{97}+x^{96}+x^{94}+x^{93}\\
&+x^{92}+x^{90}+x^{89}+x^{88}+x^{86}+x^{85}+x^{84}+x^{78}+x^{77}+x^{76}+x^{74}\\
&+x^{73}+x^{72}+x^{66}+x^{65}+x^{64}+x^{54}+x^{53}+x^{52}+x^{34}+x^{33}+x^{32}
\end{aligned}
$$

$$+ x^{30} + x^{29} + x^{28} + x^{26} + x^{25} + x^{24} + x^{22} + x^{21} + x^{20} + x^{18} + x^{17} + x^{16} + x^{6} + x^{5} + x^{4},$$

$$p_{12}(x) = x^{146} + x^{145} + x^{144} + x^{138} + x^{137} + x^{136} + x^{134} + x^{133} + x^{132} + x^{130} + x^{129} + x^{128} + x^{126} + x^{125} + x^{124} + x^{122} + x^{121} + x^{120} + x^{114} + x^{113} + x^{112} + x^{110} + x^{109} + x^{108} + x^{102} + x^{101} + x^{100} + x^{90} + x^{89} + x^{88} + x^{86} + x^{85} + x^{84} + x^{82} + x^{81} + x^{80} + x^{78} + x^{77} + x^{76} + x^{74} + x^{73} + x^{72} + x^{66} + x^{65} + x^{64} + x^{62} + x^{61} + x^{60} + x^{54} + x^{53} + x^{52} + x^{50} + x^{49} + x^{48} + x^{34} + x^{33} + x^{32} + x^{26} + x^{25} + x^{24} + x^{22} + x^{21} + x^{20} + x^{14} + x^{13} + x^{12} + x^{6} + x^{5} + x^{4} + x^{2} + x + 1,$$

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

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

$$p_{0}(x) = x^{147} + x^{146} + x^{145} + x^{144} + x^{143} + x^{142} + x^{140} + x^{138} + x^{136} + x^{135} + x^{131} + x^{129} + x^{123} + x^{122} + x^{121} + x^{118} + x^{116} + x^{114} + x^{111} + x^{107} + x^{105} + x^{101} + x^{97} + x^{96} + x^{95} + x^{94} + x^{91} + x^{89} + x^{84} + x^{83} + x^{79} + x^{78} + x^{76} + x^{75} + x^{73} + x^{70} + x^{69} + x^{67} + x^{64} + x^{63} + x^{61} + x^{59} + x^{56} + x^{55} + x^{53} + x^{52} + x^{48} + x^{47} + x^{45} + x^{44} + x^{42} + x^{40} + x^{37} + x^{36} + x^{34} + x^{31} + x^{30} + x^{26} + x^{25} + x^{23} + x^{22} + x^{21} + x^{20} + x^{17} + x^{15} + x^{13} + x^{12},$$

$$p_{3}(x) = x^{146} + x^{143} + x^{141} + x^{140} + x^{138} + x^{137} + x^{135} + x^{134} + x^{133} + x^{131} + x^{130} + x^{128} + x^{127} + x^{126} + x^{125} + x^{123} + x^{122} + x^{121} + x^{116} + x^{115} + x^{113} + x^{111} + x^{110} + x^{109} + x^{108} + x^{105} + x^{104} + x^{103} + x^{98} + x^{97} + x^{95} + x^{92} + x^{91} + x^{89} + x^{88} + x^{85} + x^{84} + x^{82} + x^{79} + x^{78} + x^{76} + x^{75} + x^{74} + x^{73} + x^{70} + x^{62} + x^{61} + x^{59} + x^{57} + x^{55} + x^{54} + x^{53} + x^{51} + x^{49} + x^{47} + x^{45} + x^{43} + x^{42} + x^{40} + x^{39} + x^{37} + x^{36} + x^{33} + x^{32} + x^{31} + x^{30} + x^{21} + x^{19} + x^{18} + x^{16} + x^{15} + x^{14} + x^{13} + x^{11} + x^{9} + x^{8},$$

$$p_{6}(x) = x^{146} + x^{143} + x^{139} + x^{136} + x^{133} + x^{132} + x^{130} + x^{129} + x^{126} + x^{125} + x^{123} + x^{121} + x^{120} + x^{119} + x^{117} + x^{116} + x^{113} + x^{112} + x^{111} + x^{109} + x^{108} + x^{105} + x^{102} + x^{101} + x^{100} + x^{97} + x^{96} + x^{95} + x^{92} + x^{88} + x^{87} + x^{85} + x^{84} + x^{79} + x^{78} + x^{77} + x^{75} + x^{74} + x^{73} + x^{72} + x^{68} + x^{66} + x^{65} + x^{63} + x^{61} + x^{58} + x^{56} + x^{55} + x^{52} + x^{50} + x^{48} + x^{44} + x^{43} + x^{41} + x^{40} + x^{37} + x^{35} + x^{33} + x^{32} + x^{31} + x^{30} + x^{28} + x^{26} + x^{25} + x^{24} + x^{21} + x^{19} + x^{14} + x^{10} + x^{8} + x^{7} + x^{5} + x^{4} + x^{2} + x + 1,$$

$$p_{9}(x) = x^{146} + x^{145} + x^{144} + x^{142} + x^{141} + x^{140} + x^{138} + x^{137} + x^{136} + x^{134}$$

$$
\begin{aligned}
&+x^{133}+x^{132}+x^{126}+x^{125}+x^{124}+x^{122}+x^{121}+x^{120}+x^{114}\\
&+x^{113}+x^{112}+x^{102}+x^{101}+x^{100}+x^{98}+x^{97}+x^{96}+x^{94}+x^{93}\\
&+x^{92}+x^{90}+x^{89}+x^{88}+x^{86}+x^{85}+x^{84}+x^{78}+x^{77}+x^{76}+x^{74}\\
&+x^{73}+x^{72}+x^{66}+x^{65}+x^{64}+x^{54}+x^{53}+x^{52}+x^{34}+x^{33}+x^{32}\\
&+x^{30}+x^{29}+x^{28}+x^{26}+x^{25}+x^{24}+x^{22}+x^{21}+x^{20}+x^{18}+x^{17}\\
&+x^{16}+x^{6}+x^{5}+x^{4},\\
p_{12}(x)={}&x^{146}+x^{145}+x^{144}+x^{138}+x^{137}+x^{136}+x^{134}+x^{133}+x^{132}+x^{130}\\
&+x^{129}+x^{128}+x^{126}+x^{125}+x^{124}+x^{122}+x^{121}+x^{120}+x^{114}\\
&+x^{113}+x^{112}+x^{110}+x^{109}+x^{108}+x^{102}+x^{101}+x^{100}+x^{90}+x^{89}\\
&+x^{88}+x^{86}+x^{85}+x^{84}+x^{82}+x^{81}+x^{80}+x^{78}+x^{77}+x^{76}+x^{74}\\
&+x^{73}+x^{72}+x^{66}+x^{65}+x^{64}+x^{62}+x^{61}+x^{60}+x^{54}+x^{53}+x^{52}\\
&+x^{50}+x^{49}+x^{48}+x^{34}+x^{33}+x^{32}+x^{26}+x^{25}+x^{24}+x^{22}+x^{21}\\
&+x^{20}+x^{14}+x^{13}+x^{12}+x^{6}+x^{5}+x^{4}+x^{2}+x+1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_{0}(x)={}&x^{162}+x^{161}+x^{160}+x^{158}+x^{157}+x^{155}+x^{154}+x^{153}+x^{148}+x^{146}\\
&+x^{144}+x^{143}+x^{140}+x^{139}+x^{134}+x^{133}+x^{130}+x^{129}+x^{125}\\
&+x^{124}+x^{123}+x^{122}+x^{121}+x^{119}+x^{118}+x^{117}+x^{116}+x^{115}\\
&+x^{112}+x^{106}+x^{105}+x^{104}+x^{97}+x^{94}+x^{93}+x^{92}+x^{86}+x^{83}\\
&+x^{81}+x^{78}+x^{77}+x^{76}+x^{74}+x^{71}+x^{69}+x^{67}+x^{62}+x^{61}+x^{60}\\
&+x^{59}+x^{58}+x^{56}+x^{55}+x^{51}+x^{50}+x^{49}+x^{44}+x^{42}+x^{36}+x^{35}\\
&+x^{30}+x^{28}+x^{27},\\
p_{3}(x)={}&x^{161}+x^{160}+x^{159}+x^{157}+x^{155}+x^{154}+x^{148}+x^{147}+x^{144}+x^{142}\\
&+x^{141}+x^{139}+x^{138}+x^{136}+x^{135}+x^{133}+x^{132}+x^{130}+x^{129}\\
&+x^{127}+x^{126}+x^{124}+x^{123}+x^{119}+x^{118}+x^{113}+x^{105}+x^{104}\\
&+x^{103}+x^{101}+x^{99}+x^{98}+x^{97}+x^{96}+x^{95}+x^{93}+x^{92}+x^{90}+x^{88}\\
&+x^{86}+x^{85}+x^{84}+x^{82}+x^{81}+x^{80}+x^{78}+x^{77}+x^{76}+x^{74}+x^{73}\\
&+x^{72}+x^{70}+x^{69}+x^{68}+x^{66}+x^{63}+x^{62}+x^{60}+x^{59}+x^{55}+x^{54}\\
&+x^{48}+x^{47}+x^{45}+x^{43}+x^{42}+x^{36}+x^{35}+x^{32}+x^{30}+x^{29}+x^{27}\\
&+x^{26}+x^{25}+x^{20}+x^{19}+x^{17}+x^{15}+x^{14}+x^{9},\\
p_{6}(x)={}&x^{162}+x^{160}+x^{156}+x^{154}+x^{152}+x^{150}+x^{148}+x^{144}+x^{128}+x^{118}\\
&+x^{110}+x^{108}+x^{104}+x^{96}+x^{90}+x^{86}+x^{84}+x^{78}+x^{76}+x^{74}+x^{72}\\
&+x^{70}+x^{68}+x^{62}+x^{60}+x^{58}+x^{48}+x^{44}+x^{42}+x^{40}+x^{30}+x^{28}\\
&+x^{22}+x^{20}+x^{18}+x^{16}+x^{10}+x^{6},\\
p_{9}(x)={}&x^{163}+x^{162}+x^{160}+x^{159}+x^{158}+x^{157}+x^{156}+x^{154}+x^{151}+x^{150}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{149} + x^{147} + x^{146} + x^{145} + x^{144} + x^{143} + x^{142} + x^{137} + x^{136} \\
&+ x^{130} + x^{128} + x^{127} + x^{126} + x^{125} + x^{124} + x^{122} + x^{119} + x^{118} \\
&+ x^{117} + x^{113} + x^{109} + x^{108} + x^{106} + x^{105} + x^{104} + x^{103} + x^{102} \\
&+ x^{101} + x^{98} + x^{97} + x^{96} + x^{95} + x^{94} + x^{89} + x^{88} + x^{82} + x^{80} + x^{79} \\
&+ x^{78} + x^{77} + x^{76} + x^{74} + x^{71} + x^{70} + x^{69} + x^{67} + x^{66} + x^{65} + x^{64} \\
&+ x^{63} + x^{62} + x^{57} + x^{56} + x^{50} + x^{48} + x^{47} + x^{46} + x^{45} + x^{44} + x^{42} \\
&+ x^{39} + x^{38} + x^{37} + x^{33} + x^{29} + x^{28} + x^{26} + x^{25} + x^{24} + x^{23} + x^{22} \\
&+ x^{21} + x^{18} + x^{17} + x^{16} + x^{15} + x^{14} + x^{9} + x^{8} + x^{3}, \\
p_{12}(x) &= x^{164} + x^{140} + x^{136} + x^{128} + x^{116} + x^{108} + x^{104} + x^{100} + x^{96} + x^{92} \\
&+ x^{88} + x^{80} + x^{60} + x^{56} + x^{48} + x^{36} + x^{28} + x^{24} + x^{20} + x^{16} + x^{12} \\
&+ x^{8} + x^{4} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{144} + x^{141} + x^{139} + x^{137} + x^{136} + x^{133} + x^{132} + x^{131} + x^{128} + x^{126} \\
&+ x^{124} + x^{121} + x^{120} + x^{119} + x^{118} + x^{113} + x^{112} + x^{110} + x^{106} \\
&+ x^{104} + x^{103} + x^{102} + x^{101} + x^{100} + x^{98} + x^{97} + x^{95} + x^{94} + x^{93} \\
&+ x^{91} + x^{90} + x^{88} + x^{86} + x^{85} + x^{83} + x^{79} + x^{78} + x^{76} + x^{75} + x^{74} \\
&+ x^{73} + x^{72} + x^{71} + x^{69} + x^{68} + x^{67} + x^{66} + x^{64} + x^{60} + x^{56} + x^{54} \\
&+ x^{51} + x^{50} + x^{47} + x^{40} + x^{39} + x^{38} + x^{36} + x^{35} + x^{33} + x^{29} + x^{26} \\
&+ x^{24} + x^{23} + x^{22} + x^{21} + x^{20} + x^{18}, \\
p_3(x) &= x^{137} + x^{136} + x^{135} + x^{132} + x^{130} + x^{129} + x^{127} + x^{126} + x^{125} + x^{121} \\
&+ x^{113} + x^{112} + x^{111} + x^{108} + x^{106} + x^{105} + x^{103} + x^{102} + x^{101} \\
&+ x^{96} + x^{95} + x^{92} + x^{90} + x^{89} + x^{87} + x^{86} + x^{85} + x^{81} + x^{73} + x^{72} \\
&+ x^{71} + x^{68} + x^{66} + x^{64} + x^{62} + x^{61} + x^{60} + x^{58} + x^{55} + x^{54} + x^{53} \\
&+ x^{49} + x^{25} + x^{24} + x^{23} + x^{20} + x^{18} + x^{17} + x^{15} + x^{14} + x^{13} + x^{9}, \\
p_6(x) &= x^{138} + x^{136} + x^{134} + x^{130} + x^{126} + x^{124} + x^{122} + x^{120} + x^{116} + x^{112} \\
&+ x^{110} + x^{108} + x^{104} + x^{102} + x^{100} + x^{96} + x^{94} + x^{92} + x^{88} + x^{82} \\
&+ x^{80} + x^{78} + x^{74} + x^{72} + x^{70} + x^{68} + x^{60} + x^{58} + x^{56} + x^{54} + x^{52} \\
&+ x^{50} + x^{48} + x^{44} + x^{38} + x^{36} + x^{34} + x^{24} + x^{22} + x^{16} + x^{14} + x^{6}, \\
p_9(x) &= x^{139} + x^{138} + x^{136} + x^{133} + x^{131} + x^{129} + x^{128} + x^{126} + x^{125} + x^{124} \\
&+ x^{123} + x^{122} + x^{121} + x^{119} + x^{117} + x^{113} + x^{112} + x^{110} + x^{109} \\
&+ x^{108} + x^{105} + x^{104} + x^{103} + x^{99} + x^{91} + x^{90} + x^{88} + x^{85} + x^{83} \\
&+ x^{81} + x^{80} + x^{78} + x^{77} + x^{76} + x^{75} + x^{74} + x^{73} + x^{71} + x^{69} + x^{65} \\
&+ x^{64} + x^{62} + x^{61} + x^{60} + x^{57} + x^{56} + x^{55} + x^{51} + x^{27} + x^{26} + x^{24} \\
&+ x^{21} + x^{19} + x^{17} + x^{16} + x^{14} + x^{13} + x^{12} + x^{9} + x^{8} + x^{7} + x^{3},
\end{aligned}
$$

$$\begin{aligned}p_{12}(x) &= x^{140}+x^{136}+x^{128}+x^{120}+x^{108}+x^{96}+x^{92}+x^{88}+x^{80}+x^{72}+x^{60}\\ &\quad +x^{48}+x^{28}+x^{24}+x^{16}+x^{12}+1,\end{aligned}$$

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

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

$$\begin{aligned}p_0(x) &= x^{147}+x^{145}+x^{143}+x^{142}+x^{141}+x^{140}+x^{138}+x^{136}+x^{135}+x^{132}\\ &\quad +x^{131}+x^{127}+x^{126}+x^{125}+x^{120}+x^{119}+x^{118}+x^{114}+x^{110}\\ &\quad +x^{109}+x^{108}+x^{107}+x^{105}+x^{104}+x^{102}+x^{100}+x^{97}+x^{95}+x^{94}\\ &\quad +x^{93}+x^{92}+x^{90}+x^{89}+x^{88}+x^{87}+x^{83}+x^{78}+x^{77}+x^{76}+x^{75}\\ &\quad +x^{73}+x^{70}+x^{69}+x^{66}+x^{64}+x^{63}+x^{60}+x^{59}+x^{58}+x^{57}+x^{55}\\ &\quad +x^{52}+x^{48}+x^{46}+x^{44}+x^{42}+x^{38}+x^{36}+x^{33},\\ p_3(x) &= x^{146}+x^{144}+x^{142}+x^{141}+x^{139}+x^{137}+x^{135}+x^{134}+x^{133}+x^{132}\\ &\quad +x^{130}+x^{129}+x^{127}+x^{126}+x^{125}+x^{124}+x^{122}+x^{119}+x^{118}\\ &\quad +x^{114}+x^{113}+x^{111}+x^{110}+x^{109}+x^{107}+x^{104}+x^{102}+x^{96}+x^{95}\\ &\quad +x^{85}+x^{83}+x^{82}+x^{81}+x^{73}+x^{72}+x^{71}+x^{66}+x^{65}+x^{64}+x^{62}\\ &\quad +x^{61}+x^{59}+x^{57}+x^{55}+x^{54}+x^{53}+x^{52}+x^{48}+x^{47}+x^{45}+x^{43}\\ &\quad +x^{42}+x^{40}+x^{39}+x^{37}+x^{36}+x^{33}+x^{28}+x^{27}+x^{26}+x^{21}+x^{20}\\ &\quad +x^{18}+x^{17}+x^{15}+x^{14}+x^{13}+x^{12},\\ p_6(x) &= x^{146}+x^{144}+x^{142}+x^{139}+x^{136}+x^{133}+x^{132}+x^{128}+x^{122}+x^{121}\\ &\quad +x^{120}+x^{119}+x^{118}+x^{116}+x^{115}+x^{114}+x^{113}+x^{110}+x^{109}\\ &\quad +x^{107}+x^{106}+x^{105}+x^{104}+x^{103}+x^{101}+x^{99}+x^{98}+x^{97}+x^{94}\\ &\quad +x^{92}+x^{86}+x^{85}+x^{84}+x^{79}+x^{76}+x^{75}+x^{72}+x^{71}+x^{69}+x^{62}\\ &\quad +x^{61}+x^{57}+x^{55}+x^{54}+x^{53}+x^{52}+x^{51}+x^{48}+x^{42}+x^{41}+x^{40}\\ &\quad +x^{37}+x^{36}+x^{31}+x^{29}+x^{28}+x^{27}+x^{26}+x^{24}+x^{23}+x^{22}+x^{21}\\ &\quad +x^{20}+x^{17}+x^{15}+x^{14}+x^{13}+x^{11}+x^{10}+x^{9}+x^{8}+x^{2}+x+1,\\ p_9(x) &= x^{146}+x^{145}+x^{144}+x^{142}+x^{141}+x^{140}+x^{138}+x^{137}+x^{136}+x^{134}\\ &\quad +x^{133}+x^{132}+x^{126}+x^{125}+x^{124}+x^{122}+x^{121}+x^{120}+x^{114}\\ &\quad +x^{113}+x^{112}+x^{102}+x^{101}+x^{100}+x^{98}+x^{97}+x^{96}+x^{94}+x^{93}\\ &\quad +x^{92}+x^{90}+x^{89}+x^{88}+x^{86}+x^{85}+x^{84}+x^{78}+x^{77}+x^{76}+x^{74}\\ &\quad +x^{73}+x^{72}+x^{66}+x^{65}+x^{64}+x^{54}+x^{53}+x^{52}+x^{34}+x^{33}+x^{32}\\ &\quad +x^{30}+x^{29}+x^{28}+x^{26}+x^{25}+x^{24}+x^{22}+x^{21}+x^{20}+x^{18}+x^{17}\\ &\quad +x^{16}+x^{6}+x^{5}+x^{4},\\ p_{12}(x) &= x^{146}+x^{145}+x^{144}+x^{138}+x^{137}+x^{136}+x^{134}+x^{133}+x^{132}+x^{130}\\ &\quad +x^{129}+x^{128}+x^{126}+x^{125}+x^{124}+x^{122}+x^{121}+x^{120}+x^{114}\\ &\quad +x^{113}+x^{112}+x^{110}+x^{109}+x^{108}+x^{102}+x^{101}+x^{100}+x^{90}+x^{89}\\ &\quad +x^{88}+x^{86}+x^{85}+x^{84}+x^{82}+x^{81}+x^{80}+x^{78}+x^{77}+x^{76}+x^{74}\end{aligned}$$

$$+ x^{73} + x^{72} + x^{66} + x^{65} + x^{64} + x^{62} + x^{61} + x^{60} + x^{54} + x^{53} + x^{52}$$
$$+ x^{50} + x^{49} + x^{48} + x^{34} + x^{33} + x^{32} + x^{26} + x^{25} + x^{24} + x^{22} + x^{21}$$
$$+ x^{20} + x^{14} + x^{13} + x^{12} + x^{6} + x^{5} + x^{4} + x^{2} + x + 1,$$

and the initial terms are [0, 0, 0, 0, 0, 0, 0, 1, 1, 1, 0, 0, 0, 1, 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]	640	[1025, 1026]	1280	[1646, 1647]	1920	[2129, 2130]
1	[3, 4]	641	[1027, 1028]	1281	[990, 1648]	1921	[2131, 901]
2	[5, 6]	642	[1029, 1030]	1282	[1649, 427]	1922	[2132, 434]
3	[7, 8]	643	[1031, 373]	1283	[1650, 1651]	1923	[1006, 374]
4	[9, 10]	644	[1032, 1033]	1284	[1652, 1538]	1924	[2133, 2134]
5	[11, 12]	645	[1034, 1035]	1285	[1653, 1075]	1925	[1507, 2135]
6	[13, 14]	646	[321, 1036]	1286	[1654, 1655]	1926	[856, 2136]
7	[15, 16]	647	[1037, 999]	1287	[1656, 742]	1927	[815, 293]
8	[17, 18]	648	[920, 1038]	1288	[113, 1657]	1928	[2137, 2138]
9	[19, 20]	649	[733, 1039]	1289	[1658, 409]	1929	[2139, 940]
10	[21, 22]	650	[1040, 1041]	1290	[1659, 1660]	1930	[2140, 1543]
11	[23, 24]	651	[1042, 116]	1291	[1661, 1141]	1931	[1777, 318]
12	[25, 26]	652	[1043, 1044]	1292	[751, 1662]	1932	[2141, 368]
13	[27, 28]	653	[1045, 1046]	1293	[1663, 1664]	1933	[2142, 1711]
14	[29, 30]	654	[1047, 1048]	1294	[1665, 1666]	1934	[2143, 2144]
15	[31, 32]	655	[1049, 964]	1295	[1035, 1076]	1935	[2145, 968]
16	[33, 32]	656	[1050, 1051]	1296	[1667, 303]	1936	[2146, 2147]
17	[34, 35]	657	[1052, 1053]	1297	[943, 1635]	1937	[2148, 782]
18	[36, 37]	658	[1054, 1055]	1298	[913, 1668]	1938	[2149, 978]
19	[38, 39]	659	[1056, 1057]	1299	[808, 1007]	1939	[2150, 1506]
20	[40, 41]	660	[1058, 1059]	1300	[1669, 1054]	1940	[2151, 2152]
21	[42, 43]	661	[1060, 1061]	1301	[1670, 987]	1941	[2153, 1773]
22	[44, 45]	662	[812, 1062]	1302	[1671, 340]	1942	[1008, 2128]
23	[46, 47]	663	[1063, 727]	1303	[1672, 15]	1943	[2154, 1479]
24	[48, 49]	664	[16, 953]	1304	[1673, 822]	1944	[2155, 786]
25	[50, 51]	665	[1064, 1065]	1305	[1674, 342]	1945	[2156, 1074]
26	[52, 53]	666	[1066, 1067]	1306	[1675, 1676]	1946	[771, 15]
27	[54, 55]	667	[1067, 1068]	1307	[1677, 726]	1947	[2157, 1111]
28	[56, 57]	668	[1065, 1069]	1308	[1678, 1679]	1948	[2158, 1756]
29	[58, 59]	669	[1070, 1071]	1309	[1680, 1681]	1949	[2159, 1868]
30	[60, 61]	670	[1072, 1073]	1310	[1682, 1683]	1950	[2160, 351]
31	[62, 63]	671	[1074, 1075]	1311	[994, 950]	1951	[1800, 1535]
32	[64, 65]	672	[1076, 1077]	1312	[1684, 1685]	1952	[2161, 275]
33	[66, 67]	673	[1078, 1079]	1313	[416, 1066]	1953	[2162, 422]
34	[68, 69]	674	[1080, 1010]	1314	[909, 1686]	1954	[2163, 2164]

35	[70, 71]	675	[979, 74]	1315	[1687, 388]	1955	[2165, 2166]
36	[72, 73]	676	[1081, 1025]	1316	[1688, 1689]	1956	[2167, 395]
37	[74, 75]	677	[1082, 1083]	1317	[261, 776]	1957	[2168, 2169]
38	[76, 77]	678	[392, 1084]	1318	[1690, 1616]	1958	[2170, 2171]
39	[78, 79]	679	[1085, 937]	1319	[1691, 1686]	1959	[2172, 22]
40	[80, 81]	680	[1086, 1087]	1320	[1569, 1692]	1960	[2173, 897]
41	[63, 82]	681	[828, 1088]	1321	[1693, 1588]	1961	[818, 1057]
42	[83, 84]	682	[1089, 804]	1322	[1694, 834]	1962	[314, 80]
43	[85, 86]	683	[1069, 967]	1323	[1695, 1696]	1963	[2174, 1496]
44	[87, 88]	684	[1090, 1091]	1324	[1697, 1698]	1964	[2175, 861]
45	[89, 90]	685	[1092, 1093]	1325	[1699, 966]	1965	[2176, 878]
46	[91, 92]	686	[1094, 1095]	1326	[1700, 1060]	1966	[2177, 1821]
47	[93, 94]	687	[1096, 1060]	1327	[1504, 1701]	1967	[2178, 2135]
48	[95, 96]	688	[1097, 1098]	1328	[1702, 1123]	1968	[2179, 2180]
49	[97, 98]	689	[1011, 361]	1329	[1703, 1617]	1969	[346, 2181]
50	[99, 100]	690	[1099, 1100]	1330	[24, 1487]	1970	[2182, 868]
51	[101, 102]	691	[1101, 1102]	1331	[289, 1704]	1971	[2183, 2112]
52	[103, 104]	692	[297, 251]	1332	[1705, 861]	1972	[837, 762]
53	[105, 106]	693	[1103, 1104]	1333	[1664, 1706]	1973	[2184, 1866]
54	[107, 108]	694	[904, 1105]	1334	[1707, 405]	1974	[2185, 849]
55	[109, 110]	695	[1106, 1107]	1335	[1708, 4]	1975	[2186, 1068]
56	[111, 112]	696	[1108, 296]	1336	[1709, 1710]	1976	[1817, 993]
57	[79, 113]	697	[1109, 1110]	1337	[265, 1711]	1977	[1763, 983]
58	[114, 115]	698	[69, 1111]	1338	[1038, 97]	1978	[2187, 2188]
59	[116, 117]	699	[71, 1112]	1339	[1712, 848]	1979	[759, 894]
60	[118, 119]	700	[1113, 726]	1340	[1713, 834]	1980	[2189, 1097]
61	[120, 121]	701	[1114, 1115]	1341	[1714, 381]	1981	[2190, 858]
62	[122, 123]	702	[1022, 1116]	1342	[1715, 1716]	1982	[2191, 2192]
63	[124, 125]	703	[1117, 1118]	1343	[1717, 303]	1983	[2193, 1709]
64	[126, 127]	704	[923, 1119]	1344	[1718, 1719]	1984	[2194, 100]
65	[128, 129]	705	[1120, 1121]	1345	[1720, 963]	1985	[1498, 1024]
66	[130, 131]	706	[1122, 877]	1346	[1721, 1526]	1986	[2195, 2196]
67	[132, 133]	707	[1123, 1124]	1347	[1722, 1723]	1987	[2197, 265]
68	[134, 135]	708	[1125, 386]	1348	[1724, 1725]	1988	[2198, 2199]
69	[136, 137]	709	[984, 339]	1349	[81, 1726]	1989	[2200, 894]
70	[138, 139]	710	[1126, 1127]	1350	[1727, 1728]	1990	[2201, 1839]
71	[140, 141]	711	[999, 1128]	1351	[1729, 865]	1991	[2202, 2203]
72	[142, 143]	712	[1129, 108]	1352	[1730, 361]	1992	[438, 284]
73	[144, 145]	713	[393, 1130]	1353	[870, 1731]	1993	[2204, 1511]
74	[146, 147]	714	[115, 1131]	1354	[1732, 1733]	1994	[2205, 2171]
75	[148, 149]	715	[1132, 1133]	1355	[797, 92]	1995	[2206, 291]
76	[150, 151]	716	[1134, 1135]	1356	[1734, 1735]	1996	[2207, 1109]
77	[152, 153]	717	[911, 1136]	1357	[1601, 1736]	1997	[2208, 786]
78	[154, 155]	718	[1137, 766]	1358	[876, 425]	1998	[2209, 2095]

79	[156, 157]	719	[1138, 1066]	1359	[1737, 29]	1999	[1626, 737]
80	[158, 159]	720	[1139, 1140]	1360	[1738, 1739]	2000	[2210, 901]
81	[160, 161]	721	[1141, 1142]	1361	[1740, 1741]	2001	[2211, 1694]
82	[123, 162]	722	[788, 1143]	1362	[1742, 747]	2002	[2212, 2181]
83	[163, 164]	723	[1144, 240]	1363	[1743, 923]	2003	[2213, 400]
84	[165, 166]	724	[1145, 855]	1364	[1744, 1745]	2004	[2214, 1832]
85	[167, 168]	725	[1146, 1147]	1365	[1746, 1747]	2005	[2215, 831]
86	[169, 170]	726	[1148, 629]	1366	[1748, 302]	2006	[2216, 948]
87	[171, 172]	727	[1149, 1150]	1367	[1749, 965]	2007	[2217, 928]
88	[173, 128]	728	[1151, 659]	1368	[1750, 1751]	2008	[2218, 107]
89	[174, 175]	729	[1152, 1153]	1369	[90, 1547]	2009	[1585, 897]
90	[176, 177]	730	[620, 1154]	1370	[1716, 815]	2010	[2219, 773]
91	[178, 143]	731	[1155, 216]	1371	[1752, 21]	2011	[2220, 1591]
92	[179, 180]	732	[1156, 1157]	1372	[1753, 1474]	2012	[2221, 845]
93	[181, 182]	733	[629, 630]	1373	[1754, 1755]	2013	[2222, 2223]
94	[183, 184]	734	[1158, 693]	1374	[1756, 853]	2014	[2223, 120]
95	[185, 186]	735	[1159, 1160]	1375	[1757, 1758]	2015	[1068, 2102]
96	[187, 188]	736	[1161, 1162]	1376	[1759, 1760]	2016	[2224, 264]
97	[189, 190]	737	[1163, 40]	1377	[1761, 1762]	2017	[2225, 330]
98	[191, 192]	738	[1164, 564]	1378	[325, 1763]	2018	[2226, 285]
99	[193, 194]	739	[580, 450]	1379	[1764, 768]	2019	[2227, 333]
100	[195, 196]	740	[1165, 1166]	1380	[1765, 1766]	2020	[2228, 306]
101	[197, 198]	741	[1167, 461]	1381	[1733, 1767]	2021	[82, 864]
102	[199, 200]	742	[1168, 1169]	1382	[1768, 1769]	2022	[2229, 2230]
103	[201, 202]	743	[484, 1170]	1383	[1770, 1771]	2023	[2231, 1592]
104	[203, 204]	744	[1171, 1172]	1384	[1772, 1773]	2024	[2232, 1059]
105	[205, 206]	745	[470, 541]	1385	[887, 1774]	2025	[2233, 1108]
106	[207, 208]	746	[35, 698]	1386	[1775, 1506]	2026	[1527, 2140]
107	[209, 210]	747	[1173, 1174]	1387	[1776, 1474]	2027	[2234, 301]
108	[211, 212]	748	[1169, 1175]	1388	[1084, 1777]	2028	[880, 940]
109	[213, 214]	749	[1176, 1177]	1389	[1778, 1779]	2029	[2235, 1598]
110	[215, 216]	750	[1178, 615]	1390	[1780, 1010]	2030	[2136, 2236]
111	[217, 218]	751	[595, 597]	1391	[1781, 80]	2031	[1731, 971]
112	[219, 126]	752	[1179, 639]	1392	[1782, 1573]	2032	[2237, 299]
113	[220, 221]	753	[1180, 14]	1393	[1619, 1594]	2033	[2238, 1584]
114	[222, 223]	754	[1181, 451]	1394	[1783, 1784]	2034	[1686, 1579]
115	[224, 225]	755	[218, 480]	1395	[1589, 1123]	2035	[2239, 2240]
116	[226, 227]	756	[1182, 1183]	1396	[1046, 1785]	2036	[1071, 773]
117	[188, 228]	757	[1184, 1185]	1397	[1786, 1787]	2037	[2241, 1723]
118	[229, 230]	758	[1186, 1187]	1398	[1788, 1789]	2038	[2242, 2243]
119	[231, 194]	759	[597, 594]	1399	[824, 1790]	2039	[2244, 2245]
120	[232, 233]	760	[1188, 1189]	1400	[1791, 787]	2040	[2246, 271]
121	[234, 234]	761	[1190, 1191]	1401	[1792, 1100]	2041	[2247, 1716]
122	[235, 236]	762	[1192, 1193]	1402	[1488, 1793]	2042	[2199, 286]

123	[237, 16]	763	[568, 609]	1403	[336, 877]	2043	[2248, 882]
124	[238, 239]	764	[1194, 1195]	1404	[1794, 1795]	2044	[2249, 2250]
125	[240, 241]	765	[1196, 160]	1405	[1796, 1797]	2045	[1807, 1503]
126	[242, 243]	766	[14, 623]	1406	[1798, 868]	2046	[342, 758]
127	[244, 245]	767	[522, 649]	1407	[731, 1771]	2047	[2251, 1109]
128	[246, 247]	768	[168, 617]	1408	[1799, 1800]	2048	[2252, 2174]
129	[248, 249]	769	[135, 661]	1409	[1801, 104]	2049	[2253, 351]
130	[250, 251]	770	[198, 1171]	1410	[1802, 244]	2050	[2254, 1508]
131	[252, 253]	771	[198, 39]	1411	[1803, 812]	2051	[2255, 1112]
132	[254, 255]	772	[1182, 1197]	1412	[1804, 1805]	2052	[2256, 1714]
133	[256, 257]	773	[1198, 1199]	1413	[1143, 1494]	2053	[2257, 1569]
134	[258, 259]	774	[180, 599]	1414	[1806, 1807]	2054	[2258, 334]
135	[260, 261]	775	[1200, 528]	1415	[892, 1531]	2055	[2259, 1092]
136	[262, 263]	776	[188, 1201]	1416	[1808, 267]	2056	[1026, 1500]
137	[264, 265]	777	[1202, 1178]	1417	[1809, 747]	2057	[780, 855]
138	[266, 267]	778	[1186, 1203]	1418	[1810, 273]	2058	[2115, 1619]
139	[268, 269]	779	[634, 1204]	1419	[1811, 1767]	2059	[2260, 1533]
140	[270, 271]	780	[591, 59]	1420	[1812, 1813]	2060	[324, 269]
141	[272, 273]	781	[185, 1205]	1421	[1814, 1732]	2061	[2261, 2262]
142	[274, 275]	782	[1206, 463]	1422	[1774, 394]	2062	[2263, 882]
143	[276, 277]	783	[1207, 9]	1423	[767, 263]	2063	[2264, 28]
144	[278, 279]	784	[1208, 659]	1424	[1815, 969]	2064	[2265, 270]
145	[280, 281]	785	[1209, 1210]	1425	[1580, 1592]	2065	[2266, 437]
146	[282, 283]	786	[1211, 552]	1426	[1816, 1817]	2066	[2267, 2192]
147	[284, 285]	787	[39, 1172]	1427	[1509, 1526]	2067	[2268, 2269]
148	[286, 287]	788	[659, 45]	1428	[1818, 1535]	2068	[2270, 1775]
149	[288, 289]	789	[1212, 1213]	1429	[1819, 1820]	2069	[2271, 783]
150	[290, 291]	790	[587, 1213]	1430	[1821, 1141]	2070	[2272, 2273]
151	[292, 293]	791	[1148, 573]	1431	[1822, 1823]	2071	[2274, 1772]
152	[294, 295]	792	[1214, 1215]	1432	[1824, 1568]	2072	[2275, 1071]
153	[296, 297]	793	[1216, 1217]	1433	[1825, 1679]	2073	[2276, 589]
154	[298, 259]	794	[1218, 1219]	1434	[1826, 343]	2074	[2277, 2278]
155	[299, 300]	795	[1220, 1221]	1435	[1827, 1828]	2075	[2279, 57]
156	[301, 302]	796	[1222, 1203]	1436	[1077, 1829]	2076	[229, 1177]
157	[303, 304]	797	[1223, 234]	1437	[401, 1735]	2077	[1874, 469]
158	[305, 306]	798	[612, 1224]	1438	[1830, 1831]	2078	[2280, 1929]
159	[112, 307]	799	[1150, 1225]	1439	[1785, 1832]	2079	[1960, 1191]
160	[308, 309]	800	[1226, 1227]	1440	[1833, 120]	2080	[2281, 174]
161	[310, 311]	801	[1228, 1229]	1441	[1834, 1761]	2081	[2282, 151]
162	[236, 312]	802	[1230, 1231]	1442	[1835, 440]	2082	[567, 225]
163	[313, 314]	803	[206, 1232]	1443	[1836, 1837]	2083	[2283, 711]
164	[315, 316]	804	[1233, 688]	1444	[1838, 1839]	2084	[1411, 1246]
165	[317, 318]	805	[1234, 453]	1445	[1840, 1633]	2085	[2284, 2285]
166	[255, 319]	806	[1235, 32]	1446	[1841, 284]	2086	[1942, 713]

167	[320, 321]	807	[1208, 44]	1447	[1842, 1843]	2087	[2017, 1454]
168	[322, 280]	808	[674, 500]	1448	[1844, 1624]	2088	[2286, 1971]
169	[323, 324]	809	[1168, 1150]	1449	[1845, 1693]	2089	[1387, 625]
170	[88, 325]	810	[1236, 228]	1450	[1846, 1093]	2090	[1974, 724]
171	[326, 327]	811	[1237, 478]	1451	[1847, 1848]	2091	[559, 1368]
172	[328, 329]	812	[565, 532]	1452	[1849, 1850]	2092	[2011, 135]
173	[102, 330]	813	[724, 502]	1453	[1002, 909]	2093	[2287, 1412]
174	[331, 332]	814	[1238, 1162]	1454	[1851, 1852]	2094	[2288, 580]
175	[333, 334]	815	[1239, 484]	1455	[1853, 1854]	2095	[2289, 1175]
176	[335, 336]	816	[1195, 611]	1456	[1855, 961]	2096	[1304, 129]
177	[337, 338]	817	[1240, 644]	1457	[1856, 1078]	2097	[1367, 560]
178	[339, 340]	818	[605, 535]	1458	[20, 1857]	2098	[2290, 1319]
179	[341, 342]	819	[616, 663]	1459	[1858, 1859]	2099	[225, 1915]
180	[343, 344]	820	[1241, 1242]	1460	[1860, 1520]	2100	[1319, 474]
181	[345, 346]	821	[1243, 176]	1461	[1861, 1078]	2101	[2287, 1246]
182	[347, 348]	822	[1244, 510]	1462	[1762, 1144]	2102	[2005, 1295]
183	[349, 350]	823	[1245, 1246]	1463	[1862, 1863]	2103	[45, 170]
184	[351, 352]	824	[1247, 1229]	1464	[835, 308]	2104	[1257, 225]
185	[353, 116]	825	[1248, 706]	1465	[1864, 1858]	2105	[2291, 1978]
186	[354, 355]	826	[678, 713]	1466	[1865, 1866]	2106	[2292, 2293]
187	[356, 357]	827	[154, 688]	1467	[1867, 19]	2107	[2294, 133]
188	[358, 242]	828	[1249, 1250]	1468	[1790, 1868]	2108	[565, 128]
189	[359, 360]	829	[1251, 1252]	1469	[122, 490]	2109	[2295, 590]
190	[361, 362]	830	[1253, 1229]	1470	[150, 663]	2110	[1970, 1255]
191	[363, 364]	831	[448, 678]	1471	[1436, 184]	2111	[1245, 1412]
192	[365, 366]	832	[722, 721]	1472	[1869, 176]	2112	[2296, 1893]
193	[241, 367]	833	[1254, 1255]	1473	[1870, 1871]	2113	[2034, 686]
194	[368, 369]	834	[1166, 698]	1474	[662, 671]	2114	[517, 549]
195	[370, 371]	835	[123, 491]	1475	[502, 673]	2115	[2297, 1894]
196	[372, 373]	836	[1256, 576]	1476	[1872, 600]	2116	[2298, 1368]
197	[374, 375]	837	[1257, 568]	1477	[1192, 1436]	2117	[2299, 2300]
198	[376, 377]	838	[484, 551]	1478	[1181, 157]	2118	[1921, 563]
199	[378, 379]	839	[1258, 656]	1479	[1873, 190]	2119	[2301, 583]
200	[110, 380]	840	[1231, 566]	1480	[1874, 1875]	2120	[126, 216]
201	[381, 382]	841	[1259, 1260]	1481	[1876, 1190]	2121	[1300, 1928]
202	[383, 384]	842	[546, 53]	1482	[1356, 1160]	2122	[1195, 565]
203	[385, 74]	843	[1261, 533]	1483	[1877, 224]	2123	[1363, 585]
204	[386, 387]	844	[1262, 1246]	1484	[1878, 721]	2124	[2302, 48]
205	[388, 389]	845	[1263, 594]	1485	[1879, 1880]	2125	[1381, 682]
206	[390, 391]	846	[9, 160]	1486	[658, 562]	2126	[13, 622]
207	[309, 392]	847	[1264, 553]	1487	[502, 516]	2127	[2303, 563]
208	[4, 393]	848	[1265, 510]	1488	[1166, 510]	2128	[2304, 609]
209	[394, 395]	849	[1215, 175]	1489	[1881, 1882]	2129	[1449, 566]
210	[396, 397]	850	[1266, 224]	1490	[1883, 1884]	2130	[2305, 673]

211	[398, 399]	851	[1267, 469]	1491	[211, 615]	2131	[134, 1303]
212	[400, 401]	852	[139, 553]	1492	[1328, 706]	2132	[2306, 486]
213	[402, 63]	853	[1268, 722]	1493	[1885, 724]	2133	[2307, 2308]
214	[403, 404]	854	[706, 1269]	1494	[1886, 1153]	2134	[456, 618]
215	[257, 405]	855	[1270, 511]	1495	[1887, 123]	2135	[2309, 170]
216	[406, 407]	856	[589, 9]	1496	[1, 207]	2136	[511, 650]
217	[408, 409]	857	[1271, 589]	1497	[1321, 449]	2137	[2310, 2311]
218	[410, 411]	858	[474, 591]	1498	[1888, 522]	2138	[2032, 1384]
219	[412, 406]	859	[1272, 1273]	1499	[1889, 1463]	2139	[2312, 1936]
220	[413, 414]	860	[497, 587]	1500	[1890, 1203]	2140	[1944, 1894]
221	[415, 416]	861	[1274, 1275]	1501	[1891, 48]	2141	[2036, 635]
222	[417, 418]	862	[449, 1276]	1502	[1892, 1378]	2142	[2303, 548]
223	[419, 420]	863	[1206, 587]	1503	[681, 1350]	2143	[2313, 2314]
224	[421, 374]	864	[1256, 1277]	1504	[1303, 661]	2144	[705, 617]
225	[247, 422]	865	[563, 549]	1505	[1322, 504]	2145	[1423, 1463]
226	[423, 424]	866	[1278, 1279]	1506	[1893, 133]	2146	[2315, 2316]
227	[425, 426]	867	[1280, 1281]	1507	[176, 1894]	2147	[1925, 184]
228	[427, 428]	868	[1282, 493]	1508	[158, 1204]	2148	[2053, 470]
229	[429, 430]	869	[1218, 1283]	1509	[663, 514]	2149	[2040, 528]
230	[431, 432]	870	[210, 626]	1510	[1895, 1896]	2150	[2301, 176]
231	[433, 434]	871	[1284, 1273]	1511	[1427, 1897]	2151	[685, 2035]
232	[435, 436]	872	[1285, 1286]	1512	[1898, 1895]	2152	[457, 619]
233	[437, 438]	873	[232, 1229]	1513	[509, 1369]	2153	[2290, 172]
234	[439, 440]	874	[1287, 1288]	1514	[1899, 1900]	2154	[1370, 8]
235	[441, 442]	875	[1165, 35]	1515	[1901, 1893]	2155	[468, 1875]
236	[443, 61]	876	[1289, 223]	1516	[596, 1354]	2156	[1265, 698]
237	[444, 445]	877	[1290, 1171]	1517	[1179, 637]	2157	[1305, 1936]
238	[446, 447]	878	[587, 464]	1518	[222, 1153]	2158	[2317, 2318]
239	[207, 448]	879	[715, 53]	1519	[1902, 518]	2159	[2319, 1924]
240	[449, 450]	880	[1291, 137]	1520	[1903, 1277]	2160	[1276, 141]
241	[156, 451]	881	[200, 541]	1521	[1904, 1289]	2161	[1254, 523]
242	[452, 453]	882	[676, 1210]	1522	[205, 1369]	2162	[2320, 1368]
243	[454, 455]	883	[493, 228]	1523	[1905, 1399]	2163	[2321, 2322]
244	[456, 457]	884	[1292, 479]	1524	[639, 1399]	2164	[1886, 223]
245	[458, 459]	885	[1293, 196]	1525	[1899, 1443]	2165	[2323, 458]
246	[460, 461]	886	[1188, 1252]	1526	[1906, 699]	2166	[2324, 1332]
247	[462, 225]	887	[1294, 1295]	1527	[462, 568]	2167	[2291, 1924]
248	[463, 464]	888	[510, 699]	1528	[1907, 1908]	2168	[2325, 2326]
249	[40, 227]	889	[1271, 1207]	1529	[1398, 1384]	2169	[1241, 1331]
250	[465, 442]	890	[1296, 141]	1530	[1434, 670]	2170	[2327, 583]
251	[466, 467]	891	[1297, 1298]	1531	[1909, 721]	2171	[1369, 1232]
252	[468, 469]	892	[48, 711]	1532	[35, 510]	2172	[1922, 519]
253	[199, 470]	893	[1299, 691]	1533	[1466, 452]	2173	[655, 1405]
254	[471, 162]	894	[1286, 1160]	1534	[1910, 553]	2174	[499, 601]

255	[45, 472]	895	[683, 595]	1535	[1911, 1169]	2175	[2328, 449]
256	[473, 474]	896	[1300, 164]	1536	[1266, 462]	2176	[2329, 469]
257	[475, 476]	897	[609, 132]	1537	[628, 573]	2177	[231, 1333]
258	[477, 478]	898	[489, 149]	1538	[1912, 1174]	2178	[1917, 174]
259	[479, 480]	899	[1237, 191]	1539	[1913, 1914]	2179	[1949, 1934]
260	[481, 482]	900	[1301, 534]	1540	[1459, 671]	2180	[472, 1369]
261	[483, 484]	901	[1302, 169]	1541	[1442, 1900]	2181	[2294, 709]
262	[485, 486]	902	[1303, 607]	1542	[208, 678]	2182	[1911, 1150]
263	[487, 128]	903	[634, 159]	1543	[568, 1915]	2183	[1935, 1306]
264	[488, 489]	904	[1304, 533]	1544	[174, 207]	2184	[2006, 1205]
265	[490, 491]	905	[1231, 1288]	1545	[1916, 1205]	2185	[2330, 131]
266	[492, 493]	906	[1297, 702]	1546	[1917, 1215]	2186	[1311, 202]
267	[494, 200]	907	[483, 552]	1547	[175, 448]	2187	[2331, 2332]
268	[495, 224]	908	[1305, 1306]	1548	[1291, 722]	2188	[1293, 1332]
269	[496, 37]	909	[1307, 162]	1549	[1918, 558]	2189	[689, 1382]
270	[497, 463]	910	[1308, 1309]	1550	[1324, 632]	2190	[1963, 59]
271	[498, 227]	911	[1216, 538]	1551	[1919, 624]	2191	[2297, 177]
272	[499, 500]	912	[217, 479]	1552	[684, 204]	2192	[2010, 53]
273	[501, 502]	913	[1310, 618]	1553	[1230, 131]	2193	[2333, 2334]
274	[503, 504]	914	[511, 504]	1554	[1920, 1897]	2194	[54, 1274]
275	[450, 156]	915	[55, 1275]	1555	[1921, 548]	2195	[2015, 443]
276	[505, 506]	916	[1311, 1312]	1556	[1922, 644]	2196	[2335, 681]
277	[219, 507]	917	[1313, 666]	1557	[1923, 1924]	2197	[2336, 1405]
278	[508, 47]	918	[1314, 1315]	1558	[175, 208]	2198	[2337, 2338]
279	[509, 206]	919	[1316, 1232]	1559	[1248, 1329]	2199	[460, 43]
280	[510, 167]	920	[191, 1317]	1560	[1925, 1926]	2200	[1977, 1924]
281	[44, 169]	921	[169, 472]	1561	[618, 1185]	2201	[2339, 1177]
282	[192, 511]	922	[1318, 1319]	1562	[1869, 583]	2202	[2340, 638]
283	[512, 474]	923	[470, 1320]	1563	[1927, 442]	2203	[641, 623]
284	[513, 514]	924	[1169, 1225]	1564	[163, 1928]	2204	[2327, 176]
285	[515, 516]	925	[580, 1276]	1565	[1929, 1160]	2205	[1895, 1281]
286	[517, 518]	926	[1321, 580]	1566	[1441, 1930]	2206	[1261, 129]
287	[519, 520]	927	[1317, 1322]	1567	[515, 673]	2207	[1268, 137]
288	[521, 522]	928	[1323, 207]	1568	[712, 43]	2208	[1939, 39]
289	[523, 524]	929	[710, 49]	1569	[183, 1926]	2209	[1345, 1882]
290	[441, 139]	930	[1324, 1325]	1570	[1931, 1209]	2210	[575, 1277]
291	[525, 526]	931	[486, 611]	1571	[146, 168]	2211	[34, 1166]
292	[527, 528]	932	[552, 1170]	1572	[1339, 59]	2212	[1943, 123]
293	[492, 188]	933	[1326, 1303]	1573	[1932, 1332]	2213	[2341, 501]
294	[446, 520]	934	[1327, 1242]	1574	[454, 467]	2214	[2008, 1405]
295	[529, 170]	935	[1328, 1329]	1575	[669, 1435]	2215	[2312, 1306]
296	[530, 531]	936	[1330, 1331]	1576	[1373, 1930]	2216	[2329, 1875]
297	[532, 533]	937	[1332, 1333]	1577	[1933, 1890]	2217	[2342, 710]
298	[534, 535]	938	[1334, 490]	1578	[1294, 145]	2218	[2319, 1978]

299	[536, 507]	939	[1335, 695]	1579	[1415, 1377]	2219	[1430, 1463]
300	[220, 459]	940	[1336, 1337]	1580	[583, 1894]	2220	[2343, 1207]
301	[537, 538]	941	[137, 721]	1581	[1366, 548]	2221	[725, 1354]
302	[539, 148]	942	[1338, 623]	1582	[1879, 1934]	2222	[2013, 667]
303	[540, 541]	943	[1339, 592]	1583	[1935, 1936]	2223	[2344, 234]
304	[32, 227]	944	[1329, 707]	1584	[699, 168]	2224	[1914, 500]
305	[542, 453]	945	[571, 484]	1585	[1279, 489]	2225	[1916, 186]
306	[543, 544]	946	[1340, 501]	1586	[1937, 8]	2226	[1877, 462]
307	[218, 545]	947	[1290, 39]	1587	[1938, 1224]	2227	[1440, 1281]
308	[546, 547]	948	[1341, 541]	1588	[1939, 1171]	2228	[2328, 580]
309	[548, 549]	949	[1342, 191]	1589	[160, 1458]	2229	[2345, 2346]
310	[550, 551]	950	[590, 10]	1590	[58, 592]	2230	[521, 475]
311	[552, 551]	951	[1343, 1344]	1591	[1940, 526]	2231	[1214, 174]
312	[442, 553]	952	[1345, 445]	1592	[1440, 1896]	2232	[1307, 491]
313	[10, 161]	953	[32, 41]	1593	[1941, 135]	2233	[2347, 2348]
314	[554, 160]	954	[1346, 1222]	1594	[1942, 153]	2234	[1278, 539]
315	[555, 556]	955	[1347, 1203]	1595	[1220, 1350]	2235	[600, 500]
316	[557, 558]	956	[1326, 135]	1596	[1284, 1157]	2236	[2349, 544]
317	[559, 560]	957	[690, 1348]	1597	[1943, 490]	2237	[2046, 220]
318	[561, 562]	958	[1349, 1350]	1598	[1930, 648]	2238	[1452, 137]
319	[563, 518]	959	[1351, 1291]	1599	[1937, 1164]	2239	[2350, 1419]
320	[564, 452]	960	[1352, 1217]	1600	[1944, 177]	2240	[2296, 132]
321	[486, 565]	961	[200, 1320]	1601	[1945, 149]	2241	[2038, 148]
322	[131, 566]	962	[573, 578]	1602	[1946, 191]	2242	[1318, 172]
323	[567, 568]	963	[493, 1201]	1603	[700, 1164]	2243	[664, 452]
324	[151, 569]	964	[1353, 234]	1604	[611, 532]	2244	[2323, 220]
325	[172, 570]	965	[1354, 683]	1605	[1947, 1948]	2245	[2279, 634]
326	[571, 552]	966	[668, 597]	1606	[195, 1332]	2246	[2351, 1162]
327	[572, 573]	967	[626, 209]	1607	[1949, 1880]	2247	[527, 1344]
328	[574, 136]	968	[234, 1223]	1608	[1950, 1193]	2248	[1406, 1269]
329	[575, 576]	969	[1355, 599]	1609	[1951, 523]	2249	[2352, 2353]
330	[577, 578]	970	[201, 1312]	1610	[715, 547]	2250	[487, 532]
331	[579, 580]	971	[1356, 1357]	1611	[1952, 169]	2251	[2354, 1936]
332	[581, 58]	972	[716, 1330]	1612	[629, 578]	2252	[2355, 2356]
333	[582, 515]	973	[518, 658]	1613	[1953, 1954]	2253	[2357, 1183]
334	[583, 177]	974	[1358, 214]	1614	[1955, 558]	2254	[2358, 1410]
335	[584, 585]	975	[1359, 1360]	1615	[1956, 1957]	2255	[2359, 1183]
336	[586, 587]	976	[1155, 127]	1616	[1235, 40]	2256	[2360, 1980]
337	[588, 467]	977	[1211, 484]	1617	[1958, 470]	2257	[1240, 519]
338	[589, 590]	978	[1361, 578]	1618	[1959, 174]	2258	[2361, 1957]
339	[591, 592]	979	[1279, 148]	1619	[1438, 576]	2259	[2362, 2363]
340	[593, 475]	980	[1362, 585]	1620	[142, 1871]	2260	[2364, 2365]
341	[594, 595]	981	[478, 192]	1621	[1960, 1199]	2261	[2366, 2367]
342	[596, 597]	982	[1302, 45]	1622	[138, 442]	2262	[1296, 156]

343	[210, 598]	983	[570, 591]	1623	[1961, 1871]	2263	[1340, 724]
344	[599, 598]	984	[442, 593]	1624	[1360, 14]	2264	[193, 1333]
345	[151, 514]	985	[574, 1291]	1625	[1962, 1163]	2265	[2368, 628]
346	[600, 601]	986	[1363, 1364]	1626	[586, 463]	2266	[2341, 724]
347	[602, 603]	987	[1365, 228]	1627	[676, 37]	2267	[1959, 1215]
348	[604, 605]	988	[1366, 563]	1628	[1963, 592]	2268	[2361, 47]
349	[606, 607]	989	[1367, 1368]	1629	[1351, 136]	2269	[2369, 447]
350	[608, 609]	990	[170, 1369]	1630	[1194, 486]	2270	[2370, 2371]
351	[610, 611]	991	[539, 489]	1631	[1964, 644]	2271	[2372, 214]
352	[141, 451]	992	[1370, 1164]	1632	[1965, 1224]	2272	[2373, 1310]
353	[612, 482]	993	[1371, 590]	1633	[1966, 1213]	2273	[1395, 702]
354	[613, 203]	994	[605, 1250]	1634	[579, 449]	2274	[215, 127]
355	[614, 615]	995	[1274, 526]	1635	[637, 640]	2275	[179, 209]
356	[616, 151]	996	[1372, 222]	1636	[1207, 590]	2276	[1820, 96]
357	[147, 617]	997	[1373, 562]	1637	[38, 1171]	2277	[2374, 390]
358	[618, 619]	998	[1374, 650]	1638	[1200, 1344]	2278	[2375, 1673]
359	[620, 621]	999	[635, 455]	1639	[1967, 1253]	2279	[2376, 1549]
360	[622, 623]	1000	[55, 526]	1640	[1968, 625]	2280	[2377, 1601]
361	[624, 625]	1001	[719, 1375]	1641	[1969, 1380]	2281	[2378, 309]
362	[599, 626]	1002	[136, 722]	1642	[667, 666]	2282	[2379, 1523]
363	[627, 539]	1003	[1243, 583]	1643	[549, 658]	2283	[2380, 19]
364	[52, 547]	1004	[130, 1231]	1644	[1964, 519]	2284	[1044, 272]
365	[628, 629]	1005	[1376, 1377]	1645	[1970, 523]	2285	[2381, 2382]
366	[573, 630]	1006	[141, 157]	1646	[694, 1431]	2286	[2383, 1084]
367	[631, 632]	1007	[1316, 1378]	1647	[1971, 625]	2287	[1130, 2243]
368	[633, 634]	1008	[490, 162]	1648	[225, 609]	2288	[2384, 1693]
369	[635, 467]	1009	[1379, 1380]	1649	[647, 710]	2289	[2385, 1705]
370	[636, 637]	1010	[1227, 145]	1650	[1972, 42]	2290	[1033, 336]
371	[638, 558]	1011	[209, 599]	1651	[1444, 124]	2291	[1741, 765]
372	[532, 129]	1012	[1381, 1382]	1652	[1973, 585]	2292	[2386, 114]
373	[639, 640]	1013	[1383, 1384]	1653	[1974, 501]	2293	[2387, 2388]
374	[604, 534]	1014	[717, 476]	1654	[1975, 720]	2294	[2389, 1484]
375	[641, 642]	1015	[1382, 1385]	1655	[1976, 147]	2295	[2390, 346]
376	[643, 644]	1016	[1386, 621]	1656	[1343, 528]	2296	[2230, 256]
377	[645, 646]	1017	[701, 1298]	1657	[8, 564]	2297	[2391, 1616]
378	[647, 48]	1018	[1387, 1388]	1658	[1977, 1978]	2298	[2392, 1733]
379	[562, 648]	1019	[1379, 1389]	1659	[1891, 710]	2299	[2393, 1664]
380	[475, 649]	1020	[1338, 642]	1660	[1337, 125]	2300	[2394, 266]
381	[503, 650]	1021	[1390, 1391]	1661	[7, 1164]	2301	[2395, 1726]
382	[651, 58]	1022	[1392, 1349]	1662	[1884, 1191]	2302	[2396, 30]
383	[652, 653]	1023	[1393, 1394]	1663	[1979, 60]	2303	[2397, 1519]
384	[654, 14]	1024	[1395, 1298]	1664	[1980, 1384]	2304	[991, 1044]
385	[655, 656]	1025	[1159, 1357]	1665	[1975, 1375]	2305	[2398, 2269]
386	[657, 658]	1026	[598, 180]	1666	[1915, 132]	2306	[1617, 1033]

387	[659, 169]	1027	[1396, 161]	1667	[1163, 32]	2307	[2399, 324]
388	[581, 591]	1028	[1397, 459]	1668	[479, 545]	2308	[2400, 1099]
389	[660, 611]	1029	[1398, 154]	1669	[1322, 650]	2309	[2401, 390]
390	[606, 661]	1030	[637, 1399]	1670	[572, 629]	2310	[2402, 854]
391	[148, 662]	1031	[465, 139]	1671	[1467, 1207]	2311	[2403, 2210]
392	[663, 569]	1032	[1400, 1205]	1672	[1267, 1875]	2312	[2404, 969]
393	[8, 664]	1033	[1401, 573]	1673	[1280, 1896]	2313	[944, 1568]
394	[665, 594]	1034	[471, 491]	1674	[1981, 164]	2314	[2405, 2406]
395	[666, 667]	1035	[1402, 208]	1675	[1982, 1983]	2315	[334, 793]
396	[594, 668]	1036	[452, 704]	1676	[1327, 1331]	2316	[2407, 1754]
397	[667, 667]	1037	[1403, 1255]	1677	[1456, 1273]	2317	[1848, 2408]
398	[669, 670]	1038	[534, 1250]	1678	[196, 194]	2318	[2409, 1809]
399	[149, 671]	1039	[1150, 1175]	1679	[1984, 618]	2319	[2410, 927]
400	[672, 673]	1040	[1404, 1175]	1680	[1985, 1168]	2320	[2411, 1065]
401	[501, 515]	1041	[1171, 1174]	1681	[33, 40]	2321	[2412, 1549]
402	[674, 601]	1042	[1282, 188]	1682	[1409, 454]	2322	[2413, 1867]
403	[675, 676]	1043	[1258, 1405]	1683	[1986, 457]	2323	[2414, 1831]
404	[677, 678]	1044	[1406, 707]	1684	[1987, 1988]	2324	[2415, 2408]
405	[679, 459]	1045	[1407, 1408]	1685	[1433, 681]	2325	[1053, 246]
406	[680, 681]	1046	[36, 1210]	1686	[1989, 1281]	2326	[2416, 2417]
407	[682, 190]	1047	[1409, 635]	1687	[1990, 1991]	2327	[2418, 2236]
408	[597, 683]	1048	[1410, 507]	1688	[1429, 49]	2328	[1588, 253]
409	[684, 166]	1049	[1411, 1412]	1689	[1992, 699]	2329	[2419, 366]
410	[685, 686]	1050	[1413, 1414]	1690	[1993, 188]	2330	[2420, 1015]
411	[687, 688]	1051	[1415, 648]	1691	[1418, 563]	2331	[2421, 2140]
412	[689, 682]	1052	[1323, 175]	1692	[519, 447]	2332	[2422, 2423]
413	[690, 691]	1053	[1416, 514]	1693	[1993, 493]	2333	[2424, 1859]
414	[692, 159]	1054	[192, 1322]	1694	[1914, 601]	2334	[2425, 1595]
415	[693, 204]	1055	[1255, 524]	1695	[485, 1195]	2335	[2426, 1727]
416	[626, 180]	1056	[1342, 478]	1696	[524, 605]	2336	[2427, 1069]
417	[694, 695]	1057	[1417, 1234]	1697	[1994, 1283]	2337	[1769, 1739]
418	[614, 212]	1058	[1418, 548]	1698	[1995, 1185]	2338	[2428, 2384]
419	[696, 697]	1059	[1419, 538]	1699	[1968, 1388]	2339	[26, 357]
420	[698, 699]	1060	[1420, 1399]	1700	[1403, 523]	2340	[2429, 914]
421	[700, 8]	1061	[523, 531]	1701	[1996, 208]	2341	[2430, 853]
422	[644, 520]	1062	[478, 1317]	1702	[1997, 172]	2342	[2431, 97]
423	[701, 702]	1063	[1362, 1364]	1703	[1998, 1882]	2343	[2432, 1820]
424	[703, 704]	1064	[1421, 668]	1704	[522, 476]	2344	[2433, 439]
425	[705, 646]	1065	[1422, 626]	1705	[542, 704]	2345	[2434, 1083]
426	[706, 707]	1066	[1421, 595]	1706	[60, 544]	2346	[2435, 2436]
427	[708, 709]	1067	[180, 210]	1707	[1999, 1195]	2347	[2437, 1079]
428	[710, 711]	1068	[595, 1354]	1708	[2000, 157]	2348	[2438, 2439]
429	[712, 461]	1069	[668, 1354]	1709	[1270, 1322]	2349	[2440, 2441]
430	[697, 713]	1070	[1423, 2]	1710	[2001, 192]	2350	[1136, 1566]

431	[714, 715]	1071	[1424, 180]	1711	[489, 662]	2351	[2442, 924]
432	[716, 671]	1072	[1425, 1426]	1712	[537, 1217]	2352	[2443, 847]
433	[717, 649]	1073	[1427, 125]	1713	[1334, 123]	2353	[2444, 942]
434	[718, 545]	1074	[1428, 707]	1714	[1233, 155]	2354	[2445, 396]
435	[719, 720]	1075	[698, 167]	1715	[1239, 552]	2355	[1813, 2245]
436	[721, 124]	1076	[548, 518]	1716	[2002, 463]	2356	[2446, 907]
437	[722, 723]	1077	[1429, 711]	1717	[1881, 445]	2357	[2423, 803]
438	[724, 515]	1078	[531, 605]	1718	[2003, 2004]	2358	[2447, 818]
439	[725, 597]	1079	[1319, 570]	1719	[2005, 145]	2359	[1494, 1560]
440	[683, 668]	1080	[1430, 2]	1720	[2006, 186]	2360	[2448, 805]
441	[726, 727]	1081	[1335, 1431]	1721	[2007, 462]	2361	[2449, 344]
442	[728, 729]	1082	[593, 522]	1722	[2008, 656]	2362	[2450, 299]
443	[730, 731]	1083	[1432, 192]	1723	[723, 124]	2363	[2451, 947]
444	[732, 733]	1084	[549, 561]	1724	[2009, 2010]	2364	[2452, 2122]
445	[734, 735]	1085	[1386, 1154]	1725	[1950, 1436]	2365	[2453, 2177]
446	[736, 737]	1086	[636, 639]	1726	[682, 1385]	2366	[2454, 289]
447	[367, 738]	1087	[1433, 1349]	1727	[654, 622]	2367	[2455, 2450]
448	[332, 739]	1088	[458, 221]	1728	[443, 544]	2368	[348, 1787]
449	[740, 741]	1089	[1299, 1348]	1729	[2011, 1303]	2369	[2456, 326]
450	[742, 743]	1090	[1434, 1435]	1730	[1457, 1312]	2370	[411, 244]
451	[744, 745]	1091	[516, 1436]	1731	[2012, 599]	2371	[2457, 1670]
452	[18, 746]	1092	[1167, 43]	1732	[2013, 666]	2372	[2458, 67]
453	[747, 748]	1093	[671, 1331]	1733	[598, 209]	2373	[2459, 380]
454	[749, 375]	1094	[1437, 1256]	1734	[508, 1957]	2374	[2336, 656]
455	[750, 751]	1095	[696, 678]	1735	[673, 1436]	2375	[2460, 2461]
456	[752, 753]	1096	[1374, 504]	1736	[1215, 207]	2376	[1390, 1324]
457	[754, 755]	1097	[557, 1297]	1737	[2014, 60]	2377	[2281, 1215]
458	[756, 757]	1098	[1382, 190]	1738	[2015, 60]	2378	[2462, 663]
459	[758, 759]	1099	[1438, 1277]	1739	[1955, 1297]	2379	[2288, 449]
460	[760, 761]	1100	[1193, 184]	1740	[681, 1221]	2380	[444, 1882]
461	[762, 763]	1101	[1439, 1440]	1741	[2016, 476]	2381	[2463, 2464]
462	[764, 765]	1102	[1441, 562]	1742	[1156, 1273]	2382	[651, 591]
463	[766, 767]	1103	[1442, 1443]	1743	[2017, 1162]	2383	[2007, 224]
464	[768, 769]	1104	[1444, 1337]	1744	[2018, 144]	2384	[1401, 629]
465	[770, 771]	1105	[1445, 511]	1745	[1198, 1191]	2385	[1332, 194]
466	[772, 78]	1106	[1446, 1447]	1746	[14, 642]	2386	[1416, 569]
467	[773, 774]	1107	[1448, 507]	1747	[2019, 1458]	2387	[2465, 2466]
468	[775, 776]	1108	[173, 532]	1748	[2020, 1231]	2388	[1445, 1322]
469	[777, 778]	1109	[1449, 1288]	1749	[1462, 2]	2389	[513, 569]
470	[779, 780]	1110	[137, 723]	1750	[2021, 2022]	2390	[495, 462]
471	[781, 782]	1111	[135, 607]	1751	[1376, 648]	2391	[1938, 482]
472	[340, 783]	1112	[139, 593]	1752	[1151, 44]	2392	[2467, 1252]
473	[784, 785]	1113	[1450, 1169]	1753	[1461, 502]	2393	[1349, 1221]
474	[786, 787]	1114	[1249, 535]	1754	[140, 156]	2394	[2468, 494]

475	[729, 788]	1115	[1451, 632]	1755	[2023, 564]	2395	[1997, 1319]
476	[789, 790]	1116	[1391, 632]	1756	[1152, 223]	2396	[2343, 589]
477	[791, 365]	1117	[42, 461]	1757	[2024, 2025]	2397	[2469, 1329]
478	[792, 793]	1118	[1452, 722]	1758	[152, 713]	2398	[582, 502]
479	[794, 795]	1119	[463, 1213]	1759	[1428, 1269]	2399	[2298, 560]
480	[796, 797]	1120	[644, 447]	1760	[2026, 658]	2400	[2470, 2471]
481	[798, 799]	1121	[1453, 149]	1761	[2027, 1276]	2401	[488, 148]
482	[800, 801]	1122	[1161, 1454]	1762	[1234, 704]	2402	[2354, 1306]
483	[802, 803]	1123	[1455, 545]	1763	[128, 533]	2403	[2472, 2473]
484	[804, 805]	1124	[172, 474]	1764	[1903, 576]	2404	[2057, 202]
485	[806, 326]	1125	[131, 1288]	1765	[2028, 1903]	2405	[2474, 2475]
486	[807, 808]	1126	[1456, 1157]	1766	[1976, 168]	2406	[1888, 475]
487	[809, 810]	1127	[1450, 1150]	1767	[1228, 233]	2407	[2476, 2477]
488	[811, 812]	1128	[1255, 531]	1768	[2029, 1197]	2408	[1448, 126]
489	[813, 24]	1129	[1457, 202]	1769	[2030, 1221]	2409	[2478, 1235]
490	[814, 815]	1130	[10, 1458]	1770	[2031, 1324]	2410	[703, 453]
491	[405, 816]	1131	[1459, 1330]	1771	[2032, 154]	2411	[2479, 1928]
492	[817, 430]	1132	[1251, 1189]	1772	[1396, 1458]	2412	[507, 216]
493	[119, 818]	1133	[1347, 1187]	1773	[1391, 1325]	2413	[2480, 38]
494	[819, 820]	1134	[570, 58]	1774	[666, 666]	2414	[1263, 683]
495	[821, 822]	1135	[1460, 564]	1775	[1989, 1896]	2415	[2056, 55]
496	[823, 824]	1136	[1461, 515]	1776	[1956, 47]	2416	[2481, 2482]
497	[825, 826]	1137	[213, 1394]	1777	[224, 568]	2417	[1417, 452]
498	[827, 828]	1138	[1462, 1463]	1778	[2033, 537]	2418	[1951, 1255]
499	[829, 830]	1139	[1464, 1465]	1779	[1336, 124]	2419	[1973, 1364]
500	[831, 832]	1140	[645, 617]	1780	[1424, 209]	2420	[2306, 1195]
501	[833, 382]	1141	[1466, 1234]	1781	[2034, 2035]	2421	[2320, 560]
502	[834, 835]	1142	[1164, 664]	1782	[2036, 454]	2422	[2483, 2484]
503	[836, 837]	1143	[1329, 1269]	1783	[2037, 712]	2423	[1352, 538]
504	[776, 838]	1144	[1276, 156]	1784	[1901, 132]	2424	[2485, 686]
505	[839, 840]	1145	[1467, 589]	1785	[2038, 489]	2425	[2486, 2324]
506	[841, 842]	1146	[1353, 1223]	1786	[1176, 230]	2426	[1979, 443]
507	[843, 236]	1147	[1468, 595]	1787	[507, 127]	2427	[2487, 695]
508	[844, 845]	1148	[1469, 1007]	1788	[1292, 218]	2428	[2488, 1993]
509	[846, 847]	1149	[1470, 1471]	1789	[2039, 57]	2429	[2489, 55]
510	[848, 322]	1150	[1020, 372]	1790	[1354, 594]	2430	[2490, 706]
511	[793, 849]	1151	[1472, 89]	1791	[2040, 1344]	2431	[477, 191]
512	[850, 114]	1152	[1473, 796]	1792	[1941, 1303]	2432	[2002, 587]
513	[851, 771]	1153	[1474, 1475]	1793	[2041, 661]	2433	[665, 683]
514	[291, 852]	1154	[1476, 1477]	1794	[1184, 619]	2434	[2372, 1394]
515	[853, 854]	1155	[1478, 1479]	1795	[2042, 1250]	2435	[2491, 1383]
516	[855, 856]	1156	[1480, 20]	1796	[2043, 2044]	2436	[692, 1204]
517	[857, 858]	1157	[1481, 1482]	1797	[1892, 1232]	2437	[2339, 230]
518	[302, 840]	1158	[1483, 1484]	1798	[1272, 1157]	2438	[2492, 1932]

519	[859, 860]	1159	[1485, 1486]	1799	[2045, 1911]	2439	[1995, 619]
520	[861, 862]	1160	[1487, 1488]	1800	[1958, 200]	2440	[2029, 1183]
521	[863, 789]	1161	[1489, 248]	1801	[2012, 210]	2441	[57, 1204]
522	[864, 865]	1162	[1490, 1491]	1802	[2046, 458]	2442	[2351, 1454]
523	[866, 867]	1163	[1492, 425]	1803	[2042, 535]	2443	[2493, 2035]
524	[868, 799]	1164	[1493, 1494]	1804	[2047, 2048]	2444	[2494, 2039]
525	[869, 779]	1165	[1495, 1496]	1805	[1986, 618]	2445	[2495, 1189]
526	[108, 870]	1166	[1497, 1498]	1806	[2049, 2050]	2446	[2496, 571]
527	[871, 743]	1167	[1499, 1500]	1807	[554, 10]	2447	[2497, 1274]
528	[872, 873]	1168	[1501, 1502]	1808	[481, 1224]	2448	[2498, 458]
529	[387, 874]	1169	[1503, 313]	1809	[1149, 1169]	2449	[2499, 1431]
530	[875, 876]	1170	[934, 1504]	1810	[1887, 490]	2450	[687, 155]
531	[877, 878]	1171	[1017, 1505]	1811	[1889, 2]	2451	[2500, 1206]
532	[879, 880]	1172	[1506, 1507]	1812	[1994, 1219]	2452	[2485, 2035]
533	[330, 881]	1173	[1508, 1014]	1813	[1384, 155]	2453	[2501, 1918]
534	[882, 813]	1174	[77, 345]	1814	[1422, 598]	2454	[1358, 1394]
535	[799, 883]	1175	[1471, 1509]	1815	[1355, 210]	2455	[2502, 536]
536	[884, 885]	1176	[1510, 1511]	1816	[2051, 2052]	2456	[1998, 445]
537	[886, 887]	1177	[1512, 1513]	1817	[1301, 605]	2457	[2503, 2053]
538	[436, 888]	1178	[1514, 1515]	1818	[1400, 186]	2458	[1419, 1217]
539	[889, 890]	1179	[1516, 824]	1819	[1238, 1454]	2459	[2504, 1324]
540	[891, 754]	1180	[1517, 1029]	1820	[2053, 200]	2460	[2505, 2196]
541	[379, 892]	1181	[1518, 1519]	1821	[2000, 451]	2461	[2506, 2208]
542	[842, 323]	1182	[1520, 934]	1822	[2054, 2055]	2462	[2507, 930]
543	[893, 358]	1183	[1521, 1522]	1823	[633, 57]	2463	[2508, 393]
544	[894, 341]	1184	[1036, 1523]	1824	[1885, 501]	2464	[2509, 1794]
545	[409, 895]	1185	[753, 1524]	1825	[2056, 1274]	2465	[2510, 920]
546	[896, 750]	1186	[1525, 85]	1826	[2057, 1312]	2466	[2511, 2264]
547	[897, 898]	1187	[1526, 1527]	1827	[2058, 2059]	2467	[424, 1498]
548	[899, 900]	1188	[65, 71]	1828	[708, 133]	2468	[1850, 110]
549	[901, 902]	1189	[1528, 1529]	1829	[518, 561]	2469	[2512, 1115]
550	[903, 904]	1190	[1530, 105]	1830	[1923, 1978]	2470	[958, 1727]
551	[803, 905]	1191	[1531, 1532]	1831	[2004, 615]	2471	[2513, 1715]
552	[906, 298]	1192	[1533, 1534]	1832	[677, 697]	2472	[2514, 2166]
553	[727, 733]	1193	[854, 437]	1833	[1870, 143]	2473	[2515, 1840]
554	[907, 310]	1194	[1535, 860]	1834	[564, 1234]	2474	[2516, 240]
555	[908, 909]	1195	[1536, 246]	1835	[1262, 1412]	2475	[2517, 423]
556	[910, 911]	1196	[1537, 1538]	1836	[2060, 2061]	2476	[2518, 1755]
557	[912, 913]	1197	[1539, 1540]	1837	[1920, 125]	2477	[2519, 2274]
558	[914, 915]	1198	[1541, 1542]	1838	[531, 534]	2478	[2406, 1848]
559	[916, 917]	1199	[1543, 1544]	1839	[2062, 531]	2479	[1795, 900]
560	[918, 919]	1200	[1545, 744]	1840	[187, 493]	2480	[2262, 78]
561	[900, 920]	1201	[430, 1120]	1841	[46, 1957]	2481	[2520, 993]
562	[902, 921]	1202	[1546, 1547]	1842	[2063, 2064]	2482	[2521, 2505]

563	[922, 314]	1203	[239, 1548]	1843	[496, 1210]	2483	[1787, 1022]
564	[782, 923]	1204	[1549, 1550]	1844	[2031, 1391]	2484	[2522, 1113]
565	[860, 924]	1205	[1551, 1552]	1845	[584, 1364]	2485	[785, 1502]
566	[306, 925]	1206	[1553, 1554]	1846	[643, 519]	2486	[2523, 313]
567	[926, 927]	1207	[1555, 308]	1847	[1393, 214]	2487	[805, 332]
568	[928, 929]	1208	[1556, 1118]	1848	[196, 1333]	2488	[1696, 119]
569	[930, 931]	1209	[1557, 1018]	1849	[1927, 139]	2489	[2524, 761]
570	[327, 932]	1210	[1091, 1558]	1850	[553, 475]	2490	[2525, 1635]
571	[933, 934]	1211	[1559, 1560]	1851	[2065, 1247]	2491	[2526, 1772]
572	[935, 936]	1212	[1561, 998]	1852	[165, 204]	2492	[2527, 1705]
573	[937, 914]	1213	[1554, 1125]	1853	[1969, 1389]	2493	[2528, 1471]
574	[938, 264]	1214	[1562, 333]	1854	[558, 702]	2494	[2529, 1628]
575	[939, 415]	1215	[1563, 1105]	1855	[1965, 482]	2495	[2530, 320]
576	[940, 941]	1216	[1564, 1565]	1856	[2019, 161]	2496	[275, 1769]
577	[942, 943]	1217	[1566, 1567]	1857	[39, 1174]	2497	[1147, 84]
578	[936, 944]	1218	[1568, 1569]	1858	[1196, 10]	2498	[968, 1621]
579	[945, 742]	1219	[1570, 1571]	1859	[2066, 1276]	2499	[1704, 1696]
580	[946, 272]	1220	[1572, 337]	1860	[627, 1279]	2500	[950, 411]
581	[947, 948]	1221	[1573, 1574]	1861	[171, 1319]	2501	[2531, 1741]
582	[949, 950]	1222	[1575, 1576]	1862	[2067, 2068]	2502	[2532, 843]
583	[951, 327]	1223	[1223, 1223]	1863	[1392, 681]	2503	[2533, 2152]
584	[952, 953]	1224	[1577, 1578]	1864	[2069, 2070]	2504	[440, 1699]
585	[954, 955]	1225	[1579, 1580]	1865	[494, 470]	2505	[2030, 1350]
586	[956, 768]	1226	[1581, 1035]	1866	[2071, 551]	2506	[2534, 1211]
587	[795, 29]	1227	[1582, 972]	1867	[31, 40]	2507	[1999, 486]
588	[957, 958]	1228	[1583, 1584]	1868	[2072, 626]	2508	[2493, 686]
589	[959, 960]	1229	[350, 1585]	1869	[2073, 337]	2509	[2535, 680]
590	[96, 961]	1230	[1586, 113]	1870	[1747, 88]	2510	[2536, 1177]
591	[329, 69]	1231	[1587, 1588]	1871	[2074, 2075]	2511	[2537, 56]
592	[932, 962]	1232	[847, 1589]	1872	[273, 279]	2512	[1946, 478]
593	[267, 963]	1233	[1590, 1591]	1873	[2076, 906]	2513	[2538, 2002]
594	[964, 408]	1234	[1592, 89]	1874	[2077, 1040]	2514	[1384, 688]
595	[965, 107]	1235	[1593, 1594]	1875	[2078, 2079]	2515	[2539, 1282]
596	[966, 964]	1236	[1595, 843]	1876	[2080, 1543]	2516	[2357, 1197]
597	[967, 965]	1237	[293, 261]	1877	[2081, 880]	2517	[2540, 1180]
598	[92, 968]	1238	[1596, 810]	1878	[2082, 2083]	2518	[2359, 1197]
599	[969, 343]	1239	[1597, 1598]	1879	[2084, 967]	2519	[2541, 1984]
600	[970, 971]	1240	[1599, 367]	1880	[2085, 2086]	2520	[2536, 230]
601	[972, 973]	1241	[1600, 1601]	1881	[2087, 789]	2521	[2542, 2335]
602	[974, 256]	1242	[1135, 1590]	1882	[2088, 2089]	2522	[2543, 1148]
603	[975, 976]	1243	[1602, 1088]	1883	[2090, 1760]	2523	[2544, 443]
604	[977, 978]	1244	[1603, 1604]	1884	[2091, 1131]	2524	[1313, 667]
605	[867, 979]	1245	[1505, 288]	1885	[2092, 837]	2525	[2276, 1207]
606	[980, 365]	1246	[1605, 1606]	1886	[2093, 1662]	2526	[2504, 1391]

607	[259, 981]	1247	[1607, 1608]	1887	[2094, 243]	2527	[2489, 1274]
608	[982, 254]	1248	[1609, 915]	1888	[1681, 2095]	2528	[2010, 547]
609	[983, 984]	1249	[1610, 1611]	1889	[2096, 1850]	2529	[2545, 1324]
610	[985, 879]	1250	[987, 1612]	1890	[2097, 762]	2530	[2016, 649]
611	[737, 248]	1251	[352, 1604]	1891	[2098, 1028]	2531	[2544, 60]
612	[986, 987]	1252	[1613, 1614]	1892	[426, 400]	2532	[2014, 443]
613	[988, 255]	1253	[1615, 1566]	1893	[422, 2099]	2533	[590, 160]
614	[989, 990]	1254	[1616, 1617]	1894	[1726, 2100]	2534	[2546, 906]
615	[391, 991]	1255	[1618, 1619]	1895	[2101, 2102]	2535	[2547, 65]
616	[992, 755]	1256	[1620, 1621]	1896	[1515, 2103]	2536	[269, 427]
617	[993, 994]	1257	[1622, 983]	1897	[1710, 1669]	2537	[2548, 79]
618	[380, 930]	1258	[1623, 1147]	1898	[2104, 990]	2538	[2549, 766]
619	[100, 995]	1259	[976, 1624]	1899	[2105, 439]	2539	[2550, 2441]
620	[741, 377]	1260	[1625, 1626]	1900	[2106, 2107]	2540	[2551, 1821]
621	[996, 997]	1261	[1627, 928]	1901	[2108, 2109]	2541	[2552, 381]
622	[998, 999]	1262	[1628, 890]	1902	[2110, 1054]	2542	[2553, 828]
623	[28, 1000]	1263	[774, 917]	1903	[2111, 758]	2543	[890, 757]
624	[1001, 419]	1264	[1629, 1510]	1904	[1118, 2112]	2544	[2554, 1647]
625	[295, 1002]	1265	[1630, 320]	1905	[2113, 1503]	2545	[1642, 830]
626	[395, 396]	1266	[1631, 247]	1906	[2114, 2115]	2546	[524, 534]
627	[1003, 979]	1267	[1632, 1633]	1907	[2116, 2083]	2547	[2545, 1391]
628	[1004, 1005]	1268	[1634, 1144]	1908	[2117, 402]	2548	[2555, 220]
629	[757, 1006]	1269	[1635, 1636]	1909	[1544, 238]	2549	[553, 522]
630	[1007, 1008]	1270	[1637, 1040]	1910	[2118, 864]	2550	[450, 141]
631	[1009, 64]	1271	[1127, 1127]	1911	[2119, 1579]	2551	[2497, 55]
632	[1010, 1011]	1272	[1638, 310]	1912	[2120, 1628]	2552	[2498, 220]
633	[1012, 1013]	1273	[1639, 1640]	1913	[1548, 831]	2553	[2555, 458]
634	[1014, 1015]	1274	[1641, 99]	1914	[2121, 1699]	2554	[2072, 598]
635	[1016, 1017]	1275	[761, 1642]	1915	[765, 2122]	2555	[362, 415]
636	[845, 1018]	1276	[253, 744]	1916	[2123, 932]		
637	[1019, 1020]	1277	[1486, 1643]	1917	[2124, 1785]		
638	[1021, 1022]	1278	[1644, 286]	1918	[2125, 2126]		
639	[1023, 1024]	1279	[1645, 288]	1919	[2127, 2128]		

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	427	0	854	0	1281	0	1708	0	2135	0
1	0	428	1	855	0	1282	0	1709	0	2136	1
2	0	429	0	856	1	1283	0	1710	0	2137	0
3	0	430	1	857	1	1284	1	1711	0	2138	0
4	0	431	1	858	1	1285	1	1712	0	2139	0
5	0	432	0	859	0	1286	1	1713	0	2140	0
6	0	433	1	860	1	1287	0	1714	1	2141	0
7	0	434	0	861	1	1288	1	1715	1	2142	1

8	0	435	0	862	1	1289	0	1716	1	2143	1
9	0	436	1	863	0	1290	1	1717	0	2144	1
10	1	437	1	864	1	1291	0	1718	0	2145	1
11	0	438	0	865	1	1292	1	1719	0	2146	0
12	0	439	1	866	0	1293	0	1720	1	2147	1
13	0	440	0	867	1	1294	1	1721	0	2148	0
14	1	441	0	868	0	1295	1	1722	1	2149	1
15	0	442	0	869	0	1296	0	1723	0	2150	0
16	1	443	1	870	1	1297	0	1724	0	2151	1
17	0	444	0	871	1	1298	1	1725	0	2152	1
18	1	445	1	872	1	1299	0	1726	0	2153	1
19	0	446	0	873	0	1300	0	1727	1	2154	1
20	0	447	0	874	0	1301	0	1728	1	2155	0
21	1	448	1	875	1	1302	0	1729	1	2156	0
22	0	449	1	876	0	1303	1	1730	0	2157	1
23	0	450	1	877	1	1304	1	1731	1	2158	1
24	0	451	1	878	0	1305	1	1732	1	2159	1
25	0	452	1	879	1	1306	1	1733	1	2160	0
26	1	453	0	880	0	1307	1	1734	1	2161	1
27	0	454	1	881	0	1308	1	1735	1	2162	0
28	0	455	0	882	0	1309	1	1736	1	2163	0
29	1	456	0	883	1	1310	1	1737	0	2164	1
30	0	457	1	884	1	1311	1	1738	1	2165	1
31	0	458	0	885	0	1312	0	1739	1	2166	1
32	1	459	0	886	0	1313	0	1740	1	2167	0
33	1	460	0	887	1	1314	1	1741	0	2168	0
34	0	461	1	888	0	1315	1	1742	0	2169	0
35	0	462	0	889	1	1316	1	1743	0	2170	1
36	1	463	1	890	0	1317	0	1744	1	2171	1
37	1	464	0	891	0	1318	1	1745	1	2172	1
38	0	465	1	892	0	1319	1	1746	1	2173	0
39	0	466	0	893	0	1320	0	1747	0	2174	1
40	0	467	1	894	1	1321	1	1748	0	2175	0
41	0	468	0	895	0	1322	0	1749	0	2176	1
42	1	469	1	896	0	1323	1	1750	0	2177	1
43	0	470	1	897	0	1324	1	1751	1	2178	1
44	0	471	0	898	0	1325	1	1752	0	2179	1
45	0	472	1	899	0	1326	0	1753	0	2180	1
46	0	473	1	900	0	1327	1	1754	1	2181	1
47	1	474	1	901	0	1328	0	1755	0	2182	0
48	0	475	0	902	1	1329	1	1756	0	2183	1
49	1	476	0	903	1	1330	0	1757	1	2184	1
50	0	477	0	904	1	1331	0	1758	0	2185	1
51	1	478	0	905	1	1332	0	1759	1	2186	1

52	1	479	0	906	0	1333	0	1760	0	2187	0
53	1	480	1	907	0	1334	0	1761	0	2188	0
54	0	481	0	908	1	1335	0	1762	0	2189	0
55	0	482	0	909	1	1336	0	1763	0	2190	1
56	0	483	0	910	1	1337	1	1764	0	2191	1
57	0	484	1	911	1	1338	0	1765	0	2192	0
58	1	485	1	912	0	1339	0	1766	0	2193	1
59	1	486	1	913	1	1340	0	1767	1	2194	0
60	0	487	1	914	1	1341	1	1768	1	2195	1
61	0	488	0	915	0	1342	1	1769	1	2196	0
62	0	489	0	916	1	1343	0	1770	1	2197	0
63	0	490	1	917	0	1344	0	1771	0	2198	1
64	1	491	0	918	1	1345	1	1772	1	2199	0
65	0	492	0	919	1	1346	0	1773	0	2200	0
66	1	493	1	920	1	1347	1	1774	0	2201	1
67	0	494	1	921	1	1348	0	1775	0	2202	0
68	0	495	1	922	1	1349	0	1776	0	2203	1
69	1	496	0	923	1	1350	1	1777	1	2204	1
70	0	497	1	924	1	1351	1	1778	1	2205	1
71	1	498	0	925	0	1352	0	1779	0	2206	0
72	1	499	1	926	1	1353	1	1780	0	2207	0
73	1	500	1	927	0	1354	1	1781	0	2208	0
74	1	501	1	928	1	1355	0	1782	0	2209	1
75	1	502	1	929	1	1356	1	1783	1	2210	0
76	0	503	1	930	1	1357	0	1784	1	2211	0
77	0	504	0	931	1	1358	0	1785	1	2212	1
78	0	505	1	932	0	1359	0	1786	1	2213	0
79	0	506	1	933	0	1360	1	1787	0	2214	1
80	0	507	0	934	1	1361	1	1788	1	2215	0
81	0	508	1	935	0	1362	0	1789	1	2216	1
82	0	509	0	936	0	1363	0	1790	1	2217	0
83	1	510	0	937	0	1364	1	1791	1	2218	1
84	1	511	1	938	0	1365	1	1792	1	2219	0
85	0	512	0	939	0	1366	0	1793	1	2220	1
86	1	513	1	940	0	1367	0	1794	1	2221	1
87	0	514	0	941	0	1368	0	1795	0	2222	1
88	0	515	0	942	0	1369	1	1796	0	2223	0
89	0	516	0	943	0	1370	1	1797	0	2224	0
90	1	517	1	944	1	1371	0	1798	0	2225	0
91	0	518	1	945	0	1372	0	1799	0	2226	1
92	1	519	0	946	0	1373	1	1800	1	2227	0
93	1	520	1	947	1	1374	0	1801	1	2228	0
94	0	521	0	948	1	1375	1	1802	0	2229	1
95	0	522	1	949	1	1376	1	1803	0	2230	0

96	1	523	0	950	1	1377	0	1804	0	2231	0
97	1	524	0	951	0	1378	0	1805	1	2232	1
98	1	525	0	952	1	1379	0	1806	0	2233	1
99	0	526	1	953	1	1380	0	1807	0	2234	0
100	1	527	1	954	0	1381	1	1808	0	2235	1
101	1	528	1	955	1	1382	1	1809	0	2236	1
102	0	529	1	956	0	1383	1	1810	1	2237	0
103	1	530	1	957	1	1384	1	1811	1	2238	1
104	0	531	1	958	0	1385	1	1812	1	2239	0
105	1	532	1	959	1	1386	0	1813	1	2240	0
106	0	533	0	960	0	1387	0	1814	0	2241	1
107	0	534	0	961	0	1388	0	1815	0	2242	1
108	1	535	0	962	0	1389	1	1816	1	2243	1
109	0	536	1	963	1	1390	0	1817	0	2244	1
110	0	537	0	964	1	1391	0	1818	1	2245	0
111	0	538	1	965	1	1392	0	1819	1	2246	1
112	0	539	1	966	0	1393	1	1820	0	2247	1
113	1	540	0	967	0	1394	1	1821	0	2248	0
114	1	541	1	968	1	1395	0	1822	1	2249	0
115	1	542	0	969	0	1396	1	1823	1	2250	1
116	1	543	0	970	1	1397	1	1824	1	2251	0
117	0	544	1	971	1	1398	1	1825	1	2252	1
118	0	545	0	972	0	1399	1	1826	0	2253	0
119	1	546	0	973	1	1400	1	1827	1	2254	1
120	0	547	0	974	0	1401	1	1828	0	2255	1
121	1	548	0	975	0	1402	1	1829	1	2256	1
122	0	549	0	976	1	1403	0	1830	1	2257	0
123	0	550	1	977	1	1404	1	1831	1	2258	1
124	0	551	0	978	1	1405	0	1832	1	2259	0
125	1	552	0	979	0	1406	0	1833	0	2260	1
126	1	553	0	980	0	1407	1	1834	0	2261	0
127	0	554	0	981	0	1408	0	1835	1	2262	0
128	0	555	1	982	0	1409	1	1836	1	2263	0
129	1	556	1	983	0	1410	0	1837	1	2264	0
130	1	557	0	984	0	1411	0	1838	1	2265	1
131	0	558	1	985	0	1412	0	1839	0	2266	0
132	0	559	1	986	0	1413	1	1840	1	2267	1
133	1	560	1	987	1	1414	0	1841	0	2268	1
134	0	561	0	988	0	1415	0	1842	0	2269	1
135	0	562	1	989	0	1416	0	1843	0	2270	0
136	1	563	1	990	0	1417	0	1844	1	2271	1
137	0	564	0	991	1	1418	1	1845	1	2272	0
138	0	565	1	992	1	1419	1	1846	1	2273	0
139	1	566	0	993	0	1420	1	1847	1	2274	0

140	1	567	1	994	1	1421	0	1848	1	2275	1
141	1	568	1	995	1	1422	0	1849	1	2276	0
142	1	569	1	996	0	1423	1	1850	0	2277	0
143	1	570	0	997	1	1424	0	1851	0	2278	1
144	1	571	0	998	0	1425	0	1852	1	2279	0
145	0	572	0	999	0	1426	1	1853	1	2280	0
146	1	573	0	1000	0	1427	0	1854	1	2281	0
147	1	574	0	1001	0	1428	1	1855	1	2282	1
148	1	575	0	1002	1	1429	1	1856	0	2283	0
149	0	576	0	1003	1	1430	0	1857	0	2284	0
150	0	577	0	1004	1	1431	1	1858	1	2285	0
151	1	578	0	1005	1	1432	1	1859	1	2286	0
152	0	579	0	1006	1	1433	1	1860	1	2287	1
153	1	580	0	1007	1	1434	0	1861	0	2288	1
154	0	581	1	1008	1	1435	1	1862	1	2289	0
155	1	582	1	1009	0	1436	1	1863	0	2290	1
156	0	583	0	1010	0	1437	1	1864	1	2291	0
157	0	584	1	1011	0	1438	1	1865	1	2292	0
158	0	585	0	1012	1	1439	1	1866	0	2293	0
159	0	586	0	1013	1	1440	0	1867	0	2294	1
160	0	587	0	1014	1	1441	0	1868	1	2295	1
161	1	588	1	1015	1	1442	1	1869	0	2296	0
162	1	589	1	1016	0	1443	1	1870	0	2297	1
163	1	590	1	1017	1	1444	1	1871	0	2298	1
164	1	591	0	1018	0	1445	1	1872	1	2299	0
165	1	592	0	1019	0	1446	0	1873	0	2300	0
166	0	593	1	1020	0	1447	0	1874	0	2301	0
167	0	594	1	1021	0	1448	1	1875	0	2302	1
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425	1	852	1	1279	0	1706	0	2133	1		
426	0	853	0	1280	1	1707	0	2134	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