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

GUO-NIU HAN* AND YINING HU*

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

1. Introduction

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

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

as the limit of the finite continued fractions

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

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

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

admits a continued fraction expansion of form (1.1).

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

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

that we shall denote

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

Date: 9/04/2020 18:44:29 .

2010 *Mathematics Subject Classification.* 11B85, 11J70, 11B50, 11Y65, 05A15.

Key words and phrases. automatic sequence, continued fraction, Thue-Morse sequence.

* This paper was automatically generated from a computer program developed by the authors, with 1.1 hours CPU time used.

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

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

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

$$\begin{aligned}
p_0(z) &= z^{21} + z^{20} + z^{19} + z^{16} + z^{14} + z^{13} + z^{12} + z^{11} + z^8 + z^7 + z^6 + z^4 + 1,\\
p_1(z) &= z^{25} + z^{23} + z^{18} + z^{17} + z^{16} + z^{15} + z^{11} + z^{10} + z^8 + z^4,\\
p_2(z) &= z^{28} + z^{24} + z^{22} + z^{16} + z^8,\\
p_3(z) &= z^{25} + z^{23} + z^{18} + z^{17} + z^{16} + z^{15} + z^{11} + z^{10} + z^8 + z^4,\\
p_4(z) &= z^{22} + z^{21} + z^{20} + z^{19} + z^{14} + z^{13} + z^{11} + z^8 + z^7 + z^6 + z^4,
\end{aligned}$$

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

$$\begin{aligned}
p_0(z) &= z^{21} + z^{20} + z^{19} + z^{14} + z^{13} + z^{11} + z^7 + z^6 + z^4,\\
p_1(z) &= z^{25} + z^{23} + z^{18} + z^{17} + z^{16} + z^{15} + z^{11} + z^{10} + z^8 + z^4,\\
p_2(z) &= z^{28} + z^{24} + z^{22} + z^{16} + z^8,\\
p_3(z) &= z^{25} + z^{23} + z^{18} + z^{17} + z^{16} + z^{15} + z^{11} + z^{10} + z^8 + z^4,\\
p_4(z) &= z^{22} + z^{21} + z^{20} + z^{19} + z^{16} + z^{14} + z^{13} + z^{12} + z^{11} + z^7 + z^6 + z^4 + 1.
\end{aligned}$$

2. Proof

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

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

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

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

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

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

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

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

for some positive integer d_n. Hence,

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

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

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

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

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

of the vector

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

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

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

Lemma 2.1. *We have*

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

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

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

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

Proof. We give the proof of the identity

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

the proofs of the others being similar.

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

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

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. □

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.*

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

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

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

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

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 $u = 2^{2k}$,

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

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

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

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

which can be rewritten as

$$0 = T[[w]_2] + T[[1w]_2] + T[[100w]_2] + T[[110w]_2] + T[[111w]_2], \tag{2.7}$$

$$\begin{aligned}0 &= T[[w]_2] + T[[10w]_2] + T[[100w]_2] + T[[101w]_2] + T[[110w]_2]\\ &\quad + T[[1000w]_2],\end{aligned} \tag{2.8}$$

$$0 = T[[11w]_2] + T[[100w]_2] + T[[101w]_2] + T[[1001w]_2], \tag{2.9}$$

$$0 = T[[100w]_2] + T[[101w]_2] + T[[110w]_2] + T[[1010w]_2], \tag{2.10}$$

$$0 = T[[1w]_2] + T[[100w]_2] + T[[101w]_2] + T[[1011w]_2], \tag{2.11}$$

$$0 = T[[w]_2] + T[[10w]_2] + T[[101w]_2] + T[[110w]_2] + T[[1100w]_2], \tag{2.12}$$

$$0 = T[[11w]_2] + T[[100w]_2] + T[[1101w]_2], \tag{2.13}$$

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

$$0 = T[[w]_2] + T[[1w]_2] + T[[100w]_2] + T[[110w]_2] + T[[111w]_2], \tag{2.14}$$

$$\begin{aligned}0 &= T[[w]_2] + T[[10w]_2] + T[[100w]_2] + T[[101w]_2] + T[[110w]_2]\\ &\quad + T[[1000w]_2],\end{aligned} \tag{2.15}$$

$$0 = T[[11w]_2] + T[[100w]_2] + T[[101w]_2] + T[[1001w]_2], \tag{2.16}$$

$$0 = T[[100w]_2] + T[[101w]_2] + T[[110w]_2] + T[[1010w]_2], \tag{2.17}$$

$$0 = T[[1w]_2] + T[[100w]_2] + T[[101w]_2] + T[[1011w]_2], \tag{2.18}$$

$$0 = T[[w]_2] + T[[10w]_2] + T[[101w]_2] + T[[110w]_2] + T[[1100w]_2], \tag{2.19}$$

$$0 = T[[11w]_2] + T[[100w]_2] + T[[1101w]_2], \tag{2.20}$$

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

First we calculate an 2-automaton that generates T from its minimal polynomial and its first terms. This automaton has 2560 states; its transition function and output function can be found in the annex. Let $A(s,w)$ denote the state reached after reading w from right to left starting from the state s, and τ the output function. Define

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

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

$$\begin{aligned}0 &= \tau(A(s,\epsilon)) + \tau(A(s,1)) + \tau(A(s,100)) + \tau(A(s,110))\\ &\quad + \tau(A(s,111)),\end{aligned} \tag{2.21}$$

$$\begin{aligned}0 &= \tau(A(s,\epsilon)) + \tau(A(s,10)) + \tau(A(s,100)) + \tau(A(s,101))\\ &\quad + \tau(A(s,110)) + \tau(A(s,1000)),\end{aligned} \tag{2.22}$$

$$0 = \tau(A(s,11)) + \tau(A(s,100)) + \tau(A(s,101)) + \tau(A(s,1001)), \tag{2.23}$$

$$0 = \tau(A(s,100)) + \tau(A(s,101)) + \tau(A(s,110)) + \tau(A(s,1010)), \tag{2.24}$$

$$0 = \tau(A(s,1)) + \tau(A(s,100)) + \tau(A(s,101)) + \tau(A(s,1011)), \tag{2.25}$$

$$\begin{aligned}0 &= \tau(A(s,\epsilon)) + \tau(A(s,10)) + \tau(A(s,101)) + \tau(A(s,110))\\ &\quad + \tau(A(s,1100)),\end{aligned} \tag{2.26}$$

$$0 = \tau(A(s,11)) + \tau(A(s,100)) + \tau(A(s,1101)), \tag{2.27}$$

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

$$\begin{aligned} 0 = {} & \tau(A(s,\epsilon)) + \tau(A(s,1)) + \tau(A(s,100)) + \tau(A(s,110)) \\ & + \tau(A(s,111)), \end{aligned} \tag{2.28}$$

$$\begin{aligned} 0 = {} & \tau(A(s,\epsilon)) + \tau(A(s,10)) + \tau(A(s,100)) + \tau(A(s,101)) \\ & + \tau(A(s,110)) + \tau(A(s,1000)), \end{aligned} \tag{2.29}$$

$$0 = \tau(A(s,11)) + \tau(A(s,100)) + \tau(A(s,101)) + \tau(A(s,1001)), \tag{2.30}$$

$$0 = \tau(A(s,100)) + \tau(A(s,101)) + \tau(A(s,110)) + \tau(A(s,1010)), \tag{2.31}$$

$$0 = \tau(A(s,1)) + \tau(A(s,100)) + \tau(A(s,101)) + \tau(A(s,1011)), \tag{2.32}$$

$$\begin{aligned} 0 = {} & \tau(A(s,\epsilon)) + \tau(A(s,10)) + \tau(A(s,101)) + \tau(A(s,110)) \\ & + \tau(A(s,1100)), \end{aligned} \tag{2.33}$$

$$0 = \tau(A(s,11)) + \tau(A(s,100)) + \tau(A(s,1101)), \tag{2.34}$$

for $s = A(i, 0^{2k})$. We find that $(A(i, 0^{38}), E_{38}) = (A(i, 0^{22}), E_{22})$, so that we only have to verify that identities (2.21) through (2.34) hold for $2 \le k \le 19$, 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 $u = 2^{2k-1}$,*

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

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

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

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

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

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

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

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

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

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

$$\begin{aligned} q_0(x) &= x^{28} + x^{24} + x^{22} + x^{21} + x^{20} + x^{17} + x^{16} + x^{15} + x^{14} + x^{12} + x^9 + x^8 \\ &\quad + x^7, \\ q_1(x) &= x^{24} + x^{20} + x^{18} + x^{17} + x^{13} + x^{12} + x^{11} + x^{10} + x^5 + x^3, \\ q_2(x) &= x^{20} + x^{12} + x^6 + x^4 + 1, \\ q_3(x) &= x^{24} + x^{20} + x^{18} + x^{17} + x^{13} + x^{12} + x^{11} + x^{10} + x^5 + x^3, \\ q_4(x) &= x^{24} + x^{22} + x^{21} + x^{20} + x^{17} + x^{15} + x^{14} + x^9 + x^8 + x^7 + x^6. \end{aligned}$$

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

3. Annexe

All 16 polynomials are of the form

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

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

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

$$\begin{aligned}
p_0(x) &= x^{144} + x^{140} + x^{138} + x^{128} + x^{124} + x^{120} + x^{114} + x^{112} + x^{110} + x^{106} \\
&\quad + x^{104} + x^{92} + x^{88} + x^{84} + x^{82} + x^{80} + x^{74} + x^{72} + x^{70} + x^{68} + x^{66} \\
&\quad + x^{60} + x^{56} + x^{38} + x^{36}, \\
p_3(x) &= x^{132} + x^{130} + x^{128} + x^{122} + x^{120} + x^{118} + x^{116} + x^{114} + x^{112} + x^{106} \\
&\quad + x^{102} + x^{100} + x^{88} + x^{80} + x^{66} + x^{64} + x^{60} + x^{56} + x^{54} + x^{52} + x^{48} \\
&\quad + x^{46} + x^{38} + x^{30} + x^{26} + x^{24} + x^{22} + x^{20}, \\
p_6(x) &= x^{132} + x^{130} + x^{124} + x^{118} + x^{116} + x^{110} + x^{108} + x^{106} + x^{102} + x^{94} \\
&\quad + x^{88} + x^{86} + x^{82} + x^{80} + x^{78} + x^{76} + x^{72} + x^{62} + x^{60} + x^{58} + x^{54} \\
&\quad + x^{50} + x^{44} + x^{42} + x^{32} + x^{24} + x^{14} + x^{12} + x^{10} + x^{8} + x^{6} + 1, \\
p_9(x) &= x^{136} + x^{128} + x^{120} + x^{116} + x^{114} + x^{112} + x^{106} + x^{104} + x^{102} + x^{100} \\
&\quad + x^{96} + x^{92} + x^{90} + x^{88} + x^{86} + x^{84} + x^{82} + x^{74} + x^{70} + x^{68} + x^{56} \\
&\quad + x^{54} + x^{52} + x^{46} + x^{44} + x^{42} + x^{40} + x^{38} + x^{36} + x^{32} + x^{30} + x^{28} \\
&\quad + x^{20} + x^{12} + x^{10} + x^{6}, \\
p_{12}(x) &= x^{136} + x^{120} + x^{112} + x^{104} + x^{80} + x^{72} + x^{64} + x^{40} + x^{16} + x^{8} + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{147} + x^{140} + x^{139} + x^{136} + x^{134} + x^{133} + x^{132} + x^{131} + x^{127} + x^{121} \\
&\quad + x^{120} + x^{115} + x^{112} + x^{110} + x^{108} + x^{99} + x^{97} + x^{96} + x^{95} + x^{92} \\
&\quad + x^{91} + x^{88} + x^{87} + x^{86} + x^{85} + x^{79} + x^{78} + x^{76} + x^{73} + x^{72} + x^{71} \\
&\quad + x^{69} + x^{66} + x^{62} + x^{61} + x^{59} + x^{57} + x^{56} + x^{55} + x^{54} + x^{53} + x^{52} \\
&\quad + x^{50} + x^{49} + x^{48} + x^{47} + x^{45} + x^{44} + x^{43} + x^{42} + x^{41} + x^{40} + x^{39}, \\
p_3(x) &= x^{139} + x^{137} + x^{136} + x^{135} + x^{131} + x^{129} + x^{128} + x^{127} + x^{125} + x^{122} \\
&\quad + x^{120} + x^{117} + x^{116} + x^{115} + x^{91} + x^{89} + x^{88} + x^{87} + x^{83} + x^{81}
\end{aligned}$$

$$
\begin{aligned}
&+ x^{80} + x^{79} + x^{77} + x^{75} + x^{74} + x^{73} + x^{71} + x^{69} + x^{68} + x^{65} + x^{64}\\
&+ x^{63} + x^{61} + x^{58} + x^{56} + x^{53} + x^{52} + x^{49} + x^{48} + x^{47} + x^{43} + x^{41}\\
&+ x^{40} + x^{39} + x^{37} + x^{34} + x^{32} + x^{29} + x^{28} + x^{27},\\
p_6(x) &= x^{135} + x^{133} + x^{132} + x^{121} + x^{118} + x^{117} + x^{116} + x^{105} + x^{102} + x^{101}\\
&+ x^{100} + x^{95} + x^{93} + x^{92} + x^{91} + x^{88} + x^{86} + x^{85} + x^{84} + x^{81} + x^{79}\\
&+ x^{78} + x^{77} + x^{74} + x^{72} + x^{71} + x^{70} + x^{67} + x^{65} + x^{64} + x^{63} + x^{60}\\
&+ x^{59} + x^{58} + x^{53} + x^{51} + x^{50} + x^{49} + x^{46} + x^{45} + x^{44} + x^{43} + x^{41}\\
&+ x^{40} + x^{35} + x^{32} + x^{31} + x^{30} + x^{29} + x^{27} + x^{26} + x^{21} + x^{19} + x^{18},\\
p_9(x) &= x^{131} + x^{129} + x^{128} + x^{127} + x^{119} + x^{117} + x^{116} + x^{113} + x^{112} + x^{111}\\
&+ x^{109} + x^{106} + x^{104} + x^{101} + x^{100} + x^{99} + x^{95} + x^{93} + x^{92} + x^{91}\\
&+ x^{85} + x^{83} + x^{82} + x^{78} + x^{76} + x^{75} + x^{71} + x^{69} + x^{68} + x^{64} + x^{62}\\
&+ x^{61} + x^{57} + x^{54} + x^{53} + x^{52} + x^{51} + x^{50} + x^{48} + x^{47} + x^{37} + x^{34}\\
&+ x^{33} + x^{32} + x^{31} + x^{30} + x^{29} + x^{28} + x^{26} + x^{22} + x^{20} + x^{17} + x^{16}\\
&+ x^{15} + x^{13} + x^{11} + x^{10} + x^{9},\\
p_{12}(x) &= x^{127} + x^{125} + x^{124} + x^{119} + x^{117} + x^{116} + x^{115} + x^{113} + x^{112} + x^{95}\\
&+ x^{93} + x^{92} + x^{87} + x^{85} + x^{84} + x^{83} + x^{81} + x^{80} + x^{79} + x^{77} + x^{76}\\
&+ x^{71} + x^{69} + x^{68} + x^{67} + x^{65} + x^{64} + x^{31} + x^{29} + x^{28} + x^{23} + x^{21}\\
&+ x^{20} + x^{19} + x^{17} + x^{16} + x^{15} + x^{13} + x^{12} + x^{7} + x^{5} + x^{4} + x^{3} + x + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{147} + x^{140} + x^{139} + x^{136} + x^{134} + x^{133} + x^{132} + x^{131} + x^{127} + x^{121}\\
&+ x^{120} + x^{115} + x^{112} + x^{110} + x^{108} + x^{99} + x^{97} + x^{96} + x^{95} + x^{92}\\
&+ x^{91} + x^{88} + x^{87} + x^{86} + x^{85} + x^{79} + x^{78} + x^{76} + x^{73} + x^{72} + x^{71}\\
&+ x^{69} + x^{66} + x^{62} + x^{61} + x^{59} + x^{57} + x^{56} + x^{55} + x^{54} + x^{53} + x^{52}\\
&+ x^{50} + x^{49} + x^{48} + x^{47} + x^{45} + x^{44} + x^{43} + x^{42} + x^{41} + x^{40} + x^{39},\\
p_3(x) &= x^{139} + x^{137} + x^{136} + x^{135} + x^{131} + x^{129} + x^{128} + x^{127} + x^{125} + x^{122}\\
&+ x^{120} + x^{117} + x^{116} + x^{115} + x^{91} + x^{89} + x^{88} + x^{87} + x^{83} + x^{81}\\
&+ x^{80} + x^{79} + x^{77} + x^{75} + x^{74} + x^{73} + x^{71} + x^{69} + x^{68} + x^{65} + x^{64}\\
&+ x^{63} + x^{61} + x^{58} + x^{56} + x^{53} + x^{52} + x^{49} + x^{48} + x^{47} + x^{43} + x^{41}\\
&+ x^{40} + x^{39} + x^{37} + x^{34} + x^{32} + x^{29} + x^{28} + x^{27},\\
p_6(x) &= x^{135} + x^{133} + x^{132} + x^{121} + x^{118} + x^{117} + x^{116} + x^{105} + x^{102} + x^{101}\\
&+ x^{100} + x^{95} + x^{93} + x^{92} + x^{91} + x^{88} + x^{86} + x^{85} + x^{84} + x^{81} + x^{79}\\
&+ x^{78} + x^{77} + x^{74} + x^{72} + x^{71} + x^{70} + x^{67} + x^{65} + x^{64} + x^{63} + x^{60}\\
&+ x^{59} + x^{58} + x^{53} + x^{51} + x^{50} + x^{49} + x^{46} + x^{45} + x^{44} + x^{43} + x^{41}\\
&+ x^{40} + x^{35} + x^{32} + x^{31} + x^{30} + x^{29} + x^{27} + x^{26} + x^{21} + x^{19} + x^{18},
\end{aligned}
$$

$$\begin{aligned}
p_9(x) = {} & x^{131} + x^{129} + x^{128} + x^{127} + x^{119} + x^{117} + x^{116} + x^{113} + x^{112} + x^{111} \\
& + x^{109} + x^{106} + x^{104} + x^{101} + x^{100} + x^{99} + x^{95} + x^{93} + x^{92} + x^{91} \\
& + x^{85} + x^{83} + x^{82} + x^{78} + x^{76} + x^{75} + x^{71} + x^{69} + x^{68} + x^{64} + x^{62} \\
& + x^{61} + x^{57} + x^{54} + x^{53} + x^{52} + x^{51} + x^{50} + x^{48} + x^{47} + x^{37} + x^{34} \\
& + x^{33} + x^{32} + x^{31} + x^{30} + x^{29} + x^{28} + x^{26} + x^{22} + x^{20} + x^{17} + x^{16} \\
& + x^{15} + x^{13} + x^{11} + x^{10} + x^{9}, \\
p_{12}(x) = {} & x^{127} + x^{125} + x^{124} + x^{119} + x^{117} + x^{116} + x^{115} + x^{113} + x^{112} + x^{95} \\
& + x^{93} + x^{92} + x^{87} + x^{85} + x^{84} + x^{83} + x^{81} + x^{80} + x^{79} + x^{77} + x^{76} \\
& + x^{71} + x^{69} + x^{68} + x^{67} + x^{65} + x^{64} + x^{31} + x^{29} + x^{28} + x^{23} + x^{21} \\
& + x^{20} + x^{19} + x^{17} + x^{16} + x^{15} + x^{13} + x^{12} + x^{7} + x^{5} + x^{4} + x^{3} + x + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) = {} & x^{150} + x^{146} + x^{144} + x^{142} + x^{126} + x^{118} + x^{114} + x^{112} + x^{102} + x^{98} \\
& + x^{88} + x^{86} + x^{84} + x^{82} + x^{80} + x^{68} + x^{62} + x^{60} + x^{56} + x^{54} + x^{50} \\
& + x^{46} + x^{42}, \\
p_3(x) = {} & x^{126} + x^{122} + x^{120} + x^{118} + x^{114} + x^{112} + x^{110} + x^{106} + x^{104} + x^{86} \\
& + x^{78} + x^{74} + x^{66} + x^{64} + x^{62} + x^{56} + x^{54} + x^{50} + x^{46} + x^{42} + x^{40} \\
& + x^{34} + x^{32} + x^{26} + x^{22} + x^{18}, \\
p_6(x) = {} & x^{126} + x^{122} + x^{120} + x^{106} + x^{104} + x^{102} + x^{98} + x^{96} + x^{90} + x^{86} \\
& + x^{84} + x^{80} + x^{78} + x^{68} + x^{60} + x^{58} + x^{56} + x^{48} + x^{46} + x^{40} + x^{38} \\
& + x^{36} + x^{30} + x^{28} + x^{22} + x^{16} + x^{10} + x^{8} + x^{2} + 1, \\
p_9(x) = {} & x^{118} + x^{114} + x^{112} + x^{110} + x^{106} + x^{104} + x^{98} + x^{96} + x^{82} + x^{78} \\
& + x^{76} + x^{74} + x^{72} + x^{68} + x^{64} + x^{62} + x^{60} + x^{58} + x^{54} + x^{50} + x^{48} \\
& + x^{46} + x^{44} + x^{42} + x^{40} + x^{38} + x^{32} + x^{28} + x^{26} + x^{22} + x^{12} + x^{10} \\
& + x^{8} + x^{6}, \\
p_{12}(x) = {} & x^{118} + x^{114} + x^{112} + x^{86} + x^{82} + x^{80} + x^{70} + x^{66} + x^{64} + x^{22} + x^{18} \\
& + x^{16} + x^{6} + x^{2} + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) = {} & x^{150} + x^{146} + x^{144} + x^{142} + x^{134} + x^{130} + x^{128} + x^{126} + x^{110} + x^{96} \\
& + x^{94} + x^{86} + x^{80} + x^{78} + x^{74} + x^{70} + x^{56} + x^{52} + x^{42} + x^{40} + x^{36}, \\
p_3(x) = {} & x^{126} + x^{122} + x^{120} + x^{118} + x^{114} + x^{112} + x^{102} + x^{94} + x^{90} + x^{88} \\
& + x^{86} + x^{80} + x^{78} + x^{76} + x^{64} + x^{62} + x^{60} + x^{58} + x^{52} + x^{50} + x^{48} \\
& + x^{42} + x^{40} + x^{32} + x^{30} + x^{28} + x^{26} + x^{20}, \\
p_6(x) = {} & x^{126} + x^{122} + x^{120} + x^{110} + x^{102} + x^{94} + x^{88} + x^{84} + x^{82} + x^{80} + x^{76}
\end{aligned}$$

$$
\begin{aligned}
&+x^{74}+x^{72}+x^{70}+x^{66}+x^{58}+x^{54}+x^{48}+x^{44}+x^{42}+x^{38}+x^{36}\\
&+x^{34}+x^{26}+x^{22}+x^{16}+x^{14}+x^{12}+x^{10}+x^{8}+x^{2}+1,\\
p_9(x) &= x^{118}+x^{114}+x^{112}+x^{110}+x^{106}+x^{104}+x^{98}+x^{96}+x^{82}+x^{78}\\
&+x^{76}+x^{74}+x^{72}+x^{68}+x^{64}+x^{62}+x^{60}+x^{58}+x^{54}+x^{50}+x^{48}\\
&+x^{46}+x^{44}+x^{42}+x^{40}+x^{38}+x^{32}+x^{28}+x^{26}+x^{22}+x^{12}+x^{10}\\
&+x^{8}+x^{6},\\
p_{12}(x) &= x^{118}+x^{114}+x^{112}+x^{86}+x^{82}+x^{80}+x^{70}+x^{66}+x^{64}+x^{22}+x^{18}\\
&+x^{16}+x^{6}+x^{2}+1,
\end{aligned}
$$

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

$$
\begin{aligned}
p_0(x) &= x^{147}+x^{143}+x^{141}+x^{139}+x^{135}+x^{133}+x^{132}+x^{131}+x^{124}+x^{107}\\
&+x^{104}+x^{102}+x^{101}+x^{100}+x^{99}+x^{93}+x^{92}+x^{90}+x^{89}+x^{88}\\
&+x^{87}+x^{84}+x^{83}+x^{82}+x^{81}+x^{78}+x^{76}+x^{69}+x^{66}+x^{65}+x^{62}\\
&+x^{60}+x^{58}+x^{57}+x^{56}+x^{53}+x^{52}+x^{51}+x^{50}+x^{49}+x^{43}+x^{42}\\
&+x^{41}+x^{40}+x^{39},\\
p_3(x) &= x^{139}+x^{137}+x^{136}+x^{135}+x^{131}+x^{129}+x^{128}+x^{127}+x^{125}+x^{122}\\
&+x^{120}+x^{117}+x^{116}+x^{115}+x^{91}+x^{89}+x^{88}+x^{87}+x^{83}+x^{81}\\
&+x^{80}+x^{79}+x^{77}+x^{75}+x^{74}+x^{73}+x^{71}+x^{69}+x^{68}+x^{65}+x^{64}\\
&+x^{63}+x^{61}+x^{58}+x^{56}+x^{53}+x^{52}+x^{49}+x^{48}+x^{47}+x^{43}+x^{41}\\
&+x^{40}+x^{39}+x^{37}+x^{34}+x^{32}+x^{29}+x^{28}+x^{27},\\
p_6(x) &= x^{135}+x^{133}+x^{132}+x^{121}+x^{118}+x^{117}+x^{116}+x^{105}+x^{102}+x^{101}\\
&+x^{100}+x^{95}+x^{93}+x^{92}+x^{91}+x^{88}+x^{86}+x^{85}+x^{84}+x^{81}+x^{79}\\
&+x^{78}+x^{77}+x^{74}+x^{72}+x^{71}+x^{70}+x^{67}+x^{65}+x^{64}+x^{63}+x^{60}\\
&+x^{59}+x^{58}+x^{53}+x^{51}+x^{50}+x^{49}+x^{46}+x^{45}+x^{44}+x^{43}+x^{41}\\
&+x^{40}+x^{35}+x^{32}+x^{31}+x^{30}+x^{29}+x^{27}+x^{26}+x^{21}+x^{19}+x^{18},\\
p_9(x) &= x^{131}+x^{129}+x^{128}+x^{127}+x^{119}+x^{117}+x^{116}+x^{113}+x^{112}+x^{111}\\
&+x^{109}+x^{106}+x^{104}+x^{101}+x^{100}+x^{99}+x^{95}+x^{93}+x^{92}+x^{91}\\
&+x^{85}+x^{83}+x^{82}+x^{78}+x^{76}+x^{75}+x^{71}+x^{69}+x^{68}+x^{64}+x^{62}\\
&+x^{61}+x^{57}+x^{54}+x^{53}+x^{52}+x^{51}+x^{50}+x^{48}+x^{47}+x^{37}+x^{34}\\
&+x^{33}+x^{32}+x^{31}+x^{30}+x^{29}+x^{28}+x^{26}+x^{22}+x^{20}+x^{17}+x^{16}\\
&+x^{15}+x^{13}+x^{11}+x^{10}+x^{9},\\
p_{12}(x) &= x^{127}+x^{125}+x^{124}+x^{119}+x^{117}+x^{116}+x^{115}+x^{113}+x^{112}+x^{95}\\
&+x^{93}+x^{92}+x^{87}+x^{85}+x^{84}+x^{83}+x^{81}+x^{80}+x^{79}+x^{77}+x^{76}\\
&+x^{71}+x^{69}+x^{68}+x^{67}+x^{65}+x^{64}+x^{31}+x^{29}+x^{28}+x^{23}+x^{21}\\
&+x^{20}+x^{19}+x^{17}+x^{16}+x^{15}+x^{13}+x^{12}+x^{7}+x^{5}+x^{4}+x^{3}+x+1,
\end{aligned}
$$

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

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

$$\begin{aligned}
p_0(x) &= x^{147} + x^{143} + x^{141} + x^{139} + x^{135} + x^{133} + x^{132} + x^{131} + x^{124} + x^{107} \\
&\quad + x^{104} + x^{102} + x^{101} + x^{100} + x^{99} + x^{93} + x^{92} + x^{90} + x^{89} + x^{88} \\
&\quad + x^{87} + x^{84} + x^{83} + x^{82} + x^{81} + x^{78} + x^{76} + x^{69} + x^{66} + x^{65} + x^{62} \\
&\quad + x^{60} + x^{58} + x^{57} + x^{56} + x^{53} + x^{52} + x^{51} + x^{50} + x^{49} + x^{43} + x^{42} \\
&\quad + x^{41} + x^{40} + x^{39}, \\
p_3(x) &= x^{139} + x^{137} + x^{136} + x^{135} + x^{131} + x^{129} + x^{128} + x^{127} + x^{125} + x^{122} \\
&\quad + x^{120} + x^{117} + x^{116} + x^{115} + x^{91} + x^{89} + x^{88} + x^{87} + x^{83} + x^{81} \\
&\quad + x^{80} + x^{79} + x^{77} + x^{75} + x^{74} + x^{73} + x^{71} + x^{69} + x^{68} + x^{65} + x^{64} \\
&\quad + x^{63} + x^{61} + x^{58} + x^{56} + x^{53} + x^{52} + x^{49} + x^{48} + x^{47} + x^{43} + x^{41} \\
&\quad + x^{40} + x^{39} + x^{37} + x^{34} + x^{32} + x^{29} + x^{28} + x^{27}, \\
p_6(x) &= x^{135} + x^{133} + x^{132} + x^{121} + x^{118} + x^{117} + x^{116} + x^{105} + x^{102} + x^{101} \\
&\quad + x^{100} + x^{95} + x^{93} + x^{92} + x^{91} + x^{88} + x^{86} + x^{85} + x^{84} + x^{81} + x^{79} \\
&\quad + x^{78} + x^{77} + x^{74} + x^{72} + x^{71} + x^{70} + x^{67} + x^{65} + x^{64} + x^{63} + x^{60} \\
&\quad + x^{59} + x^{58} + x^{53} + x^{51} + x^{50} + x^{49} + x^{46} + x^{45} + x^{44} + x^{43} + x^{41} \\
&\quad + x^{40} + x^{35} + x^{32} + x^{31} + x^{30} + x^{29} + x^{27} + x^{26} + x^{21} + x^{19} + x^{18}, \\
p_9(x) &= x^{131} + x^{129} + x^{128} + x^{127} + x^{119} + x^{117} + x^{116} + x^{113} + x^{112} + x^{111} \\
&\quad + x^{109} + x^{106} + x^{104} + x^{101} + x^{100} + x^{99} + x^{95} + x^{93} + x^{92} + x^{91} \\
&\quad + x^{85} + x^{83} + x^{82} + x^{78} + x^{76} + x^{75} + x^{71} + x^{69} + x^{68} + x^{64} + x^{62} \\
&\quad + x^{61} + x^{57} + x^{54} + x^{53} + x^{52} + x^{51} + x^{50} + x^{48} + x^{47} + x^{37} + x^{34} \\
&\quad + x^{33} + x^{32} + x^{31} + x^{30} + x^{29} + x^{28} + x^{26} + x^{22} + x^{20} + x^{17} + x^{16} \\
&\quad + x^{15} + x^{13} + x^{11} + x^{10} + x^{9}, \\
p_{12}(x) &= x^{127} + x^{125} + x^{124} + x^{119} + x^{117} + x^{116} + x^{115} + x^{113} + x^{112} + x^{95} \\
&\quad + x^{93} + x^{92} + x^{87} + x^{85} + x^{84} + x^{83} + x^{81} + x^{80} + x^{79} + x^{77} + x^{76} \\
&\quad + x^{71} + x^{69} + x^{68} + x^{67} + x^{65} + x^{64} + x^{31} + x^{29} + x^{28} + x^{23} + x^{21} \\
&\quad + x^{20} + x^{19} + x^{17} + x^{16} + x^{15} + x^{13} + x^{12} + x^{7} + x^{5} + x^{4} + x^{3} + x + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{144} + x^{140} + x^{138} + x^{136} + x^{128} + x^{124} + x^{122} + x^{112} + x^{108} + x^{106} \\
&\quad + x^{104} + x^{98} + x^{96} + x^{94} + x^{88} + x^{84} + x^{82} + x^{76} + x^{74} + x^{70} + x^{64} \\
&\quad + x^{60} + x^{58} + x^{56} + x^{54} + x^{52} + x^{48} + x^{44} + x^{42}, \\
p_3(x) &= x^{132} + x^{130} + x^{122} + x^{118} + x^{100} + x^{98} + x^{96} + x^{84} + x^{82} + x^{74} + x^{72} \\
&\quad + x^{70} + x^{64} + x^{58} + x^{56} + x^{54} + x^{48} + x^{40} + x^{36} + x^{32} + x^{30} + x^{24} \\
&\quad + x^{20} + x^{18},
\end{aligned}$$

$$\begin{aligned}
p_6(x) &= x^{132}+x^{130}+x^{128}+x^{124}+x^{118}+x^{114}+x^{112}+x^{110}+x^{108}+x^{98}\\
&\quad +x^{96}+x^{94}+x^{92}+x^{88}+x^{86}+x^{84}+x^{78}+x^{76}+x^{74}+x^{70}+x^{66}\\
&\quad +x^{64}+x^{62}+x^{60}+x^{56}+x^{54}+x^{52}+x^{50}+x^{46}+x^{44}+x^{42}+x^{38}\\
&\quad +x^{28}+x^{26}+x^{24}+x^{22}+x^{18}+x^{14}+x^{10}+x^{8}+x^{6}+1,\\
p_9(x) &= x^{136}+x^{128}+x^{120}+x^{116}+x^{114}+x^{112}+x^{106}+x^{104}+x^{102}+x^{100}\\
&\quad +x^{96}+x^{92}+x^{90}+x^{88}+x^{86}+x^{84}+x^{82}+x^{74}+x^{70}+x^{68}+x^{56}\\
&\quad +x^{54}+x^{52}+x^{46}+x^{44}+x^{42}+x^{40}+x^{38}+x^{36}+x^{32}+x^{30}+x^{28}\\
&\quad +x^{20}+x^{12}+x^{10}+x^{6},\\
p_{12}(x) &= x^{136}+x^{120}+x^{112}+x^{104}+x^{80}+x^{72}+x^{64}+x^{40}+x^{16}+x^{8}+1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{147}+x^{140}+x^{136}+x^{135}+x^{134}+x^{132}+x^{131}+x^{128}+x^{127}+x^{126}\\
&\quad +x^{125}+x^{124}+x^{123}+x^{121}+x^{120}+x^{119}+x^{116}+x^{113}+x^{112}\\
&\quad +x^{111}+x^{108}+x^{107}+x^{105}+x^{102}+x^{101}+x^{94}+x^{93}+x^{90}+x^{89}\\
&\quad +x^{88}+x^{86}+x^{85}+x^{84}+x^{83}+x^{80}+x^{79}+x^{77}+x^{76}+x^{74}+x^{69}\\
&\quad +x^{67}+x^{65}+x^{64}+x^{61}+x^{60}+x^{59}+x^{58}+x^{57}+x^{56}+x^{54}+x^{53}\\
&\quad +x^{52}+x^{50}+x^{49}+x^{47}+x^{45}+x^{44}+x^{40}+x^{38}+x^{37}+x^{36},\\
p_3(x) &= x^{143}+x^{141}+x^{140}+x^{139}+x^{129}+x^{128}+x^{125}+x^{123}+x^{121}+x^{118}\\
&\quad +x^{113}+x^{111}+x^{110}+x^{103}+x^{101}+x^{100}+x^{99}+x^{96}+x^{95}+x^{94}\\
&\quad +x^{91}+x^{89}+x^{86}+x^{84}+x^{83}+x^{82}+x^{81}+x^{80}+x^{79}+x^{76}+x^{75}\\
&\quad +x^{72}+x^{71}+x^{70}+x^{68}+x^{66}+x^{65}+x^{63}+x^{62}+x^{59}+x^{58}+x^{57}\\
&\quad +x^{56}+x^{55}+x^{49}+x^{48}+x^{43}+x^{39}+x^{37}+x^{36}+x^{35}+x^{34}+x^{32}\\
&\quad +x^{30}+x^{29}+x^{26}+x^{25}+x^{24},\\
p_6(x) &= x^{143}+x^{141}+x^{140}+x^{139}+x^{129}+x^{128}+x^{125}+x^{121}+x^{119}+x^{118}\\
&\quad +x^{117}+x^{116}+x^{115}+x^{113}+x^{110}+x^{108}+x^{105}+x^{102}+x^{99}+x^{97}\\
&\quad +x^{96}+x^{92}+x^{89}+x^{88}+x^{83}+x^{82}+x^{78}+x^{75}+x^{74}+x^{73}+x^{70}\\
&\quad +x^{69}+x^{67}+x^{66}+x^{64}+x^{63}+x^{61}+x^{60}+x^{59}+x^{57}+x^{56}+x^{54}\\
&\quad +x^{50}+x^{49}+x^{46}+x^{45}+x^{44}+x^{40}+x^{38}+x^{37}+x^{36}+x^{34}+x^{33}\\
&\quad +x^{31}+x^{27}+x^{25}+x^{20}+x^{19}+x^{18}+x^{16}+x^{15}+x^{14}+x^{7}+x^{5}+x^{4}\\
&\quad +x^{3}+x+1,\\
p_9(x) &= x^{143}+x^{141}+x^{140}+x^{135}+x^{133}+x^{132}+x^{131}+x^{129}+x^{128}+x^{127}\\
&\quad +x^{125}+x^{124}+x^{111}+x^{109}+x^{108}+x^{103}+x^{101}+x^{100}+x^{99}+x^{97}\\
&\quad +x^{96}+x^{87}+x^{85}+x^{84}+x^{83}+x^{81}+x^{80}+x^{79}+x^{77}+x^{76}+x^{47}\\
&\quad +x^{45}+x^{44}+x^{39}+x^{37}+x^{36}+x^{35}+x^{33}+x^{32}+x^{23}+x^{21}+x^{20}\\
&\quad +x^{19}+x^{17}+x^{16}+x^{15}+x^{13}+x^{12},
\end{aligned}$$

$$\begin{aligned}p_{12}(x) &= x^{143}+x^{141}+x^{140}+x^{135}+x^{133}+x^{132}+x^{131}+x^{129}+x^{128}+x^{119}\\&\quad+x^{117}+x^{116}+x^{115}+x^{113}+x^{112}+x^{111}+x^{109}+x^{108}+x^{103}\\&\quad+x^{101}+x^{100}+x^{99}+x^{97}+x^{96}+x^{95}+x^{93}+x^{92}+x^{71}+x^{69}+x^{68}\\&\quad+x^{67}+x^{65}+x^{64}+x^{47}+x^{45}+x^{44}+x^{39}+x^{37}+x^{36}+x^{35}+x^{33}\\&\quad+x^{32}+x^{31}+x^{29}+x^{28}+x^{7}+x^{5}+x^{4}+x^{3}+x+1,\end{aligned}$$

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

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

$$\begin{aligned}p_{0}(x) &= x^{156}+x^{148}+x^{144}+x^{141}+x^{140}+x^{137}+x^{136}+x^{135}+x^{134}+x^{133}\\&\quad+x^{129}+x^{128}+x^{127}+x^{126}+x^{121}+x^{119}+x^{117}+x^{116}+x^{112}\\&\quad+x^{108}+x^{106}+x^{104}+x^{103}+x^{102}+x^{101}+x^{100}+x^{99}+x^{98}+x^{97}\\&\quad+x^{95}+x^{94}+x^{91}+x^{89}+x^{86}+x^{85}+x^{84}+x^{80}+x^{78}+x^{76}+x^{75}\\&\quad+x^{74}+x^{71}+x^{68}+x^{67}+x^{66}+x^{63}+x^{59}+x^{58}+x^{57}+x^{54}+x^{52}\\&\quad+x^{50}+x^{46}+x^{45}+x^{42}+x^{41}+x^{39},\\p_{3}(x) &= x^{128}+x^{124}+x^{122}+x^{121}+x^{117}+x^{115}+x^{80}+x^{76}+x^{74}+x^{73}\\&\quad+x^{69}+x^{67}+x^{64}+x^{60}+x^{58}+x^{57}+x^{53}+x^{51}+x^{40}+x^{36}+x^{34}\\&\quad+x^{33}+x^{29}+x^{27},\\p_{6}(x) &= x^{132}+x^{118}+x^{116}+x^{102}+x^{100}+x^{92}+x^{88}+x^{86}+x^{84}+x^{78}+x^{74}\\&\quad+x^{72}+x^{70}+x^{64}+x^{60}+x^{58}+x^{50}+x^{46}+x^{44}+x^{40}+x^{32}+x^{30}\\&\quad+x^{26}+x^{18},\\p_{9}(x) &= x^{136}+x^{132}+x^{130}+x^{129}+x^{128}+x^{125}+x^{123}+x^{121}+x^{104}+x^{100}\\&\quad+x^{98}+x^{97}+x^{96}+x^{93}+x^{91}+x^{89}+x^{88}+x^{84}+x^{82}+x^{81}+x^{80}\\&\quad+x^{77}+x^{75}+x^{73}+x^{40}+x^{36}+x^{34}+x^{33}+x^{32}+x^{29}+x^{27}+x^{25}\\&\quad+x^{24}+x^{20}+x^{18}+x^{17}+x^{16}+x^{13}+x^{11}+x^{9},\\p_{12}(x) &= x^{140}+x^{132}+x^{128}+x^{116}+x^{112}+x^{108}+x^{100}+x^{96}+x^{92}+x^{68}\\&\quad+x^{64}+x^{44}+x^{36}+x^{32}+x^{28}+x^{4}+1,\end{aligned}$$

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

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

$$\begin{aligned}p_{0}(x) &= x^{144}+x^{137}+x^{133}+x^{131}+x^{130}+x^{125}+x^{124}+x^{123}+x^{122}+x^{118}\\&\quad+x^{116}+x^{115}+x^{114}+x^{112}+x^{110}+x^{107}+x^{106}+x^{104}+x^{100}\\&\quad+x^{97}+x^{95}+x^{93}+x^{92}+x^{90}+x^{89}+x^{87}+x^{83}+x^{81}+x^{80}+x^{79}\\&\quad+x^{73}+x^{72}+x^{71}+x^{70}+x^{68}+x^{66}+x^{65}+x^{63}+x^{60}+x^{59}+x^{58}\\&\quad+x^{53}+x^{44}+x^{43}+x^{42}+x^{41}+x^{39},\\p_{3}(x) &= x^{140}+x^{136}+x^{134}+x^{133}+x^{132}+x^{129}+x^{127}+x^{126}+x^{125}+x^{124}\\&\quad+x^{122}+x^{119}+x^{117}+x^{115}+x^{92}+x^{88}+x^{86}+x^{85}+x^{84}+x^{81}\\&\quad+x^{79}+x^{78}+x^{77}+x^{74}+x^{72}+x^{71}+x^{70}+x^{68}+x^{67}+x^{65}+x^{63}\end{aligned}$$

$$
\begin{aligned}
&+ x^{62} + x^{61} + x^{60} + x^{58} + x^{55} + x^{53} + x^{52} + x^{51} + x^{48} + x^{46} + x^{45}\\
&+ x^{44} + x^{41} + x^{39} + x^{38} + x^{37} + x^{36} + x^{34} + x^{31} + x^{29} + x^{27},\\
p_6(x) &= x^{144} + x^{136} + x^{132} + x^{130} + x^{128} + x^{122} + x^{120} + x^{118} + x^{116} + x^{114}\\
&+ x^{112} + x^{106} + x^{102} + x^{98} + x^{68} + x^{60} + x^{56} + x^{54} + x^{52} + x^{48} + x^{46}\\
&+ x^{44} + x^{42} + x^{40} + x^{38} + x^{36} + x^{34} + x^{32} + x^{30} + x^{26} + x^{22} + x^{18},\\
p_9(x) &= x^{148} + x^{144} + x^{142} + x^{141} + x^{137} + x^{135} + x^{134} + x^{130} + x^{128} + x^{127}\\
&+ x^{123} + x^{121} + x^{116} + x^{112} + x^{110} + x^{109} + x^{105} + x^{103} + x^{102}\\
&+ x^{100} + x^{98} + x^{95} + x^{94} + x^{93} + x^{91} + x^{87} + x^{86} + x^{82} + x^{80} + x^{79}\\
&+ x^{75} + x^{73} + x^{52} + x^{48} + x^{46} + x^{45} + x^{41} + x^{39} + x^{38} + x^{36} + x^{34}\\
&+ x^{31} + x^{30} + x^{29} + x^{27} + x^{23} + x^{22} + x^{18} + x^{16} + x^{15} + x^{11} + x^{9},\\
p_{12}(x) &= x^{152} + x^{136} + x^{124} + x^{112} + x^{92} + x^{80} + x^{76} + x^{72} + x^{64} + x^{56} + x^{28}\\
&+ x^{16} + x^{12} + x^{8} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{147} + x^{143} + x^{141} + x^{135} + x^{133} + x^{131} + x^{124} + x^{119} + x^{117} + x^{103}\\
&+ x^{100} + x^{96} + x^{95} + x^{93} + x^{92} + x^{91} + x^{89} + x^{84} + x^{83} + x^{81} + x^{79}\\
&+ x^{78} + x^{76} + x^{72} + x^{71} + x^{70} + x^{66} + x^{63} + x^{62} + x^{57} + x^{56} + x^{53}\\
&+ x^{52} + x^{51} + x^{50} + x^{49} + x^{47} + x^{46} + x^{44} + x^{43} + x^{42},\\
p_3(x) &= x^{143} + x^{141} + x^{140} + x^{139} + x^{135} + x^{133} + x^{132} + x^{129} + x^{128} + x^{127}\\
&+ x^{124} + x^{123} + x^{117} + x^{116} + x^{115} + x^{112} + x^{111} + x^{110} + x^{103}\\
&+ x^{101} + x^{100} + x^{99} + x^{96} + x^{95} + x^{94} + x^{91} + x^{89} + x^{87} + x^{86} + x^{85}\\
&+ x^{83} + x^{82} + x^{81} + x^{80} + x^{77} + x^{75} + x^{73} + x^{72} + x^{68} + x^{67} + x^{66}\\
&+ x^{64} + x^{62} + x^{61} + x^{60} + x^{59} + x^{58} + x^{56} + x^{55} + x^{54} + x^{53} + x^{52}\\
&+ x^{51} + x^{47} + x^{45} + x^{44} + x^{43} + x^{35} + x^{34} + x^{33} + x^{32} + x^{28} + x^{27}\\
&+ x^{26},\\
p_6(x) &= x^{143} + x^{141} + x^{140} + x^{139} + x^{135} + x^{133} + x^{132} + x^{129} + x^{128} + x^{127}\\
&+ x^{124} + x^{117} + x^{116} + x^{112} + x^{111} + x^{110} + x^{109} + x^{103} + x^{92} + x^{91}\\
&+ x^{89} + x^{86} + x^{85} + x^{84} + x^{83} + x^{82} + x^{81} + x^{79} + x^{77} + x^{75} + x^{73}\\
&+ x^{72} + x^{71} + x^{69} + x^{66} + x^{65} + x^{61} + x^{58} + x^{57} + x^{56} + x^{54} + x^{53}\\
&+ x^{49} + x^{48} + x^{40} + x^{39} + x^{38} + x^{34} + x^{31} + x^{30} + x^{28} + x^{27} + x^{26}\\
&+ x^{24} + x^{23} + x^{19} + x^{17} + x^{14} + x^{13} + x^{12} + x^{7} + x^{5} + x^{4} + x^{3} + x + 1,\\
p_9(x) &= x^{143} + x^{141} + x^{140} + x^{135} + x^{133} + x^{132} + x^{131} + x^{129} + x^{128} + x^{127}\\
&+ x^{125} + x^{124} + x^{111} + x^{109} + x^{108} + x^{103} + x^{101} + x^{100} + x^{99} + x^{97}\\
&+ x^{96} + x^{87} + x^{85} + x^{84} + x^{83} + x^{81} + x^{80} + x^{79} + x^{77} + x^{76} + x^{47}\\
&+ x^{45} + x^{44} + x^{39} + x^{37} + x^{36} + x^{35} + x^{33} + x^{32} + x^{23} + x^{21} + x^{20}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{19} + x^{17} + x^{16} + x^{15} + x^{13} + x^{12},\\
p_{12}(x) &= x^{143} + x^{141} + x^{140} + x^{135} + x^{133} + x^{132} + x^{131} + x^{129} + x^{128} + x^{119}\\
&+ x^{117} + x^{116} + x^{115} + x^{113} + x^{112} + x^{111} + x^{109} + x^{108} + x^{103}\\
&+ x^{101} + x^{100} + x^{99} + x^{97} + x^{96} + x^{95} + x^{93} + x^{92} + x^{71} + x^{69} + x^{68}\\
&+ x^{67} + x^{65} + x^{64} + x^{47} + x^{45} + x^{44} + x^{39} + x^{37} + x^{36} + x^{35} + x^{33}\\
&+ x^{32} + x^{31} + x^{29} + x^{28} + x^{7} + x^{5} + x^{4} + x^{3} + x + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{147} + x^{140} + x^{136} + x^{135} + x^{134} + x^{132} + x^{131} + x^{128} + x^{127} + x^{126}\\
&+ x^{125} + x^{124} + x^{123} + x^{121} + x^{120} + x^{119} + x^{116} + x^{113} + x^{112}\\
&+ x^{111} + x^{108} + x^{107} + x^{105} + x^{102} + x^{101} + x^{94} + x^{93} + x^{90} + x^{89}\\
&+ x^{88} + x^{86} + x^{85} + x^{84} + x^{83} + x^{80} + x^{79} + x^{77} + x^{76} + x^{74} + x^{69}\\
&+ x^{67} + x^{65} + x^{64} + x^{61} + x^{60} + x^{59} + x^{58} + x^{57} + x^{56} + x^{54} + x^{53}\\
&+ x^{52} + x^{50} + x^{49} + x^{47} + x^{45} + x^{44} + x^{40} + x^{38} + x^{37} + x^{36},\\
p_3(x) &= x^{143} + x^{141} + x^{140} + x^{139} + x^{129} + x^{128} + x^{125} + x^{123} + x^{121} + x^{118}\\
&+ x^{113} + x^{111} + x^{110} + x^{103} + x^{101} + x^{100} + x^{99} + x^{96} + x^{95} + x^{94}\\
&+ x^{91} + x^{89} + x^{86} + x^{84} + x^{83} + x^{82} + x^{81} + x^{80} + x^{79} + x^{76} + x^{75}\\
&+ x^{72} + x^{71} + x^{70} + x^{68} + x^{66} + x^{65} + x^{63} + x^{62} + x^{59} + x^{58} + x^{57}\\
&+ x^{56} + x^{55} + x^{49} + x^{48} + x^{43} + x^{39} + x^{37} + x^{36} + x^{35} + x^{34} + x^{32}\\
&+ x^{30} + x^{29} + x^{26} + x^{25} + x^{24},\\
p_6(x) &= x^{143} + x^{141} + x^{140} + x^{139} + x^{129} + x^{128} + x^{125} + x^{121} + x^{119} + x^{118}\\
&+ x^{117} + x^{116} + x^{115} + x^{113} + x^{110} + x^{108} + x^{105} + x^{102} + x^{99} + x^{97}\\
&+ x^{96} + x^{92} + x^{89} + x^{88} + x^{83} + x^{82} + x^{78} + x^{75} + x^{74} + x^{73} + x^{70}\\
&+ x^{69} + x^{67} + x^{66} + x^{64} + x^{63} + x^{61} + x^{60} + x^{59} + x^{57} + x^{56} + x^{54}\\
&+ x^{50} + x^{49} + x^{46} + x^{45} + x^{44} + x^{40} + x^{38} + x^{37} + x^{36} + x^{34} + x^{33}\\
&+ x^{31} + x^{27} + x^{25} + x^{20} + x^{19} + x^{18} + x^{16} + x^{15} + x^{14} + x^{7} + x^{5} + x^{4}\\
&+ x^{3} + x + 1,\\
p_9(x) &= x^{143} + x^{141} + x^{140} + x^{135} + x^{133} + x^{132} + x^{131} + x^{129} + x^{128} + x^{127}\\
&+ x^{125} + x^{124} + x^{111} + x^{109} + x^{108} + x^{103} + x^{101} + x^{100} + x^{99} + x^{97}\\
&+ x^{96} + x^{87} + x^{85} + x^{84} + x^{83} + x^{81} + x^{80} + x^{79} + x^{77} + x^{76} + x^{47}\\
&+ x^{45} + x^{44} + x^{39} + x^{37} + x^{36} + x^{35} + x^{33} + x^{32} + x^{23} + x^{21} + x^{20}\\
&+ x^{19} + x^{17} + x^{16} + x^{15} + x^{13} + x^{12},\\
p_{12}(x) &= x^{143} + x^{141} + x^{140} + x^{135} + x^{133} + x^{132} + x^{131} + x^{129} + x^{128} + x^{119}\\
&+ x^{117} + x^{116} + x^{115} + x^{113} + x^{112} + x^{111} + x^{109} + x^{108} + x^{103}\\
&+ x^{101} + x^{100} + x^{99} + x^{97} + x^{96} + x^{95} + x^{93} + x^{92} + x^{71} + x^{69} + x^{68}
\end{aligned}
$$

$$+ x^{67} + x^{65} + x^{64} + x^{47} + x^{45} + x^{44} + x^{39} + x^{37} + x^{36} + x^{35} + x^{33}$$
$$+ x^{32} + x^{31} + x^{29} + x^{28} + x^{7} + x^{5} + x^{4} + x^{3} + x + 1,$$

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

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

$$\begin{aligned}
p_0(x) = {} & x^{144} + x^{137} + x^{133} + x^{131} + x^{130} + x^{125} + x^{124} + x^{123} + x^{122} + x^{118} \\
& + x^{116} + x^{115} + x^{114} + x^{112} + x^{110} + x^{107} + x^{106} + x^{104} + x^{100} \\
& + x^{97} + x^{95} + x^{93} + x^{92} + x^{90} + x^{89} + x^{87} + x^{83} + x^{81} + x^{80} + x^{79} \\
& + x^{73} + x^{72} + x^{71} + x^{70} + x^{68} + x^{66} + x^{65} + x^{63} + x^{60} + x^{59} + x^{58} \\
& + x^{53} + x^{44} + x^{43} + x^{42} + x^{41} + x^{39}, \\
p_3(x) = {} & x^{140} + x^{136} + x^{134} + x^{133} + x^{132} + x^{129} + x^{127} + x^{126} + x^{125} + x^{124} \\
& + x^{122} + x^{119} + x^{117} + x^{115} + x^{92} + x^{88} + x^{86} + x^{85} + x^{84} + x^{81} \\
& + x^{79} + x^{78} + x^{77} + x^{74} + x^{72} + x^{71} + x^{70} + x^{68} + x^{67} + x^{65} + x^{63} \\
& + x^{62} + x^{61} + x^{60} + x^{58} + x^{55} + x^{53} + x^{52} + x^{51} + x^{48} + x^{46} + x^{45} \\
& + x^{44} + x^{41} + x^{39} + x^{38} + x^{37} + x^{36} + x^{34} + x^{31} + x^{29} + x^{27}, \\
p_6(x) = {} & x^{144} + x^{136} + x^{132} + x^{130} + x^{128} + x^{122} + x^{120} + x^{118} + x^{116} + x^{114} \\
& + x^{112} + x^{106} + x^{102} + x^{98} + x^{68} + x^{60} + x^{56} + x^{54} + x^{52} + x^{48} + x^{46} \\
& + x^{44} + x^{42} + x^{40} + x^{38} + x^{36} + x^{34} + x^{32} + x^{30} + x^{26} + x^{22} + x^{18}, \\
p_9(x) = {} & x^{148} + x^{144} + x^{142} + x^{141} + x^{137} + x^{135} + x^{134} + x^{130} + x^{128} + x^{127} \\
& + x^{123} + x^{121} + x^{116} + x^{112} + x^{110} + x^{109} + x^{105} + x^{103} + x^{102} \\
& + x^{100} + x^{98} + x^{95} + x^{94} + x^{93} + x^{91} + x^{87} + x^{86} + x^{82} + x^{80} + x^{79} \\
& + x^{75} + x^{73} + x^{52} + x^{48} + x^{46} + x^{45} + x^{41} + x^{39} + x^{38} + x^{36} + x^{34} \\
& + x^{31} + x^{30} + x^{29} + x^{27} + x^{23} + x^{22} + x^{18} + x^{16} + x^{15} + x^{11} + x^{9}, \\
p_{12}(x) = {} & x^{152} + x^{136} + x^{124} + x^{112} + x^{92} + x^{80} + x^{76} + x^{72} + x^{64} + x^{56} + x^{28} \\
& + x^{16} + x^{12} + x^{8} + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) = {} & x^{156} + x^{148} + x^{144} + x^{141} + x^{140} + x^{137} + x^{136} + x^{135} + x^{134} + x^{133} \\
& + x^{129} + x^{128} + x^{127} + x^{126} + x^{121} + x^{119} + x^{117} + x^{116} + x^{112} \\
& + x^{108} + x^{106} + x^{104} + x^{103} + x^{102} + x^{101} + x^{100} + x^{99} + x^{98} + x^{97} \\
& + x^{95} + x^{94} + x^{91} + x^{89} + x^{86} + x^{85} + x^{84} + x^{80} + x^{78} + x^{76} + x^{75} \\
& + x^{74} + x^{71} + x^{68} + x^{67} + x^{66} + x^{63} + x^{59} + x^{58} + x^{57} + x^{54} + x^{52} \\
& + x^{50} + x^{46} + x^{45} + x^{42} + x^{41} + x^{39}, \\
p_3(x) = {} & x^{128} + x^{124} + x^{122} + x^{121} + x^{117} + x^{115} + x^{80} + x^{76} + x^{74} + x^{73} \\
& + x^{69} + x^{67} + x^{64} + x^{60} + x^{58} + x^{57} + x^{53} + x^{51} + x^{40} + x^{36} + x^{34} \\
& + x^{33} + x^{29} + x^{27},
\end{aligned}$$

$$\begin{aligned}
p_6(x) &= x^{132} + x^{118} + x^{116} + x^{102} + x^{100} + x^{92} + x^{88} + x^{86} + x^{84} + x^{78} + x^{74} \\
&\quad + x^{72} + x^{70} + x^{64} + x^{60} + x^{58} + x^{50} + x^{46} + x^{44} + x^{40} + x^{32} + x^{30} \\
&\quad + x^{26} + x^{18}, \\
p_9(x) &= x^{136} + x^{132} + x^{130} + x^{129} + x^{128} + x^{125} + x^{123} + x^{121} + x^{104} + x^{100} \\
&\quad + x^{98} + x^{97} + x^{96} + x^{93} + x^{91} + x^{89} + x^{88} + x^{84} + x^{82} + x^{81} + x^{80} \\
&\quad + x^{77} + x^{75} + x^{73} + x^{40} + x^{36} + x^{34} + x^{33} + x^{32} + x^{29} + x^{27} + x^{25} \\
&\quad + x^{24} + x^{20} + x^{18} + x^{17} + x^{16} + x^{13} + x^{11} + x^{9}, \\
p_{12}(x) &= x^{140} + x^{132} + x^{128} + x^{116} + x^{112} + x^{108} + x^{100} + x^{96} + x^{92} + x^{68} \\
&\quad + x^{64} + x^{44} + x^{36} + x^{32} + x^{28} + x^{4} + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{147} + x^{143} + x^{141} + x^{135} + x^{133} + x^{131} + x^{124} + x^{119} + x^{117} + x^{103} \\
&\quad + x^{100} + x^{96} + x^{95} + x^{93} + x^{92} + x^{91} + x^{89} + x^{84} + x^{83} + x^{81} + x^{79} \\
&\quad + x^{78} + x^{76} + x^{72} + x^{71} + x^{70} + x^{66} + x^{63} + x^{62} + x^{57} + x^{56} + x^{53} \\
&\quad + x^{52} + x^{51} + x^{50} + x^{49} + x^{47} + x^{46} + x^{44} + x^{43} + x^{42}, \\
p_3(x) &= x^{143} + x^{141} + x^{140} + x^{139} + x^{135} + x^{133} + x^{132} + x^{129} + x^{128} + x^{127} \\
&\quad + x^{124} + x^{123} + x^{117} + x^{116} + x^{115} + x^{112} + x^{111} + x^{110} + x^{103} \\
&\quad + x^{101} + x^{100} + x^{99} + x^{96} + x^{95} + x^{94} + x^{91} + x^{89} + x^{87} + x^{86} + x^{85} \\
&\quad + x^{83} + x^{82} + x^{81} + x^{80} + x^{77} + x^{75} + x^{73} + x^{72} + x^{68} + x^{67} + x^{66} \\
&\quad + x^{64} + x^{62} + x^{61} + x^{60} + x^{59} + x^{58} + x^{56} + x^{55} + x^{54} + x^{53} + x^{52} \\
&\quad + x^{51} + x^{47} + x^{45} + x^{44} + x^{43} + x^{35} + x^{34} + x^{33} + x^{32} + x^{28} + x^{27} \\
&\quad + x^{26}, \\
p_6(x) &= x^{143} + x^{141} + x^{140} + x^{139} + x^{135} + x^{133} + x^{132} + x^{129} + x^{128} + x^{127} \\
&\quad + x^{124} + x^{117} + x^{116} + x^{112} + x^{111} + x^{110} + x^{109} + x^{103} + x^{92} + x^{91} \\
&\quad + x^{89} + x^{86} + x^{85} + x^{84} + x^{83} + x^{82} + x^{81} + x^{79} + x^{77} + x^{75} + x^{73} \\
&\quad + x^{72} + x^{71} + x^{69} + x^{66} + x^{65} + x^{61} + x^{58} + x^{57} + x^{56} + x^{54} + x^{53} \\
&\quad + x^{49} + x^{48} + x^{40} + x^{39} + x^{38} + x^{34} + x^{31} + x^{30} + x^{28} + x^{27} + x^{26} \\
&\quad + x^{24} + x^{23} + x^{19} + x^{17} + x^{14} + x^{13} + x^{12} + x^{7} + x^{5} + x^{4} + x^{3} + x + 1, \\
p_9(x) &= x^{143} + x^{141} + x^{140} + x^{135} + x^{133} + x^{132} + x^{131} + x^{129} + x^{128} + x^{127} \\
&\quad + x^{125} + x^{124} + x^{111} + x^{109} + x^{108} + x^{103} + x^{101} + x^{100} + x^{99} + x^{97} \\
&\quad + x^{96} + x^{87} + x^{85} + x^{84} + x^{83} + x^{81} + x^{80} + x^{79} + x^{77} + x^{76} + x^{47} \\
&\quad + x^{45} + x^{44} + x^{39} + x^{37} + x^{36} + x^{35} + x^{33} + x^{32} + x^{23} + x^{21} + x^{20} \\
&\quad + x^{19} + x^{17} + x^{16} + x^{15} + x^{13} + x^{12}, \\
p_{12}(x) &= x^{143} + x^{141} + x^{140} + x^{135} + x^{133} + x^{132} + x^{131} + x^{129} + x^{128} + x^{119} \\
&\quad + x^{117} + x^{116} + x^{115} + x^{113} + x^{112} + x^{111} + x^{109} + x^{108} + x^{103}
\end{aligned}$$

$$+x^{101}+x^{100}+x^{99}+x^{97}+x^{96}+x^{95}+x^{93}+x^{92}+x^{71}+x^{69}+x^{68}$$
$$+x^{67}+x^{65}+x^{64}+x^{47}+x^{45}+x^{44}+x^{39}+x^{37}+x^{36}+x^{35}+x^{33}$$
$$+x^{32}+x^{31}+x^{29}+x^{28}+x^{7}+x^{5}+x^{4}+x^{3}+x+1,$$

and the initial terms are [0, 0, 0, 0, 0, 0, 0, 1, 1, 1, 0, 1, 0, 1, 1, 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]	641	[334, 1009]	1282	[1653, 344]	1923	[2191, 1558]
1	[3, 4]	642	[1010, 372]	1283	[808, 1654]	1924	[1504, 784]
2	[5, 6]	643	[1011, 1012]	1284	[1622, 997]	1925	[2192, 349]
3	[7, 8]	644	[1013, 1001]	1285	[912, 967]	1926	[2193, 985]
4	[9, 10]	645	[1014, 1015]	1286	[321, 1655]	1927	[880, 807]
5	[11, 12]	646	[1016, 1017]	1287	[1656, 1039]	1928	[2194, 246]
6	[13, 14]	647	[1018, 330]	1288	[1657, 252]	1929	[2195, 1077]
7	[15, 16]	648	[1019, 1020]	1289	[1658, 381]	1930	[2196, 1588]
8	[17, 18]	649	[1021, 1022]	1290	[1659, 1660]	1931	[2197, 406]
9	[19, 20]	650	[896, 1023]	1291	[1661, 113]	1932	[2198, 296]
10	[21, 22]	651	[1024, 770]	1292	[1662, 827]	1933	[1046, 801]
11	[23, 24]	652	[724, 982]	1293	[1663, 1633]	1934	[1566, 236]
12	[25, 26]	653	[1025, 1026]	1294	[1664, 1665]	1935	[2199, 1659]
13	[27, 28]	654	[1027, 239]	1295	[1666, 419]	1936	[91, 266]
14	[29, 30]	655	[1028, 1029]	1296	[1667, 1633]	1937	[102, 2159]
15	[31, 32]	656	[1030, 1031]	1297	[1668, 310]	1938	[2200, 1026]
16	[33, 34]	657	[1032, 1033]	1298	[1669, 310]	1939	[1035, 2158]
17	[35, 36]	658	[1034, 1035]	1299	[1670, 1496]	1940	[2201, 2157]
18	[37, 38]	659	[1036, 340]	1300	[1671, 853]	1941	[2202, 1795]
19	[39, 40]	660	[1037, 318]	1301	[1672, 325]	1942	[1739, 1532]
20	[41, 42]	661	[1038, 1039]	1302	[1673, 920]	1943	[2156, 1654]
21	[43, 44]	662	[93, 1040]	1303	[1081, 294]	1944	[776, 257]
22	[45, 46]	663	[1041, 998]	1304	[356, 1613]	1945	[108, 826]
23	[47, 48]	664	[947, 1042]	1305	[1674, 1018]	1946	[888, 1042]
24	[49, 50]	665	[874, 20]	1306	[1675, 358]	1947	[2184, 1535]
25	[51, 52]	666	[1043, 848]	1307	[1676, 920]	1948	[2203, 117]
26	[36, 53]	667	[107, 758]	1308	[1677, 1635]	1949	[843, 2131]
27	[54, 55]	668	[1044, 1045]	1309	[1678, 294]	1950	[1950, 1950]
28	[56, 57]	669	[81, 1046]	1310	[1679, 1546]	1951	[1765, 2185]
29	[58, 59]	670	[1047, 1048]	1311	[1680, 901]	1952	[2204, 1542]
30	[60, 61]	671	[957, 1049]	1312	[1681, 1682]	1953	[252, 345]
31	[62, 63]	672	[1050, 360]	1313	[1683, 116]	1954	[264, 741]
32	[64, 65]	673	[1051, 1052]	1314	[1684, 237]	1955	[2172, 1595]
33	[66, 67]	674	[1031, 740]	1315	[959, 423]	1956	[863, 319]
34	[68, 69]	675	[1053, 76]	1316	[1516, 797]	1957	[2205, 911]

35	[70, 71]	676	[1054, 364]	1317	[1685, 997]	1958	[1695, 2206]
36	[72, 73]	677	[1018, 118]	1318	[1686, 871]	1959	[2207, 1542]
37	[74, 75]	678	[1055, 1056]	1319	[1687, 1688]	1960	[2208, 755]
38	[76, 77]	679	[1057, 811]	1320	[1689, 387]	1961	[2209, 1786]
39	[78, 79]	680	[1058, 825]	1321	[273, 952]	1962	[2210, 1012]
40	[80, 81]	681	[75, 1030]	1322	[1690, 861]	1963	[2211, 1082]
41	[82, 83]	682	[393, 1059]	1323	[1691, 1487]	1964	[2212, 1088]
42	[84, 85]	683	[118, 283]	1324	[1692, 851]	1965	[2136, 990]
43	[86, 87]	684	[1046, 1060]	1325	[1693, 340]	1966	[2213, 788]
44	[30, 88]	685	[1061, 1062]	1326	[1694, 1665]	1967	[2214, 1523]
45	[89, 90]	686	[1063, 984]	1327	[1695, 1580]	1968	[2215, 1761]
46	[91, 68]	687	[1064, 98]	1328	[1696, 864]	1969	[2216, 757]
47	[92, 93]	688	[1065, 765]	1329	[1697, 901]	1970	[1669, 427]
48	[94, 95]	689	[731, 1004]	1330	[1698, 109]	1971	[2217, 2206]
49	[96, 97]	690	[1066, 1067]	1331	[1699, 272]	1972	[2218, 330]
50	[98, 99]	691	[1068, 356]	1332	[1700, 414]	1973	[2219, 120]
51	[100, 101]	692	[1069, 1070]	1333	[1546, 373]	1974	[1089, 2220]
52	[102, 103]	693	[1071, 116]	1334	[1701, 422]	1975	[2221, 845]
53	[104, 105]	694	[1072, 119]	1335	[1702, 915]	1976	[1795, 1612]
54	[106, 107]	695	[1073, 316]	1336	[1703, 377]	1977	[2222, 984]
55	[108, 109]	696	[1074, 273]	1337	[1679, 372]	1978	[2223, 840]
56	[110, 111]	697	[1075, 117]	1338	[1704, 729]	1979	[2224, 1605]
57	[112, 113]	698	[1076, 1077]	1339	[109, 746]	1980	[1067, 1583]
58	[114, 115]	699	[1078, 1046]	1340	[1705, 103]	1981	[2225, 986]
59	[116, 117]	700	[1079, 783]	1341	[1706, 934]	1982	[2226, 824]
60	[115, 118]	701	[253, 996]	1342	[1707, 260]	1983	[1680, 731]
61	[119, 120]	702	[1080, 1081]	1343	[1708, 369]	1984	[2227, 286]
62	[121, 122]	703	[1082, 838]	1344	[1709, 298]	1985	[1606, 1641]
63	[123, 124]	704	[1083, 1084]	1345	[1710, 823]	1986	[2228, 2137]
64	[125, 126]	705	[1085, 1086]	1346	[1711, 236]	1987	[2229, 795]
65	[127, 128]	706	[1087, 1087]	1347	[380, 1550]	1988	[2230, 303]
66	[129, 130]	707	[99, 1088]	1348	[1712, 734]	1989	[2231, 775]
67	[131, 132]	708	[1089, 1090]	1349	[1713, 956]	1990	[2232, 321]
68	[133, 134]	709	[1091, 273]	1350	[1546, 301]	1991	[2233, 997]
69	[135, 136]	710	[948, 263]	1351	[1714, 1070]	1992	[2234, 1046]
70	[137, 138]	711	[1092, 253]	1352	[1715, 1487]	1993	[2235, 1797]
71	[139, 140]	712	[1093, 894]	1353	[1716, 1717]	1994	[2236, 30]
72	[141, 142]	713	[1094, 1095]	1354	[1718, 1719]	1995	[391, 1059]
73	[143, 144]	714	[73, 1020]	1355	[1720, 1635]	1996	[769, 778]
74	[145, 146]	715	[1096, 1097]	1356	[1721, 1492]	1997	[782, 1005]
75	[147, 9]	716	[1098, 240]	1357	[1517, 288]	1998	[2237, 421]
76	[148, 149]	717	[1099, 1100]	1358	[1722, 103]	1999	[1642, 743]
77	[150, 151]	718	[385, 938]	1359	[1723, 1004]	2000	[2238, 302]
78	[152, 153]	719	[839, 119]	1360	[1724, 85]	2001	[119, 249]

79	[154, 155]	720	[1101, 848]	1361	[1725, 102]	2002	[2239, 824]
80	[156, 157]	721	[1102, 744]	1362	[1726, 774]	2003	[2240, 1084]
81	[158, 159]	722	[1103, 49]	1363	[997, 859]	2004	[2241, 422]
82	[160, 161]	723	[1104, 178]	1364	[1727, 106]	2005	[2242, 93]
83	[162, 130]	724	[1105, 1106]	1365	[1728, 1097]	2006	[2243, 355]
84	[163, 164]	725	[1107, 467]	1366	[1729, 1052]	2007	[1818, 724]
85	[124, 165]	726	[1108, 55]	1367	[1730, 837]	2008	[2161, 1026]
86	[166, 167]	727	[1109, 1110]	1368	[1731, 376]	2009	[2244, 835]
87	[168, 169]	728	[1111, 209]	1369	[1732, 1548]	2010	[2245, 343]
88	[170, 171]	729	[1112, 1113]	1370	[1733, 347]	2011	[1584, 1008]
89	[172, 173]	730	[1114, 1115]	1371	[1734, 964]	2012	[312, 1035]
90	[174, 175]	731	[1116, 514]	1372	[1735, 1736]	2013	[2246, 1506]
91	[176, 177]	732	[1117, 1118]	1373	[759, 1512]	2014	[1632, 816]
92	[178, 179]	733	[545, 197]	1374	[1737, 819]	2015	[2247, 263]
93	[180, 181]	734	[1119, 1120]	1375	[1738, 948]	2016	[2248, 2156]
94	[182, 183]	735	[1121, 541]	1376	[357, 1739]	2017	[2249, 383]
95	[184, 185]	736	[434, 535]	1377	[1068, 1612]	2018	[2250, 782]
96	[186, 187]	737	[129, 53]	1378	[1740, 1741]	2019	[2251, 895]
97	[188, 189]	738	[10, 1122]	1379	[1742, 327]	2020	[2196, 1682]
98	[190, 191]	739	[1123, 1124]	1380	[1743, 789]	2021	[2252, 1643]
99	[192, 193]	740	[1125, 1126]	1381	[1744, 77]	2022	[2253, 376]
100	[194, 195]	741	[1127, 1128]	1382	[1745, 992]	2023	[2254, 1087]
101	[196, 197]	742	[1129, 1130]	1383	[1623, 339]	2024	[2255, 385]
102	[198, 199]	743	[700, 473]	1384	[1746, 351]	2025	[75, 1009]
103	[200, 201]	744	[1131, 60]	1385	[1519, 19]	2026	[2256, 916]
104	[202, 203]	745	[1132, 162]	1386	[1747, 760]	2027	[948, 919]
105	[50, 54]	746	[1133, 1106]	1387	[1748, 1029]	2028	[2257, 988]
106	[204, 205]	747	[1134, 1135]	1388	[1572, 422]	2029	[1651, 726]
107	[206, 207]	748	[1136, 1137]	1389	[1749, 329]	2030	[340, 110]
108	[208, 209]	749	[1138, 1139]	1390	[1750, 1751]	2031	[79, 359]
109	[210, 211]	750	[1140, 1141]	1391	[782, 244]	2032	[2258, 1504]
110	[212, 213]	751	[1142, 556]	1392	[1752, 828]	2033	[2259, 2189]
111	[138, 214]	752	[126, 570]	1393	[1753, 1052]	2034	[2260, 740]
112	[215, 216]	753	[1143, 680]	1394	[1754, 1629]	2035	[2261, 1029]
113	[217, 218]	754	[1144, 42]	1395	[1755, 929]	2036	[1009, 1031]
114	[219, 220]	755	[1145, 1146]	1396	[1756, 992]	2037	[2262, 1823]
115	[221, 222]	756	[183, 1147]	1397	[1757, 331]	2038	[2263, 1741]
116	[153, 223]	757	[1148, 674]	1398	[1758, 950]	2039	[2264, 1070]
117	[224, 225]	758	[1149, 1150]	1399	[1759, 750]	2040	[2265, 945]
118	[226, 227]	759	[1151, 224]	1400	[1760, 1761]	2041	[2266, 1548]
119	[228, 229]	760	[1152, 1153]	1401	[290, 764]	2042	[2267, 303]
120	[230, 38]	761	[1154, 1109]	1402	[1762, 339]	2043	[2268, 380]
121	[231, 232]	762	[1155, 183]	1403	[1763, 1764]	2044	[832, 390]
122	[233, 234]	763	[1156, 1157]	1404	[1655, 1765]	2045	[1054, 238]

123	[235, 236]	764	[480, 124]	1405	[1766, 751]	2046	[2258, 783]
124	[237, 238]	765	[1158, 54]	1406	[1767, 890]	2047	[2269, 1797]
125	[239, 240]	766	[603, 581]	1407	[1768, 1504]	2048	[2270, 1640]
126	[241, 242]	767	[1159, 1160]	1408	[1769, 965]	2049	[1791, 353]
127	[243, 244]	768	[1161, 469]	1409	[1770, 1771]	2050	[2271, 295]
128	[245, 246]	769	[1162, 630]	1410	[1613, 1739]	2051	[2272, 357]
129	[247, 248]	770	[641, 596]	1411	[1772, 402]	2052	[2273, 6]
130	[88, 249]	771	[1163, 1164]	1412	[1773, 888]	2053	[2274, 757]
131	[250, 251]	772	[1165, 184]	1413	[1774, 1775]	2054	[2248, 808]
132	[252, 253]	773	[1166, 225]	1414	[1776, 972]	2055	[355, 1499]
133	[254, 255]	774	[1167, 1168]	1415	[1777, 1563]	2056	[2275, 1823]
134	[256, 257]	775	[225, 607]	1416	[1778, 971]	2057	[2276, 861]
135	[258, 259]	776	[1169, 597]	1417	[1779, 896]	2058	[1093, 773]
136	[260, 261]	777	[1170, 706]	1418	[302, 1780]	2059	[2277, 292]
137	[262, 263]	778	[1171, 585]	1419	[1781, 848]	2060	[2278, 737]
138	[4, 264]	779	[1172, 1118]	1420	[1782, 1783]	2061	[2279, 2137]
139	[265, 246]	780	[1173, 638]	1421	[1702, 1011]	2062	[99, 1503]
140	[266, 267]	781	[1174, 452]	1422	[1784, 367]	2063	[2280, 1665]
141	[249, 268]	782	[229, 1175]	1423	[1493, 863]	2064	[784, 841]
142	[269, 270]	783	[1176, 1177]	1424	[1785, 1786]	2065	[748, 804]
143	[271, 272]	784	[533, 1178]	1425	[1787, 976]	2066	[260, 1565]
144	[273, 274]	785	[1179, 36]	1426	[932, 1054]	2067	[255, 854]
145	[275, 67]	786	[1180, 670]	1427	[1788, 871]	2068	[2281, 30]
146	[276, 277]	787	[1181, 60]	1428	[1789, 994]	2069	[1771, 2282]
147	[278, 21]	788	[1182, 1183]	1429	[1790, 735]	2070	[2283, 843]
148	[279, 280]	789	[464, 205]	1430	[326, 336]	2071	[2284, 245]
149	[281, 248]	790	[1184, 1185]	1431	[1791, 890]	2072	[2285, 413]
150	[282, 23]	791	[1186, 628]	1432	[322, 727]	2073	[2286, 2220]
151	[283, 284]	792	[1187, 1188]	1433	[1787, 413]	2074	[2287, 251]
152	[285, 286]	793	[1189, 1190]	1434	[774, 1647]	2075	[24, 1023]
153	[287, 288]	794	[1191, 1192]	1435	[1792, 1793]	2076	[1583, 95]
154	[289, 290]	795	[1107, 179]	1436	[1794, 1795]	2077	[1720, 924]
155	[291, 292]	796	[520, 473]	1437	[1796, 1797]	2078	[2288, 290]
156	[293, 294]	797	[1193, 213]	1438	[336, 1564]	2079	[2289, 1783]
157	[295, 296]	798	[1194, 1195]	1439	[1798, 1775]	2080	[2290, 1558]
158	[16, 297]	799	[1196, 1197]	1440	[1799, 94]	2081	[2291, 1659]
159	[298, 299]	800	[1198, 134]	1441	[1800, 4]	2082	[2292, 1620]
160	[300, 301]	801	[159, 569]	1442	[1801, 1090]	2083	[341, 111]
161	[302, 303]	802	[1199, 1200]	1443	[1802, 1643]	2084	[2197, 882]
162	[304, 305]	803	[1201, 169]	1444	[1803, 419]	2085	[2293, 1563]
163	[306, 307]	804	[1202, 1113]	1445	[1804, 76]	2086	[2294, 1485]
164	[308, 309]	805	[1203, 157]	1446	[1717, 832]	2087	[2295, 1783]
165	[310, 311]	806	[1204, 451]	1447	[1805, 769]	2088	[2296, 340]
166	[312, 313]	807	[1205, 532]	1448	[1806, 394]	2089	[2297, 1688]

167	[314, 315]	808	[1206, 457]	1449	[29, 839]	2090	[807, 1040]
168	[316, 317]	809	[1207, 149]	1450	[1807, 323]	2091	[2298, 415]
169	[318, 319]	810	[1208, 1209]	1451	[1808, 986]	2092	[1533, 857]
170	[320, 321]	811	[577, 1210]	1452	[887, 947]	2093	[2299, 348]
171	[322, 323]	812	[1211, 1212]	1453	[1809, 341]	2094	[313, 2158]
172	[324, 325]	813	[459, 563]	1454	[1810, 951]	2095	[2262, 803]
173	[326, 327]	814	[590, 497]	1455	[1811, 380]	2096	[2300, 1054]
174	[328, 329]	815	[1213, 624]	1456	[79, 116]	2097	[330, 283]
175	[330, 331]	816	[1214, 14]	1457	[1812, 292]	2098	[2301, 298]
176	[332, 333]	817	[1215, 1216]	1458	[73, 416]	2099	[2284, 1771]
177	[251, 334]	818	[1217, 588]	1459	[1813, 261]	2100	[2208, 747]
178	[335, 336]	819	[1218, 1219]	1460	[1814, 846]	2101	[933, 870]
179	[257, 337]	820	[1203, 140]	1461	[109, 936]	2102	[2302, 1496]
180	[338, 339]	821	[1220, 1221]	1462	[1815, 968]	2103	[2120, 1620]
181	[340, 341]	822	[1222, 220]	1463	[1816, 291]	2104	[2303, 774]
182	[342, 343]	823	[1223, 1224]	1464	[1728, 80]	2105	[2183, 956]
183	[344, 345]	824	[1225, 1226]	1465	[1817, 845]	2106	[2304, 2157]
184	[346, 347]	825	[1227, 499]	1466	[1818, 981]	2107	[2305, 994]
185	[348, 349]	826	[1228, 1229]	1467	[1819, 1741]	2108	[2143, 1610]
186	[350, 351]	827	[489, 641]	1468	[1820, 1068]	2109	[2306, 2156]
187	[352, 353]	828	[1230, 1231]	1469	[1821, 895]	2110	[1087, 1950]
188	[354, 355]	829	[1152, 181]	1470	[1822, 1823]	2111	[2307, 840]
189	[356, 357]	830	[1232, 608]	1471	[1097, 403]	2112	[2140, 1605]
190	[358, 359]	831	[1124, 128]	1472	[794, 1751]	2113	[87, 391]
191	[360, 361]	832	[1233, 617]	1473	[324, 1736]	2114	[2308, 1087]
192	[362, 363]	833	[1234, 133]	1474	[1824, 71]	2115	[2309, 640]
193	[364, 365]	834	[1235, 151]	1475	[1798, 940]	2116	[2061, 1190]
194	[366, 367]	835	[1236, 1237]	1476	[1825, 192]	2117	[2310, 2311]
195	[368, 369]	836	[1238, 170]	1477	[552, 533]	2118	[597, 508]
196	[370, 371]	837	[1239, 1137]	1478	[1826, 195]	2119	[2312, 1934]
197	[372, 373]	838	[453, 228]	1479	[1827, 559]	2120	[2313, 696]
198	[374, 375]	839	[1240, 462]	1480	[1828, 539]	2121	[2314, 1926]
199	[376, 377]	840	[1241, 128]	1481	[1829, 1106]	2122	[1257, 1471]
200	[378, 379]	841	[433, 575]	1482	[1830, 1831]	2123	[2091, 511]
201	[380, 381]	842	[200, 669]	1483	[1832, 1147]	2124	[2315, 146]
202	[382, 77]	843	[1242, 1243]	1484	[1833, 178]	2125	[2316, 2317]
203	[319, 383]	844	[1244, 1202]	1485	[1834, 161]	2126	[2318, 2103]
204	[384, 385]	845	[1245, 462]	1486	[1835, 1836]	2127	[2319, 1241]
205	[386, 387]	846	[1246, 577]	1487	[563, 1135]	2128	[586, 1253]
206	[388, 389]	847	[1247, 507]	1488	[1137, 1144]	2129	[2320, 1266]
207	[390, 391]	848	[1248, 1150]	1489	[1837, 1838]	2130	[1912, 201]
208	[392, 393]	849	[516, 1249]	1490	[1839, 650]	2131	[1404, 1942]
209	[394, 395]	850	[1197, 1250]	1491	[1406, 643]	2132	[1390, 56]
210	[396, 397]	851	[493, 222]	1492	[1840, 1391]	2133	[656, 1148]

211	[398, 399]	852	[1251, 142]	1493	[1841, 591]	2134	[169, 621]
212	[400, 401]	853	[1252, 1253]	1494	[1842, 1843]	2135	[1131, 525]
213	[402, 98]	854	[443, 1149]	1495	[1413, 210]	2136	[2321, 2322]
214	[403, 404]	855	[1254, 645]	1496	[1122, 1844]	2137	[2323, 1350]
215	[405, 406]	856	[1255, 1256]	1497	[1845, 1846]	2138	[2324, 1896]
216	[69, 256]	857	[1257, 710]	1498	[1847, 639]	2139	[2325, 1233]
217	[407, 408]	858	[1258, 690]	1499	[40, 1456]	2140	[2326, 668]
218	[299, 27]	859	[1259, 203]	1500	[1848, 528]	2141	[2327, 487]
219	[409, 6]	860	[1260, 609]	1501	[1849, 1387]	2142	[546, 596]
220	[410, 411]	861	[1261, 159]	1502	[565, 1339]	2143	[2328, 1225]
221	[412, 413]	862	[1262, 1263]	1503	[1442, 1253]	2144	[2329, 135]
222	[414, 415]	863	[1264, 664]	1504	[1850, 1285]	2145	[2068, 497]
223	[286, 416]	864	[1226, 1265]	1505	[1851, 1852]	2146	[2330, 2331]
224	[417, 418]	865	[1266, 703]	1506	[1224, 168]	2147	[687, 457]
225	[419, 390]	866	[1267, 1209]	1507	[1853, 1854]	2148	[1917, 124]
226	[420, 313]	867	[1268, 1269]	1508	[1855, 1856]	2149	[2332, 1963]
227	[421, 280]	868	[1270, 1249]	1509	[1857, 550]	2150	[2333, 1442]
228	[422, 423]	869	[1271, 1272]	1510	[1858, 1177]	2151	[2334, 1968]
229	[424, 425]	870	[1273, 228]	1511	[1859, 1860]	2152	[2335, 2336]
230	[426, 427]	871	[1274, 1149]	1512	[1861, 667]	2153	[2337, 440]
231	[428, 429]	872	[444, 171]	1513	[433, 207]	2154	[2338, 528]
232	[430, 431]	873	[1275, 508]	1514	[1838, 1146]	2155	[1976, 1985]
233	[432, 433]	874	[472, 449]	1515	[1862, 162]	2156	[2339, 1949]
234	[434, 435]	875	[122, 1276]	1516	[1863, 1316]	2157	[2340, 2069]
235	[126, 40]	876	[1277, 561]	1517	[1864, 1865]	2158	[1878, 1943]
236	[436, 437]	877	[1278, 151]	1518	[1866, 1421]	2159	[1410, 2069]
237	[438, 439]	878	[1279, 217]	1519	[1867, 41]	2160	[1991, 630]
238	[440, 441]	879	[211, 461]	1520	[1868, 445]	2161	[2341, 1827]
239	[442, 443]	880	[1280, 1216]	1521	[1869, 1407]	2162	[1344, 158]
240	[444, 445]	881	[1281, 1282]	1522	[1870, 1871]	2163	[2342, 715]
241	[446, 447]	882	[1181, 525]	1523	[1371, 565]	2164	[1261, 682]
242	[448, 449]	883	[1283, 1284]	1524	[207, 689]	2165	[463, 631]
243	[450, 451]	884	[218, 48]	1525	[1872, 608]	2166	[2343, 1919]
244	[452, 453]	885	[1285, 155]	1526	[550, 435]	2167	[2344, 715]
245	[454, 455]	886	[1286, 1287]	1527	[1873, 190]	2168	[2345, 2317]
246	[456, 457]	887	[1288, 214]	1528	[1874, 550]	2169	[2346, 150]
247	[458, 459]	888	[1195, 621]	1529	[456, 2]	2170	[2347, 1960]
248	[460, 461]	889	[1276, 463]	1530	[1875, 1876]	2171	[516, 495]
249	[462, 463]	890	[1289, 1290]	1531	[532, 210]	2172	[2348, 2020]
250	[464, 465]	891	[1291, 717]	1532	[1877, 1878]	2173	[2349, 2350]
251	[466, 467]	892	[1292, 1125]	1533	[1879, 474]	2174	[2351, 1473]
252	[468, 11]	893	[1293, 503]	1534	[600, 585]	2175	[484, 637]
253	[469, 13]	894	[1294, 576]	1535	[1293, 42]	2176	[2352, 2353]
254	[470, 464]	895	[1295, 185]	1536	[1161, 48]	2177	[2354, 1984]

255	[471, 472]	896	[650, 175]	1537	[1111, 158]	2178	[2355, 583]
256	[134, 473]	897	[1247, 597]	1538	[1880, 614]	2179	[1906, 478]
257	[474, 140]	898	[1296, 1223]	1539	[1881, 1371]	2180	[2356, 627]
258	[475, 476]	899	[500, 461]	1540	[1882, 1834]	2181	[2357, 1374]
259	[477, 478]	900	[1297, 1298]	1541	[1883, 476]	2182	[2358, 2311]
260	[479, 480]	901	[1299, 570]	1542	[645, 520]	2183	[2359, 1894]
261	[481, 482]	902	[598, 643]	1543	[1884, 39]	2184	[2360, 481]
262	[483, 206]	903	[1300, 1301]	1544	[1885, 1886]	2185	[1876, 1410]
263	[484, 485]	904	[1302, 1231]	1545	[1887, 539]	2186	[1352, 543]
264	[8, 158]	905	[127, 1303]	1546	[1888, 1844]	2187	[2052, 555]
265	[486, 487]	906	[34, 211]	1547	[1889, 680]	2188	[2361, 1974]
266	[130, 488]	907	[1304, 1305]	1548	[716, 1471]	2189	[1938, 1985]
267	[177, 489]	908	[1122, 581]	1549	[1890, 1185]	2190	[2362, 456]
268	[490, 179]	909	[1306, 593]	1550	[1301, 516]	2191	[1308, 1226]
269	[491, 135]	910	[1307, 58]	1551	[1364, 50]	2192	[2363, 1447]
270	[492, 493]	911	[1308, 44]	1552	[10, 603]	2193	[2364, 1247]
271	[436, 132]	912	[12, 1153]	1553	[1891, 51]	2194	[2365, 542]
272	[494, 495]	913	[1309, 1133]	1554	[1892, 1383]	2195	[1155, 439]
273	[496, 497]	914	[1310, 1311]	1555	[1893, 1894]	2196	[2366, 2367]
274	[498, 499]	915	[1312, 701]	1556	[1895, 1896]	2197	[2368, 2369]
275	[500, 216]	916	[1216, 498]	1557	[1897, 1160]	2198	[2370, 659]
276	[501, 182]	917	[1313, 1231]	1558	[1898, 681]	2199	[1245, 1276]
277	[502, 503]	918	[34, 460]	1559	[1899, 554]	2200	[1877, 1876]
278	[504, 45]	919	[1137, 41]	1560	[1900, 1212]	2201	[1940, 1243]
279	[505, 506]	920	[1314, 177]	1561	[1901, 1902]	2202	[1404, 1237]
280	[197, 431]	921	[1315, 1316]	1562	[481, 716]	2203	[2371, 1109]
281	[507, 508]	922	[1317, 1318]	1563	[1903, 46]	2204	[2372, 1838]
282	[509, 510]	923	[1319, 654]	1564	[1178, 437]	2205	[2373, 2374]
283	[511, 512]	924	[1320, 445]	1565	[585, 531]	2206	[2375, 136]
284	[513, 514]	925	[193, 652]	1566	[1904, 1131]	2207	[2376, 1269]
285	[50, 512]	926	[518, 1168]	1567	[1905, 1871]	2208	[2377, 1136]
286	[515, 516]	927	[1321, 1322]	1568	[1906, 61]	2209	[639, 169]
287	[517, 518]	928	[1323, 552]	1569	[1907, 1200]	2210	[2378, 2081]
288	[519, 520]	929	[1324, 718]	1570	[1908, 625]	2211	[2379, 2374]
289	[214, 437]	930	[1306, 1150]	1571	[1909, 1886]	2212	[2380, 2037]
290	[521, 522]	931	[44, 1219]	1572	[1910, 678]	2213	[2381, 1240]
291	[523, 524]	932	[1325, 1326]	1573	[1198, 520]	2214	[2382, 1326]
292	[525, 478]	933	[1327, 8]	1574	[1911, 527]	2215	[2383, 1169]
293	[526, 527]	934	[1328, 59]	1575	[1912, 669]	2216	[2384, 545]
294	[528, 529]	935	[1329, 624]	1576	[1913, 1836]	2217	[1166, 565]
295	[530, 531]	936	[209, 682]	1577	[1914, 566]	2218	[2385, 2367]
296	[532, 34]	937	[1330, 1331]	1578	[1915, 1378]	2219	[2386, 2331]
297	[32, 533]	938	[1332, 493]	1579	[1916, 1437]	2220	[2387, 1951]
298	[534, 535]	939	[1333, 666]	1580	[1917, 489]	2221	[655, 1135]

299	[536, 56]	940	[1334, 223]	1581	[692, 1456]	2222	[539, 667]
300	[537, 538]	941	[1335, 1225]	1582	[1918, 1433]	2223	[2388, 433]
301	[539, 532]	942	[1336, 1337]	1583	[1290, 1919]	2224	[1827, 199]
302	[540, 541]	943	[1338, 1339]	1584	[1920, 1921]	2225	[2389, 444]
303	[542, 543]	944	[1340, 1124]	1585	[209, 159]	2226	[2390, 1282]
304	[544, 545]	945	[1341, 641]	1586	[159, 647]	2227	[2391, 1966]
305	[546, 547]	946	[1342, 1303]	1587	[1922, 588]	2228	[545, 9]
306	[548, 549]	947	[549, 1290]	1588	[1923, 229]	2229	[1443, 214]
307	[550, 535]	948	[1135, 1148]	1589	[1924, 1121]	2230	[2392, 712]
308	[551, 469]	949	[598, 719]	1590	[493, 175]	2231	[2393, 212]
309	[552, 138]	950	[439, 613]	1591	[1108, 707]	2232	[2394, 1454]
310	[553, 554]	951	[1343, 587]	1592	[1925, 1926]	2233	[1224, 639]
311	[555, 556]	952	[1344, 209]	1593	[1927, 566]	2234	[2395, 2336]
312	[557, 198]	953	[1345, 485]	1594	[1928, 1133]	2235	[197, 10]
313	[558, 559]	954	[1346, 1298]	1595	[1929, 1148]	2236	[2396, 170]
314	[560, 561]	955	[1347, 479]	1596	[1832, 613]	2237	[1948, 197]
315	[562, 563]	956	[1348, 1128]	1597	[1930, 1931]	2238	[2397, 542]
316	[564, 565]	957	[164, 1144]	1598	[1932, 199]	2239	[2398, 2369]
317	[566, 567]	958	[1349, 187]	1599	[1933, 1934]	2240	[2399, 1364]
318	[568, 569]	959	[601, 1350]	1600	[1935, 549]	2241	[2400, 2039]
319	[570, 571]	960	[1351, 200]	1601	[1936, 474]	2242	[1210, 1175]
320	[572, 573]	961	[1352, 1120]	1602	[1937, 1287]	2243	[2401, 1131]
321	[574, 201]	962	[615, 183]	1603	[1938, 1939]	2244	[1236, 1942]
322	[575, 576]	963	[225, 1339]	1604	[1940, 1877]	2245	[2402, 2403]
323	[223, 577]	964	[1353, 1122]	1605	[1941, 1942]	2246	[2404, 32]
324	[578, 579]	965	[1354, 637]	1606	[1943, 1404]	2247	[2405, 2008]
325	[580, 581]	966	[1355, 1356]	1607	[1944, 490]	2248	[2406, 1207]
326	[582, 583]	967	[1164, 495]	1608	[1945, 1171]	2249	[2407, 122]
327	[584, 585]	968	[667, 210]	1609	[1946, 1947]	2250	[2408, 2085]
328	[525, 61]	969	[1357, 579]	1610	[1948, 9]	2251	[494, 1249]
329	[586, 227]	970	[439, 1147]	1611	[1949, 1950]	2252	[1457, 1388]
330	[587, 513]	971	[1358, 1229]	1612	[1237, 1951]	2253	[2409, 2410]
331	[588, 435]	972	[1124, 1303]	1613	[1939, 1877]	2254	[2411, 1460]
332	[589, 590]	973	[1359, 590]	1614	[1952, 218]	2255	[2412, 1332]
333	[591, 525]	974	[1360, 1226]	1615	[1953, 1163]	2256	[2413, 1318]
334	[592, 593]	975	[1361, 51]	1616	[1396, 575]	2257	[1285, 674]
335	[594, 479]	976	[1362, 460]	1617	[1954, 1163]	2258	[2414, 2353]
336	[595, 596]	977	[1363, 490]	1618	[1829, 691]	2259	[1932, 559]
337	[597, 598]	978	[1313, 52]	1619	[1834, 189]	2260	[2415, 173]
338	[599, 205]	979	[1364, 511]	1620	[1412, 40]	2261	[620, 1221]
339	[600, 601]	980	[1365, 1366]	1621	[1955, 1356]	2262	[2416, 1464]
340	[602, 138]	981	[1367, 682]	1622	[1956, 1259]	2263	[590, 567]
341	[431, 603]	982	[178, 467]	1623	[1957, 1958]	2264	[2417, 2418]
342	[604, 230]	983	[652, 1153]	1624	[1959, 1960]	2265	[2419, 2105]

343	[605, 513]	984	[1368, 488]	1625	[498, 1126]	2266	[2420, 1858]
344	[606, 607]	985	[1369, 1110]	1626	[1961, 627]	2267	[2421, 198]
345	[608, 609]	986	[520, 701]	1627	[1962, 1963]	2268	[709, 662]
346	[610, 611]	987	[1370, 1371]	1628	[1964, 1331]	2269	[518, 1183]
347	[612, 613]	988	[1372, 707]	1629	[1235, 529]	2270	[2422, 2423]
348	[614, 190]	989	[1373, 1374]	1630	[1419, 587]	2271	[1861, 532]
349	[615, 439]	990	[1375, 716]	1631	[1965, 1966]	2272	[2424, 1119]
350	[616, 617]	991	[1376, 1284]	1632	[1967, 1968]	2273	[2425, 447]
351	[618, 609]	992	[169, 1221]	1633	[1969, 1164]	2274	[2426, 1958]
352	[619, 452]	993	[1377, 1378]	1634	[1970, 1197]	2275	[1414, 11]
353	[620, 621]	994	[1210, 1190]	1635	[1971, 1210]	2276	[48, 13]
354	[622, 623]	995	[1379, 1223]	1636	[1972, 1902]	2277	[2427, 1203]
355	[624, 551]	996	[1200, 189]	1637	[683, 1919]	2278	[1975, 54]
356	[625, 626]	997	[1380, 1276]	1638	[1973, 1974]	2279	[1149, 593]
357	[627, 628]	998	[639, 1195]	1639	[1112, 1177]	2280	[1395, 460]
358	[629, 575]	999	[1381, 705]	1640	[1975, 512]	2281	[2428, 1831]
359	[630, 631]	1000	[1382, 1383]	1641	[1942, 1976]	2282	[1949, 1949]
360	[632, 498]	1001	[1384, 1126]	1642	[1977, 675]	2283	[1410, 1404]
361	[633, 524]	1002	[1385, 147]	1643	[1978, 597]	2284	[2429, 456]
362	[634, 635]	1003	[1386, 1387]	1644	[635, 1290]	2285	[1978, 507]
363	[636, 637]	1004	[1115, 678]	1645	[1273, 577]	2286	[1942, 1951]
364	[638, 639]	1005	[463, 554]	1646	[563, 656]	2287	[443, 592]
365	[640, 164]	1006	[1282, 1388]	1647	[429, 11]	2288	[1314, 480]
366	[641, 547]	1007	[1389, 1390]	1648	[448, 514]	2289	[1985, 1877]
367	[642, 643]	1008	[599, 465]	1649	[1979, 1843]	2290	[555, 57]
368	[644, 645]	1009	[467, 1391]	1650	[1980, 1228]	2291	[2430, 1416]
369	[646, 647]	1010	[188, 161]	1651	[1981, 1407]	2292	[193, 12]
370	[648, 518]	1011	[1392, 507]	1652	[1982, 1224]	2293	[2431, 616]
371	[649, 650]	1012	[656, 1285]	1653	[1983, 1984]	2294	[2432, 2112]
372	[651, 555]	1013	[1393, 1260]	1654	[1985, 1243]	2295	[2433, 1121]
373	[652, 181]	1014	[1394, 484]	1655	[1243, 1876]	2296	[1422, 431]
374	[653, 654]	1015	[1395, 211]	1656	[1986, 1266]	2297	[2387, 1976]
375	[655, 656]	1016	[1133, 691]	1657	[218, 469]	2298	[2434, 1301]
376	[657, 652]	1017	[1396, 207]	1658	[1987, 1115]	2299	[2435, 615]
377	[211, 216]	1018	[1397, 511]	1659	[1988, 1401]	2300	[1982, 638]
378	[658, 659]	1019	[1398, 649]	1660	[1276, 630]	2301	[2436, 2437]
379	[660, 168]	1020	[142, 638]	1661	[1989, 133]	2302	[2438, 1856]
380	[661, 598]	1021	[1399, 1230]	1662	[1990, 1230]	2303	[207, 576]
381	[662, 144]	1022	[1400, 603]	1663	[636, 485]	2304	[1186, 149]
382	[663, 573]	1023	[1260, 1401]	1664	[1358, 703]	2305	[2439, 698]
383	[664, 587]	1024	[1402, 153]	1665	[1991, 463]	2306	[542, 1120]
384	[665, 666]	1025	[1121, 1141]	1666	[1992, 1130]	2307	[2440, 2423]
385	[447, 667]	1026	[1403, 1404]	1667	[1993, 41]	2308	[2441, 1139]
386	[668, 669]	1027	[1405, 444]	1668	[580, 1844]	2309	[2442, 308]

387	[670, 455]	1028	[1289, 683]	1669	[1994, 1308]	2310	[1081, 1765]
388	[671, 672]	1029	[1406, 719]	1670	[1995, 217]	2311	[1733, 84]
389	[673, 674]	1030	[1407, 1125]	1671	[1408, 443]	2312	[793, 334]
390	[675, 676]	1031	[1374, 1183]	1672	[1996, 459]	2313	[1699, 270]
391	[617, 592]	1032	[480, 489]	1673	[1997, 1439]	2314	[2443, 68]
392	[677, 635]	1033	[1408, 617]	1674	[1998, 226]	2315	[2444, 1775]
393	[167, 465]	1034	[1140, 541]	1675	[37, 706]	2316	[290, 361]
394	[678, 656]	1035	[1409, 1410]	1676	[1999, 182]	2317	[2265, 71]
395	[616, 443]	1036	[1411, 212]	1677	[2000, 1834]	2318	[2445, 888]
396	[679, 482]	1037	[1412, 570]	1678	[2001, 1827]	2319	[2295, 1598]
397	[680, 681]	1038	[1413, 34]	1679	[2002, 2003]	2320	[2446, 1082]
398	[682, 647]	1039	[1414, 193]	1680	[2004, 1854]	2321	[423, 395]
399	[683, 684]	1040	[179, 522]	1681	[174, 222]	2322	[2447, 887]
400	[685, 686]	1041	[1415, 1416]	1682	[1868, 171]	2323	[2448, 887]
401	[687, 2]	1042	[214, 132]	1683	[2005, 1860]	2324	[985, 847]
402	[688, 689]	1043	[1417, 649]	1684	[2006, 440]	2325	[2449, 968]
403	[690, 691]	1044	[1418, 1305]	1685	[1282, 441]	2326	[1097, 81]
404	[187, 601]	1045	[1419, 191]	1686	[2007, 2008]	2327	[2450, 948]
405	[512, 55]	1046	[165, 547]	1687	[1462, 455]	2328	[1656, 943]
406	[692, 571]	1047	[1420, 1421]	1688	[2009, 1878]	2329	[2451, 260]
407	[693, 58]	1048	[1422, 10]	1689	[2010, 1426]	2330	[1690, 1618]
408	[694, 60]	1049	[1390, 555]	1690	[2011, 2012]	2331	[2154, 1764]
409	[695, 696]	1050	[1423, 633]	1691	[2013, 49]	2332	[2452, 119]
410	[697, 698]	1051	[646, 569]	1692	[2014, 1431]	2333	[1572, 959]
411	[699, 683]	1052	[1424, 57]	1693	[1182, 1168]	2334	[2453, 938]
412	[700, 701]	1053	[1425, 1426]	1694	[2015, 2016]	2335	[1721, 892]
413	[702, 703]	1054	[1427, 684]	1695	[2017, 192]	2336	[62, 291]
414	[704, 662]	1055	[1428, 130]	1696	[2018, 1337]	2337	[2454, 301]
415	[705, 706]	1056	[1144, 503]	1697	[1275, 598]	2338	[2455, 1793]
416	[512, 707]	1057	[1429, 464]	1698	[2019, 2020]	2339	[2456, 2189]
417	[708, 167]	1058	[1430, 1431]	1699	[2021, 2022]	2340	[2457, 1605]
418	[709, 13]	1059	[635, 683]	1700	[2023, 705]	2341	[798, 105]
419	[482, 710]	1060	[672, 664]	1701	[2024, 717]	2342	[1027, 1098]
420	[711, 712]	1061	[1432, 1433]	1702	[2025, 1858]	2343	[2458, 1793]
421	[713, 714]	1062	[48, 662]	1703	[2026, 2003]	2344	[1740, 1100]
422	[715, 716]	1063	[1434, 1435]	1704	[1384, 499]	2345	[967, 850]
423	[717, 718]	1064	[1436, 1437]	1705	[2027, 668]	2346	[414, 1660]
424	[508, 719]	1065	[1127, 213]	1706	[1216, 1125]	2347	[2459, 94]
425	[53, 714]	1066	[1438, 1439]	1707	[2028, 2029]	2348	[2460, 934]
426	[720, 538]	1067	[1440, 218]	1708	[162, 53]	2349	[2270, 234]
427	[721, 453]	1068	[1441, 543]	1709	[2030, 536]	2350	[1820, 1795]
428	[722, 23]	1069	[1442, 227]	1710	[2031, 1947]	2351	[1508, 112]
429	[723, 724]	1070	[1443, 1178]	1711	[513, 449]	2352	[295, 397]
430	[725, 726]	1071	[1444, 224]	1712	[2032, 1931]	2353	[2125, 351]

431	[117, 727]	1072	[1445, 230]	1713	[1239, 164]	2354	[2152, 389]
432	[728, 729]	1073	[1446, 1447]	1714	[191, 513]	2355	[1063, 800]
433	[730, 731]	1074	[1448, 1344]	1715	[2033, 510]	2356	[2461, 981]
434	[732, 733]	1075	[1449, 1322]	1716	[1375, 482]	2357	[276, 1067]
435	[734, 735]	1076	[1450, 640]	1717	[2034, 1388]	2358	[245, 2282]
436	[736, 737]	1077	[1451, 1250]	1718	[2035, 2029]	2359	[2462, 273]
437	[264, 738]	1078	[1452, 672]	1719	[1952, 551]	2360	[2463, 851]
438	[739, 341]	1079	[44, 1265]	1720	[2036, 2037]	2361	[2464, 307]
439	[740, 741]	1080	[1453, 686]	1721	[2038, 2039]	2362	[2465, 1640]
440	[742, 743]	1081	[1454, 1141]	1722	[2040, 1852]	2363	[22, 309]
441	[355, 744]	1082	[1455, 1456]	1723	[2041, 591]	2364	[2466, 838]
442	[745, 746]	1083	[649, 493]	1724	[2042, 1354]	2365	[2467, 873]
443	[747, 748]	1084	[1457, 441]	1725	[2043, 200]	2366	[2468, 1761]
444	[749, 750]	1085	[1458, 623]	1726	[1371, 225]	2367	[2245, 329]
445	[751, 308]	1086	[1459, 480]	1727	[2044, 206]	2368	[238, 365]
446	[283, 752]	1087	[1460, 2]	1728	[2045, 2046]	2369	[2301, 765]
447	[753, 396]	1088	[191, 472]	1729	[2047, 2048]	2370	[2469, 2220]
448	[754, 751]	1089	[1461, 1119]	1730	[223, 228]	2371	[1043, 101]
449	[755, 756]	1090	[1462, 626]	1731	[1266, 1229]	2372	[1748, 315]
450	[757, 758]	1091	[1292, 498]	1732	[2049, 1311]	2373	[2470, 1039]
451	[759, 760]	1092	[1463, 1464]	1733	[2050, 1203]	2374	[2471, 1519]
452	[761, 762]	1093	[1465, 1466]	1734	[2051, 1354]	2375	[2472, 256]
453	[26, 424]	1094	[1193, 1128]	1735	[1230, 52]	2376	[850, 979]
454	[763, 764]	1095	[1467, 592]	1736	[2052, 56]	2377	[2139, 379]
455	[765, 766]	1096	[1468, 690]	1737	[2053, 1263]	2378	[2473, 2206]
456	[767, 768]	1097	[1469, 165]	1738	[2054, 484]	2379	[2474, 1011]
457	[769, 770]	1098	[1470, 1471]	1739	[1951, 1985]	2380	[868, 1514]
458	[5, 771]	1099	[1472, 1473]	1740	[2055, 1442]	2381	[2475, 296]
459	[772, 773]	1100	[1474, 1265]	1741	[137, 533]	2382	[2476, 1033]
460	[67, 266]	1101	[1214, 144]	1742	[138, 1178]	2383	[2240, 1498]
461	[774, 775]	1102	[1475, 45]	1743	[2056, 39]	2384	[2477, 372]
462	[267, 776]	1103	[1476, 98]	1744	[2057, 1454]	2385	[2478, 1717]
463	[777, 778]	1104	[1477, 783]	1745	[2058, 1188]	2386	[2471, 953]
464	[779, 780]	1105	[1478, 1020]	1746	[716, 710]	2387	[2479, 1035]
465	[313, 102]	1106	[294, 1479]	1747	[673, 155]	2388	[2480, 924]
466	[781, 782]	1107	[1480, 377]	1748	[2059, 615]	2389	[2481, 1492]
467	[783, 784]	1108	[1481, 411]	1749	[122, 462]	2390	[2163, 1572]
468	[785, 25]	1109	[1482, 1483]	1750	[2060, 1314]	2391	[2211, 408]
469	[408, 29]	1110	[101, 371]	1751	[2061, 1175]	2392	[2482, 738]
470	[786, 386]	1111	[1484, 1485]	1752	[2062, 1171]	2393	[2483, 272]
471	[787, 788]	1112	[1486, 1479]	1753	[1873, 664]	2394	[2484, 1519]
472	[359, 322]	1113	[868, 1487]	1754	[2063, 670]	2395	[1556, 21]
473	[255, 789]	1114	[1488, 1055]	1755	[1360, 44]	2396	[116, 322]
474	[790, 791]	1115	[1489, 1490]	1756	[2064, 147]	2397	[2485, 887]

475	[792, 793]	1116	[1491, 1492]	1757	[2065, 126]	2398	[895, 24]
476	[794, 795]	1117	[731, 902]	1758	[2066, 1259]	2399	[2293, 768]
477	[796, 797]	1118	[1493, 318]	1759	[2067, 1460]	2400	[2486, 239]
478	[798, 307]	1119	[1494, 1495]	1760	[645, 134]	2401	[1674, 115]
479	[799, 800]	1120	[957, 1496]	1761	[2068, 567]	2402	[28, 1006]
480	[404, 801]	1121	[1497, 1498]	1762	[1467, 1149]	2403	[866, 853]
481	[802, 803]	1122	[20, 1499]	1763	[1403, 2069]	2404	[1076, 1495]
482	[756, 804]	1123	[1500, 1081]	1764	[2070, 1950]	2405	[2173, 363]
483	[84, 805]	1124	[1501, 863]	1765	[2069, 1237]	2406	[976, 281]
484	[806, 807]	1125	[1502, 1503]	1766	[217, 551]	2407	[928, 375]
485	[808, 809]	1126	[1504, 840]	1767	[705, 38]	2408	[922, 396]
486	[810, 811]	1127	[1505, 877]	1768	[2071, 1241]	2409	[1638, 904]
487	[812, 290]	1128	[28, 1506]	1769	[2072, 1390]	2410	[1754, 835]
488	[248, 813]	1129	[1507, 381]	1770	[2070, 1949]	2411	[253, 5]
489	[333, 814]	1130	[1508, 1055]	1771	[2073, 1976]	2412	[1036, 819]
490	[815, 816]	1131	[1509, 798]	1772	[672, 190]	2413	[2487, 1537]
491	[817, 244]	1132	[1011, 1510]	1773	[2074, 1314]	2414	[266, 69]
492	[818, 330]	1133	[1511, 1512]	1774	[1301, 1164]	2415	[410, 821]
493	[819, 110]	1134	[1513, 988]	1775	[1899, 631]	2416	[2488, 1077]
494	[820, 769]	1135	[1490, 1514]	1776	[2075, 536]	2417	[2146, 978]
495	[821, 348]	1136	[1515, 82]	1777	[585, 1350]	2418	[1759, 1530]
496	[822, 274]	1137	[379, 832]	1778	[2076, 2077]	2419	[2489, 929]
497	[823, 824]	1138	[1516, 1022]	1779	[2078, 1260]	2420	[427, 311]
498	[825, 826]	1139	[1517, 421]	1780	[1976, 1939]	2421	[2490, 1095]
499	[827, 828]	1140	[1518, 838]	1781	[1969, 516]	2422	[2491, 972]
500	[829, 295]	1141	[1519, 874]	1782	[1207, 628]	2423	[2238, 1688]
501	[830, 344]	1142	[1520, 981]	1783	[2079, 1943]	2424	[964, 957]
502	[831, 327]	1143	[1521, 75]	1784	[1171, 601]	2425	[871, 107]
503	[832, 87]	1144	[120, 268]	1785	[1259, 676]	2426	[2492, 1030]
504	[833, 91]	1145	[1522, 756]	1786	[1993, 1144]	2427	[2493, 406]
505	[834, 835]	1146	[780, 1523]	1787	[2080, 2081]	2428	[2121, 79]
506	[836, 837]	1147	[976, 25]	1788	[1858, 1113]	2429	[2494, 769]
507	[838, 839]	1148	[988, 1524]	1789	[2082, 614]	2430	[2495, 985]
508	[840, 841]	1149	[965, 1049]	1790	[2083, 1207]	2431	[2213, 1048]
509	[842, 843]	1150	[239, 811]	1791	[2084, 2085]	2432	[2496, 828]
510	[844, 845]	1151	[1525, 931]	1792	[2086, 2087]	2433	[827, 337]
511	[846, 847]	1152	[1526, 286]	1793	[2088, 12]	2434	[2497, 971]
512	[331, 752]	1153	[24, 1062]	1794	[150, 529]	2435	[2498, 740]
513	[848, 849]	1154	[368, 1527]	1795	[2089, 1939]	2436	[1686, 106]
514	[850, 851]	1155	[1528, 1062]	1796	[2090, 1127]	2437	[1804, 843]
515	[852, 284]	1156	[1529, 1530]	1797	[2091, 50]	2438	[1729, 974]
516	[853, 854]	1157	[830, 252]	1798	[2092, 1332]	2439	[2499, 371]
517	[855, 813]	1158	[1531, 108]	1799	[2093, 184]	2440	[2500, 25]
518	[856, 857]	1159	[734, 1532]	1800	[2094, 1272]	2441	[2291, 414]

519	[858, 738]	1160	[1533, 1033]	1801	[2095, 1366]	2442	[1, 552]
520	[259, 859]	1161	[1534, 1535]	1802	[1847, 168]	2443	[2501, 2022]
521	[860, 861]	1162	[1536, 1537]	1803	[2096, 675]	2444	[662, 14]
522	[336, 260]	1163	[1538, 821]	1804	[2097, 150]	2445	[2502, 1192]
523	[862, 775]	1164	[345, 5]	1805	[2098, 2099]	2446	[1334, 453]
524	[863, 333]	1165	[1539, 733]	1806	[2100, 616]	2447	[2503, 2504]
525	[864, 865]	1166	[1540, 1088]	1807	[2101, 429]	2448	[2114, 203]
526	[866, 255]	1167	[1541, 950]	1808	[2102, 2103]	2449	[2505, 1364]
527	[867, 868]	1168	[813, 1542]	1809	[2104, 2105]	2450	[2506, 2077]
528	[869, 870]	1169	[1543, 953]	1810	[2106, 1157]	2451	[2507, 481]
529	[871, 757]	1170	[1544, 1060]	1811	[618, 1401]	2452	[2508, 2403]
530	[872, 873]	1171	[1545, 1546]	1812	[2107, 611]	2453	[2509, 1435]
531	[874, 355]	1172	[766, 27]	1813	[2108, 633]	2454	[2510, 1308]
532	[411, 398]	1173	[1547, 916]	1814	[2109, 506]	2455	[1341, 165]
533	[63, 875]	1174	[281, 26]	1815	[2110, 1846]	2456	[2079, 1410]
534	[876, 348]	1175	[423, 1548]	1816	[40, 571]	2457	[1876, 1943]
535	[877, 386]	1176	[1549, 356]	1817	[1324, 1146]	2458	[139, 157]
536	[878, 112]	1177	[1009, 4]	1818	[2111, 2112]	2459	[2511, 1466]
537	[879, 369]	1178	[904, 1550]	1819	[664, 191]	2460	[179, 1391]
538	[880, 93]	1179	[1551, 104]	1820	[2113, 625]	2461	[1923, 1210]
539	[881, 882]	1180	[1552, 765]	1821	[492, 650]	2462	[1840, 522]
540	[883, 884]	1181	[1553, 1012]	1822	[1338, 607]	2463	[2512, 1228]
541	[784, 885]	1182	[1554, 896]	1823	[2114, 676]	2464	[2513, 2504]
542	[886, 63]	1183	[1067, 94]	1824	[1474, 1219]	2465	[1929, 1285]
543	[887, 888]	1184	[1555, 85]	1825	[2115, 364]	2466	[2514, 1240]
544	[889, 890]	1185	[1556, 751]	1826	[2116, 726]	2467	[577, 229]
545	[891, 892]	1186	[1557, 394]	1827	[2117, 232]	2468	[53, 488]
546	[893, 894]	1187	[867, 1490]	1828	[2118, 1736]	2469	[670, 626]
547	[895, 896]	1188	[15, 1558]	1829	[2119, 813]	2470	[1451, 681]
548	[897, 797]	1189	[1559, 1082]	1830	[2120, 242]	2471	[2515, 2516]
549	[898, 899]	1190	[1558, 864]	1831	[2121, 358]	2472	[2517, 1256]
550	[900, 91]	1191	[1560, 261]	1832	[2122, 853]	2473	[1294, 689]
551	[901, 902]	1192	[722, 895]	1833	[2123, 1682]	2474	[1838, 718]
552	[903, 904]	1193	[1561, 809]	1834	[2124, 1652]	2475	[2518, 1233]
553	[905, 795]	1194	[1562, 1563]	1835	[2125, 418]	2476	[633, 136]
554	[776, 827]	1195	[1564, 1565]	1836	[1073, 402]	2477	[2088, 652]
555	[413, 281]	1196	[1566, 1086]	1837	[987, 780]	2478	[2323, 531]
556	[6, 385]	1197	[1567, 1568]	1838	[2126, 1098]	2479	[1875, 1878]
557	[906, 376]	1198	[1569, 253]	1839	[2127, 918]	2480	[429, 193]
558	[907, 267]	1199	[1570, 1479]	1840	[2128, 1519]	2481	[562, 678]
559	[249, 782]	1200	[1571, 1572]	1841	[2129, 864]	2482	[2519, 2046]
560	[908, 909]	1201	[1573, 985]	1842	[2130, 1764]	2483	[1459, 177]
561	[833, 67]	1202	[1574, 1575]	1843	[1013, 1537]	2484	[605, 472]
562	[910, 911]	1203	[1576, 1068]	1844	[1717, 419]	2485	[1201, 1195]

563	[771, 912]	1204	[821, 398]	1845	[76, 2131]	2486	[1328, 1110]
564	[913, 109]	1205	[1577, 349]	1846	[1650, 108]	2487	[1903, 185]
565	[347, 805]	1206	[1578, 1506]	1847	[2132, 909]	2488	[2343, 684]
566	[914, 915]	1207	[1579, 1580]	1848	[2133, 871]	2489	[1424, 556]
567	[807, 916]	1208	[1581, 788]	1849	[2134, 277]	2490	[1400, 1122]
568	[917, 901]	1209	[1582, 104]	1850	[2135, 291]	2491	[2520, 2437]
569	[297, 918]	1210	[277, 1583]	1851	[1582, 798]	2492	[2521, 2322]
570	[804, 919]	1211	[1031, 264]	1852	[2136, 2137]	2493	[142, 1224]
571	[888, 920]	1212	[1584, 1095]	1853	[2138, 744]	2494	[124, 641]
572	[921, 827]	1213	[1585, 1017]	1854	[231, 774]	2495	[1368, 714]
573	[922, 295]	1214	[1586, 402]	1855	[812, 360]	2496	[2522, 2099]
574	[923, 308]	1215	[844, 1568]	1856	[2139, 1717]	2497	[640, 1137]
575	[924, 925]	1216	[1587, 1588]	1857	[2140, 877]	2498	[2523, 1127]
576	[766, 823]	1217	[1589, 734]	1858	[2141, 302]	2499	[2524, 1865]
577	[288, 926]	1218	[1590, 104]	1859	[2142, 1535]	2500	[2525, 2016]
578	[927, 762]	1219	[87, 393]	1860	[2143, 909]	2501	[2526, 252]
579	[928, 929]	1220	[1591, 1054]	1861	[2144, 68]	2502	[2527, 333]
580	[930, 421]	1221	[317, 1502]	1862	[839, 88]	2503	[2528, 996]
581	[22, 931]	1222	[1592, 770]	1863	[421, 926]	2504	[1626, 1604]
582	[932, 237]	1223	[1593, 316]	1864	[2145, 1018]	2505	[2193, 846]
583	[933, 934]	1224	[327, 1564]	1865	[2146, 873]	2506	[1082, 29]
584	[935, 874]	1225	[1594, 1595]	1866	[2147, 1771]	2507	[2529, 756]
585	[826, 936]	1226	[915, 1510]	1867	[2148, 84]	2508	[402, 317]
586	[937, 386]	1227	[1596, 956]	1868	[2149, 102]	2509	[69, 776]
587	[938, 850]	1228	[1597, 1598]	1869	[2150, 1502]	2510	[2530, 274]
588	[939, 940]	1229	[1583, 884]	1870	[2151, 874]	2511	[2531, 108]
589	[941, 823]	1230	[1599, 1527]	1871	[2152, 1017]	2512	[813, 425]
590	[942, 943]	1231	[321, 1081]	1872	[780, 1524]	2513	[2532, 789]
591	[944, 945]	1232	[385, 967]	1873	[2153, 1523]	2514	[2533, 267]
592	[946, 947]	1233	[1600, 946]	1874	[2154, 401]	2515	[2534, 965]
593	[748, 948]	1234	[1601, 256]	1875	[2155, 2156]	2516	[2232, 2157]
594	[81, 404]	1235	[1602, 383]	1876	[2157, 1655]	2517	[2227, 73]
595	[949, 868]	1236	[1603, 1604]	1877	[1688, 1780]	2518	[2535, 764]
596	[238, 950]	1237	[1605, 1606]	1878	[2158, 2159]	2519	[319, 814]
597	[951, 952]	1238	[101, 849]	1879	[348, 399]	2520	[1792, 97]
598	[953, 19]	1239	[1607, 120]	1880	[2160, 358]	2521	[1558, 297]
599	[954, 113]	1240	[1608, 777]	1881	[1796, 90]	2522	[1694, 18]
600	[955, 885]	1241	[1609, 1610]	1882	[2161, 1575]	2523	[823, 28]
601	[956, 957]	1242	[1611, 1530]	1883	[1624, 899]	2524	[2536, 837]
602	[958, 403]	1243	[1612, 1613]	1884	[2162, 80]	2525	[2537, 403]
603	[367, 959]	1244	[1614, 894]	1885	[112, 1056]	2526	[184, 46]
604	[960, 961]	1245	[1615, 996]	1886	[2163, 367]	2527	[2538, 2048]
605	[962, 755]	1246	[1616, 760]	1887	[2164, 411]	2528	[2539, 2012]
606	[963, 924]	1247	[1617, 1618]	1888	[2165, 2166]	2529	[2540, 1202]

607	[964, 965]	1248	[1619, 1620]	1889	[2167, 1060]	2530	[2541, 226]
608	[966, 808]	1249	[757, 733]	1890	[2168, 87]	2531	[680, 1250]
609	[967, 968]	1250	[427, 911]	1891	[2169, 387]	2532	[2542, 2516]
610	[969, 248]	1251	[376, 83]	1892	[2170, 766]	2533	[2543, 1169]
611	[792, 251]	1252	[1621, 735]	1893	[2171, 1084]	2534	[2544, 1921]
612	[970, 971]	1253	[959, 394]	1894	[2172, 729]	2535	[2545, 1344]
613	[341, 972]	1254	[1622, 259]	1895	[317, 99]	2536	[1109, 59]
614	[973, 974]	1255	[1623, 305]	1896	[2173, 1786]	2537	[2546, 2087]
615	[975, 976]	1256	[1624, 737]	1897	[877, 1606]	2538	[2547, 84]
616	[977, 978]	1257	[1625, 80]	1898	[2174, 1502]	2539	[2253, 82]
617	[968, 979]	1258	[1626, 791]	1899	[2175, 1055]	2540	[2548, 868]
618	[980, 357]	1259	[1627, 961]	1900	[291, 875]	2541	[2549, 2166]
619	[981, 982]	1260	[1628, 1629]	1901	[2176, 918]	2542	[2550, 746]
620	[983, 984]	1261	[1630, 1018]	1902	[927, 2166]	2543	[1074, 951]
621	[985, 986]	1262	[1631, 284]	1903	[2177, 931]	2544	[2551, 331]
622	[248, 424]	1263	[1632, 1633]	1904	[836, 1483]	2545	[2552, 280]
623	[987, 988]	1264	[1634, 938]	1905	[2178, 885]	2546	[2553, 393]
624	[989, 990]	1265	[1635, 1485]	1906	[2179, 1659]	2547	[2375, 524]
625	[991, 747]	1266	[1636, 245]	1907	[2180, 356]	2548	[1115, 563]
626	[391, 992]	1267	[1637, 755]	1908	[1635, 925]	2549	[452, 223]
627	[993, 16]	1268	[755, 748]	1909	[6, 912]	2550	[2554, 2410]
628	[981, 994]	1269	[1638, 380]	1910	[2181, 1030]	2551	[2555, 2418]
629	[995, 766]	1270	[1639, 1640]	1911	[1778, 1015]	2552	[2556, 1247]
630	[996, 771]	1271	[386, 1641]	1912	[2182, 323]	2553	[2557, 2350]
631	[997, 998]	1272	[1642, 1643]	1913	[2183, 964]	2554	[2264, 65]
632	[999, 998]	1273	[1644, 277]	1914	[2184, 1719]	2555	[2447, 946]
633	[1000, 1001]	1274	[1645, 239]	1915	[294, 2185]	2556	[2558, 884]
634	[297, 865]	1275	[1646, 1011]	1916	[2186, 1604]	2557	[1805, 777]
635	[1002, 793]	1276	[232, 1647]	1917	[2187, 310]	2558	[2559, 1136]
636	[1003, 1004]	1277	[1648, 318]	1918	[751, 22]	2559	[2215, 1045]
637	[357, 734]	1278	[1649, 364]	1919	[793, 75]		
638	[268, 1005]	1279	[765, 299]	1920	[2188, 415]		
639	[824, 1006]	1280	[1650, 825]	1921	[960, 2189]		
640	[1007, 1008]	1281	[1651, 1652]	1922	[2190, 809]		

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

7	0	434	0	861	0	1288	0	1715	0	2142	0
8	1	435	0	862	0	1289	1	1716	0	2143	1
9	0	436	0	863	0	1290	0	1717	1	2144	0
10	0	437	1	864	0	1291	1	1718	0	2145	1
11	0	438	0	865	1	1292	0	1719	1	2146	0
12	1	439	0	866	1	1293	0	1720	1	2147	1
13	1	440	0	867	1	1294	0	1721	0	2148	0
14	1	441	1	868	0	1295	1	1722	0	2149	1
15	0	442	1	869	0	1296	1	1723	1	2150	0
16	0	443	0	870	0	1297	1	1724	1	2151	1
17	1	444	0	871	0	1298	0	1725	0	2152	0
18	1	445	1	872	0	1299	1	1726	0	2153	1
19	0	446	1	873	0	1300	0	1727	0	2154	1
20	0	447	0	874	1	1301	1	1728	1	2155	0
21	0	448	1	875	1	1302	0	1729	0	2156	1
22	0	449	1	876	1	1303	1	1730	1	2157	0
23	0	450	0	877	1	1304	1	1731	1	2158	1
24	1	451	1	878	0	1305	0	1732	0	2159	0
25	1	452	1	879	0	1306	1	1733	0	2160	0
26	0	453	0	880	0	1307	1	1734	0	2161	1
27	1	454	0	881	1	1308	0	1735	0	2162	0
28	0	455	0	882	1	1309	0	1736	0	2163	0
29	1	456	0	883	0	1310	1	1737	1	2164	0
30	1	457	1	884	0	1311	1	1738	0	2165	0
31	0	458	0	885	1	1312	0	1739	1	2166	0
32	1	459	1	886	1	1313	1	1740	1	2167	1
33	0	460	1	887	0	1314	0	1741	1	2168	1
34	0	461	0	888	0	1315	1	1742	0	2169	1
35	1	462	0	889	1	1316	0	1743	1	2170	1
36	0	463	0	890	1	1317	1	1744	1	2171	0
37	1	464	1	891	1	1318	1	1745	0	2172	0
38	0	465	1	892	0	1319	1	1746	0	2173	0
39	0	466	0	893	0	1320	0	1747	0	2174	1
40	1	467	1	894	0	1321	0	1748	1	2175	1
41	0	468	0	895	1	1322	0	1749	1	2176	0
42	1	469	0	896	0	1323	1	1750	1	2177	0
43	0	470	0	897	1	1324	0	1751	0	2178	0
44	1	471	1	898	1	1325	1	1752	1	2179	1
45	0	472	1	899	1	1326	0	1753	1	2180	0
46	0	473	1	900	1	1327	1	1754	1	2181	0
47	0	474	0	901	1	1328	1	1755	1	2182	0
48	1	475	1	902	1	1329	0	1756	1	2183	1
49	1	476	0	903	0	1330	1	1757	0	2184	1
50	0	477	0	904	0	1331	0	1758	1	2185	0

51	1	478	1	905	0	1332	0	1759	1	2186	0
52	0	479	1	906	0	1333	0	1760	1	2187	0
53	0	480	1	907	1	1334	0	1761	1	2188	0
54	1	481	1	908	0	1335	0	1762	1	2189	1
55	0	482	1	909	1	1336	0	1763	1	2190	1
56	0	483	1	910	1	1337	1	1764	0	2191	0
57	0	484	1	911	0	1338	0	1765	1	2192	0
58	1	485	0	912	1	1339	1	1766	0	2193	0
59	0	486	0	913	0	1340	1	1767	0	2194	1
60	1	487	1	914	1	1341	1	1768	0	2195	1
61	0	488	1	915	0	1342	1	1769	0	2196	0
62	0	489	1	916	1	1343	1	1770	0	2197	0
63	1	490	1	917	1	1344	0	1771	1	2198	0
64	1	491	1	918	0	1345	1	1772	0	2199	0
65	0	492	0	919	0	1346	0	1773	0	2200	1
66	0	493	1	920	0	1347	1	1774	1	2201	0
67	1	494	1	921	1	1348	1	1775	1	2202	0
68	0	495	1	922	1	1349	0	1776	1	2203	0
69	1	496	0	923	1	1350	0	1777	0	2204	1
70	1	497	0	924	0	1351	1	1778	0	2205	0
71	0	498	1	925	1	1352	0	1779	0	2206	1
72	0	499	1	926	0	1353	0	1780	0	2207	0
73	0	500	1	927	0	1354	0	1781	0	2208	0
74	1	501	0	928	1	1355	1	1782	0	2209	1
75	0	502	1	929	0	1356	0	1783	1	2210	0
76	0	503	0	930	1	1357	1	1784	0	2211	1
77	1	504	0	931	1	1358	0	1785	0	2212	0
78	0	505	0	932	1	1359	1	1786	1	2213	1
79	1	506	1	933	1	1360	1	1787	1	2214	0
80	1	507	0	934	1	1361	0	1788	1	2215	1
81	0	508	0	935	0	1362	0	1789	1	2216	0
82	0	509	1	936	1	1363	1	1790	1	2217	1
83	1	510	1	937	1	1364	0	1791	0	2218	1
84	1	511	1	938	0	1365	1	1792	0	2219	1
85	0	512	0	939	0	1366	0	1793	0	2220	0
86	0	513	0	940	0	1367	1	1794	1	2221	1
87	0	514	0	941	0	1368	1	1795	0	2222	1
88	1	515	1	942	0	1369	0	1796	1	2223	0
89	0	516	0	943	0	1370	0	1797	1	2224	1
90	0	517	0	944	1	1371	0	1798	1	2225	1
91	0	518	0	945	1	1372	0	1799	0	2226	0
92	0	519	1	946	1	1373	1	1800	1	2227	1
93	0	520	0	947	1	1374	1	1801	0	2228	1
94	1	521	0	948	1	1375	0	1802	1	2229	1

95	1	522	1	949	1	1376	1	1803	0	2230	0
96	1	523	0	950	0	1377	1	1804	0	2231	1
97	1	524	0	951	1	1378	1	1805	1	2232	0
98	0	525	0	952	0	1379	0	1806	0	2233	0
99	1	526	1	953	1	1380	1	1807	1	2234	1
100	1	527	1	954	0	1381	1	1808	0	2235	1
101	1	528	0	955	1	1382	0	1809	1	2236	0
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103	1	530	0	957	1	1384	0	1811	1	2238	0
104	0	531	1	958	0	1385	0	1812	0	2239	1
105	0	532	0	959	1	1386	0	1813	1	2240	1
106	1	533	1	960	1	1387	1	1814	1	2241	1
107	1	534	1	961	0	1388	0	1815	1	2242	1
108	0	535	1	962	0	1389	1	1816	1	2243	0
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110	0	537	0	964	0	1391	0	1818	1	2245	0
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112	0	539	1	966	1	1393	1	1820	0	2247	0
113	0	540	0	967	1	1394	1	1821	0	2248	0
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115	1	542	1	969	1	1396	1	1823	1	2250	1
116	0	543	0	970	0	1397	0	1824	0	2251	1
117	1	544	1	971	0	1398	1	1825	0	2252	0
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119	0	546	0	973	1	1400	1	1827	1	2254	0
120	1	547	1	974	1	1401	0	1828	1	2255	0
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123	1	550	1	977	1	1404	0	1831	1	2258	1
124	0	551	1	978	1	1405	0	1832	1	2259	0
125	1	552	0	979	0	1406	0	1833	1	2260	1
126	1	553	0	980	1	1407	0	1834	0	2261	0
127	0	554	0	981	1	1408	0	1835	0	2262	0
128	0	555	1	982	0	1409	0	1836	1	2263	0
129	0	556	1	983	0	1410	0	1837	0	2264	0
130	1	557	0	984	1	1411	0	1838	1	2265	0
131	1	558	1	985	0	1412	0	1839	1	2266	1
132	0	559	0	986	0	1413	1	1840	1	2267	1
133	0	560	0	987	0	1414	1	1841	0	2268	0
134	1	561	0	988	0	1415	0	1842	0	2269	0
135	1	562	1	989	1	1416	0	1843	1	2270	0
136	1	563	0	990	0	1417	0	1844	1	2271	0
137	1	564	0	991	1	1418	0	1845	0	2272	0
138	0	565	0	992	1	1419	0	1846	0	2273	0

139	0	566	1	993	1	1420	0	1847	1	2274	1
140	1	567	1	994	1	1421	0	1848	0	2275	1
141	0	568	1	995	0	1422	0	1849	1	2276	1
142	1	569	1	996	1	1423	0	1850	0	2277	1
143	0	570	0	997	1	1424	0	1851	1	2278	1
144	0	571	0	998	1	1425	1	1852	0	2279	0
145	1	572	1	999	1	1426	1	1853	0	2280	1
146	0	573	1	1000	0	1427	1	1854	0	2281	1
147	0	574	1	1001	0	1428	1	1855	1	2282	1
148	0	575	0	1002	0	1429	1	1856	0	2283	0
149	0	576	1	1003	0	1430	1	1857	0	2284	0
150	1	577	1	1004	0	1431	0	1858	1	2285	0
151	1	578	0	1005	0	1432	0	1859	0	2286	1
152	0	579	1	1006	1	1433	1	1860	1	2287	0
153	0	580	1	1007	1	1434	0	1861	0	2288	0
154	1	581	0	1008	0	1435	0	1862	0	2289	1
155	0	582	1	1009	1	1436	1	1863	0	2290	1
156	1	583	1	1010	1	1437	1	1864	1	2291	1
157	0	584	0	1011	1	1438	1	1865	0	2292	1
158	0	585	0	1012	0	1439	1	1866	1	2293	1
159	1	586	1	1013	1	1440	0	1867	0	2294	0
160	0	587	0	1014	1	1441	1	1868	1	2295	1
161	0	588	0	1015	1	1442	0	1869	0	2296	0
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163	1	590	0	1017	1	1444	0	1871	0	2298	1
164	1	591	1	1018	0	1445	0	1872	1	2299	0
165	0	592	1	1019	1	1446	1	1873	1	2300	0
166	0	593	0	1020	1	1447	1	1874	1	2301	1
167	0	594	0	1021	1	1448	0	1875	0	2302	0
168	0	595	1	1022	1	1449	1	1876	0	2303	1
169	1	596	0	1023	0	1450	1	1877	1	2304	1
170	1	597	1	1024	1	1451	0	1878	1	2305	0
171	0	598	1	1025	0	1452	0	1879	1	2306	1
172	0	599	0	1026	1	1453	1	1880	0	2307	1
173	1	600	1	1027	0	1454	1	1881	1	2308	1
174	0	601	1	1028	1	1455	1	1882	1	2309	0
175	0	602	0	1029	0	1456	1	1883	0	2310	1
176	0	603	1	1030	0	1457	0	1884	0	2311	0
177	0	604	1	1031	1	1458	0	1885	0	2312	1
178	0	605	0	1032	1	1459	1	1886	0	2313	0
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180	0	607	0	1034	1	1461	1	1888	0	2315	0
181	0	608	1	1035	0	1462	1	1889	1	2316	0
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183	1	610	1	1037	0	1464	1	1891	1	2318	1
184	1	611	1	1038	1	1465	0	1892	1	2319	1
185	1	612	0	1039	1	1466	1	1893	0	2320	0
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189	1	616	1	1043	0	1470	0	1897	1	2324	0
190	0	617	1	1044	0	1471	0	1898	1	2325	0
191	1	618	1	1045	0	1472	0	1899	1	2326	0
192	1	619	1	1046	0	1473	0	1900	0	2327	1
193	1	620	0	1047	0	1474	0	1901	0	2328	1
194	1	621	0	1048	0	1475	1	1902	0	2329	0
195	1	622	1	1049	1	1476	0	1903	0	2330	0
196	1	623	0	1050	0	1477	0	1904	1	2331	1
197	1	624	1	1051	0	1478	0	1905	0	2332	1
198	0	625	1	1052	0	1479	1	1906	1	2333	0
199	1	626	1	1053	1	1480	1	1907	0	2334	1
200	1	627	1	1054	1	1481	1	1908	1	2335	0
201	1	628	1	1055	1	1482	0	1909	1	2336	0
202	0	629	0	1056	1	1483	1	1910	0	2337	1
203	0	630	1	1057	1	1484	1	1911	0	2338	1
204	1	631	1	1058	1	1485	0	1912	0	2339	1
205	0	632	1	1059	0	1486	0	1913	1	2340	0
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207	1	634	1	1061	0	1488	0	1915	0	2342	0
208	0	635	0	1062	1	1489	0	1916	0	2343	0
209	1	636	0	1063	0	1490	1	1917	0	2344	1
210	1	637	1	1064	1	1491	0	1918	1	2345	1
211	0	638	1	1065	1	1492	1	1919	1	2346	1
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213	1	640	1	1067	0	1494	0	1921	1	2348	0
214	1	641	1	1068	1	1495	1	1922	1	2349	0
215	0	642	1	1069	0	1496	0	1923	0	2350	0
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217	0	644	1	1071	0	1498	1	1925	0	2352	0
218	0	645	1	1072	0	1499	1	1926	0	2353	0
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220	1	647	0	1074	0	1501	1	1928	1	2355	0
221	1	648	1	1075	1	1502	0	1929	1	2356	0
222	1	649	1	1076	1	1503	0	1930	0	2357	0
223	1	650	0	1077	0	1504	0	1931	0	2358	0
224	1	651	1	1078	0	1505	1	1932	0	2359	1
225	1	652	0	1079	1	1506	0	1933	0	2360	1
226	1	653	0	1080	1	1507	0	1934	1	2361	0

227	0	654	0	1081	1	1508	1	1935	0	2362	1
228	0	655	1	1082	1	1509	0	1936	0	2363	0
229	0	656	0	1083	1	1510	1	1937	0	2364	0
230	1	657	1	1084	0	1511	0	1938	1	2365	1
231	0	658	1	1085	0	1512	0	1939	0	2366	0
232	1	659	0	1086	1	1513	0	1940	0	2367	0
233	1	660	0	1087	1	1514	1	1941	0	2368	0
234	0	661	1	1088	1	1515	0	1942	1	2369	1
235	1	662	0	1089	1	1516	0	1943	1	2370	0
236	0	663	0	1090	1	1517	1	1944	0	2371	0
237	0	664	1	1091	0	1518	1	1945	0	2372	1
238	0	665	1	1092	1	1519	0	1946	0	2373	0
239	1	666	0	1093	0	1520	1	1947	1	2374	1
240	0	667	1	1094	0	1521	0	1948	0	2375	1
241	1	668	0	1095	1	1522	1	1949	1	2376	0
242	1	669	0	1096	0	1523	0	1950	0	2377	0
243	0	670	0	1097	0	1524	1	1951	1	2378	0
244	1	671	1	1098	0	1525	1	1952	1	2379	1
245	0	672	0	1099	0	1526	1	1953	0	2380	0
246	0	673	0	1100	0	1527	1	1954	1	2381	1
247	0	674	1	1101	1	1528	1	1955	0	2382	0
248	1	675	1	1102	1	1529	0	1956	0	2383	1
249	0	676	1	1103	0	1530	0	1957	0	2384	0
250	1	677	0	1104	0	1531	0	1958	1	2385	1
251	0	678	1	1105	0	1532	1	1959	0	2386	1
252	0	679	1	1106	0	1533	1	1960	0	2387	0
253	0	680	1	1107	1	1534	1	1961	1	2388	0
254	0	681	0	1108	1	1535	0	1962	0	2389	1
255	1	682	0	1109	0	1536	1	1963	1	2390	0
256	1	683	1	1110	1	1537	1	1964	0	2391	1
257	0	684	0	1111	1	1538	0	1965	0	2392	0
258	1	685	0	1112	0	1539	1	1966	1	2393	1
259	0	686	0	1113	0	1540	1	1967	0	2394	0
260	1	687	1	1114	0	1541	0	1968	1	2395	1
261	1	688	1	1115	0	1542	1	1969	0	2396	0
262	1	689	0	1116	0	1543	0	1970	0	2397	0
263	1	690	1	1117	0	1544	0	1971	1	2398	1
264	1	691	1	1118	0	1545	0	1972	1	2399	1
265	0	692	0	1119	0	1546	0	1973	1	2400	1
266	1	693	0	1120	1	1547	1	1974	1	2401	0
267	0	694	0	1121	0	1548	0	1975	1	2402	0
268	1	695	1	1122	0	1549	1	1976	0	2403	1
269	1	696	0	1123	0	1550	1	1977	1	2404	1
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271	0	698	1	1125	0	1552	0	1979	1	2406	0
272	1	699	0	1126	0	1553	1	1980	0	2407	1
273	0	700	1	1127	1	1554	1	1981	1	2408	1
274	1	701	0	1128	0	1555	0	1982	0	2409	1
275	1	702	1	1129	0	1556	1	1983	1	2410	1
276	0	703	1	1130	1	1557	1	1984	1	2411	0
277	1	704	1	1131	0	1558	1	1985	1	2412	0
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279	0	706	1	1133	0	1560	0	1987	1	2414	1
280	1	707	1	1134	0	1561	0	1988	0	2415	1
281	0	708	1	1135	1	1562	1	1989	1	2416	0
282	1	709	0	1136	0	1563	0	1990	0	2417	0
283	1	710	1	1137	0	1564	0	1991	0	2418	1
284	0	711	1	1138	0	1565	0	1992	1	2419	0
285	0	712	0	1139	1	1566	1	1993	1	2420	1
286	1	713	0	1140	1	1567	0	1994	0	2421	1
287	0	714	0	1141	0	1568	1	1995	1	2422	0
288	1	715	0	1142	1	1569	0	1996	1	2423	0
289	1	716	0	1143	0	1570	1	1997	0	2424	0
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291	0	718	0	1145	1	1572	0	1999	1	2426	1
292	0	719	0	1146	1	1573	0	2000	0	2427	1
293	1	720	1	1147	0	1574	0	2001	0	2428	1
294	0	721	1	1148	0	1575	0	2002	1	2429	0
295	0	722	0	1149	0	1576	1	2003	1	2430	1
296	0	723	0	1150	1	1577	1	2004	1	2431	1
297	1	724	0	1151	1	1578	0	2005	1	2432	0
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299	0	726	1	1153	1	1580	0	2007	1	2434	1
300	0	727	0	1154	1	1581	0	2008	1	2435	0
301	1	728	1	1155	1	1582	1	2009	1	2436	1
302	0	729	0	1156	0	1583	0	2010	0	2437	0
303	1	730	0	1157	0	1584	0	2011	0	2438	0
304	1	731	0	1158	0	1585	1	2012	0	2439	0
305	0	732	0	1159	0	1586	1	2013	1	2440	1
306	1	733	1	1160	1	1587	1	2014	0	2441	1
307	1	734	0	1161	1	1588	0	2015	0	2442	0
308	1	735	0	1162	1	1589	0	2016	0	2443	1
309	0	736	0	1163	0	1590	1	2017	1	2444	0
310	0	737	0	1164	1	1591	1	2018	1	2445	1
311	1	738	0	1165	1	1592	0	2019	1	2446	0
312	0	739	0	1166	1	1593	0	2020	0	2447	1
313	1	740	0	1167	0	1594	1	2021	0	2448	1
314	0	741	1	1168	1	1595	1	2022	1	2449	0

315	1	742	0	1169	0	1596	1	2023	0	2450	1
316	0	743	1	1170	0	1597	0	2024	0	2451	0
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318	1	745	1	1172	1	1599	0	2026	0	2453	1
319	0	746	0	1173	1	1600	0	2027	1	2454	1
320	1	747	0	1174	0	1601	0	2028	1	2455	1
321	1	748	0	1175	0	1602	0	2029	1	2456	1
322	0	749	0	1176	1	1603	1	2030	0	2457	0
323	1	750	1	1177	1	1604	0	2031	1	2458	0
324	0	751	1	1178	0	1605	0	2032	1	2459	1
325	1	752	1	1179	0	1606	1	2033	0	2460	0
326	1	753	0	1180	0	1607	0	2034	1	2461	0
327	0	754	1	1181	1	1608	0	2035	0	2462	1
328	0	755	1	1182	1	1609	0	2036	1	2463	1
329	1	756	1	1183	0	1610	0	2037	0	2464	0
330	0	757	0	1184	0	1611	1	2038	0	2465	1
331	0	758	0	1185	1	1612	0	2039	0	2466	0
332	0	759	1	1186	1	1613	0	2040	0	2467	1
333	1	760	1	1187	1	1614	1	2041	1	2468	0
334	1	761	1	1188	0	1615	0	2042	1	2469	0
335	0	762	1	1189	1	1616	1	2043	0	2470	0
336	1	763	0	1190	1	1617	1	2044	0	2471	1
337	1	764	1	1191	0	1618	1	2045	1	2472	1
338	0	765	0	1192	0	1619	0	2046	1	2473	0
339	1	766	1	1193	0	1620	0	2047	0	2474	1
340	0	767	0	1194	1	1621	0	2048	0	2475	1
341	1	768	1	1195	0	1622	0	2049	0	2476	0
342	1	769	1	1196	1	1623	0	2050	0	2477	0
343	0	770	1	1197	0	1624	0	2051	0	2478	1
344	1	771	0	1198	0	1625	1	2052	0	2479	0
345	1	772	1	1199	1	1626	1	2053	1	2480	0
346	1	773	1	1200	1	1627	0	2054	0	2481	1
347	0	774	0	1201	0	1628	0	2055	1	2482	0
348	1	775	1	1202	0	1629	0	2056	1	2483	1
349	0	776	0	1203	1	1630	0	2057	1	2484	0
350	1	777	0	1204	1	1631	0	2058	0	2485	0
351	1	778	0	1205	1	1632	0	2059	1	2486	1
352	1	779	1	1206	0	1633	0	2060	1	2487	0
353	0	780	1	1207	0	1634	0	2061	0	2488	0
354	1	781	0	1208	0	1635	1	2062	1	2489	0
355	1	782	0	1209	1	1636	1	2063	1	2490	1
356	1	783	1	1210	1	1637	1	2064	1	2491	0
357	1	784	1	1211	1	1638	1	2065	0	2492	1
358	0	785	0	1212	0	1639	0	2066	1	2493	1

359	1	786	0	1213	1	1640	1	2067	1	2494	0
360	1	787	1	1214	1	1641	1	2068	1	2495	1
361	0	788	1	1215	1	1642	1	2069	1	2496	0
362	1	789	1	1216	1	1643	0	2070	0	2497	1
363	0	790	0	1217	0	1644	0	2071	0	2498	0
364	1	791	1	1218	1	1645	0	2072	0	2499	0
365	1	792	1	1219	0	1646	0	2073	1	2500	1
366	1	793	1	1220	1	1647	0	2074	0	2501	1
367	1	794	0	1221	1	1648	1	2075	1	2502	1
368	1	795	1	1222	0	1649	1	2076	0	2503	1
369	0	796	0	1223	0	1650	0	2077	1	2504	1
370	1	797	0	1224	0	1651	1	2078	0	2505	0
371	1	798	1	1225	1	1652	0	2079	1	2506	1
372	1	799	1	1226	0	1653	1	2080	1	2507	0
373	0	800	0	1227	1	1654	1	2081	1	2508	1
374	0	801	1	1228	0	1655	0	2082	1	2509	1
375	1	802	1	1229	0	1656	1	2083	1	2510	1
376	1	803	0	1230	0	1657	0	2084	0	2511	1
377	0	804	0	1231	1	1658	1	2085	1	2512	1
378	1	805	1	1232	0	1659	0	2086	0	2513	0
379	0	806	1	1233	0	1660	1	2087	1	2514	0
380	1	807	1	1234	0	1661	1	2088	0	2515	1
381	0	808	0	1235	0	1662	0	2089	0	2516	0
382	0	809	0	1236	1	1663	0	2090	1	2517	1
383	1	810	0	1237	0	1664	0	2091	1	2518	1
384	1	811	1	1238	1	1665	0	2092	1	2519	0
385	0	812	1	1239	0	1666	1	2093	0	2520	0
386	0	813	1	1240	0	1667	1	2094	1	2521	1
387	0	814	0	1241	0	1668	1	2095	0	2522	0
388	1	815	1	1242	1	1669	0	2096	0	2523	0
389	0	816	1	1243	0	1670	1	2097	0	2524	0
390	1	817	1	1244	1	1671	0	2098	1	2525	1
391	1	818	0	1245	0	1672	1	2099	0	2526	1
392	0	819	1	1246	1	1673	0	2100	0	2527	1
393	0	820	1	1247	1	1674	0	2101	1	2528	1
394	1	821	1	1248	0	1675	1	2102	0	2529	0
395	1	822	0	1249	0	1676	1	2103	0	2530	1
396	1	823	0	1250	1	1677	0	2104	1	2531	1
397	1	824	1	1251	1	1678	0	2105	1	2532	0
398	0	825	1	1252	0	1679	1	2106	1	2533	0
399	1	826	0	1253	1	1680	1	2107	0	2534	1
400	0	827	1	1254	0	1681	0	2108	1	2535	1
401	1	828	0	1255	0	1682	1	2109	1	2536	0
402	1	829	1	1256	0	1683	1	2110	1	2537	1

403	1	830	0	1257	1	1684	0	2111	1	2538	1
404	1	831	1	1258	1	1685	1	2112	0	2539	1
405	0	832	0	1259	0	1686	1	2113	0	2540	0
406	0	833	0	1260	0	1687	1	2114	1	2541	1
407	0	834	0	1261	0	1688	1	2115	0	2542	0
408	0	835	1	1262	0	1689	0	2116	0	2543	0
409	1	836	1	1263	0	1690	0	2117	1	2544	1
410	1	837	0	1264	0	1691	1	2118	1	2545	1
411	0	838	0	1265	1	1692	0	2119	1	2546	1
412	1	839	0	1266	1	1693	1	2120	0	2547	1
413	1	840	0	1267	1	1694	0	2121	1	2548	0
414	1	841	0	1268	1	1695	1	2122	1	2549	1
415	0	842	1	1269	1	1696	1	2123	1	2550	0
416	0	843	1	1270	0	1697	0	2124	0	2551	1
417	1	844	1	1271	0	1698	1	2125	0	2552	1
418	0	845	0	1272	1	1699	0	2126	1	2553	1
419	1	846	1	1273	0	1700	0	2127	1	2554	0
420	1	847	1	1274	0	1701	0	2128	1	2555	1
421	0	848	0	1275	0	1702	0	2129	0	2556	1
422	0	849	0	1276	1	1703	0	2130	0	2557	1
423	0	850	0	1277	1	1704	0	2131	0	2558	1
424	0	851	1	1278	1	1705	1	2132	1	2559	1
425	0	852	1	1279	0	1706	1	2133	0		
426	1	853	0	1280	0	1707	1	2134	1		

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`