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

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 $(a,b)=(z^4+z^3+1,z^2+1)$.

1. Introduction

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

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

as the limit of the finite continued fractions

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

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

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

admits a continued fraction expansion of form (1.1).

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

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

that we shall denote

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

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Theorem 1.1. *When* $(a,b)=(z^4+z^3+1, z^2+1)$, *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 $\mathrm{CF}(a,b)$,

$$\begin{aligned}
p_0(z) &= z^{18}+z^{17}+z^{13}+z^{12}+z^5+z^3+z^2+1,\\
p_1(z) &= z^{22}+z^{19}+z^{17}+z^{16}+z^{15}+z^{14}+z^{13}+z^{12}+z^{10}+z^8+z^7+z^6+z^3\\
&\quad +z^2,\\
p_2(z) &= z^{24}+z^{14}+z^8+z^6+z^4+1,\\
p_3(z) &= z^{22}+z^{19}+z^{17}+z^{16}+z^{15}+z^{14}+z^{13}+z^{12}+z^{10}+z^8+z^7+z^6+z^3\\
&\quad +z^2,\\
p_4(z) &= z^{20}+z^{18}+z^{17}+z^{14}+z^{13}+z^{12}+z^8+z^6+z^5+z^4+z^3+z^2+1,
\end{aligned}$$

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

$$\begin{aligned}
p_0(z) &= z^{18}+z^{17}+z^{16}+z^{13}+z^8+z^5+z^3+z^2+1,\\
p_1(z) &= z^{22}+z^{19}+z^{17}+z^{16}+z^{15}+z^{14}+z^{13}+z^{12}+z^{10}+z^8+z^7+z^6+z^3\\
&\quad +z^2,\\
p_2(z) &= z^{24}+z^{14}+z^8+z^6+z^4+1,\\
p_3(z) &= z^{22}+z^{19}+z^{17}+z^{16}+z^{15}+z^{14}+z^{13}+z^{12}+z^{10}+z^8+z^7+z^6+z^3\\
&\quad +z^2,\\
p_4(z) &= z^{20}+z^{18}+z^{17}+z^{16}+z^{14}+z^{13}+z^6+z^5+z^4+z^3+z^2+1.
\end{aligned}$$

2. Proof

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

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

By the basic properties of continued fractions, we have

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

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

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

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

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

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

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

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

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

for some positive integer d_n. Hence,

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

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

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

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

$$(150, 150, 150, 150, 150)$$

of the vector

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

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

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

Lemma 2.1. *We have*

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

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

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

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

Proof. We give the proof of the identity

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

the proofs of the others being similar.

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

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

is an annihilating polynomial of $W^o_{0,0}M^o_{0,0}$. We use Padé-Hermite approximation to find a candidate for the minimal polynomial of $W^o_{0,0}M^o_{0,0}$, that will be called $\phi_0(x,y)$. To prove that $\phi_0(x,y)$ is indeed the minimal polynomial, it suffices to prove that it is an irreducible factor of $P(x,y)$ of multiplicity m and that $Q(x,y) := P(x,y)/\phi_0(x,y)^m$ is not an annihilating polynomial of $W^o_{0,0}M^o_{0,0}$. We verify the first point directly. For the second point, we truncate $W^o_{0,0}M^o_{0,0}$ to order 540 and substitute it for y in $Q(x,y)$. We get a series of valuation less than 540, 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 660 and substitute it for y in $Q(x,y)$. We get a series of valuation less than 660, 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

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

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

$$\begin{aligned} M^e[:12u] = {} & M^e[:6u] + x^u M^e[:5u] + x^{2u} M^e[:4u] + x^{3u} M^e[:3u] + x^{5u} M^e[:u] \\ & + x^u M^e[:6u] + x^{2u} M^e[:5u] + x^{3u} M^e[:4u] + x^{4u} M^e[:3u] \\ & + x^{6u} M^e[:u] + x^{4u} M^e[:6u] + x^{5u} M^e[:5u] + x^{6u} M^e[:4u] \\ & + x^{7u} M^e[:3u] + x^{9u} M^e[:u] + x^{8u} M^e[:4u] \end{aligned}$$

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

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

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

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 $u = 2^{2k}$,

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

The proof of the other 15 cases are similar. We break down the above identity into 6 parts:

$$
\begin{aligned}
x^6 u &= x^{5u} T[u:2u] + x^{3u} T[3u:4u] + x^{2u} T[4u:5u] + x^u T[5u:6u]\\
&+ T[6u:7u],\\
x^7 u &= x^{7u} T[:u] + x^{6u} T[u:2u] + x^{5u} T[2u:3u] + x^{4u} T[3u:4u]\\
&+ T[7u:8u],\\
0 &= x^{8u} T[:u] + x^{7u} T[u:2u] + x^{6u} T[2u:3u] + x^{5u} T[3u:4u]\\
&+ x^{4u} T[4u:5u] + T[8u:9u],\\
0 &= x^{9u} T[:u] + x^{8u} T[u:2u] + x^{7u} T[2u:3u] + x^{6u} T[3u:4u]\\
&+ x^{5u} T[4u:5u] + x^{4u} T[5u:6u] + T[9u:10u],\\
x^1 0u &= x^{8u} T[2u:3u] + T[10u:11u],
\end{aligned}
$$

$$0 = x^{8u}T[3u:4u] + T[11u:12u],$$

which can be rewritten as

$$0 = T[[1w]_2] + T[[11w]_2] + T[[100w]_2] + T[[101w]_2] + T[[110w]_2], \tag{2.7}$$

$$0 = T[[w]_2] + T[[1w]_2] + T[[10w]_2] + T[[11w]_2] + T[[111w]_2], \tag{2.8}$$

$$\begin{aligned} 0 = {} & T[[w]_2] + T[[1w]_2] + T[[10w]_2] + T[[11w]_2] + T[[100w]_2] \\ & + T[[1000w]_2], \end{aligned} \tag{2.9}$$

$$\begin{aligned} 0 = {} & T[[w]_2] + T[[1w]_2] + T[[10w]_2] + T[[11w]_2] + T[[100w]_2] \\ & + T[[101w]_2] + T[[1001w]_2], \end{aligned} \tag{2.10}$$

$$0 = T[[10w]_2] + T[[1010w]_2], \tag{2.11}$$

$$0 = T[[11w]_2] + T[[1011w]_2], \tag{2.12}$$

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

$$1 = T[[1w]_2] + T[[11w]_2] + T[[100w]_2] + T[[101w]_2] + T[[110w]_2], \tag{2.13}$$

$$1 = T[[w]_2] + T[[1w]_2] + T[[10w]_2] + T[[11w]_2] + T[[111w]_2], \tag{2.14}$$

$$\begin{aligned} 0 = {} & T[[w]_2] + T[[1w]_2] + T[[10w]_2] + T[[11w]_2] + T[[100w]_2] \\ & + T[[1000w]_2], \end{aligned} \tag{2.15}$$

$$\begin{aligned} 0 = {} & T[[w]_2] + T[[1w]_2] + T[[10w]_2] + T[[11w]_2] + T[[100w]_2] \\ & + T[[101w]_2] + T[[1001w]_2], \end{aligned} \tag{2.16}$$

$$1 = T[[10w]_2] + T[[1010w]_2], \tag{2.17}$$

$$0 = T[[11w]_2] + T[[1011w]_2], \tag{2.18}$$

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

First we calculate an 2-automaton that generates T from its minimal polynomial and its first terms. This automaton has 2558 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 (2.18) can be written as

$$\begin{aligned} 0 = {} & \tau(A(s,1)) + \tau(A(s,11)) + \tau(A(s,100)) + \tau(A(s,101)) \\ & + \tau(A(s,110)), \end{aligned} \tag{2.19}$$

$$0 = \tau(A(s,\epsilon)) + \tau(A(s,1)) + \tau(A(s,10)) + \tau(A(s,11)) + \tau(A(s,111)), \tag{2.20}$$

$$\begin{aligned} 0 = {} & \tau(A(s,\epsilon)) + \tau(A(s,1)) + \tau(A(s,10)) + \tau(A(s,11)) + \tau(A(s,100)) \\ & + \tau(A(s,1000)), \end{aligned} \tag{2.21}$$

$$\begin{aligned} 0 = {} & \tau(A(s,\epsilon)) + \tau(A(s,1)) + \tau(A(s,10)) + \tau(A(s,11)) + \tau(A(s,100)) \\ & + \tau(A(s,101)) + \tau(A(s,1001)), \end{aligned} \tag{2.22}$$

$$0 = \tau(A(s,10)) + \tau(A(s,1010)), \tag{2.23}$$

$$0 = \tau(A(s,11)) + \tau(A(s,1011)), \tag{2.24}$$

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

$$1 = \tau(A(s,1)) + \tau(A(s,11)) + \tau(A(s,100)) + \tau(A(s,101))$$

$$+\tau(A(s,110)), \tag{2.25}$$

$$1=\tau(A(s,\epsilon))+\tau(A(s,1))+\tau(A(s,10))+\tau(A(s,11))+\tau(A(s,111)), \tag{2.26}$$

$$\begin{aligned}0=&\tau(A(s,\epsilon))+\tau(A(s,1))+\tau(A(s,10))+\tau(A(s,11))+\tau(A(s,100))\\&+\tau(A(s,1000)),\end{aligned} \tag{2.27}$$

$$\begin{aligned}0=&\tau(A(s,\epsilon))+\tau(A(s,1))+\tau(A(s,10))+\tau(A(s,11))+\tau(A(s,100))\\&+\tau(A(s,101))+\tau(A(s,1001)),\end{aligned} \tag{2.28}$$

$$1=\tau(A(s,10))+\tau(A(s,1010)), \tag{2.29}$$

$$0=\tau(A(s,11))+\tau(A(s,1011)), \tag{2.30}$$

for $s=A(i,0^{2k})$. We find that $(A(i,0^{20}),E_{20})=(A(i,0^{16}),E_{16})$, so that we only have to verify that identities (2.19) through (2.30) hold for $2\le k\le 10$, which turns out to be true. $\square$

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

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

$$\begin{aligned}M_{2k}=&M^e[:6u]+x^uM^e[:5u]+x^{2u}M^e[:4u]+x^{3u}M^e[:3u]+x^{5u}M^e[:u]\\&+x^{6u}R^e,\\W_{2k}=&W^e[:6u]+x^uW^e[:5u]+x^{2u}W^e[:4u]+x^{3u}W^e[:3u]+x^{5u}W^e[:u]\\&+x^{6u}R^e.\end{aligned}$$

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

$$\begin{aligned}M_{2k+1}=&M^o[:6u]+x^uM^o[:5u]+x^{2u}M^o[:4u]+x^{3u}M^o[:3u]+x^{5u}M^o[:u]\\&+x^{6u}R^o,\\W_{2k+1}=&W^o[:6u]+x^uW^o[:5u]+x^{2u}W^o[:4u]+x^{3u}W^o[:3u]+x^{5u}W^o[:u]\\&+x^{6u}R^o.\end{aligned}$$

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

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

We give the proof of

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

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

$$\begin{aligned}W_{2k}M_{2k}=&\big(W^e[:6v]+x^vW^e[:5v]+x^{2v}W^e[:4v]+x^{3v}W^e[:3v]+x^{5v}W^e[:v]\\&+x^{6u}R^e\big)\times\big(M^e[:6v]+x^vM^e[:5v]+x^{2v}M^e[:4v]+x^{3v}M^e[:3v]\\&+x^{5v}M^e[:v]+x^{6u}R^e\big);\end{aligned} \tag{2.31}$$

Call this expression lhs. Note that both sides of identity M_{2k+1} have the same term of highest degree $x^{12v}R^o$. Therefore we only need to prove that their difference is

$O(x^{12v})$. Using Lemma 2.1 it can be seen that the right side of identity M_{2k+1} is congruent, modulo x^{12v}, to

$$W^e[:12v]M^e[:12v] + x^{2v}W^e[:10v]M^e[:10v] + x^{4v}W^e[:8v]M^e[:8v] \\ + x^{6v}W^e[:6v]M^e[:6v] + x^{10v}W^e[:2v]M^e[:2v].$$

For all $n \le 12$, 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 (2.31) and rhs as polynomials in $\mathbb{F}_2[a_1, ..., a_{12}, b_1, ..., b_{12}, c][X]$. 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 $O(X^{12})$, 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

$$\begin{aligned} q_0(x) &= x^{24} + x^{22} + x^{21} + x^{19} + x^{12} + x^{11} + x^7 + x^6, \\ q_1(x) &= x^{22} + x^{21} + x^{18} + x^{17} + x^{16} + x^{14} + x^{12} + x^{11} + x^{10} + x^9 + x^8 + x^7 \\ &\quad + x^5 + x^2, \\ q_2(x) &= x^{24} + x^{20} + x^{18} + x^{16} + x^{10} + 1, \\ q_3(x) &= x^{22} + x^{21} + x^{18} + x^{17} + x^{16} + x^{14} + x^{12} + x^{11} + x^{10} + x^9 + x^8 + x^7 \end{aligned}$$

$$
\begin{aligned}
&\quad + x^5 + x^2,\\
q_4(x) &= x^{24} + x^{22} + x^{21} + x^{20} + x^{19} + x^{18} + x^{16} + x^{12} + x^{11} + x^{10} + x^7 + x^6\\
&\quad + x^4.
\end{aligned}
$$

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 186, and substitute it for y in $R(z,y)$, we get a series with valuation smaller than 186, 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 $\phi(M^e, 0, 0)$:

$$
\begin{aligned}
p_0(x) &= x^{120} + x^{116} + x^{112} + x^{108} + x^{104} + x^{98} + x^{96} + x^{94} + x^{86} + x^{84} + x^{82}\\
&\quad + x^{80} + x^{76} + x^{68} + x^{66} + x^{64} + x^{62} + x^{58} + x^{56} + x^{54} + x^{50} + x^{42}\\
&\quad + x^{40} + x^{36} + x^{28} + x^{26} + x^{24},\\
p_3(x) &= x^{116} + x^{114} + x^{112} + x^{110} + x^{108} + x^{106} + x^{104} + x^{98} + x^{96} + x^{92}\\
&\quad + x^{86} + x^{84} + x^{76} + x^{74} + x^{70} + x^{66} + x^{62} + x^{60} + x^{52} + x^{50} + x^{48}\\
&\quad + x^{46} + x^{38} + x^{36} + x^{32} + x^{26} + x^{24} + x^{18},\\
p_6(x) &= x^{116} + x^{114} + x^{104} + x^{102} + x^{98} + x^{82} + x^{78} + x^{76} + x^{74} + x^{70} + x^{68}\\
&\quad + x^{62} + x^{52} + x^{48} + x^{42} + x^{38} + x^{34} + x^{26} + x^{24} + x^{22} + x^{14} + x^{12}\\
&\quad + x^6 + x^4 + x^2 + 1,\\
p_9(x) &= x^{116} + x^{114} + x^{112} + x^{110} + x^{106} + x^{104} + x^{100} + x^{94} + x^{92} + x^{90}\\
&\quad + x^{84} + x^{78} + x^{74} + x^{72} + x^{68} + x^{66} + x^{64} + x^{60} + x^{58} + x^{52} + x^{50}\\
&\quad + x^{46} + x^{42} + x^{38} + x^{28} + x^{26} + x^{24} + x^{18} + x^{12} + x^8 + x^6 + x^4,\\
p_{12}(x) &= x^{120} + x^{114} + x^{112} + x^{104} + x^{98} + x^{96} + x^{40} + x^{34} + x^{32} + x^8 + x^2 + 1\\
&\quad ,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{126} + x^{124} + x^{123} + x^{122} + x^{121} + x^{119} + x^{116} + x^{115} + x^{114} + x^{113}\\
&\quad + x^{109} + x^{107} + x^{101} + x^{100} + x^{97} + x^{94} + x^{93} + x^{91} + x^{90} + x^{89}\\
&\quad + x^{87} + x^{86} + x^{83} + x^{82} + x^{75} + x^{74} + x^{73} + x^{70} + x^{68} + x^{67} + x^{64}\\
&\quad + x^{59} + x^{58} + x^{51} + x^{48} + x^{46} + x^{44} + x^{43} + x^{41} + x^{40} + x^{39} + x^{38}\\
&\quad + x^{36} + x^{35} + x^{34} + x^{33} + x^{30},
\end{aligned}
$$

$$\begin{aligned}
p_3(x) &= x^{108} + x^{107} + x^{106} + x^{104} + x^{103} + x^{101} + x^{100} + x^{96} + x^{95} + x^{94}\\
&\quad + x^{88} + x^{87} + x^{86} + x^{78} + x^{77} + x^{75} + x^{74} + x^{64} + x^{63} + x^{61} + x^{59}\\
&\quad + x^{58} + x^{54} + x^{53} + x^{52} + x^{40} + x^{39} + x^{37} + x^{35} + x^{34} + x^{30} + x^{29}\\
&\quad + x^{28} + x^{20} + x^{19} + x^{18},\\
p_6(x) &= x^{114} + x^{111} + x^{110} + x^{106} + x^{103} + x^{102} + x^{100} + x^{97} + x^{96} + x^{88}\\
&\quad + x^{86} + x^{85} + x^{84} + x^{83} + x^{80} + x^{79} + x^{78} + x^{77} + x^{73} + x^{72} + x^{68}\\
&\quad + x^{66} + x^{65} + x^{63} + x^{62} + x^{61} + x^{58} + x^{57} + x^{56} + x^{55} + x^{54} + x^{52}\\
&\quad + x^{49} + x^{46} + x^{45} + x^{44} + x^{43} + x^{39} + x^{36} + x^{35} + x^{34} + x^{33} + x^{29}\\
&\quad + x^{28} + x^{24} + x^{21} + x^{18} + x^{17} + x^{15} + x^{14} + x^{13} + x^{12},\\
p_9(x) &= x^{120} + x^{119} + x^{117} + x^{115} + x^{114} + x^{112} + x^{111} + x^{110} + x^{106} + x^{105}\\
&\quad + x^{103} + x^{102} + x^{100} + x^{99} + x^{97} + x^{95} + x^{93} + x^{92} + x^{90} + x^{89} + x^{88}\\
&\quad + x^{82} + x^{81} + x^{79} + x^{77} + x^{76} + x^{72} + x^{71} + x^{70} + x^{66} + x^{65} + x^{64}\\
&\quad + x^{62} + x^{61} + x^{59} + x^{58} + x^{56} + x^{55} + x^{53} + x^{51} + x^{50} + x^{48} + x^{47}\\
&\quad + x^{45} + x^{44} + x^{36} + x^{35} + x^{33} + x^{31} + x^{29} + x^{28} + x^{24} + x^{23} + x^{22}\\
&\quad + x^{20} + x^{19} + x^{18} + x^{16} + x^{15} + x^{13} + x^{12} + x^{8} + x^{7} + x^{6},\\
p_{12}(x) &= x^{126} + x^{124} + x^{123} + x^{122} + x^{121} + x^{120} + x^{118} + x^{116} + x^{115} + x^{113}\\
&\quad + x^{111} + x^{109} + x^{107} + x^{105} + x^{103} + x^{101} + x^{99} + x^{98} + x^{97} + x^{96}\\
&\quad + x^{46} + x^{44} + x^{43} + x^{42} + x^{41} + x^{40} + x^{38} + x^{36} + x^{35} + x^{33} + x^{31}\\
&\quad + x^{30} + x^{29} + x^{28} + x^{26} + x^{24} + x^{23} + x^{22} + x^{21} + x^{20} + x^{18} + x^{16}\\
&\quad + x^{15} + x^{13} + x^{11} + x^{9} + x^{7} + x^{5} + x^{3} + x^{2} + x + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{126} + x^{124} + x^{123} + x^{122} + x^{121} + x^{119} + x^{116} + x^{115} + x^{114} + x^{113}\\
&\quad + x^{109} + x^{107} + x^{101} + x^{100} + x^{97} + x^{94} + x^{93} + x^{91} + x^{90} + x^{89}\\
&\quad + x^{87} + x^{86} + x^{83} + x^{82} + x^{75} + x^{74} + x^{73} + x^{70} + x^{68} + x^{67} + x^{64}\\
&\quad + x^{59} + x^{58} + x^{51} + x^{48} + x^{46} + x^{44} + x^{43} + x^{41} + x^{40} + x^{39} + x^{38}\\
&\quad + x^{36} + x^{35} + x^{34} + x^{33} + x^{30},\\
p_3(x) &= x^{108} + x^{107} + x^{106} + x^{104} + x^{103} + x^{101} + x^{100} + x^{96} + x^{95} + x^{94}\\
&\quad + x^{88} + x^{87} + x^{86} + x^{78} + x^{77} + x^{75} + x^{74} + x^{64} + x^{63} + x^{61} + x^{59}\\
&\quad + x^{58} + x^{54} + x^{53} + x^{52} + x^{40} + x^{39} + x^{37} + x^{35} + x^{34} + x^{30} + x^{29}\\
&\quad + x^{28} + x^{20} + x^{19} + x^{18},\\
p_6(x) &= x^{114} + x^{111} + x^{110} + x^{106} + x^{103} + x^{102} + x^{100} + x^{97} + x^{96} + x^{88}\\
&\quad + x^{86} + x^{85} + x^{84} + x^{83} + x^{80} + x^{79} + x^{78} + x^{77} + x^{73} + x^{72} + x^{68}\\
&\quad + x^{66} + x^{65} + x^{63} + x^{62} + x^{61} + x^{58} + x^{57} + x^{56} + x^{55} + x^{54} + x^{52}\\
&\quad + x^{49} + x^{46} + x^{45} + x^{44} + x^{43} + x^{39} + x^{36} + x^{35} + x^{34} + x^{33} + x^{29}
\end{aligned}$$

$$
\begin{aligned}
&+ x^{28} + x^{24} + x^{21} + x^{18} + x^{17} + x^{15} + x^{14} + x^{13} + x^{12},\\
p_9(x) &= x^{120} + x^{119} + x^{117} + x^{115} + x^{114} + x^{112} + x^{111} + x^{110} + x^{106} + x^{105}\\
&+ x^{103} + x^{102} + x^{100} + x^{99} + x^{97} + x^{95} + x^{93} + x^{92} + x^{90} + x^{89} + x^{88}\\
&+ x^{82} + x^{81} + x^{79} + x^{77} + x^{76} + x^{72} + x^{71} + x^{70} + x^{66} + x^{65} + x^{64}\\
&+ x^{62} + x^{61} + x^{59} + x^{58} + x^{56} + x^{55} + x^{53} + x^{51} + x^{50} + x^{48} + x^{47}\\
&+ x^{45} + x^{44} + x^{36} + x^{35} + x^{33} + x^{31} + x^{29} + x^{28} + x^{24} + x^{23} + x^{22}\\
&+ x^{20} + x^{19} + x^{18} + x^{16} + x^{15} + x^{13} + x^{12} + x^{8} + x^{7} + x^{6},\\
p_{12}(x) &= x^{126} + x^{124} + x^{123} + x^{122} + x^{121} + x^{120} + x^{118} + x^{116} + x^{115} + x^{113}\\
&+ x^{111} + x^{109} + x^{107} + x^{105} + x^{103} + x^{101} + x^{99} + x^{98} + x^{97} + x^{96}\\
&+ x^{46} + x^{44} + x^{43} + x^{42} + x^{41} + x^{40} + x^{38} + x^{36} + x^{35} + x^{33} + x^{31}\\
&+ x^{30} + x^{29} + x^{28} + x^{26} + x^{24} + x^{23} + x^{22} + x^{21} + x^{20} + x^{18} + x^{16}\\
&+ x^{15} + x^{13} + x^{11} + x^{9} + x^{7} + x^{5} + x^{3} + x^{2} + x + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{132} + x^{126} + x^{120} + x^{114} + x^{108} + x^{106} + x^{104} + x^{102} + x^{100} + x^{96}\\
&+ x^{94} + x^{92} + x^{90} + x^{88} + x^{84} + x^{80} + x^{78} + x^{76} + x^{74} + x^{72} + x^{70}\\
&+ x^{68} + x^{66} + x^{62} + x^{60} + x^{58} + x^{52} + x^{48} + x^{44} + x^{38} + x^{36},\\
p_3(x) &= x^{128} + x^{126} + x^{122} + x^{120} + x^{116} + x^{112} + x^{108} + x^{100} + x^{98} + x^{88}\\
&+ x^{84} + x^{80} + x^{76} + x^{74} + x^{60} + x^{58} + x^{52} + x^{50} + x^{46} + x^{44} + x^{42}\\
&+ x^{40} + x^{36} + x^{34} + x^{32} + x^{30} + x^{24} + x^{20} + x^{16} + x^{12},\\
p_6(x) &= x^{128} + x^{126} + x^{120} + x^{118} + x^{114} + x^{112} + x^{110} + x^{108} + x^{106} + x^{104}\\
&+ x^{102} + x^{100} + x^{90} + x^{88} + x^{82} + x^{80} + x^{78} + x^{72} + x^{66} + x^{64} + x^{62}\\
&+ x^{54} + x^{52} + x^{50} + x^{48} + x^{46} + x^{40} + x^{30} + x^{28} + x^{22} + x^{20} + x^{14}\\
&+ x^{10} + 1,\\
p_9(x) &= x^{128} + x^{126} + x^{122} + x^{120} + x^{118} + x^{114} + x^{112} + x^{106} + x^{102} + x^{100}\\
&+ x^{98} + x^{96} + x^{92} + x^{90} + x^{88} + x^{84} + x^{82} + x^{76} + x^{74} + x^{70} + x^{66}\\
&+ x^{62} + x^{60} + x^{58} + x^{56} + x^{54} + x^{52} + x^{48} + x^{46} + x^{42} + x^{38} + x^{34}\\
&+ x^{28} + x^{24} + x^{16} + x^{12} + x^{10} + x^{4},\\
p_{12}(x) &= x^{132} + x^{128} + x^{108} + x^{104} + x^{100} + x^{96} + x^{52} + x^{48} + x^{36} + x^{32} + x^{28}\\
&+ x^{24} + x^{20} + x^{16} + x^{12} + x^{8} + x^{4} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{132} + x^{126} + x^{124} + x^{120} + x^{116} + x^{114} + x^{112} + x^{110} + x^{108} + x^{106}\\
&+ x^{104} + x^{102} + x^{96} + x^{94} + x^{92} + x^{88} + x^{86} + x^{84} + x^{76} + x^{74} + x^{70}\\
&+ x^{68} + x^{66} + x^{64} + x^{60} + x^{48} + x^{42} + x^{40} + x^{36} + x^{34} + x^{32} + x^{30}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{24},\\
p_3(x) &= x^{128} + x^{126} + x^{122} + x^{118} + x^{116} + x^{110} + x^{108} + x^{106} + x^{104} + x^{94}\\
&+ x^{92} + x^{88} + x^{84} + x^{82} + x^{74} + x^{64} + x^{62} + x^{60} + x^{58} + x^{56} + x^{54}\\
&+ x^{52} + x^{40} + x^{38} + x^{32} + x^{28} + x^{26} + x^{18},\\
p_6(x) &= x^{128} + x^{126} + x^{124} + x^{116} + x^{114} + x^{102} + x^{100} + x^{98} + x^{96} + x^{94}\\
&+ x^{90} + x^{84} + x^{78} + x^{68} + x^{66} + x^{60} + x^{56} + x^{52} + x^{48} + x^{42} + x^{38}\\
&+ x^{34} + x^{32} + x^{26} + x^{22} + x^{18} + x^{14} + x^{10} + x^{8} + 1,\\
p_9(x) &= x^{128} + x^{126} + x^{122} + x^{120} + x^{118} + x^{114} + x^{112} + x^{106} + x^{102} + x^{100}\\
&+ x^{98} + x^{96} + x^{92} + x^{90} + x^{88} + x^{84} + x^{82} + x^{76} + x^{74} + x^{70} + x^{66}\\
&+ x^{62} + x^{60} + x^{58} + x^{56} + x^{54} + x^{52} + x^{48} + x^{46} + x^{42} + x^{38} + x^{34}\\
&+ x^{28} + x^{24} + x^{16} + x^{12} + x^{10} + x^{4},\\
p_{12}(x) &= x^{132} + x^{128} + x^{108} + x^{104} + x^{100} + x^{96} + x^{52} + x^{48} + x^{36} + x^{32} + x^{28}\\
&+ x^{24} + x^{20} + x^{16} + x^{12} + x^{8} + x^{4} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{126} + x^{124} + x^{123} + x^{122} + x^{121} + x^{119} + x^{116} + x^{115} + x^{113} + x^{111}\\
&+ x^{110} + x^{109} + x^{107} + x^{102} + x^{101} + x^{99} + x^{98} + x^{96} + x^{95} + x^{94}\\
&+ x^{92} + x^{91} + x^{87} + x^{86} + x^{82} + x^{79} + x^{72} + x^{69} + x^{68} + x^{66} + x^{61}\\
&+ x^{57} + x^{56} + x^{50} + x^{49} + x^{48} + x^{45} + x^{41} + x^{40} + x^{38} + x^{37} + x^{36}\\
&+ x^{35} + x^{32} + x^{30},\\
p_3(x) &= x^{108} + x^{107} + x^{106} + x^{104} + x^{103} + x^{101} + x^{100} + x^{96} + x^{95} + x^{94}\\
&+ x^{88} + x^{87} + x^{86} + x^{78} + x^{77} + x^{75} + x^{74} + x^{64} + x^{63} + x^{61} + x^{59}\\
&+ x^{58} + x^{54} + x^{53} + x^{52} + x^{40} + x^{39} + x^{37} + x^{35} + x^{34} + x^{30} + x^{29}\\
&+ x^{28} + x^{20} + x^{19} + x^{18},\\
p_6(x) &= x^{114} + x^{111} + x^{110} + x^{106} + x^{103} + x^{102} + x^{100} + x^{97} + x^{96} + x^{88}\\
&+ x^{86} + x^{85} + x^{84} + x^{83} + x^{80} + x^{79} + x^{78} + x^{77} + x^{73} + x^{72} + x^{68}\\
&+ x^{66} + x^{65} + x^{63} + x^{62} + x^{61} + x^{58} + x^{57} + x^{56} + x^{55} + x^{54} + x^{52}\\
&+ x^{49} + x^{46} + x^{45} + x^{44} + x^{43} + x^{39} + x^{36} + x^{35} + x^{34} + x^{33} + x^{29}\\
&+ x^{28} + x^{24} + x^{21} + x^{18} + x^{17} + x^{15} + x^{14} + x^{13} + x^{12},\\
p_9(x) &= x^{120} + x^{119} + x^{117} + x^{115} + x^{114} + x^{112} + x^{111} + x^{110} + x^{106} + x^{105}\\
&+ x^{103} + x^{102} + x^{100} + x^{99} + x^{97} + x^{95} + x^{93} + x^{92} + x^{90} + x^{89} + x^{88}\\
&+ x^{82} + x^{81} + x^{79} + x^{77} + x^{76} + x^{72} + x^{71} + x^{70} + x^{66} + x^{65} + x^{64}\\
&+ x^{62} + x^{61} + x^{59} + x^{58} + x^{56} + x^{55} + x^{53} + x^{51} + x^{50} + x^{48} + x^{47}\\
&+ x^{45} + x^{44} + x^{36} + x^{35} + x^{33} + x^{31} + x^{29} + x^{28} + x^{24} + x^{23} + x^{22}\\
&+ x^{20} + x^{19} + x^{18} + x^{16} + x^{15} + x^{13} + x^{12} + x^{8} + x^{7} + x^{6},
\end{aligned}
$$

$$
\begin{aligned}
p_{12}(x) &= x^{126}+x^{124}+x^{123}+x^{122}+x^{121}+x^{120}+x^{118}+x^{116}+x^{115}+x^{113}\\
&+x^{111}+x^{109}+x^{107}+x^{105}+x^{103}+x^{101}+x^{99}+x^{98}+x^{97}+x^{96}\\
&+x^{46}+x^{44}+x^{43}+x^{42}+x^{41}+x^{40}+x^{38}+x^{36}+x^{35}+x^{33}+x^{31}\\
&+x^{30}+x^{29}+x^{28}+x^{26}+x^{24}+x^{23}+x^{22}+x^{21}+x^{20}+x^{18}+x^{16}\\
&+x^{15}+x^{13}+x^{11}+x^{9}+x^{7}+x^{5}+x^{3}+x^{2}+x+1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_{0}(x) &= x^{126}+x^{124}+x^{123}+x^{122}+x^{121}+x^{119}+x^{116}+x^{115}+x^{113}+x^{111}\\
&+x^{110}+x^{109}+x^{107}+x^{102}+x^{101}+x^{99}+x^{98}+x^{96}+x^{95}+x^{94}\\
&+x^{92}+x^{91}+x^{87}+x^{86}+x^{82}+x^{79}+x^{72}+x^{69}+x^{68}+x^{66}+x^{61}\\
&+x^{57}+x^{56}+x^{50}+x^{49}+x^{48}+x^{45}+x^{41}+x^{40}+x^{38}+x^{37}+x^{36}\\
&+x^{35}+x^{32}+x^{30},\\
p_{3}(x) &= x^{108}+x^{107}+x^{106}+x^{104}+x^{103}+x^{101}+x^{100}+x^{96}+x^{95}+x^{94}\\
&+x^{88}+x^{87}+x^{86}+x^{78}+x^{77}+x^{75}+x^{74}+x^{64}+x^{63}+x^{61}+x^{59}\\
&+x^{58}+x^{54}+x^{53}+x^{52}+x^{40}+x^{39}+x^{37}+x^{35}+x^{34}+x^{30}+x^{29}\\
&+x^{28}+x^{20}+x^{19}+x^{18},\\
p_{6}(x) &= x^{114}+x^{111}+x^{110}+x^{106}+x^{103}+x^{102}+x^{100}+x^{97}+x^{96}+x^{88}\\
&+x^{86}+x^{85}+x^{84}+x^{83}+x^{80}+x^{79}+x^{78}+x^{77}+x^{73}+x^{72}+x^{68}\\
&+x^{66}+x^{65}+x^{63}+x^{62}+x^{61}+x^{58}+x^{57}+x^{56}+x^{55}+x^{54}+x^{52}\\
&+x^{49}+x^{46}+x^{45}+x^{44}+x^{43}+x^{39}+x^{36}+x^{35}+x^{34}+x^{33}+x^{29}\\
&+x^{28}+x^{24}+x^{21}+x^{18}+x^{17}+x^{15}+x^{14}+x^{13}+x^{12},\\
p_{9}(x) &= x^{120}+x^{119}+x^{117}+x^{115}+x^{114}+x^{112}+x^{111}+x^{110}+x^{106}+x^{105}\\
&+x^{103}+x^{102}+x^{100}+x^{99}+x^{97}+x^{95}+x^{93}+x^{92}+x^{90}+x^{89}+x^{88}\\
&+x^{82}+x^{81}+x^{79}+x^{77}+x^{76}+x^{72}+x^{71}+x^{70}+x^{66}+x^{65}+x^{64}\\
&+x^{62}+x^{61}+x^{59}+x^{58}+x^{56}+x^{55}+x^{53}+x^{51}+x^{50}+x^{48}+x^{47}\\
&+x^{45}+x^{44}+x^{36}+x^{35}+x^{33}+x^{31}+x^{29}+x^{28}+x^{24}+x^{23}+x^{22}\\
&+x^{20}+x^{19}+x^{18}+x^{16}+x^{15}+x^{13}+x^{12}+x^{8}+x^{7}+x^{6},\\
p_{12}(x) &= x^{126}+x^{124}+x^{123}+x^{122}+x^{121}+x^{120}+x^{118}+x^{116}+x^{115}+x^{113}\\
&+x^{111}+x^{109}+x^{107}+x^{105}+x^{103}+x^{101}+x^{99}+x^{98}+x^{97}+x^{96}\\
&+x^{46}+x^{44}+x^{43}+x^{42}+x^{41}+x^{40}+x^{38}+x^{36}+x^{35}+x^{33}+x^{31}\\
&+x^{30}+x^{29}+x^{28}+x^{26}+x^{24}+x^{23}+x^{22}+x^{21}+x^{20}+x^{18}+x^{16}\\
&+x^{15}+x^{13}+x^{11}+x^{9}+x^{7}+x^{5}+x^{3}+x^{2}+x+1,
\end{aligned}
$$

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

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

$$
p_{0}(x) = x^{120}+x^{116}+x^{106}+x^{102}+x^{96}+x^{94}+x^{88}+x^{86}+x^{80}+x^{76}+x^{66}
$$

$$
\begin{aligned}
&+ x^{60} + x^{46} + x^{44} + x^{42} + x^{40} + x^{36},\\
p_3(x) &= x^{116} + x^{114} + x^{112} + x^{110} + x^{98} + x^{96} + x^{92} + x^{86} + x^{82} + x^{78} + x^{76}\\
&+ x^{72} + x^{70} + x^{66} + x^{64} + x^{60} + x^{58} + x^{56} + x^{52} + x^{50} + x^{48} + x^{46}\\
&+ x^{44} + x^{42} + x^{30} + x^{28} + x^{26} + x^{22} + x^{14} + x^{12},\\
p_6(x) &= x^{116} + x^{114} + x^{112} + x^{104} + x^{100} + x^{98} + x^{88} + x^{84} + x^{82} + x^{80} + x^{72}\\
&+ x^{68} + x^{64} + x^{62} + x^{58} + x^{56} + x^{54} + x^{44} + x^{42} + x^{32} + x^{28} + x^{24}\\
&+ x^{22} + x^{20} + x^{18} + x^{16} + x^{10} + x^{8} + x^{6} + x^{4} + x^{2} + 1,\\
p_9(x) &= x^{116} + x^{114} + x^{112} + x^{110} + x^{106} + x^{104} + x^{100} + x^{94} + x^{92} + x^{90}\\
&+ x^{84} + x^{78} + x^{74} + x^{72} + x^{68} + x^{66} + x^{64} + x^{60} + x^{58} + x^{52} + x^{50}\\
&+ x^{46} + x^{42} + x^{38} + x^{28} + x^{26} + x^{24} + x^{18} + x^{12} + x^{8} + x^{6} + x^{4},\\
p_{12}(x) &= x^{120} + x^{114} + x^{112} + x^{104} + x^{98} + x^{96} + x^{40} + x^{34} + x^{32} + x^{8} + x^{2} + 1\\
&,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{126} + x^{124} + x^{123} + x^{121} + x^{120} + x^{119} + x^{109} + x^{107} + x^{103} + x^{102}\\
&+ x^{98} + x^{97} + x^{92} + x^{91} + x^{85} + x^{84} + x^{80} + x^{79} + x^{76} + x^{75} + x^{74}\\
&+ x^{72} + x^{71} + x^{66} + x^{61} + x^{60} + x^{59} + x^{57} + x^{56} + x^{55} + x^{54} + x^{50}\\
&+ x^{49} + x^{47} + x^{44} + x^{43} + x^{42} + x^{40} + x^{39} + x^{35} + x^{34} + x^{32} + x^{29}\\
&+ x^{27} + x^{26} + x^{25} + x^{24},\\
p_3(x) &= x^{118} + x^{116} + x^{115} + x^{114} + x^{113} + x^{110} + x^{109} + x^{105} + x^{104} + x^{103}\\
&+ x^{101} + x^{99} + x^{97} + x^{93} + x^{89} + x^{87} + x^{85} + x^{84} + x^{83} + x^{82} + x^{78}\\
&+ x^{77} + x^{73} + x^{72} + x^{68} + x^{65} + x^{63} + x^{62} + x^{59} + x^{56} + x^{55} + x^{51}\\
&+ x^{47} + x^{44} + x^{43} + x^{42} + x^{41} + x^{39} + x^{32} + x^{28} + x^{25} + x^{21} + x^{19}\\
&+ x^{18} + x^{17} + x^{16},\\
p_6(x) &= x^{122} + x^{119} + x^{118} + x^{116} + x^{115} + x^{113} + x^{111} + x^{106} + x^{105} + x^{104}\\
&+ x^{103} + x^{102} + x^{99} + x^{98} + x^{97} + x^{95} + x^{92} + x^{91} + x^{90} + x^{88} + x^{85}\\
&+ x^{82} + x^{78} + x^{77} + x^{76} + x^{75} + x^{70} + x^{67} + x^{66} + x^{65} + x^{64} + x^{62}\\
&+ x^{61} + x^{57} + x^{56} + x^{55} + x^{54} + x^{53} + x^{52} + x^{51} + x^{50} + x^{47} + x^{45}\\
&+ x^{44} + x^{43} + x^{42} + x^{40} + x^{39} + x^{34} + x^{33} + x^{31} + x^{29} + x^{28} + x^{26}\\
&+ x^{21} + x^{20} + x^{19} + x^{15} + x^{10} + x^{8} + x^{7} + x^{5} + x^{3} + x^{2} + x + 1,\\
p_9(x) &= x^{118} + x^{116} + x^{115} + x^{113} + x^{111} + x^{109} + x^{107} + x^{106} + x^{105} + x^{104}\\
&+ x^{38} + x^{36} + x^{35} + x^{33} + x^{31} + x^{29} + x^{27} + x^{26} + x^{25} + x^{24} + x^{22}\\
&+ x^{20} + x^{19} + x^{17} + x^{15} + x^{13} + x^{11} + x^{10} + x^{9} + x^{8},\\
p_{12}(x) &= x^{126} + x^{124} + x^{123} + x^{122} + x^{121} + x^{120} + x^{106} + x^{104} + x^{103} + x^{101}\\
&+ x^{99} + x^{98} + x^{97} + x^{96} + x^{46} + x^{44} + x^{43} + x^{42} + x^{41} + x^{40} + x^{30}
\end{aligned}
$$

$$+ x^{28} + x^{27} + x^{25} + x^{23} + x^{21} + x^{19} + x^{18} + x^{17} + x^{16} + x^{10} + x^{8} + x^{7} + x^{5} + x^{3} + x^{2} + x + 1,$$

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

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

$$\begin{aligned}
p_0(x) &= x^{136} + x^{130} + x^{129} + x^{126} + x^{125} + x^{119} + x^{117} + x^{115} + x^{112} + x^{110} \\
&\quad + x^{109} + x^{108} + x^{104} + x^{103} + x^{102} + x^{100} + x^{97} + x^{96} + x^{94} + x^{86} \\
&\quad + x^{82} + x^{80} + x^{78} + x^{73} + x^{69} + x^{63} + x^{61} + x^{59} + x^{58} + x^{54} + x^{52} \\
&\quad + x^{48} + x^{47} + x^{46} + x^{45} + x^{41} + x^{37} + x^{36} + x^{35} + x^{33} + x^{31} + x^{30}, \\
p_3(x) &= x^{118} + x^{117} + x^{111} + x^{109} + x^{108} + x^{106} + x^{105} + x^{104} + x^{101} + x^{100} \\
&\quad + x^{99} + x^{98} + x^{97} + x^{95} + x^{92} + x^{88} + x^{87} + x^{86} + x^{85} + x^{81} + x^{75} \\
&\quad + x^{73} + x^{72} + x^{70} + x^{69} + x^{68} + x^{65} + x^{64} + x^{63} + x^{59} + x^{56} + x^{55} \\
&\quad + x^{53} + x^{51} + x^{50} + x^{49} + x^{48} + x^{46} + x^{45} + x^{44} + x^{41} + x^{40} + x^{39} \\
&\quad + x^{35} + x^{32} + x^{31} + x^{30} + x^{27} + x^{26} + x^{25} + x^{24} + x^{23} + x^{21} + x^{18}, \\
p_6(x) &= x^{124} + x^{122} + x^{120} + x^{118} + x^{112} + x^{108} + x^{106} + x^{100} + x^{98} + x^{94} \\
&\quad + x^{90} + x^{88} + x^{86} + x^{82} + x^{80} + x^{78} + x^{76} + x^{68} + x^{64} + x^{60} + x^{54} \\
&\quad + x^{52} + x^{48} + x^{44} + x^{42} + x^{40} + x^{38} + x^{36} + x^{34} + x^{30} + x^{22} + x^{20} \\
&\quad + x^{18} + x^{12}, \\
p_9(x) &= x^{130} + x^{129} + x^{128} + x^{127} + x^{123} + x^{122} + x^{121} + x^{117} + x^{116} + x^{115} \\
&\quad + x^{114} + x^{113} + x^{112} + x^{110} + x^{109} + x^{107} + x^{105} + x^{102} + x^{50} + x^{49} \\
&\quad + x^{48} + x^{47} + x^{43} + x^{42} + x^{41} + x^{37} + x^{36} + x^{35} + x^{31} + x^{30} + x^{29} \\
&\quad + x^{26} + x^{22} + x^{21} + x^{20} + x^{19} + x^{18} + x^{17} + x^{16} + x^{14} + x^{13} + x^{11} \\
&\quad + x^{9} + x^{6}, \\
p_{12}(x) &= x^{136} + x^{124} + x^{120} + x^{116} + x^{112} + x^{104} + x^{96} + x^{56} + x^{44} + x^{36} \\
&\quad + x^{32} + x^{28} + x^{20} + x^{8} + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{128} + x^{122} + x^{121} + x^{120} + x^{118} + x^{117} + x^{113} + x^{112} + x^{111} + x^{110} \\
&\quad + x^{109} + x^{108} + x^{107} + x^{104} + x^{103} + x^{102} + x^{98} + x^{97} + x^{95} + x^{90} \\
&\quad + x^{89} + x^{87} + x^{82} + x^{79} + x^{78} + x^{77} + x^{76} + x^{74} + x^{73} + x^{71} + x^{69} \\
&\quad + x^{66} + x^{64} + x^{63} + x^{58} + x^{57} + x^{54} + x^{53} + x^{51} + x^{50} + x^{49} + x^{48} \\
&\quad + x^{47} + x^{46} + x^{41} + x^{35} + x^{34} + x^{33} + x^{32} + x^{31} + x^{30}, \\
p_3(x) &= x^{110} + x^{109} + x^{103} + x^{102} + x^{100} + x^{96} + x^{95} + x^{94} + x^{93} + x^{90} + x^{86} \\
&\quad + x^{85} + x^{79} + x^{78} + x^{76} + x^{72} + x^{71} + x^{66} + x^{63} + x^{61} + x^{60} + x^{56} \\
&\quad + x^{53} + x^{52} + x^{50} + x^{48} + x^{47} + x^{42} + x^{39} + x^{37} + x^{36} + x^{32} + x^{29} \\
&\quad + x^{28} + x^{26} + x^{24} + x^{23} + x^{22} + x^{21} + x^{18},
\end{aligned}$$

$$\begin{aligned}
p_6(x) &= x^{116} + x^{114} + x^{112} + x^{110} + x^{108} + x^{106} + x^{104} + x^{100} + x^{98} + x^{96}\\
&\quad + x^{90} + x^{84} + x^{82} + x^{78} + x^{74} + x^{72} + x^{70} + x^{66} + x^{64} + x^{62} + x^{60}\\
&\quad + x^{52} + x^{48} + x^{44} + x^{38} + x^{34} + x^{30} + x^{28} + x^{26} + x^{24} + x^{20} + x^{18}\\
&\quad + x^{16} + x^{12},\\
p_9(x) &= x^{122} + x^{121} + x^{120} + x^{119} + x^{115} + x^{112} + x^{111} + x^{110} + x^{107} + x^{106}\\
&\quad + x^{105} + x^{102} + x^{42} + x^{41} + x^{40} + x^{39} + x^{35} + x^{32} + x^{31} + x^{30} + x^{27}\\
&\quad + x^{24} + x^{23} + x^{22} + x^{19} + x^{16} + x^{15} + x^{14} + x^{11} + x^{10} + x^{9} + x^{6},\\
p_{12}(x) &= x^{128} + x^{120} + x^{108} + x^{104} + x^{100} + x^{96} + x^{48} + x^{40} + x^{32} + x^{28} + x^{20}\\
&\quad + x^{16} + x^{12} + x^{8} + x^{4} + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{126} + x^{124} + x^{123} + x^{121} + x^{120} + x^{119} + x^{118} + x^{116} + x^{115} + x^{114}\\
&\quad + x^{113} + x^{110} + x^{106} + x^{105} + x^{104} + x^{103} + x^{100} + x^{95} + x^{94} + x^{92}\\
&\quad + x^{91} + x^{89} + x^{88} + x^{86} + x^{84} + x^{81} + x^{80} + x^{78} + x^{77} + x^{75} + x^{73}\\
&\quad + x^{71} + x^{69} + x^{68} + x^{67} + x^{65} + x^{64} + x^{62} + x^{61} + x^{60} + x^{59} + x^{57}\\
&\quad + x^{56} + x^{55} + x^{54} + x^{51} + x^{48} + x^{47} + x^{44} + x^{43} + x^{42} + x^{40} + x^{38}\\
&\quad + x^{37} + x^{36},\\
p_3(x) &= x^{118} + x^{116} + x^{115} + x^{114} + x^{113} + x^{109} + x^{108} + x^{107} + x^{101} + x^{97}\\
&\quad + x^{96} + x^{95} + x^{94} + x^{92} + x^{90} + x^{89} + x^{88} + x^{86} + x^{83} + x^{82} + x^{80}\\
&\quad + x^{78} + x^{68} + x^{66} + x^{65} + x^{60} + x^{59} + x^{57} + x^{56} + x^{55} + x^{54} + x^{53}\\
&\quad + x^{52} + x^{50} + x^{47} + x^{44} + x^{43} + x^{41} + x^{38} + x^{36} + x^{33} + x^{32} + x^{30}\\
&\quad + x^{29} + x^{27} + x^{26} + x^{25} + x^{22} + x^{21} + x^{20},\\
p_6(x) &= x^{122} + x^{119} + x^{114} + x^{111} + x^{109} + x^{108} + x^{105} + x^{104} + x^{102} + x^{97}\\
&\quad + x^{95} + x^{94} + x^{90} + x^{89} + x^{87} + x^{86} + x^{85} + x^{84} + x^{82} + x^{81} + x^{80}\\
&\quad + x^{77} + x^{76} + x^{72} + x^{71} + x^{69} + x^{67} + x^{64} + x^{63} + x^{58} + x^{53} + x^{51}\\
&\quad + x^{49} + x^{48} + x^{45} + x^{44} + x^{42} + x^{40} + x^{38} + x^{33} + x^{29} + x^{27} + x^{26}\\
&\quad + x^{25} + x^{24} + x^{23} + x^{22} + x^{21} + x^{19} + x^{17} + x^{16} + x^{15} + x^{14} + x^{12}\\
&\quad + x^{11} + x^{9} + x^{7} + x^{5} + x^{3} + x^{2} + x + 1,\\
p_9(x) &= x^{118} + x^{116} + x^{115} + x^{113} + x^{111} + x^{109} + x^{107} + x^{106} + x^{105} + x^{104}\\
&\quad + x^{38} + x^{36} + x^{35} + x^{33} + x^{31} + x^{29} + x^{27} + x^{26} + x^{25} + x^{24} + x^{22}\\
&\quad + x^{20} + x^{19} + x^{17} + x^{15} + x^{13} + x^{11} + x^{10} + x^{9} + x^{8},\\
p_{12}(x) &= x^{126} + x^{124} + x^{123} + x^{122} + x^{121} + x^{120} + x^{106} + x^{104} + x^{103} + x^{101}\\
&\quad + x^{99} + x^{98} + x^{97} + x^{96} + x^{46} + x^{44} + x^{43} + x^{42} + x^{41} + x^{40} + x^{30}\\
&\quad + x^{28} + x^{27} + x^{25} + x^{23} + x^{21} + x^{19} + x^{18} + x^{17} + x^{16} + x^{10} + x^{8}\\
&\quad + x^{7} + x^{5} + x^{3} + x^{2} + x + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{126}+x^{124}+x^{123}+x^{121}+x^{120}+x^{119}+x^{109}+x^{107}+x^{103}+x^{102}\\
&\quad +x^{98}+x^{97}+x^{92}+x^{91}+x^{85}+x^{84}+x^{80}+x^{79}+x^{76}+x^{75}+x^{74}\\
&\quad +x^{72}+x^{71}+x^{66}+x^{61}+x^{60}+x^{59}+x^{57}+x^{56}+x^{55}+x^{54}+x^{50}\\
&\quad +x^{49}+x^{47}+x^{44}+x^{43}+x^{42}+x^{40}+x^{39}+x^{35}+x^{34}+x^{32}+x^{29}\\
&\quad +x^{27}+x^{26}+x^{25}+x^{24},\\
p_3(x) &= x^{118}+x^{116}+x^{115}+x^{114}+x^{113}+x^{110}+x^{109}+x^{105}+x^{104}+x^{103}\\
&\quad +x^{101}+x^{99}+x^{97}+x^{93}+x^{89}+x^{87}+x^{85}+x^{84}+x^{83}+x^{82}+x^{78}\\
&\quad +x^{77}+x^{73}+x^{72}+x^{68}+x^{65}+x^{63}+x^{62}+x^{59}+x^{56}+x^{55}+x^{51}\\
&\quad +x^{47}+x^{44}+x^{43}+x^{42}+x^{41}+x^{39}+x^{32}+x^{28}+x^{25}+x^{21}+x^{19}\\
&\quad +x^{18}+x^{17}+x^{16},\\
p_6(x) &= x^{122}+x^{119}+x^{118}+x^{116}+x^{115}+x^{113}+x^{111}+x^{106}+x^{105}+x^{104}\\
&\quad +x^{103}+x^{102}+x^{99}+x^{98}+x^{97}+x^{95}+x^{92}+x^{91}+x^{90}+x^{88}+x^{85}\\
&\quad +x^{82}+x^{78}+x^{77}+x^{76}+x^{75}+x^{70}+x^{67}+x^{66}+x^{65}+x^{64}+x^{62}\\
&\quad +x^{61}+x^{57}+x^{56}+x^{55}+x^{54}+x^{53}+x^{52}+x^{51}+x^{50}+x^{47}+x^{45}\\
&\quad +x^{44}+x^{43}+x^{42}+x^{40}+x^{39}+x^{34}+x^{33}+x^{31}+x^{29}+x^{28}+x^{26}\\
&\quad +x^{21}+x^{20}+x^{19}+x^{15}+x^{10}+x^{8}+x^{7}+x^{5}+x^{3}+x^{2}+x+1,\\
p_9(x) &= x^{118}+x^{116}+x^{115}+x^{113}+x^{111}+x^{109}+x^{107}+x^{106}+x^{105}+x^{104}\\
&\quad +x^{38}+x^{36}+x^{35}+x^{33}+x^{31}+x^{29}+x^{27}+x^{26}+x^{25}+x^{24}+x^{22}\\
&\quad +x^{20}+x^{19}+x^{17}+x^{15}+x^{13}+x^{11}+x^{10}+x^{9}+x^{8},\\
p_{12}(x) &= x^{126}+x^{124}+x^{123}+x^{122}+x^{121}+x^{120}+x^{106}+x^{104}+x^{103}+x^{101}\\
&\quad +x^{99}+x^{98}+x^{97}+x^{96}+x^{46}+x^{44}+x^{43}+x^{42}+x^{41}+x^{40}+x^{30}\\
&\quad +x^{28}+x^{27}+x^{25}+x^{23}+x^{21}+x^{19}+x^{18}+x^{17}+x^{16}+x^{10}+x^{8}\\
&\quad +x^{7}+x^{5}+x^{3}+x^{2}+x+1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{128}+x^{122}+x^{121}+x^{120}+x^{118}+x^{117}+x^{113}+x^{112}+x^{111}+x^{110}\\
&\quad +x^{109}+x^{108}+x^{107}+x^{104}+x^{103}+x^{102}+x^{98}+x^{97}+x^{95}+x^{90}\\
&\quad +x^{89}+x^{87}+x^{82}+x^{79}+x^{78}+x^{77}+x^{76}+x^{74}+x^{73}+x^{71}+x^{69}\\
&\quad +x^{66}+x^{64}+x^{63}+x^{58}+x^{57}+x^{54}+x^{53}+x^{51}+x^{50}+x^{49}+x^{48}\\
&\quad +x^{47}+x^{46}+x^{41}+x^{35}+x^{34}+x^{33}+x^{32}+x^{31}+x^{30},\\
p_3(x) &= x^{110}+x^{109}+x^{103}+x^{102}+x^{100}+x^{96}+x^{95}+x^{94}+x^{93}+x^{90}+x^{86}\\
&\quad +x^{85}+x^{79}+x^{78}+x^{76}+x^{72}+x^{71}+x^{66}+x^{63}+x^{61}+x^{60}+x^{56}\\
&\quad +x^{53}+x^{52}+x^{50}+x^{48}+x^{47}+x^{42}+x^{39}+x^{37}+x^{36}+x^{32}+x^{29}
\end{aligned}$$

$$
\begin{aligned}
&+ x^{28} + x^{26} + x^{24} + x^{23} + x^{22} + x^{21} + x^{18},\\
p_6(x) &= x^{116} + x^{114} + x^{112} + x^{110} + x^{108} + x^{106} + x^{104} + x^{100} + x^{98} + x^{96}\\
&+ x^{90} + x^{84} + x^{82} + x^{78} + x^{74} + x^{72} + x^{70} + x^{66} + x^{64} + x^{62} + x^{60}\\
&+ x^{52} + x^{48} + x^{44} + x^{38} + x^{34} + x^{30} + x^{28} + x^{26} + x^{24} + x^{20} + x^{18}\\
&+ x^{16} + x^{12},\\
p_9(x) &= x^{122} + x^{121} + x^{120} + x^{119} + x^{115} + x^{112} + x^{111} + x^{110} + x^{107} + x^{106}\\
&+ x^{105} + x^{102} + x^{42} + x^{41} + x^{40} + x^{39} + x^{35} + x^{32} + x^{31} + x^{30} + x^{27}\\
&+ x^{24} + x^{23} + x^{22} + x^{19} + x^{16} + x^{15} + x^{14} + x^{11} + x^{10} + x^{9} + x^{6},\\
p_{12}(x) &= x^{128} + x^{120} + x^{108} + x^{104} + x^{100} + x^{96} + x^{48} + x^{40} + x^{32} + x^{28} + x^{20}\\
&+ x^{16} + x^{12} + x^{8} + x^{4} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{136} + x^{130} + x^{129} + x^{126} + x^{125} + x^{119} + x^{117} + x^{115} + x^{112} + x^{110}\\
&+ x^{109} + x^{108} + x^{104} + x^{103} + x^{102} + x^{100} + x^{97} + x^{96} + x^{94} + x^{86}\\
&+ x^{82} + x^{80} + x^{78} + x^{73} + x^{69} + x^{63} + x^{61} + x^{59} + x^{58} + x^{54} + x^{52}\\
&+ x^{48} + x^{47} + x^{46} + x^{45} + x^{41} + x^{37} + x^{36} + x^{35} + x^{33} + x^{31} + x^{30},\\
p_3(x) &= x^{118} + x^{117} + x^{111} + x^{109} + x^{108} + x^{106} + x^{105} + x^{104} + x^{101} + x^{100}\\
&+ x^{99} + x^{98} + x^{97} + x^{95} + x^{92} + x^{88} + x^{87} + x^{86} + x^{85} + x^{81} + x^{75}\\
&+ x^{73} + x^{72} + x^{70} + x^{69} + x^{68} + x^{65} + x^{64} + x^{63} + x^{59} + x^{56} + x^{55}\\
&+ x^{53} + x^{51} + x^{50} + x^{49} + x^{48} + x^{46} + x^{45} + x^{44} + x^{41} + x^{40} + x^{39}\\
&+ x^{35} + x^{32} + x^{31} + x^{30} + x^{27} + x^{26} + x^{25} + x^{24} + x^{23} + x^{21} + x^{18},\\
p_6(x) &= x^{124} + x^{122} + x^{120} + x^{118} + x^{112} + x^{108} + x^{106} + x^{100} + x^{98} + x^{94}\\
&+ x^{90} + x^{88} + x^{86} + x^{82} + x^{80} + x^{78} + x^{76} + x^{68} + x^{64} + x^{60} + x^{54}\\
&+ x^{52} + x^{48} + x^{44} + x^{42} + x^{40} + x^{38} + x^{36} + x^{34} + x^{30} + x^{22} + x^{20}\\
&+ x^{18} + x^{12},\\
p_9(x) &= x^{130} + x^{129} + x^{128} + x^{127} + x^{123} + x^{122} + x^{121} + x^{117} + x^{116} + x^{115}\\
&+ x^{114} + x^{113} + x^{112} + x^{110} + x^{109} + x^{107} + x^{105} + x^{102} + x^{50} + x^{49}\\
&+ x^{48} + x^{47} + x^{43} + x^{42} + x^{41} + x^{37} + x^{36} + x^{35} + x^{31} + x^{30} + x^{29}\\
&+ x^{26} + x^{22} + x^{21} + x^{20} + x^{19} + x^{18} + x^{17} + x^{16} + x^{14} + x^{13} + x^{11}\\
&+ x^{9} + x^{6},\\
p_{12}(x) &= x^{136} + x^{124} + x^{120} + x^{116} + x^{112} + x^{104} + x^{96} + x^{56} + x^{44} + x^{36}\\
&+ x^{32} + x^{28} + x^{20} + x^{8} + 1,
\end{aligned}
$$

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

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

$$
p_0(x) = x^{126} + x^{124} + x^{123} + x^{121} + x^{120} + x^{119} + x^{118} + x^{116} + x^{115} + x^{114}
$$

$$
\begin{aligned}
&+ x^{113} + x^{110} + x^{106} + x^{105} + x^{104} + x^{103} + x^{100} + x^{95} + x^{94} + x^{92}\\
&+ x^{91} + x^{89} + x^{88} + x^{86} + x^{84} + x^{81} + x^{80} + x^{78} + x^{77} + x^{75} + x^{73}\\
&+ x^{71} + x^{69} + x^{68} + x^{67} + x^{65} + x^{64} + x^{62} + x^{61} + x^{60} + x^{59} + x^{57}\\
&+ x^{56} + x^{55} + x^{54} + x^{51} + x^{48} + x^{47} + x^{44} + x^{43} + x^{42} + x^{40} + x^{38}\\
&+ x^{37} + x^{36},\\
p_3(x) = {}& x^{118} + x^{116} + x^{115} + x^{114} + x^{113} + x^{109} + x^{108} + x^{107} + x^{101} + x^{97}\\
&+ x^{96} + x^{95} + x^{94} + x^{92} + x^{90} + x^{89} + x^{88} + x^{86} + x^{83} + x^{82} + x^{80}\\
&+ x^{78} + x^{68} + x^{66} + x^{65} + x^{60} + x^{59} + x^{57} + x^{56} + x^{55} + x^{54} + x^{53}\\
&+ x^{52} + x^{50} + x^{47} + x^{44} + x^{43} + x^{41} + x^{38} + x^{36} + x^{33} + x^{32} + x^{30}\\
&+ x^{29} + x^{27} + x^{26} + x^{25} + x^{22} + x^{21} + x^{20},\\
p_6(x) = {}& x^{122} + x^{119} + x^{114} + x^{111} + x^{109} + x^{108} + x^{105} + x^{104} + x^{102} + x^{97}\\
&+ x^{95} + x^{94} + x^{90} + x^{89} + x^{87} + x^{86} + x^{85} + x^{84} + x^{82} + x^{81} + x^{80}\\
&+ x^{77} + x^{76} + x^{72} + x^{71} + x^{69} + x^{67} + x^{64} + x^{63} + x^{58} + x^{53} + x^{51}\\
&+ x^{49} + x^{48} + x^{45} + x^{44} + x^{42} + x^{40} + x^{38} + x^{33} + x^{29} + x^{27} + x^{26}\\
&+ x^{25} + x^{24} + x^{23} + x^{22} + x^{21} + x^{19} + x^{17} + x^{16} + x^{15} + x^{14} + x^{12}\\
&+ x^{11} + x^{9} + x^{7} + x^{5} + x^{3} + x^{2} + x + 1,\\
p_9(x) = {}& x^{118} + x^{116} + x^{115} + x^{113} + x^{111} + x^{109} + x^{107} + x^{106} + x^{105} + x^{104}\\
&+ x^{38} + x^{36} + x^{35} + x^{33} + x^{31} + x^{29} + x^{27} + x^{26} + x^{25} + x^{24} + x^{22}\\
&+ x^{20} + x^{19} + x^{17} + x^{15} + x^{13} + x^{11} + x^{10} + x^{9} + x^{8},\\
p_{12}(x) = {}& x^{126} + x^{124} + x^{123} + x^{122} + x^{121} + x^{120} + x^{106} + x^{104} + x^{103} + x^{101}\\
&+ x^{99} + x^{98} + x^{97} + x^{96} + x^{46} + x^{44} + x^{43} + x^{42} + x^{41} + x^{40} + x^{30}\\
&+ x^{28} + x^{27} + x^{25} + x^{23} + x^{21} + x^{19} + x^{18} + x^{17} + x^{16} + x^{10} + x^{8}\\
&+ x^{7} + x^{5} + x^{3} + x^{2} + x + 1,
\end{aligned}
$$

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

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

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

n	$\Lambda(n)$	n	$\Lambda(n)$	n	$\Lambda(n)$	n	$\Lambda(n)$
0	[1, 2]	640	[1081, 837]	1280	[1750, 1080]	1920	[1641, 2261]
1	[3, 4]	641	[1082, 1083]	1281	[840, 1759]	1921	[2262, 717]
2	[5, 6]	642	[1084, 1085]	1282	[935, 1760]	1922	[606, 2263]
3	[7, 8]	643	[1039, 1086]	1283	[1761, 822]	1923	[2264, 1283]
4	[9, 10]	644	[1087, 1088]	1284	[68, 1187]	1924	[516, 621]
5	[11, 12]	645	[28, 343]	1285	[6, 1074]	1925	[1238, 2217]
6	[13, 14]	646	[1089, 1090]	1286	[1762, 1763]	1926	[1497, 1333]
7	[15, 16]	647	[1091, 78]	1287	[1117, 18]	1927	[2265, 2266]
8	[17, 18]	648	[1092, 1093]	1288	[1764, 784]	1928	[1420, 502]
9	[19, 20]	649	[1094, 1095]	1289	[1765, 1766]	1929	[1361, 2267]

10	[21, 22]	650	[779, 1096]	1290	[1767, 1768]	1930	[1301, 1548]
11	[23, 24]	651	[1097, 1098]	1291	[1030, 361]	1931	[1602, 1558]
12	[25, 26]	652	[1099, 1100]	1292	[961, 1769]	1932	[1296, 2268]
13	[27, 28]	653	[1101, 1102]	1293	[1770, 1083]	1933	[531, 2269]
14	[29, 30]	654	[820, 910]	1294	[250, 1771]	1934	[1522, 2115]
15	[31, 32]	655	[1103, 421]	1295	[1772, 1056]	1935	[1637, 50]
16	[33, 34]	656	[4, 1104]	1296	[877, 6]	1936	[2270, 1235]
17	[35, 36]	657	[1105, 282]	1297	[1773, 1774]	1937	[1446, 2271]
18	[37, 38]	658	[1106, 1107]	1298	[1775, 1776]	1938	[1519, 1559]
19	[39, 40]	659	[1108, 1109]	1299	[1777, 5]	1939	[574, 151]
20	[41, 42]	660	[1110, 1111]	1300	[1778, 1779]	1940	[2238, 1480]
21	[43, 44]	661	[1112, 1113]	1301	[1780, 950]	1941	[2272, 1502]
22	[45, 46]	662	[1056, 1114]	1302	[396, 359]	1942	[187, 2273]
23	[47, 48]	663	[66, 92]	1303	[1781, 1156]	1943	[2274, 2275]
24	[12, 49]	664	[1115, 250]	1304	[358, 1219]	1944	[2276, 1474]
25	[50, 51]	665	[382, 1116]	1305	[1782, 1783]	1945	[1645, 2277]
26	[52, 53]	666	[958, 1117]	1306	[1784, 1185]	1946	[744, 2278]
27	[54, 55]	667	[767, 1118]	1307	[1785, 1786]	1947	[1279, 12]
28	[56, 57]	668	[1119, 1120]	1308	[1787, 1773]	1948	[641, 492]
29	[58, 59]	669	[1121, 1122]	1309	[1788, 936]	1949	[2210, 2279]
30	[60, 61]	670	[973, 1123]	1310	[1789, 1790]	1950	[1583, 1256]
31	[62, 63]	671	[281, 847]	1311	[1791, 110]	1951	[1440, 1436]
32	[64, 65]	672	[904, 1124]	1312	[1792, 112]	1952	[533, 2280]
33	[66, 67]	673	[1030, 1125]	1313	[893, 1793]	1953	[157, 618]
34	[68, 69]	674	[1126, 1127]	1314	[873, 416]	1954	[2281, 2282]
35	[70, 71]	675	[1128, 1129]	1315	[981, 1794]	1955	[1683, 1676]
36	[72, 73]	676	[963, 1130]	1316	[1795, 1796]	1956	[2202, 1312]
37	[74, 75]	677	[342, 1131]	1317	[1797, 884]	1957	[2283, 2284]
38	[76, 69]	678	[1132, 1097]	1318	[1798, 1799]	1958	[2285, 124]
39	[77, 78]	679	[1133, 406]	1319	[1800, 772]	1959	[615, 2149]
40	[79, 80]	680	[1134, 1135]	1320	[1801, 1802]	1960	[2112, 1588]
41	[81, 82]	681	[1136, 1137]	1321	[1803, 1102]	1961	[2274, 2286]
42	[83, 84]	682	[1138, 1139]	1322	[1134, 1804]	1962	[1626, 2239]
43	[85, 86]	683	[99, 1140]	1323	[1805, 1806]	1963	[2255, 1601]
44	[87, 88]	684	[1141, 1142]	1324	[937, 1807]	1964	[1289, 1627]
45	[89, 90]	685	[1143, 966]	1325	[1808, 1809]	1965	[2208, 2287]
46	[91, 92]	686	[1075, 822]	1326	[1810, 301]	1966	[2288, 123]
47	[93, 94]	687	[1144, 1145]	1327	[1143, 912]	1967	[2116, 1607]
48	[95, 96]	688	[773, 1146]	1328	[1811, 1054]	1968	[1233, 533]
49	[97, 98]	689	[801, 1147]	1329	[1812, 1813]	1969	[1348, 544]
50	[99, 100]	690	[1148, 68]	1330	[1814, 28]	1970	[2289, 2290]
51	[101, 102]	691	[783, 1149]	1331	[1815, 1816]	1971	[1516, 1433]
52	[103, 104]	692	[1133, 368]	1332	[1817, 783]	1972	[1688, 2291]
53	[105, 106]	693	[1150, 1151]	1333	[1818, 1204]	1973	[1269, 487]

54	[107, 108]	694	[1061, 1152]	1334	[1819, 1820]	1974	[1568, 41]
55	[86, 109]	695	[988, 1153]	1335	[268, 320]	1975	[2200, 718]
56	[110, 111]	696	[306, 1154]	1336	[815, 1821]	1976	[14, 645]
57	[112, 113]	697	[1155, 1156]	1337	[1822, 1823]	1977	[506, 440]
58	[114, 115]	698	[987, 998]	1338	[1803, 1824]	1978	[528, 2292]
59	[116, 117]	699	[1157, 943]	1339	[1825, 1826]	1979	[206, 2293]
60	[118, 119]	700	[1158, 1159]	1340	[81, 1827]	1980	[2272, 704]
61	[120, 121]	701	[93, 253]	1341	[1828, 1829]	1981	[1448, 2294]
62	[122, 123]	702	[305, 1160]	1342	[347, 1830]	1982	[2178, 2295]
63	[124, 125]	703	[1049, 1161]	1343	[1128, 1831]	1983	[479, 2296]
64	[126, 127]	704	[1162, 1163]	1344	[1832, 1756]	1984	[2182, 2297]
65	[128, 129]	705	[436, 1164]	1345	[1833, 1834]	1985	[1623, 583]
66	[130, 131]	706	[830, 830]	1346	[1835, 410]	1986	[1694, 202]
67	[132, 133]	707	[1165, 947]	1347	[1836, 102]	1987	[2130, 2298]
68	[134, 135]	708	[1166, 1167]	1348	[1837, 334]	1988	[1357, 2299]
69	[136, 137]	709	[1144, 1168]	1349	[1838, 1839]	1989	[1362, 1686]
70	[138, 139]	710	[1169, 1132]	1350	[1840, 1841]	1990	[1238, 2300]
71	[140, 141]	711	[1170, 1139]	1351	[1842, 1827]	1991	[2288, 483]
72	[142, 143]	712	[1171, 1172]	1352	[1753, 1843]	1992	[1691, 2301]
73	[144, 145]	713	[1173, 348]	1353	[1844, 1845]	1993	[1498, 2151]
74	[146, 147]	714	[1174, 1175]	1354	[1745, 1846]	1994	[2197, 2302]
75	[148, 149]	715	[936, 775]	1355	[1712, 908]	1995	[1529, 530]
76	[150, 151]	716	[1176, 353]	1356	[1709, 291]	1996	[1689, 2303]
77	[152, 153]	717	[336, 1177]	1357	[435, 1847]	1997	[1579, 165]
78	[154, 155]	718	[1153, 1178]	1358	[20, 1801]	1998	[173, 2300]
79	[156, 157]	719	[1179, 1180]	1359	[1848, 1719]	1999	[1357, 2304]
80	[158, 159]	720	[1181, 794]	1360	[1021, 1062]	2000	[1677, 53]
81	[160, 161]	721	[931, 375]	1361	[1710, 1849]	2001	[1320, 2305]
82	[56, 162]	722	[1108, 113]	1362	[794, 1850]	2002	[1443, 2306]
83	[163, 164]	723	[792, 1182]	1363	[1218, 1851]	2003	[673, 1588]
84	[165, 166]	724	[724, 724]	1364	[825, 1852]	2004	[608, 1627]
85	[41, 167]	725	[344, 1183]	1365	[1853, 1854]	2005	[2307, 160]
86	[168, 169]	726	[1184, 88]	1366	[235, 1855]	2006	[2289, 2138]
87	[170, 171]	727	[1185, 1186]	1367	[1179, 1060]	2007	[1656, 2308]
88	[172, 173]	728	[76, 1187]	1368	[334, 364]	2008	[2309, 538]
89	[174, 175]	729	[811, 907]	1369	[78, 1856]	2009	[665, 2310]
90	[176, 177]	730	[1136, 1188]	1370	[1857, 1788]	2010	[212, 2263]
91	[178, 179]	731	[1189, 1190]	1371	[1858, 1859]	2011	[1511, 1626]
92	[180, 155]	732	[1191, 1192]	1372	[308, 259]	2012	[695, 1557]
93	[160, 181]	733	[263, 1193]	1373	[1860, 1070]	2013	[2226, 1598]
94	[182, 183]	734	[1194, 1195]	1374	[273, 1861]	2014	[2311, 553]
95	[184, 185]	735	[861, 1196]	1375	[1862, 1863]	2015	[1549, 2312]
96	[186, 187]	736	[357, 1197]	1376	[253, 934]	2016	[2123, 1650]
97	[188, 189]	737	[119, 1198]	1377	[1864, 1865]	2017	[2264, 2313]

98	[190, 149]	738	[1199, 853]	1378	[1866, 1867]	2018	[627, 521]
99	[191, 192]	739	[952, 1200]	1379	[1868, 112]	2019	[603, 2314]
100	[193, 194]	740	[1201, 900]	1380	[1869, 1870]	2020	[2315, 2233]
101	[195, 196]	741	[1202, 1203]	1381	[1115, 1068]	2021	[536, 195]
102	[161, 197]	742	[1161, 355]	1382	[770, 1871]	2022	[2316, 1654]
103	[198, 199]	743	[1204, 1205]	1383	[912, 967]	2023	[1235, 758]
104	[200, 201]	744	[95, 1206]	1384	[1872, 1873]	2024	[1679, 2317]
105	[202, 38]	745	[1207, 1208]	1385	[826, 784]	2025	[704, 2318]
106	[203, 204]	746	[1209, 1210]	1386	[1868, 1108]	2026	[2220, 2319]
107	[205, 206]	747	[909, 1211]	1387	[1006, 896]	2027	[2262, 2168]
108	[207, 208]	748	[1212, 856]	1388	[1012, 21]	2028	[1484, 39]
109	[167, 209]	749	[1213, 1214]	1389	[1874, 1875]	2029	[1393, 36]
110	[210, 211]	750	[366, 1020]	1390	[1876, 1081]	2030	[650, 1597]
111	[212, 213]	751	[1215, 21]	1391	[1752, 335]	2031	[599, 1310]
112	[214, 215]	752	[1216, 1117]	1392	[1877, 1878]	2032	[515, 1303]
113	[216, 217]	753	[1217, 1218]	1393	[1830, 905]	2033	[2320, 2321]
114	[218, 219]	754	[1008, 420]	1394	[74, 977]	2034	[2300, 2322]
115	[220, 221]	755	[396, 1219]	1395	[1830, 380]	2035	[1662, 712]
116	[222, 223]	756	[1220, 1130]	1396	[1879, 1880]	2036	[612, 40]
117	[224, 225]	757	[1221, 100]	1397	[1881, 773]	2037	[459, 2323]
118	[226, 227]	758	[903, 1118]	1398	[1882, 72]	2038	[178, 2324]
119	[228, 229]	759	[942, 1222]	1399	[1797, 1728]	2039	[2325, 737]
120	[230, 231]	760	[1223, 1224]	1400	[1767, 1883]	2040	[2126, 2185]
121	[232, 233]	761	[839, 392]	1401	[426, 824]	2041	[2235, 2197]
122	[234, 235]	762	[1225, 809]	1402	[1884, 1885]	2042	[2326, 2277]
123	[236, 237]	763	[73, 1226]	1403	[1871, 1886]	2043	[2327, 607]
124	[238, 239]	764	[1011, 1227]	1404	[1887, 1888]	2044	[489, 2226]
125	[240, 241]	765	[380, 1228]	1405	[1889, 1066]	2045	[32, 554]
126	[242, 243]	766	[1229, 748]	1406	[321, 1890]	2046	[2328, 1470]
127	[244, 245]	767	[1230, 1231]	1407	[986, 795]	2047	[2329, 1625]
128	[246, 247]	768	[717, 1232]	1408	[1891, 1892]	2048	[1586, 2330]
129	[248, 249]	769	[1233, 1234]	1409	[16, 1893]	2049	[2285, 2295]
130	[250, 251]	770	[1235, 1236]	1410	[1894, 386]	2050	[1691, 2331]
131	[252, 253]	771	[466, 1237]	1411	[1895, 988]	2051	[595, 2267]
132	[254, 255]	772	[491, 1238]	1412	[274, 990]	2052	[2157, 2332]
133	[256, 19]	773	[1239, 1240]	1413	[1896, 1897]	2053	[139, 2333]
134	[257, 258]	774	[1241, 1242]	1414	[1898, 1899]	2054	[1369, 2216]
135	[259, 260]	775	[1243, 680]	1415	[1193, 786]	2055	[511, 2334]
136	[261, 262]	776	[1244, 1245]	1416	[1218, 1900]	2056	[449, 49]
137	[263, 264]	777	[597, 1246]	1417	[1901, 258]	2057	[1359, 2282]
138	[265, 266]	778	[1247, 1248]	1418	[360, 1125]	2058	[2316, 1667]
139	[83, 267]	779	[1249, 1250]	1419	[1902, 1869]	2059	[1615, 2335]
140	[268, 269]	780	[203, 1251]	1420	[244, 1903]	2060	[2189, 2336]
141	[270, 271]	781	[1252, 1253]	1421	[237, 1904]	2061	[1452, 158]

142	[272, 273]	782	[1254, 1255]	1422	[1801, 1905]	2062	[1249, 2337]
143	[260, 274]	783	[163, 1256]	1423	[328, 1906]	2063	[1494, 727]
144	[275, 276]	784	[1257, 619]	1424	[1087, 1907]	2064	[193, 1640]
145	[277, 278]	785	[693, 1258]	1425	[1908, 1854]	2065	[1524, 2338]
146	[279, 280]	786	[762, 1259]	1426	[776, 108]	2066	[614, 2339]
147	[281, 282]	787	[137, 1260]	1427	[1223, 1757]	2067	[1599, 2340]
148	[283, 284]	788	[1261, 1262]	1428	[830, 724]	2068	[583, 187]
149	[285, 286]	789	[1263, 1264]	1429	[19, 1909]	2069	[1236, 759]
150	[287, 288]	790	[1265, 1266]	1430	[1910, 965]	2070	[2341, 2342]
151	[289, 290]	791	[629, 1267]	1431	[322, 350]	2071	[626, 615]
152	[291, 292]	792	[722, 1268]	1432	[1792, 1108]	2072	[1295, 1257]
153	[293, 278]	793	[671, 1269]	1433	[1911, 1905]	2073	[530, 1649]
154	[294, 295]	794	[1270, 1269]	1434	[1912, 1913]	2074	[227, 2132]
155	[296, 297]	795	[1271, 1272]	1435	[108, 362]	2075	[197, 2152]
156	[298, 299]	796	[127, 1273]	1436	[1914, 1915]	2076	[2142, 2343]
157	[277, 300]	797	[216, 568]	1437	[1916, 956]	2077	[1614, 2344]
158	[301, 302]	798	[127, 522]	1438	[1896, 1917]	2078	[2325, 1684]
159	[303, 294]	799	[671, 1274]	1439	[1918, 1914]	2079	[1532, 1349]
160	[304, 305]	800	[1275, 1276]	1440	[1919, 1790]	2080	[449, 1567]
161	[306, 307]	801	[1277, 1278]	1441	[1764, 827]	2081	[200, 2119]
162	[308, 309]	802	[1279, 449]	1442	[1920, 1921]	2082	[1479, 156]
163	[310, 311]	803	[1280, 1281]	1443	[999, 1092]	2083	[2345, 2346]
164	[312, 313]	804	[1282, 1283]	1444	[1876, 1922]	2084	[2170, 2347]
165	[314, 315]	805	[1241, 1284]	1445	[1923, 1924]	2085	[176, 2338]
166	[316, 317]	806	[1285, 1286]	1446	[1124, 291]	2086	[598, 2348]
167	[318, 319]	807	[190, 1287]	1447	[813, 1925]	2087	[2187, 571]
168	[320, 321]	808	[648, 1288]	1448	[1025, 1926]	2088	[1570, 495]
169	[322, 323]	809	[1289, 625]	1449	[413, 1116]	2089	[636, 2321]
170	[324, 325]	810	[1290, 169]	1450	[1927, 1928]	2090	[2112, 1446]
171	[326, 327]	811	[660, 1291]	1451	[118, 1929]	2091	[1392, 2349]
172	[328, 329]	812	[224, 60]	1452	[897, 437]	2092	[2350, 1284]
173	[330, 331]	813	[1292, 1293]	1453	[783, 1930]	2093	[1594, 2351]
174	[332, 333]	814	[1294, 763]	1454	[1931, 854]	2094	[2352, 1550]
175	[334, 335]	815	[156, 1295]	1455	[282, 1018]	2095	[1327, 2353]
176	[336, 337]	816	[538, 684]	1456	[1932, 1933]	2096	[1461, 2354]
177	[338, 339]	817	[1296, 1297]	1457	[1018, 851]	2097	[2307, 2355]
178	[340, 341]	818	[1298, 1299]	1458	[1139, 1934]	2098	[169, 452]
179	[342, 343]	819	[1300, 558]	1459	[1891, 371]	2099	[1265, 2356]
180	[344, 345]	820	[1301, 1302]	1460	[391, 270]	2100	[712, 2357]
181	[346, 98]	821	[1303, 1304]	1461	[1935, 1936]	2101	[1561, 2358]
182	[347, 348]	822	[1305, 1306]	1462	[1914, 1924]	2102	[1517, 2359]
183	[349, 350]	823	[1307, 1308]	1463	[974, 1937]	2103	[1322, 2360]
184	[351, 352]	824	[1309, 683]	1464	[286, 1930]	2104	[1673, 2361]
185	[353, 354]	825	[230, 1310]	1465	[407, 789]	2105	[2137, 2290]

186	[326, 355]	826	[1311, 1312]	1466	[421, 1938]	2106	[547, 2362]
187	[356, 357]	827	[43, 54]	1467	[946, 1939]	2107	[507, 2363]
188	[358, 359]	828	[1313, 1314]	1468	[1798, 1940]	2108	[1596, 651]
189	[360, 361]	829	[520, 628]	1469	[63, 854]	2109	[1571, 511]
190	[362, 363]	830	[1315, 1316]	1470	[1730, 1941]	2110	[2364, 2352]
191	[364, 365]	831	[1317, 691]	1471	[1942, 849]	2111	[2021, 2365]
192	[366, 367]	832	[1318, 754]	1472	[339, 1184]	2112	[1877, 888]
193	[368, 369]	833	[1319, 1320]	1473	[1943, 1944]	2113	[1814, 342]
194	[370, 371]	834	[1321, 201]	1474	[1945, 1774]	2114	[2366, 2367]
195	[372, 373]	835	[1322, 1323]	1475	[1911, 1802]	2115	[2097, 2368]
196	[374, 375]	836	[1324, 1325]	1476	[1946, 85]	2116	[916, 2095]
197	[376, 377]	837	[611, 1326]	1477	[1031, 1163]	2117	[796, 2369]
198	[378, 379]	838	[1327, 610]	1478	[1063, 1947]	2118	[1866, 2370]
199	[380, 381]	839	[1244, 1328]	1479	[870, 1948]	2119	[846, 2371]
200	[382, 383]	840	[1329, 1330]	1480	[1949, 1950]	2120	[2372, 803]
201	[384, 385]	841	[708, 744]	1481	[940, 1951]	2121	[264, 1998]
202	[72, 386]	842	[1331, 1332]	1482	[1952, 1953]	2122	[2083, 244]
203	[387, 388]	843	[1333, 1334]	1483	[846, 1954]	2123	[1929, 1198]
204	[389, 390]	844	[1335, 1336]	1484	[1081, 1047]	2124	[2373, 2374]
205	[391, 392]	845	[1337, 1338]	1485	[1955, 1956]	2125	[1725, 1809]
206	[289, 393]	846	[1339, 1340]	1486	[1957, 1958]	2126	[1059, 1180]
207	[394, 316]	847	[487, 568]	1487	[87, 1959]	2127	[2094, 917]
208	[395, 396]	848	[523, 1270]	1488	[411, 1960]	2128	[2375, 2376]
209	[82, 397]	849	[1341, 1342]	1489	[1181, 986]	2129	[2377, 237]
210	[120, 398]	850	[1343, 1344]	1490	[1961, 1147]	2130	[1937, 2378]
211	[399, 68]	851	[485, 1345]	1491	[1773, 1962]	2131	[94, 934]
212	[400, 401]	852	[1281, 1346]	1492	[1811, 243]	2132	[426, 2379]
213	[402, 403]	853	[136, 1347]	1493	[1946, 1963]	2133	[860, 1098]
214	[404, 405]	854	[1348, 735]	1494	[1102, 1964]	2134	[1930, 2380]
215	[406, 369]	855	[578, 746]	1495	[1965, 930]	2135	[2381, 1971]
216	[407, 408]	856	[743, 709]	1496	[1800, 1881]	2136	[771, 1997]
217	[409, 410]	857	[1349, 13]	1497	[1966, 1819]	2137	[2382, 2383]
218	[411, 412]	858	[1350, 1351]	1498	[1967, 1968]	2138	[377, 997]
219	[413, 383]	859	[497, 1352]	1499	[868, 27]	2139	[944, 1005]
220	[106, 414]	860	[473, 132]	1500	[1969, 1777]	2140	[1918, 1923]
221	[415, 416]	861	[1353, 1354]	1501	[28, 1131]	2141	[1074, 1976]
222	[417, 418]	862	[559, 530]	1502	[1180, 1970]	2142	[953, 2384]
223	[419, 420]	863	[758, 1355]	1503	[1971, 428]	2143	[101, 2385]
224	[421, 422]	864	[533, 1356]	1504	[1972, 1820]	2144	[349, 323]
225	[423, 424]	865	[1248, 1357]	1505	[282, 848]	2145	[2386, 1922]
226	[425, 426]	866	[1358, 1319]	1506	[1973, 309]	2146	[2387, 2388]
227	[427, 428]	867	[1359, 1360]	1507	[1151, 893]	2147	[2389, 2390]
228	[429, 430]	868	[1312, 56]	1508	[1974, 1975]	2148	[1772, 915]
229	[431, 263]	869	[1361, 596]	1509	[1961, 802]	2149	[428, 793]

230	[432, 433]	870	[1362, 1363]	1510	[423, 1976]	2150	[2391, 390]
231	[434, 362]	871	[181, 702]	1511	[1977, 236]	2151	[2392, 2010]
232	[435, 436]	872	[474, 1364]	1512	[1978, 1979]	2152	[98, 1731]
233	[437, 438]	873	[1329, 1365]	1513	[1869, 1837]	2153	[97, 970]
234	[439, 440]	874	[483, 1366]	1514	[356, 1980]	2154	[1789, 2393]
235	[441, 442]	875	[739, 1367]	1515	[293, 300]	2155	[2073, 267]
236	[443, 444]	876	[724, 721]	1516	[1981, 1982]	2156	[1121, 341]
237	[445, 446]	877	[544, 1368]	1517	[1983, 114]	2157	[254, 1095]
238	[447, 448]	878	[1369, 1370]	1518	[772, 1984]	2158	[2394, 2395]
239	[11, 449]	879	[1371, 1372]	1519	[1985, 1210]	2159	[321, 2396]
240	[450, 451]	880	[1373, 1374]	1520	[1986, 241]	2160	[1983, 2397]
241	[452, 453]	881	[1375, 1376]	1521	[1832, 263]	2161	[2088, 265]
242	[454, 455]	882	[749, 1377]	1522	[291, 1955]	2162	[428, 65]
243	[217, 456]	883	[1378, 1379]	1523	[1000, 1093]	2163	[866, 2398]
244	[456, 457]	884	[1380, 503]	1524	[1987, 816]	2164	[257, 2399]
245	[458, 127]	885	[198, 1381]	1525	[1988, 1989]	2165	[2400, 387]
246	[459, 460]	886	[1382, 462]	1526	[1984, 1990]	2166	[2401, 2402]
247	[461, 462]	887	[610, 1383]	1527	[1991, 1901]	2167	[2109, 398]
248	[463, 464]	888	[1384, 44]	1528	[1992, 1000]	2168	[1987, 1821]
249	[465, 466]	889	[145, 1385]	1529	[889, 1846]	2169	[2403, 1929]
250	[467, 468]	890	[615, 1386]	1530	[1069, 1993]	2170	[2404, 2405]
251	[469, 470]	891	[1350, 1387]	1531	[110, 983]	2171	[2400, 1214]
252	[471, 472]	892	[1388, 194]	1532	[1994, 1995]	2172	[248, 1716]
253	[473, 474]	893	[1389, 1390]	1533	[367, 29]	2173	[2406, 1916]
254	[475, 476]	894	[1391, 587]	1534	[1996, 1190]	2174	[274, 1749]
255	[477, 478]	895	[660, 1392]	1535	[116, 1227]	2175	[2407, 402]
256	[479, 480]	896	[1393, 1394]	1536	[1969, 1744]	2176	[2398, 833]
257	[481, 482]	897	[1395, 663]	1537	[1871, 1997]	2177	[1781, 1710]
258	[483, 484]	898	[1396, 1397]	1538	[822, 1123]	2178	[1219, 2408]
259	[485, 486]	899	[616, 1235]	1539	[1193, 1998]	2179	[1833, 2042]
260	[487, 217]	900	[1398, 1399]	1540	[1999, 2000]	2180	[1776, 2409]
261	[488, 489]	901	[1400, 1401]	1541	[1756, 264]	2181	[1972, 1969]
262	[48, 490]	902	[1402, 495]	1542	[2001, 302]	2182	[899, 2410]
263	[491, 173]	903	[462, 1403]	1543	[905, 1228]	2183	[1973, 259]
264	[492, 137]	904	[1309, 538]	1544	[1737, 1815]	2184	[863, 83]
265	[493, 494]	905	[1396, 535]	1545	[1945, 1962]	2185	[1985, 2067]
266	[495, 496]	906	[1404, 1405]	1546	[2002, 2003]	2186	[2076, 1717]
267	[497, 498]	907	[1406, 1407]	1547	[364, 2004]	2187	[417, 2411]
268	[133, 499]	908	[456, 1272]	1548	[2005, 2006]	2188	[112, 1109]
269	[500, 501]	909	[588, 722]	1549	[771, 1886]	2189	[2018, 403]
270	[502, 503]	910	[1298, 1408]	1550	[833, 1020]	2190	[1971, 64]
271	[504, 505]	911	[1337, 665]	1551	[1808, 995]	2191	[2403, 119]
272	[506, 507]	912	[1409, 1410]	1552	[2007, 2008]	2192	[1097, 861]
273	[210, 508]	913	[1411, 205]	1553	[1159, 1185]	2193	[2412, 2369]

274	[509, 510]	914	[656, 1412]	1554	[2009, 2010]	2194	[768, 2413]
275	[511, 512]	915	[35, 1394]	1555	[2011, 1945]	2195	[879, 1881]
276	[513, 143]	916	[1413, 1414]	1556	[1748, 919]	2196	[2414, 1121]
277	[514, 515]	917	[1415, 219]	1557	[392, 2012]	2197	[409, 2415]
278	[516, 517]	918	[1416, 1417]	1558	[1809, 996]	2198	[2416, 2417]
279	[518, 519]	919	[509, 1418]	1559	[324, 2013]	2199	[1211, 1835]
280	[520, 521]	920	[1419, 1420]	1560	[1117, 2014]	2200	[2418, 1201]
281	[522, 523]	921	[687, 490]	1561	[2015, 2016]	2201	[934, 872]
282	[524, 525]	922	[1421, 1422]	1562	[2017, 2013]	2202	[2394, 2419]
283	[152, 526]	923	[37, 674]	1563	[2018, 287]	2203	[790, 1788]
284	[186, 527]	924	[1423, 1424]	1564	[2019, 2020]	2204	[2420, 2421]
285	[528, 529]	925	[1349, 1425]	1565	[979, 1980]	2205	[915, 1114]
286	[530, 531]	926	[725, 1426]	1566	[2021, 2022]	2206	[374, 932]
287	[532, 533]	927	[1427, 1251]	1567	[24, 307]	2207	[2050, 921]
288	[534, 535]	928	[500, 757]	1568	[965, 83]	2208	[2422, 2423]
289	[475, 536]	929	[195, 1428]	1569	[895, 1007]	2209	[430, 296]
290	[537, 514]	930	[1429, 1430]	1570	[2023, 862]	2210	[940, 2424]
291	[538, 539]	931	[1431, 1432]	1571	[2024, 1899]	2211	[86, 846]
292	[540, 541]	932	[1307, 1433]	1572	[298, 105]	2212	[2425, 841]
293	[542, 543]	933	[13, 644]	1573	[1092, 1176]	2213	[875, 1211]
294	[544, 545]	934	[184, 1325]	1574	[2025, 331]	2214	[2426, 2427]
295	[546, 547]	935	[154, 1434]	1575	[2026, 2027]	2215	[1777, 877]
296	[548, 205]	936	[1435, 1436]	1576	[2028, 1101]	2216	[2428, 2396]
297	[549, 550]	937	[688, 1437]	1577	[1908, 2029]	2217	[1996, 1840]
298	[551, 225]	938	[1438, 1408]	1578	[330, 2030]	2218	[2429, 2077]
299	[552, 553]	939	[1439, 1440]	1579	[265, 2031]	2219	[986, 1850]
300	[554, 162]	940	[532, 1234]	1580	[389, 1918]	2220	[2065, 1052]
301	[58, 555]	941	[38, 1254]	1581	[1013, 1884]	2221	[2430, 1813]
302	[556, 557]	942	[1261, 1441]	1582	[2032, 892]	2222	[2431, 1043]
303	[558, 546]	943	[1442, 742]	1583	[80, 2033]	2223	[2432, 1173]
304	[559, 560]	944	[728, 47]	1584	[1165, 1939]	2224	[1035, 1855]
305	[561, 562]	945	[232, 159]	1585	[1715, 249]	2225	[1712, 274]
306	[563, 564]	946	[170, 1443]	1586	[2034, 2035]	2226	[2007, 2433]
307	[48, 565]	947	[1444, 135]	1587	[79, 1941]	2227	[2086, 2434]
308	[566, 567]	948	[552, 1445]	1588	[1812, 2036]	2228	[1927, 2435]
309	[568, 456]	949	[673, 1446]	1589	[1159, 869]	2229	[2106, 1815]
310	[494, 569]	950	[546, 1447]	1590	[253, 871]	2230	[1894, 73]
311	[570, 571]	951	[513, 699]	1591	[1138, 1805]	2231	[1184, 1959]
312	[572, 573]	952	[1448, 1449]	1592	[2037, 834]	2232	[773, 1990]
313	[574, 575]	953	[1446, 1450]	1593	[2038, 2039]	2233	[2009, 2436]
314	[146, 576]	954	[1451, 8]	1594	[1220, 964]	2234	[960, 1097]
315	[577, 229]	955	[1452, 232]	1595	[1795, 262]	2235	[1033, 2437]
316	[578, 579]	956	[1453, 765]	1596	[1139, 1806]	2236	[978, 1971]
317	[580, 581]	957	[570, 1454]	1597	[1898, 2040]	2237	[2431, 2438]

318	[130, 582]	958	[450, 1455]	1598	[851, 794]	2238	[2439, 1772]
319	[583, 527]	959	[123, 1366]	1599	[2041, 2042]	2239	[236, 2440]
320	[584, 585]	960	[1456, 1457]	1600	[1189, 1840]	2240	[384, 1763]
321	[586, 587]	961	[1458, 1459]	1601	[2043, 1837]	2241	[2391, 1918]
322	[454, 588]	962	[1460, 1447]	1602	[2044, 324]	2242	[2426, 2441]
323	[589, 215]	963	[1461, 1462]	1603	[16, 2045]	2243	[2442, 315]
324	[590, 591]	964	[1463, 1464]	1604	[818, 2046]	2244	[1002, 2443]
325	[592, 132]	965	[207, 165]	1605	[24, 1154]	2245	[1836, 2385]
326	[593, 594]	966	[593, 1465]	1606	[1713, 2047]	2246	[107, 434]
327	[595, 596]	967	[148, 1287]	1607	[914, 1056]	2247	[1935, 2444]
328	[597, 598]	968	[1466, 634]	1608	[2048, 2049]	2248	[2445, 867]
329	[599, 231]	969	[534, 1397]	1609	[2050, 1753]	2249	[2442, 2051]
330	[600, 601]	970	[548, 1467]	1610	[314, 2051]	2250	[21, 1884]
331	[602, 478]	971	[1468, 1469]	1611	[73, 1732]	2251	[1156, 1849]
332	[603, 604]	972	[1470, 482]	1612	[2052, 1019]	2252	[2381, 427]
333	[605, 606]	973	[1270, 1274]	1613	[2053, 2054]	2253	[17, 2014]
334	[607, 608]	974	[1471, 731]	1614	[2055, 2056]	2254	[332, 2446]
335	[609, 610]	975	[1472, 1473]	1615	[361, 2057]	2255	[2447, 2026]
336	[611, 141]	976	[1474, 1475]	1616	[788, 408]	2256	[1835, 2415]
337	[612, 613]	977	[1411, 1467]	1617	[1705, 373]	2257	[1201, 2410]
338	[614, 170]	978	[1268, 126]	1618	[1141, 1944]	2258	[1132, 860]
339	[227, 615]	979	[1231, 1248]	1619	[1989, 2058]	2259	[425, 1077]
340	[616, 617]	980	[1476, 1477]	1620	[98, 1729]	2260	[2011, 1773]
341	[618, 619]	981	[1471, 1478]	1621	[2059, 1153]	2261	[437, 2448]
342	[620, 621]	982	[1479, 1480]	1622	[2060, 948]	2262	[2449, 2450]
343	[55, 622]	983	[1481, 218]	1623	[2061, 356]	2263	[2451, 2452]
344	[623, 624]	984	[1482, 1483]	1624	[1978, 1038]	2264	[2453, 2454]
345	[608, 625]	985	[738, 756]	1625	[2062, 2063]	2265	[295, 2455]
346	[226, 626]	986	[1305, 129]	1626	[876, 1835]	2266	[1706, 354]
347	[627, 628]	987	[1484, 612]	1627	[1038, 2064]	2267	[2456, 2457]
348	[629, 630]	988	[1311, 32]	1628	[1039, 1160]	2268	[2066, 2458]
349	[631, 632]	989	[1485, 1399]	1629	[818, 2065]	2269	[2445, 2398]
350	[458, 633]	990	[1486, 1345]	1630	[1979, 1046]	2270	[880, 1713]
351	[634, 635]	991	[1487, 1488]	1631	[2066, 1989]	2271	[1125, 2459]
352	[636, 637]	992	[1290, 1489]	1632	[1162, 1032]	2272	[1964, 2460]
353	[638, 639]	993	[1490, 1491]	1633	[2067, 2068]	2273	[1000, 1176]
354	[640, 562]	994	[756, 501]	1634	[1818, 1747]	2274	[2461, 2462]
355	[577, 641]	995	[134, 1492]	1635	[1079, 1751]	2275	[1020, 29]
356	[642, 643]	996	[1493, 1240]	1636	[2017, 325]	2276	[20, 1911]
357	[158, 233]	997	[1494, 557]	1637	[1082, 2069]	2277	[2104, 2463]
358	[644, 645]	998	[1495, 1496]	1638	[1864, 1111]	2278	[2464, 1129]
359	[646, 647]	999	[1419, 686]	1639	[1213, 387]	2279	[2041, 1834]
360	[648, 649]	1000	[700, 466]	1640	[1744, 877]	2280	[2430, 2036]
361	[650, 651]	1001	[1497, 1498]	1641	[1207, 1001]	2281	[1119, 2465]

362	[652, 505]	1002	[1499, 1349]	1642	[303, 239]	2282	[2466, 1907]
363	[208, 166]	1003	[1500, 1458]	1643	[2070, 2071]	2283	[2467, 2468]
364	[218, 653]	1004	[681, 1501]	1644	[1840, 831]	2284	[1167, 2101]
365	[654, 655]	1005	[703, 1502]	1645	[1210, 2068]	2285	[2044, 2017]
366	[656, 657]	1006	[1404, 1503]	1646	[241, 105]	2286	[2456, 1839]
367	[551, 60]	1007	[1504, 1505]	1647	[2072, 826]	2287	[261, 1796]
368	[658, 659]	1008	[588, 1506]	1648	[1211, 409]	2288	[1926, 842]
369	[477, 660]	1009	[1507, 1508]	1649	[965, 2073]	2289	[2469, 1025]
370	[661, 662]	1010	[461, 1509]	1650	[976, 75]	2290	[2470, 814]
371	[663, 664]	1011	[1462, 1510]	1651	[434, 1061]	2291	[1770, 2069]
372	[665, 666]	1012	[1511, 1280]	1652	[1929, 2074]	2292	[1761, 973]
373	[507, 667]	1013	[1257, 1512]	1653	[1206, 2075]	2293	[1707, 2001]
374	[668, 669]	1014	[1423, 623]	1654	[420, 1028]	2294	[1101, 1824]
375	[670, 671]	1015	[745, 579]	1655	[1166, 2076]	2295	[898, 2448]
376	[672, 673]	1016	[1313, 1513]	1656	[825, 2077]	2296	[1155, 1710]
377	[202, 674]	1017	[1514, 1515]	1657	[312, 1766]	2297	[1809, 2471]
378	[675, 676]	1018	[1516, 1308]	1658	[2061, 979]	2298	[852, 1755]
379	[605, 212]	1019	[60, 1517]	1659	[1210, 2078]	2299	[995, 2471]
380	[677, 678]	1020	[452, 1407]	1660	[1943, 1142]	2300	[855, 1064]
381	[679, 680]	1021	[1320, 1518]	1661	[296, 1739]	2301	[406, 2108]
382	[681, 682]	1022	[1519, 1520]	1662	[849, 2079]	2302	[1171, 2452]
383	[683, 684]	1023	[1292, 1521]	1663	[295, 2080]	2303	[241, 299]
384	[685, 559]	1024	[1522, 1523]	1664	[1072, 2081]	2304	[1209, 2067]
385	[686, 502]	1025	[1524, 177]	1665	[1161, 327]	2305	[1965, 2472]
386	[687, 565]	1026	[1525, 1526]	1666	[2082, 1861]	2306	[1949, 2463]
387	[688, 689]	1027	[1527, 1416]	1667	[2083, 919]	2307	[1757, 2473]
388	[690, 691]	1028	[1442, 1528]	1668	[2084, 2085]	2308	[1734, 1039]
389	[692, 590]	1029	[678, 650]	1669	[2086, 2087]	2309	[2422, 2474]
390	[693, 694]	1030	[168, 1489]	1670	[1853, 2029]	2310	[1923, 1915]
391	[205, 695]	1031	[685, 1529]	1671	[1027, 2088]	2311	[1952, 2475]
392	[561, 696]	1032	[699, 1530]	1672	[109, 1954]	2312	[2062, 2003]
393	[42, 697]	1033	[1468, 1531]	1673	[400, 843]	2313	[919, 1903]
394	[698, 580]	1034	[1532, 1533]	1674	[816, 2089]	2314	[1060, 2476]
395	[142, 699]	1035	[1534, 1535]	1675	[362, 1152]	2315	[1977, 2377]
396	[700, 701]	1036	[445, 1458]	1676	[301, 2090]	2316	[2477, 2478]
397	[161, 702]	1037	[1536, 193]	1677	[1856, 268]	2317	[966, 913]
398	[703, 704]	1038	[652, 1537]	1678	[2091, 1024]	2318	[1992, 1092]
399	[705, 706]	1039	[502, 1538]	1679	[1194, 2092]	2319	[1709, 2479]
400	[481, 707]	1040	[1487, 1539]	1680	[920, 1753]	2320	[984, 2480]
401	[708, 709]	1041	[1540, 719]	1681	[2093, 393]	2321	[2481, 2482]
402	[710, 711]	1042	[50, 1541]	1682	[2094, 2095]	2322	[331, 1778]
403	[712, 713]	1043	[549, 1542]	1683	[1706, 1708]	2323	[1916, 806]
404	[714, 715]	1044	[1543, 1544]	1684	[2096, 1893]	2324	[1170, 1805]
405	[716, 717]	1045	[1545, 1546]	1685	[2097, 2098]	2325	[1726, 1722]

406	[718, 719]	1046	[1547, 1548]	1686	[2099, 2100]	2326	[858, 2483]
407	[457, 720]	1047	[1495, 1549]	1687	[420, 1182]	2327	[385, 304]
408	[721, 721]	1048	[1415, 653]	1688	[2076, 2101]	2328	[2484, 1165]
409	[722, 723]	1049	[1550, 595]	1689	[2102, 2103]	2329	[237, 2485]
410	[721, 724]	1050	[717, 1551]	1690	[2104, 1950]	2330	[1047, 838]
411	[725, 726]	1051	[1374, 1267]	1691	[2030, 2105]	2331	[1215, 1013]
412	[556, 727]	1052	[1341, 1552]	1692	[2106, 1738]	2332	[915, 1057]
413	[728, 729]	1053	[1470, 707]	1693	[1784, 869]	2333	[2486, 317]
414	[730, 731]	1054	[1486, 486]	1694	[1148, 76]	2334	[861, 2487]
415	[732, 733]	1055	[1553, 675]	1695	[2099, 940]	2335	[2025, 2030]
416	[734, 735]	1056	[1554, 1505]	1696	[1842, 82]	2336	[1889, 799]
417	[736, 737]	1057	[1555, 1518]	1697	[273, 2107]	2337	[399, 76]
418	[738, 500]	1058	[140, 1326]	1698	[1721, 1127]	2338	[989, 2488]
419	[739, 740]	1059	[600, 1556]	1699	[368, 2108]	2339	[1986, 298]
420	[741, 742]	1060	[1339, 514]	1700	[2024, 2040]	2340	[1919, 2393]
421	[743, 744]	1061	[206, 1557]	1701	[2109, 121]	2341	[2055, 2489]
422	[745, 746]	1062	[1427, 204]	1702	[2110, 1900]	2342	[27, 342]
423	[563, 747]	1063	[1558, 1559]	1703	[1167, 1717]	2343	[1756, 1193]
424	[465, 701]	1064	[735, 1368]	1704	[439, 507]	2344	[2490, 2435]
425	[584, 748]	1065	[474, 133]	1705	[2111, 728]	2345	[2469, 2491]
426	[749, 750]	1066	[128, 1306]	1706	[466, 1589]	2346	[2093, 290]
427	[523, 671]	1067	[447, 1560]	1707	[672, 2112]	2347	[2486, 2492]
428	[214, 751]	1068	[1561, 1474]	1708	[1380, 1538]	2348	[2429, 1852]
429	[752, 190]	1069	[124, 1562]	1709	[1231, 1683]	2349	[1838, 2457]
430	[753, 754]	1070	[1375, 1277]	1710	[1674, 2113]	2350	[378, 2493]
431	[229, 492]	1071	[1563, 713]	1711	[2114, 2115]	2351	[1743, 807]
432	[166, 755]	1072	[1564, 1565]	1712	[524, 1609]	2352	[1827, 836]
433	[756, 757]	1073	[1566, 627]	1713	[2116, 1515]	2353	[1013, 22]
434	[758, 759]	1074	[12, 1567]	1714	[1374, 630]	2354	[1216, 17]
435	[760, 761]	1075	[522, 670]	1715	[488, 2117]	2355	[1765, 313]
436	[762, 763]	1076	[1568, 1569]	1716	[14, 1591]	2356	[1910, 863]
437	[677, 764]	1077	[1570, 1571]	1717	[467, 581]	2357	[2494, 2433]
438	[663, 765]	1078	[1572, 1573]	1718	[2118, 1370]	2358	[1988, 2458]
439	[766, 767]	1079	[668, 1574]	1719	[1321, 2119]	2359	[2096, 2045]
440	[768, 769]	1080	[1575, 1418]	1720	[2120, 2121]	2360	[2495, 1096]
441	[770, 771]	1081	[1576, 1415]	1721	[1686, 2122]	2361	[1018, 1181]
442	[772, 773]	1082	[1577, 1578]	1722	[1317, 33]	2362	[1810, 2001]
443	[774, 775]	1083	[1579, 208]	1723	[2123, 1410]	2363	[881, 1714]
444	[776, 434]	1084	[1252, 1580]	1724	[1303, 2124]	2364	[2496, 2497]
445	[777, 778]	1085	[1581, 1582]	1725	[2125, 2126]	2365	[2339, 1443]
446	[779, 780]	1086	[1583, 164]	1726	[494, 2127]	2366	[598, 2498]
447	[781, 782]	1087	[760, 1584]	1727	[2128, 2129]	2367	[690, 33]
448	[285, 783]	1088	[1585, 675]	1728	[640, 696]	2368	[2281, 1360]
449	[784, 785]	1089	[1586, 1587]	1729	[52, 1678]	2369	[1608, 525]

450	[786, 787]	1090	[1588, 1450]	1730	[2130, 2131]	2370	[730, 1478]
451	[788, 789]	1091	[1589, 1590]	1731	[626, 2132]	2371	[169, 1406]
452	[790, 791]	1092	[644, 1591]	1732	[143, 1697]	2372	[2312, 2499]
453	[419, 792]	1093	[1592, 1593]	1733	[1699, 2133]	2373	[2334, 2500]
454	[64, 793]	1094	[1594, 1595]	1734	[2134, 2135]	2374	[1556, 2194]
455	[794, 795]	1095	[1596, 1597]	1735	[225, 61]	2375	[2501, 2502]
456	[796, 797]	1096	[225, 1517]	1736	[1589, 738]	2376	[1438, 1299]
457	[798, 799]	1097	[182, 1598]	1737	[1358, 2136]	2377	[2327, 2205]
458	[309, 260]	1098	[1599, 622]	1738	[2137, 2138]	2378	[1254, 2503]
459	[800, 425]	1099	[623, 1600]	1739	[754, 1363]	2379	[748, 2244]
460	[801, 802]	1100	[220, 1601]	1740	[1566, 520]	2380	[531, 2504]
461	[803, 804]	1101	[607, 1289]	1741	[174, 2139]	2381	[2345, 2505]
462	[805, 806]	1102	[39, 613]	1742	[2140, 1338]	2382	[2283, 2506]
463	[807, 297]	1103	[1602, 1519]	1743	[1286, 2141]	2383	[1588, 2271]
464	[808, 109]	1104	[8, 1603]	1744	[2142, 2143]	2384	[1581, 2507]
465	[809, 810]	1105	[1604, 1605]	1745	[572, 2144]	2385	[1324, 185]
466	[811, 812]	1106	[518, 1606]	1746	[1230, 1247]	2386	[441, 1495]
467	[813, 814]	1107	[1514, 1607]	1747	[1416, 2145]	2387	[1517, 2508]
468	[815, 816]	1108	[126, 633]	1748	[1268, 458]	2388	[2120, 2509]
469	[817, 818]	1109	[1608, 1609]	1749	[217, 1271]	2389	[1697, 2510]
470	[819, 769]	1110	[514, 1610]	1750	[1431, 454]	2390	[2311, 1445]
471	[820, 821]	1111	[592, 474]	1751	[1271, 457]	2391	[2312, 2511]
472	[822, 823]	1112	[1543, 1611]	1752	[2146, 2147]	2392	[2111, 2512]
473	[824, 825]	1113	[1304, 1612]	1753	[144, 2148]	2393	[1555, 2305]
474	[826, 827]	1114	[1613, 59]	1754	[1420, 1380]	2394	[1400, 2513]
475	[828, 829]	1115	[558, 1460]	1755	[1669, 2113]	2395	[2176, 2352]
476	[724, 830]	1116	[1614, 1615]	1756	[2132, 2149]	2396	[2309, 683]
477	[831, 832]	1117	[1554, 1616]	1757	[1683, 1357]	2397	[609, 2353]
478	[833, 367]	1118	[748, 1617]	1758	[2150, 1621]	2398	[1489, 452]
479	[834, 835]	1119	[714, 1618]	1759	[1333, 2151]	2399	[734, 544]
480	[82, 836]	1120	[1619, 1391]	1760	[702, 2152]	2400	[1332, 690]
481	[837, 838]	1121	[1620, 1621]	1761	[1604, 2153]	2401	[2300, 2514]
482	[839, 270]	1122	[1384, 54]	1762	[1539, 2154]	2402	[2515, 519]
483	[840, 841]	1123	[670, 1270]	1763	[1592, 2155]	2403	[188, 2516]
484	[842, 843]	1124	[642, 1622]	1764	[1615, 2156]	2404	[675, 2517]
485	[844, 845]	1125	[602, 660]	1765	[145, 2157]	2405	[2315, 2181]
486	[808, 846]	1126	[1623, 186]	1766	[1444, 1492]	2406	[1395, 1453]
487	[847, 848]	1127	[181, 197]	1767	[2158, 2159]	2407	[2223, 712]
488	[849, 850]	1128	[661, 1624]	1768	[2160, 508]	2408	[2198, 639]
489	[848, 851]	1129	[1625, 689]	1769	[469, 2161]	2409	[1402, 1571]
490	[852, 853]	1130	[1626, 1281]	1770	[1378, 2162]	2410	[2326, 1646]
491	[854, 855]	1131	[1429, 1354]	1771	[1460, 547]	2411	[2518, 2221]
492	[430, 807]	1132	[54, 1599]	1772	[1319, 1555]	2412	[2242, 2519]
493	[856, 857]	1133	[678, 1596]	1773	[1485, 1694]	2413	[1563, 2357]

494	[858, 859]	1134	[1627, 1628]	1774	[1463, 46]	2414	[1295, 618]
495	[860, 861]	1135	[1629, 1630]	1775	[1275, 2163]	2415	[1263, 1316]
496	[862, 863]	1136	[1490, 1631]	1776	[1389, 2164]	2416	[2520, 2521]
497	[864, 865]	1137	[1632, 1633]	1777	[1533, 13]	2417	[702, 2241]
498	[866, 867]	1138	[1634, 1635]	1778	[601, 528]	2418	[1520, 2326]
499	[827, 868]	1139	[1239, 1636]	1779	[478, 1291]	2419	[1391, 1696]
500	[869, 870]	1140	[1547, 1302]	1780	[139, 2165]	2420	[564, 2522]
501	[871, 872]	1141	[1277, 1637]	1781	[1655, 1585]	2421	[44, 1599]
502	[873, 874]	1142	[580, 468]	1782	[2166, 2167]	2422	[138, 2523]
503	[875, 876]	1143	[752, 148]	1783	[716, 2168]	2423	[2254, 2184]
504	[877, 878]	1144	[191, 1638]	1784	[1286, 2169]	2424	[2350, 1242]
505	[879, 772]	1145	[208, 1639]	1785	[2170, 2171]	2425	[732, 2245]
506	[880, 881]	1146	[1294, 1259]	1786	[2140, 665]	2426	[2166, 2524]
507	[882, 265]	1147	[735, 545]	1787	[1692, 2172]	2427	[1364, 499]
508	[883, 884]	1148	[229, 136]	1788	[2173, 688]	2428	[2364, 2177]
509	[885, 886]	1149	[1388, 1640]	1789	[1697, 2174]	2429	[1571, 496]
510	[887, 888]	1150	[1641, 1642]	1790	[1613, 555]	2430	[2352, 2525]
511	[889, 890]	1151	[133, 1643]	1791	[2175, 212]	2431	[2341, 1577]
512	[891, 892]	1152	[1644, 498]	1792	[1269, 216]	2432	[1373, 629]
513	[893, 894]	1153	[1645, 1646]	1793	[2176, 2177]	2433	[585, 1617]
514	[895, 896]	1154	[1647, 145]	1794	[2178, 124]	2434	[1436, 148]
515	[395, 358]	1155	[1634, 1648]	1795	[463, 2179]	2435	[2214, 2155]
516	[897, 898]	1156	[492, 1347]	1796	[1647, 2148]	2436	[1481, 1415]
517	[899, 900]	1157	[457, 1431]	1797	[1577, 178]	2437	[1343, 2291]
518	[901, 902]	1158	[1550, 1361]	1798	[2180, 2181]	2438	[754, 1686]
519	[903, 904]	1159	[753, 1362]	1799	[2160, 211]	2439	[147, 1554]
520	[905, 381]	1160	[560, 1649]	1800	[2125, 2182]	2440	[440, 2363]
521	[906, 907]	1161	[1409, 1650]	1801	[658, 2183]	2441	[1619, 586]
522	[260, 908]	1162	[1539, 1651]	1802	[42, 209]	2442	[1474, 2526]
523	[909, 876]	1163	[646, 1630]	1803	[2146, 2184]	2443	[1498, 1334]
524	[910, 911]	1164	[8, 1652]	1804	[143, 1530]	2444	[2150, 1681]
525	[912, 913]	1165	[1653, 1654]	1805	[2182, 2185]	2445	[547, 2527]
526	[914, 915]	1166	[698, 467]	1806	[1553, 2186]	2446	[2528, 2507]
527	[916, 917]	1167	[1533, 1425]	1807	[2187, 1454]	2447	[2520, 2529]
528	[882, 918]	1168	[1644, 1352]	1808	[1371, 2188]	2448	[2247, 1286]
529	[919, 245]	1169	[489, 182]	1809	[150, 575]	2449	[564, 1634]
530	[920, 921]	1170	[1655, 1553]	1810	[2189, 2190]	2450	[1282, 2313]
531	[922, 923]	1171	[1656, 1657]	1811	[631, 2191]	2451	[2530, 1568]
532	[924, 925]	1172	[1658, 1659]	1812	[1413, 2192]	2452	[1695, 2145]
533	[926, 927]	1173	[710, 677]	1813	[1663, 718]	2453	[2227, 2531]
534	[800, 928]	1174	[1660, 1661]	1814	[1456, 2193]	2454	[1572, 2532]
535	[929, 930]	1175	[1662, 1563]	1815	[601, 2194]	2455	[2533, 747]
536	[931, 932]	1176	[686, 1380]	1816	[2136, 1320]	2456	[1673, 2534]
537	[933, 395]	1177	[1663, 1540]	1817	[1536, 1388]	2457	[695, 2293]

538	[934, 935]	1178	[1664, 1258]	1818	[462, 2195]	2458	[1668, 1542]
539	[936, 937]	1179	[704, 1665]	1819	[1499, 1533]	2459	[1489, 1406]
540	[859, 938]	1180	[167, 697]	1820	[123, 484]	2460	[1540, 2257]
541	[939, 940]	1181	[568, 1271]	1821	[2196, 1615]	2461	[166, 2535]
542	[106, 941]	1182	[1506, 723]	1822	[2197, 2189]	2462	[1632, 2536]
543	[942, 943]	1183	[654, 1666]	1823	[2198, 2199]	2463	[560, 531]
544	[891, 820]	1184	[1653, 1667]	1824	[2200, 1540]	2464	[2245, 1487]
545	[944, 945]	1185	[228, 641]	1825	[1637, 2201]	2465	[1364, 1643]
546	[946, 947]	1186	[1668, 550]	1826	[2202, 32]	2466	[1451, 2537]
547	[948, 949]	1187	[1669, 1670]	1827	[620, 517]	2467	[1660, 2538]
548	[950, 951]	1188	[1671, 1390]	1828	[2158, 2203]	2468	[2515, 1606]
549	[952, 953]	1189	[1332, 1317]	1829	[2204, 2205]	2469	[1335, 2539]
550	[954, 436]	1190	[1285, 1672]	1830	[2173, 1625]	2470	[1392, 2540]
551	[955, 120]	1191	[1465, 1673]	1831	[679, 1691]	2471	[2126, 2297]
552	[956, 957]	1192	[478, 1392]	1832	[705, 2206]	2472	[55, 2340]
553	[958, 17]	1193	[1674, 1670]	1833	[610, 2207]	2473	[2270, 617]
554	[63, 959]	1194	[1466, 1675]	1834	[1398, 1694]	2474	[2205, 1289]
555	[960, 860]	1195	[1440, 752]	1835	[741, 1528]	2475	[2320, 637]
556	[961, 962]	1196	[180, 1434]	1836	[2208, 2209]	2476	[1556, 528]
557	[963, 964]	1197	[1248, 1676]	1837	[1576, 218]	2477	[1476, 2541]
558	[376, 948]	1198	[1677, 1678]	1838	[2210, 2211]	2478	[2306, 2532]
559	[862, 965]	1199	[1679, 1680]	1839	[504, 1537]	2479	[2196, 2344]
560	[966, 967]	1200	[1472, 443]	1840	[1453, 664]	2480	[2518, 2319]
561	[968, 969]	1201	[1620, 1681]	1841	[2128, 2212]	2481	[1300, 2542]
562	[346, 970]	1202	[1564, 1682]	1842	[471, 2213]	2482	[2329, 688]
563	[971, 972]	1203	[1382, 1509]	1843	[2214, 1593]	2483	[165, 1639]
564	[973, 823]	1204	[493, 1659]	1844	[1458, 2215]	2484	[2183, 1444]
565	[94, 871]	1205	[1247, 1683]	1845	[2118, 2216]	2485	[2205, 608]
566	[974, 975]	1206	[736, 1684]	1846	[172, 1238]	2486	[1558, 1520]
567	[976, 977]	1207	[187, 1685]	1847	[173, 2217]	2487	[132, 1364]
568	[978, 427]	1208	[1525, 1546]	1848	[1507, 2218]	2488	[32, 56]
569	[979, 357]	1209	[1686, 1687]	1849	[1585, 2186]	2489	[2533, 564]
570	[980, 981]	1210	[1353, 1430]	1850	[1575, 510]	2490	[1627, 2543]
571	[982, 983]	1211	[1315, 1264]	1851	[1695, 1417]	2491	[2328, 481]
572	[984, 985]	1212	[1688, 1344]	1852	[683, 539]	2492	[2276, 2358]
573	[851, 986]	1213	[1689, 1690]	1853	[222, 2219]	2493	[2528, 1582]
574	[987, 336]	1214	[1243, 1691]	1854	[1504, 1616]	2494	[2530, 2544]
575	[988, 989]	1215	[1692, 1693]	1855	[440, 667]	2495	[1443, 1572]
576	[908, 990]	1216	[1694, 37]	1856	[2220, 2221]	2496	[536, 2545]
577	[991, 992]	1217	[1527, 1695]	1857	[1439, 1435]	2497	[641, 136]
578	[993, 994]	1218	[586, 1696]	1858	[9, 2222]	2498	[1974, 19]
579	[995, 996]	1219	[699, 1697]	1859	[137, 2120]	2499	[929, 2472]
580	[948, 997]	1220	[33, 1698]	1860	[2223, 1563]	2500	[2389, 923]
581	[998, 337]	1221	[1699, 1700]	1861	[1500, 446]	2501	[80, 2546]

582	[906, 812]	1222	[1506, 1268]	1862	[1465, 2224]	2502	[827, 785]
583	[999, 1000]	1223	[634, 1701]	1863	[2136, 1555]	2503	[1127, 96]
584	[1001, 1002]	1224	[540, 1702]	1864	[542, 2225]	2504	[921, 1754]
585	[372, 1003]	1225	[744, 1703]	1865	[2226, 183]	2505	[2059, 989]
586	[1004, 1005]	1226	[1629, 647]	1866	[2227, 2228]	2506	[2464, 1831]
587	[1006, 1007]	1227	[1406, 453]	1867	[38, 2229]	2507	[1098, 2487]
588	[1008, 792]	1228	[1625, 1437]	1868	[566, 2230]	2508	[119, 2074]
589	[1009, 1010]	1229	[1704, 1705]	1869	[443, 2231]	2509	[2547, 1960]
590	[1011, 117]	1230	[1176, 1706]	1870	[606, 213]	2510	[1105, 847]
591	[1012, 1013]	1231	[1707, 301]	1871	[638, 2199]	2511	[1881, 1984]
592	[1014, 1015]	1232	[353, 1708]	1872	[1549, 2232]	2512	[1126, 95]
593	[1016, 1017]	1233	[904, 1709]	1873	[1318, 1362]	2513	[1050, 2482]
594	[847, 1018]	1234	[1710, 1711]	1874	[2180, 2233]	2514	[2548, 1804]
595	[926, 1019]	1235	[309, 1712]	1875	[2204, 607]	2515	[1902, 2043]
596	[1020, 1021]	1236	[1713, 1714]	1876	[1534, 2234]	2516	[887, 1878]
597	[1014, 1022]	1237	[1715, 1716]	1877	[2235, 2236]	2517	[1185, 870]
598	[1023, 1024]	1238	[340, 1122]	1878	[618, 1512]	2518	[2461, 2549]
599	[1025, 1026]	1239	[1717, 1718]	1879	[194, 2237]	2519	[2550, 396]
600	[1027, 882]	1240	[240, 298]	1880	[1545, 1526]	2520	[2053, 933]
601	[792, 1028]	1241	[1719, 1720]	1881	[2132, 1386]	2521	[2548, 1135]
602	[1029, 1030]	1242	[1721, 95]	1882	[47, 687]	2522	[1967, 1071]
603	[898, 438]	1243	[1722, 1723]	1883	[2238, 156]	2523	[318, 2039]
604	[1031, 1032]	1244	[817, 1724]	1884	[1280, 2239]	2524	[1076, 2397]
605	[1033, 1034]	1245	[259, 1712]	1885	[44, 55]	2525	[1110, 1865]
606	[1035, 1036]	1246	[299, 106]	1886	[1236, 1355]	2526	[1787, 1945]
607	[1037, 1038]	1247	[392, 271]	1887	[1482, 2240]	2527	[270, 2012]
608	[304, 1039]	1248	[1725, 995]	1888	[197, 2241]	2528	[1042, 2438]
609	[1040, 1041]	1249	[1726, 1727]	1889	[2242, 2243]	2529	[331, 2105]
610	[1042, 1043]	1250	[883, 1728]	1890	[585, 2244]	2530	[1989, 2551]
611	[1044, 1045]	1251	[970, 1729]	1891	[2245, 2246]	2531	[1125, 2057]
612	[1038, 1046]	1252	[1730, 80]	1892	[2247, 1672]	2532	[2552, 2098]
613	[1047, 1048]	1253	[970, 1731]	1893	[1664, 694]	2533	[1860, 1967]
614	[1049, 326]	1254	[386, 1732]	1894	[2248, 2249]	2534	[2412, 797]
615	[1050, 1051]	1255	[1733, 1145]	1895	[1520, 1645]	2535	[2005, 2374]
616	[1052, 1053]	1256	[1734, 305]	1896	[194, 2250]	2536	[2553, 2483]
617	[242, 1054]	1257	[299, 1735]	1897	[1304, 2251]	2537	[1817, 286]
618	[1023, 1055]	1258	[1736, 417]	1898	[1281, 2252]	2538	[1912, 803]
619	[1056, 1057]	1259	[1737, 1738]	1899	[1493, 1636]	2539	[998, 1177]
620	[1036, 1058]	1260	[807, 1739]	1900	[1658, 494]	2540	[367, 1021]
621	[1059, 1060]	1261	[103, 1740]	1901	[1331, 2253]	2541	[1060, 1970]
622	[108, 1061]	1262	[1094, 255]	1902	[2175, 606]	2542	[305, 1086]
623	[29, 1062]	1263	[1741, 1742]	1903	[589, 751]	2543	[2060, 377]
624	[1063, 1064]	1264	[1743, 296]	1904	[2254, 2147]	2544	[922, 2390]
625	[77, 1065]	1265	[1744, 5]	1905	[537, 1340]	2545	[1212, 2443]

626	[798, 1066]	1266	[1745, 890]	1906	[495, 511]	2546	[157, 1257]
627	[1067, 1068]	1267	[1746, 1747]	1907	[2114, 1523]	2547	[2157, 2554]
628	[252, 94]	1268	[1748, 244]	1908	[1462, 1451]	2548	[2265, 2125]
629	[1069, 421]	1269	[876, 409]	1909	[2255, 221]	2549	[1671, 2164]
630	[1070, 1071]	1270	[908, 1749]	1910	[2134, 2256]	2550	[2248, 2555]
631	[1072, 1073]	1271	[848, 1181]	1911	[718, 2257]	2551	[2339, 171]
632	[1074, 424]	1272	[427, 64]	1912	[692, 2258]	2552	[2334, 2556]
633	[1075, 973]	1273	[1157, 1222]	1913	[45, 1464]	2553	[515, 2557]
634	[283, 417]	1274	[1750, 1751]	1914	[590, 1699]	2554	[1037, 1979]
635	[1076, 114]	1275	[1752, 364]	1915	[554, 57]	2555	[2550, 358]
636	[997, 974]	1276	[1753, 1754]	1916	[1435, 752]	2556	[863, 2073]
637	[1077, 824]	1277	[1199, 1755]	1917	[2259, 1552]	2557	[1827, 397]
638	[780, 1078]	1278	[431, 1756]	1918	[1312, 554]		
639	[1079, 1080]	1279	[1757, 1758]	1919	[1421, 2260]		

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

n	$\tau(n)$	n	$\tau(n)$	n	$\tau(n)$	n	$\tau(n)$	n	$\tau(n)$	n	$\tau(n)$
0	0	427	0	854	0	1281	0	1708	1	2135	1
1	0	428	0	855	0	1282	1	1709	0	2136	1
2	0	429	0	856	1	1283	1	1710	1	2137	0
3	0	430	0	857	1	1284	0	1711	0	2138	0
4	1	431	0	858	1	1285	0	1712	1	2139	1
5	0	432	0	859	0	1286	1	1713	0	2140	0
6	0	433	0	860	0	1287	0	1714	0	2141	0
7	0	434	1	861	0	1288	1	1715	1	2142	1
8	1	435	1	862	0	1289	1	1716	0	2143	0
9	1	436	1	863	1	1290	1	1717	0	2144	0
10	0	437	1	864	0	1291	0	1718	0	2145	0
11	0	438	0	865	0	1292	0	1719	1	2146	1
12	0	439	0	866	0	1293	0	1720	1	2147	0
13	0	440	0	867	1	1294	0	1721	1	2148	0
14	0	441	0	868	0	1295	0	1722	1	2149	0
15	0	442	0	869	1	1296	1	1723	1	2150	1
16	0	443	1	870	1	1297	1	1724	0	2151	1
17	1	444	1	871	0	1298	1	1725	0	2152	0
18	1	445	1	872	0	1299	0	1726	1	2153	1
19	1	446	1	873	0	1300	1	1727	0	2154	0
20	0	447	1	874	0	1301	1	1728	0	2155	0
21	0	448	1	875	1	1302	0	1729	0	2156	0
22	0	449	1	876	0	1303	0	1730	1	2157	1
23	0	450	1	877	1	1304	1	1731	1	2158	1
24	0	451	0	878	1	1305	0	1732	0	2159	0
25	0	452	1	879	1	1306	1	1733	1	2160	1
26	0	453	1	880	0	1307	0	1734	1	2161	0

27	0	454	1	881	1	1308	1	1735	1	2162	0
28	0	455	1	882	1	1309	0	1736	0	2163	0
29	0	456	1	883	0	1310	0	1737	0	2164	0
30	0	457	1	884	1	1311	0	1738	0	2165	0
31	0	458	0	885	0	1312	0	1739	0	2166	0
32	1	459	1	886	0	1313	1	1740	1	2167	1
33	0	460	1	887	0	1314	0	1741	0	2168	1
34	0	461	1	888	1	1315	1	1742	0	2169	1
35	1	462	1	889	1	1316	0	1743	1	2170	0
36	0	463	0	890	0	1317	1	1744	1	2171	0
37	1	464	1	891	1	1318	1	1745	0	2172	0
38	1	465	1	892	0	1319	0	1746	0	2173	0
39	1	466	1	893	1	1320	1	1747	0	2174	0
40	0	467	0	894	1	1321	1	1748	0	2175	0
41	0	468	0	895	1	1322	0	1749	1	2176	0
42	1	469	1	896	0	1323	1	1750	1	2177	0
43	0	470	1	897	0	1324	0	1751	0	2178	1
44	1	471	1	898	0	1325	1	1752	1	2179	0
45	0	472	0	899	1	1326	1	1753	1	2180	1
46	1	473	0	900	0	1327	0	1754	1	2181	1
47	0	474	0	901	1	1328	0	1755	0	2182	1
48	1	475	1	902	1	1329	0	1756	1	2183	0
49	1	476	0	903	1	1330	1	1757	1	2184	1
50	0	477	1	904	0	1331	1	1758	1	2185	0
51	0	478	0	905	0	1332	0	1759	1	2186	1
52	0	479	1	906	0	1333	1	1760	1	2187	0
53	0	480	0	907	0	1334	0	1761	1	2188	0
54	0	481	0	908	1	1335	1	1762	1	2189	1
55	0	482	1	909	0	1336	0	1763	1	2190	1
56	0	483	0	910	1	1337	1	1764	1	2191	1
57	0	484	1	911	1	1338	1	1765	1	2192	1
58	0	485	1	912	0	1339	1	1766	1	2193	0
59	0	486	1	913	0	1340	0	1767	1	2194	0
60	0	487	0	914	1	1341	1	1768	1	2195	1
61	0	488	1	915	1	1342	1	1769	1	2196	0
62	0	489	0	916	0	1343	0	1770	0	2197	1
63	1	490	0	917	1	1344	1	1771	0	2198	1
64	1	491	0	918	0	1345	0	1772	0	2199	1
65	1	492	0	919	0	1346	0	1773	1	2200	0
66	0	493	1	920	0	1347	1	1774	1	2201	1
67	1	494	1	921	0	1348	0	1775	1	2202	1
68	0	495	0	922	1	1349	1	1776	1	2203	1
69	1	496	0	923	1	1350	1	1777	0	2204	1
70	1	497	0	924	1	1351	1	1778	1	2205	1

71	1	498	0	925	1	1352	1	1779	0	2206	0
72	0	499	0	926	0	1353	0	1780	1	2207	1
73	1	500	1	927	1	1354	0	1781	0	2208	1
74	1	501	0	928	1	1355	1	1782	0	2209	0
75	1	502	0	929	0	1356	0	1783	0	2210	1
76	1	503	1	930	1	1357	1	1784	1	2211	0
77	1	504	1	931	1	1358	0	1785	0	2212	1
78	1	505	1	932	0	1359	1	1786	0	2213	1
79	0	506	0	933	0	1360	1	1787	1	2214	0
80	0	507	1	934	1	1361	1	1788	0	2215	0
81	0	508	0	935	1	1362	1	1789	0	2216	1
82	0	509	0	936	0	1363	0	1790	1	2217	1
83	1	510	0	937	0	1364	0	1791	0	2218	1
84	1	511	1	938	0	1365	0	1792	0	2219	0
85	0	512	1	939	0	1366	0	1793	0	2220	1
86	0	513	1	940	1	1367	1	1794	1	2221	1
87	1	514	1	941	1	1368	0	1795	0	2222	1
88	1	515	0	942	0	1369	1	1796	0	2223	0
89	0	516	0	943	1	1370	0	1797	1	2224	1
90	0	517	1	944	1	1371	1	1798	1	2225	1
91	1	518	1	945	1	1372	1	1799	1	2226	0
92	0	519	1	946	1	1373	0	1800	0	2227	0
93	0	520	0	947	1	1374	0	1801	1	2228	1
94	1	521	0	948	1	1375	1	1802	1	2229	1
95	1	522	0	949	0	1376	0	1803	1	2230	1
96	1	523	0	950	1	1377	0	1804	0	2231	0
97	1	524	1	951	1	1378	0	1805	1	2232	0
98	0	525	0	952	1	1379	1	1806	0	2233	0
99	0	526	1	953	1	1380	1	1807	0	2234	1
100	1	527	0	954	0	1381	0	1808	1	2235	1
101	0	528	1	955	0	1382	0	1809	1	2236	0
102	1	529	0	956	1	1383	0	1810	1	2237	1
103	0	530	0	957	1	1384	1	1811	0	2238	0
104	0	531	1	958	1	1385	0	1812	0	2239	1
105	0	532	1	959	1	1386	1	1813	1	2240	0
106	0	533	0	960	1	1387	0	1814	1	2241	1
107	0	534	1	961	0	1388	0	1815	1	2242	0
108	0	535	0	962	0	1389	1	1816	1	2243	0
109	0	536	1	963	1	1390	1	1817	0	2244	0
110	0	537	0	964	1	1391	1	1818	1	2245	1
111	0	538	1	965	0	1392	1	1819	0	2246	0
112	0	539	0	966	1	1393	0	1820	1	2247	1
113	1	540	0	967	1	1394	1	1821	0	2248	1
114	0	541	0	968	1	1395	0	1822	1	2249	0

115	0	542	0	969	1	1396	0	1823	1	2250	0
116	0	543	0	970	1	1397	1	1824	0	2251	0
117	1	544	1	971	1	1398	0	1825	1	2252	1
118	0	545	1	972	1	1399	1	1826	1	2253	1
119	0	546	1	973	1	1400	1	1827	1	2254	0
120	0	547	1	974	1	1401	1	1828	1	2255	1
121	1	548	1	975	0	1402	1	1829	1	2256	0
122	0	549	1	976	0	1403	0	1830	0	2257	0
123	1	550	0	977	0	1404	0	1831	0	2258	0
124	1	551	0	978	0	1405	0	1832	1	2259	0
125	1	552	1	979	0	1406	0	1833	0	2260	0
126	1	553	1	980	1	1407	0	1834	0	2261	1
127	1	554	1	981	1	1408	1	1835	0	2262	1
128	1	555	1	982	1	1409	0	1836	1	2263	1
129	0	556	0	983	1	1410	1	1837	0	2264	0
130	0	557	1	984	0	1411	0	1838	1	2265	1
131	1	558	0	985	1	1412	0	1839	1	2266	1
132	1	559	0	986	0	1413	0	1840	1	2267	0
133	1	560	1	987	0	1414	0	1841	0	2268	0
134	0	561	1	988	0	1415	1	1842	1	2269	1
135	1	562	0	989	1	1416	0	1843	0	2270	0
136	1	563	1	990	0	1417	1	1844	0	2271	0
137	0	564	1	991	1	1418	1	1845	0	2272	1
138	1	565	1	992	1	1419	0	1846	1	2273	0
139	1	566	1	993	0	1420	1	1847	0	2274	0
140	1	567	0	994	0	1421	1	1848	1	2275	1
141	0	568	0	995	0	1422	1	1849	1	2276	0
142	0	569	0	996	1	1423	1	1850	1	2277	0
143	0	570	1	997	1	1424	1	1851	1	2278	1
144	1	571	1	998	1	1425	1	1852	0	2279	1
145	1	572	0	999	0	1426	1	1853	0	2280	1
146	1	573	1	1000	0	1427	1	1854	1	2281	0
147	0	574	0	1001	0	1428	1	1855	0	2282	0
148	1	575	0	1002	0	1429	1	1856	1	2283	0
149	1	576	1	1003	0	1430	1	1857	0	2284	0
150	1	577	1	1004	0	1431	1	1858	1	2285	0
151	1	578	0	1005	0	1432	0	1859	0	2286	0
152	1	579	0	1006	0	1433	0	1860	0	2287	1
153	0	580	1	1007	1	1434	0	1861	0	2288	0
154	1	581	1	1008	0	1435	0	1862	1	2289	1
155	1	582	0	1009	1	1436	1	1863	1	2290	1
156	0	583	0	1010	1	1437	0	1864	0	2291	0
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158	0	585	0	1012	0	1439	0	1866	0	2293	0

159	0	586	0	1013	1	1440	1	1867	1	2294	0
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161	1	588	0	1015	1	1442	1	1869	1	2296	1
162	1	589	1	1016	1	1443	0	1870	1	2297	1
163	1	590	1	1017	1	1444	1	1871	0	2298	0
164	0	591	0	1018	1	1445	0	1872	1	2299	0
165	1	592	1	1019	0	1446	1	1873	1	2300	0
166	0	593	1	1020	1	1447	0	1874	1	2301	0
167	0	594	0	1021	1	1448	1	1875	1	2302	0
168	0	595	0	1022	0	1449	1	1876	1	2303	1
169	1	596	1	1023	0	1450	1	1877	1	2304	1
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171	1	598	0	1025	1	1452	0	1879	0	2306	1
172	1	599	1	1026	1	1453	1	1880	0	2307	1
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175	0	602	0	1029	0	1456	1	1883	0	2310	0
176	0	603	0	1030	0	1457	1	1884	1	2311	0
177	0	604	0	1031	0	1458	0	1885	1	2312	1
178	1	605	1	1032	1	1459	1	1886	0	2313	0
179	1	606	1	1033	1	1460	0	1887	0	2314	1
180	0	607	0	1034	1	1461	1	1888	0	2315	0
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182	1	609	1	1036	1	1463	1	1890	0	2317	1
183	0	610	0	1037	0	1464	0	1891	1	2318	1
184	1	611	0	1038	0	1465	1	1892	1	2319	0
185	0	612	0	1039	0	1466	1	1893	0	2320	0
186	1	613	1	1040	1	1467	1	1894	1	2321	1
187	1	614	0	1041	1	1468	1	1895	0	2322	0
188	1	615	0	1042	0	1469	1	1896	0	2323	0
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190	0	617	1	1044	0	1471	1	1898	0	2325	1
191	0	618	0	1045	0	1472	0	1899	1	2326	1
192	1	619	0	1046	0	1473	0	1900	0	2327	0
193	1	620	1	1047	1	1474	0	1901	1	2328	0
194	0	621	0	1048	1	1475	0	1902	0	2329	1
195	0	622	0	1049	0	1476	1	1903	1	2330	1
196	0	623	0	1050	0	1477	0	1904	0	2331	1
197	0	624	1	1051	0	1478	1	1905	0	2332	1
198	0	625	1	1052	1	1479	1	1906	0	2333	1
199	1	626	1	1053	1	1480	1	1907	0	2334	0
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201	0	628	1	1055	0	1482	0	1909	1	2336	0
202	0	629	1	1056	0	1483	1	1910	1	2337	1

203	0	630	1	1057	0	1484	0	1911	0	2338	1
204	0	631	0	1058	1	1485	1	1912	0	2339	0
205	0	632	0	1059	0	1486	0	1913	0	2340	1
206	1	633	0	1060	1	1487	1	1914	1	2341	1
207	0	634	1	1061	1	1488	0	1915	1	2342	0
208	0	635	0	1062	1	1489	0	1916	0	2343	1
209	0	636	1	1063	1	1490	0	1917	0	2344	0
210	0	637	0	1064	0	1491	1	1918	0	2345	1
211	1	638	0	1065	0	1492	0	1919	1	2346	0
212	0	639	0	1066	1	1493	1	1920	1	2347	1
213	0	640	0	1067	1	1494	1	1921	1	2348	1
214	0	641	1	1068	1	1495	1	1922	1	2349	1
215	0	642	1	1069	1	1496	0	1923	0	2350	0
216	1	643	0	1070	1	1497	0	1924	0	2351	1
217	1	644	1	1071	1	1498	0	1925	1	2352	1
218	0	645	0	1072	0	1499	0	1926	0	2353	1
219	1	646	0	1073	1	1500	0	1927	1	2354	0
220	0	647	0	1074	0	1501	0	1928	1	2355	1
221	1	648	1	1075	0	1502	0	1929	1	2356	1
222	0	649	0	1076	0	1503	1	1930	1	2357	1
223	1	650	1	1077	0	1504	1	1931	0	2358	1
224	1	651	1	1078	0	1505	1	1932	1	2359	1
225	1	652	0	1079	0	1506	0	1933	1	2360	0
226	0	653	0	1080	1	1507	1	1934	1	2361	1
227	0	654	1	1081	0	1508	0	1935	1	2362	1
228	0	655	0	1082	1	1509	0	1936	0	2363	1
229	0	656	1	1083	1	1510	1	1937	1	2364	1
230	0	657	1	1084	1	1511	0	1938	0	2365	0
231	1	658	1	1085	1	1512	1	1939	0	2366	0
232	1	659	1	1086	0	1513	1	1940	0	2367	0
233	1	660	1	1087	1	1514	1	1941	1	2368	0
234	0	661	0	1088	1	1515	0	1942	1	2369	0
235	0	662	0	1089	0	1516	1	1943	0	2370	0
236	1	663	0	1090	0	1517	1	1944	0	2371	1
237	1	664	0	1091	0	1518	0	1945	0	2372	1
238	1	665	0	1092	1	1519	0	1946	1	2373	0
239	0	666	1	1093	1	1520	0	1947	1	2374	0
240	1	667	0	1094	0	1521	1	1948	1	2375	0
241	1	668	0	1095	0	1522	1	1949	1	2376	0
242	1	669	0	1096	1	1523	0	1950	0	2377	0
243	1	670	1	1097	1	1524	1	1951	1	2378	0
244	1	671	0	1098	1	1525	1	1952	0	2379	1
245	0	672	0	1099	0	1526	1	1953	1	2380	1
246	1	673	0	1100	0	1527	0	1954	0	2381	1

247	1	674	0	1101	0	1528	1	1955	1	2382	0
248	0	675	0	1102	1	1529	1	1956	1	2383	0
249	1	676	1	1103	0	1530	1	1957	0	2384	1
250	0	677	1	1104	1	1531	0	1958	0	2385	0
251	1	678	0	1105	1	1532	1	1959	0	2386	0
252	1	679	0	1106	1	1533	0	1960	1	2387	1
253	0	680	0	1107	1	1534	1	1961	0	2388	1
254	1	681	0	1108	1	1535	0	1962	0	2389	0
255	1	682	1	1109	0	1536	0	1963	1	2390	0
256	1	683	0	1110	1	1537	0	1964	1	2391	1
257	0	684	1	1111	1	1538	0	1965	1	2392	1
258	0	685	0	1112	0	1539	1	1966	0	2393	0
259	1	686	0	1113	1	1540	1	1967	0	2394	1
260	0	687	0	1114	1	1541	1	1968	0	2395	0
261	1	688	0	1115	0	1542	1	1969	0	2396	1
262	1	689	1	1116	1	1543	0	1970	1	2397	1
263	0	690	0	1117	0	1544	0	1971	1	2398	0
264	0	691	1	1118	1	1545	0	1972	1	2399	1
265	1	692	0	1119	0	1546	0	1973	0	2400	0
266	0	693	1	1120	1	1547	0	1974	0	2401	0
267	0	694	1	1121	0	1548	1	1975	0	2402	0
268	1	695	0	1122	1	1549	1	1976	0	2403	1
269	1	696	1	1123	1	1550	0	1977	0	2404	0
270	0	697	1	1124	1	1551	1	1978	1	2405	0
271	1	698	0	1125	0	1552	0	1979	1	2406	0
272	0	699	1	1126	0	1553	0	1980	1	2407	0
273	0	700	0	1127	0	1554	0	1981	1	2408	1
274	0	701	0	1128	0	1555	0	1982	1	2409	1
275	1	702	1	1129	1	1556	0	1983	1	2410	1
276	1	703	0	1130	0	1557	1	1984	1	2411	0
277	1	704	1	1131	1	1558	1	1985	0	2412	0
278	0	705	1	1132	0	1559	1	1986	0	2413	1
279	1	706	1	1133	0	1560	0	1987	1	2414	0
280	0	707	0	1134	0	1561	1	1988	1	2415	0
281	0	708	0	1135	1	1562	0	1989	1	2416	1
282	1	709	0	1136	0	1563	1	1990	1	2417	1
283	1	710	0	1137	1	1564	0	1991	0	2418	0
284	1	711	0	1138	1	1565	0	1992	1	2419	1
285	1	712	0	1139	0	1566	1	1993	0	2420	1
286	0	713	0	1140	0	1567	0	1994	1	2421	1
287	1	714	0	1141	1	1568	0	1995	1	2422	1
288	1	715	0	1142	1	1569	1	1996	1	2423	0
289	1	716	0	1143	0	1570	0	1997	1	2424	0
290	0	717	0	1144	0	1571	1	1998	0	2425	1

291	1	718	0	1145	0	1572	0	1999	1	2426	0
292	0	719	1	1146	0	1573	1	2000	1	2427	0
293	0	720	0	1147	0	1574	1	2001	1	2428	1
294	1	721	1	1148	0	1575	1	2002	0	2429	1
295	1	722	1	1149	0	1576	0	2003	0	2430	1
296	1	723	1	1150	1	1577	1	2004	0	2431	1
297	1	724	0	1151	1	1578	0	2005	1	2432	0
298	0	725	0	1152	1	1579	1	2006	1	2433	0
299	1	726	0	1153	0	1580	0	2007	0	2434	1
300	1	727	0	1154	0	1581	1	2008	1	2435	0
301	0	728	1	1155	1	1582	0	2009	0	2436	1
302	0	729	1	1156	0	1583	0	2010	0	2437	0
303	0	730	0	1157	1	1584	0	2011	0	2438	0
304	0	731	0	1158	0	1585	1	2012	0	2439	0
305	1	732	1	1159	0	1586	0	2013	0	2440	0
306	1	733	0	1160	1	1587	0	2014	0	2441	1
307	1	734	1	1161	0	1588	0	2015	1	2442	0
308	1	735	0	1162	1	1589	0	2016	1	2443	0
309	0	736	0	1163	0	1590	0	2017	0	2444	1
310	1	737	0	1164	1	1591	1	2018	1	2445	1
311	1	738	1	1165	0	1592	1	2019	0	2446	0
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313	0	740	0	1167	0	1594	0	2021	1	2448	1
314	1	741	0	1168	1	1595	0	2022	1	2449	1
315	1	742	0	1169	0	1596	0	2023	0	2450	1
316	0	743	1	1170	0	1597	0	2024	1	2451	1
317	1	744	1	1171	0	1598	1	2025	1	2452	1
318	0	745	1	1172	0	1599	1	2026	1	2453	0
319	0	746	1	1173	0	1600	0	2027	1	2454	0
320	0	747	0	1174	0	1601	0	2028	0	2455	0
321	0	748	1	1175	1	1602	0	2029	0	2456	0
322	1	749	1	1176	0	1603	0	2030	1	2457	0
323	1	750	1	1177	1	1604	1	2031	1	2458	0
324	1	751	1	1178	0	1605	0	2032	0	2459	0
325	1	752	0	1179	1	1606	0	2033	0	2460	1
326	1	753	0	1180	0	1607	1	2034	0	2461	0
327	0	754	0	1181	0	1608	0	2035	1	2462	1
328	1	755	0	1182	0	1609	1	2036	0	2463	1
329	1	756	0	1183	1	1610	1	2037	1	2464	1
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333	1	760	1	1187	0	1614	1	2041	1	2468	0
334	0	761	1	1188	0	1615	1	2042	1	2469	1

335	1	762	1	1189	0	1616	0	2043	0	2470	1
336	0	763	1	1190	0	1617	1	2044	0	2471	0
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338	0	765	1	1192	0	1619	1	2046	0	2473	0
339	0	766	0	1193	1	1620	0	2047	1	2474	1
340	1	767	0	1194	1	1621	1	2048	0	2475	0
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343	0	770	0	1197	0	1624	1	2051	0	2478	1
344	0	771	1	1198	1	1625	1	2052	1	2479	0
345	0	772	0	1199	1	1626	0	2053	1	2480	0
346	0	773	0	1200	0	1627	0	2054	1	2481	1
347	1	774	1	1201	0	1628	0	2055	1	2482	1
348	1	775	1	1202	0	1629	1	2056	1	2483	1
349	0	776	1	1203	0	1630	1	2057	1	2484	0
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352	1	779	1	1206	0	1633	1	2060	1	2487	1
353	0	780	0	1207	1	1634	1	2061	0	2488	1
354	0	781	1	1208	1	1635	0	2062	1	2489	0
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356	1	783	1	1210	0	1637	1	2064	1	2491	0
357	0	784	1	1211	1	1638	0	2065	1	2492	0
358	1	785	1	1212	1	1639	1	2066	0	2493	0
359	0	786	1	1213	1	1640	1	2067	1	2494	1
360	1	787	0	1214	1	1641	1	2068	0	2495	0
361	1	788	0	1215	1	1642	0	2069	0	2496	1
362	0	789	0	1216	0	1643	1	2070	1	2497	1
363	0	790	1	1217	0	1644	1	2071	1	2498	0
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366	1	793	0	1220	0	1647	0	2074	0	2501	0
367	0	794	1	1221	1	1648	1	2075	0	2502	0
368	1	795	0	1222	0	1649	0	2076	1	2503	0
369	1	796	1	1223	1	1650	0	2077	1	2504	0
370	0	797	1	1224	0	1651	1	2078	1	2505	1
371	0	798	1	1225	1	1652	1	2079	1	2506	1
372	0	799	0	1226	1	1653	0	2080	1	2507	1
373	1	800	1	1227	0	1654	0	2081	0	2508	0
374	0	801	1	1228	1	1655	0	2082	1	2509	1
375	1	802	1	1229	0	1656	0	2083	1	2510	1
376	0	803	1	1230	0	1657	0	2084	0	2511	1
377	0	804	1	1231	0	1658	0	2085	0	2512	0
378	0	805	1	1232	0	1659	0	2086	0	2513	0

379	1	806	0	1233	0	1660	0	2087	0	2514	1
380	1	807	0	1234	1	1661	1	2088	0	2515	0
381	0	808	1	1235	0	1662	1	2089	1	2516	0
382	0	809	1	1236	0	1663	1	2090	1	2517	0
383	0	810	1	1237	1	1664	0	2091	1	2518	0
384	0	811	1	1238	1	1665	0	2092	0	2519	1
385	0	812	1	1239	0	1666	1	2093	0	2520	1
386	0	813	0	1240	1	1667	1	2094	1	2521	1
387	0	814	0	1241	1	1668	0	2095	0	2522	0
388	0	815	0	1242	1	1669	0	2096	1	2523	0
389	0	816	1	1243	1	1670	0	2097	1	2524	0
390	1	817	1	1244	1	1671	0	2098	1	2525	1
391	0	818	1	1245	1	1672	0	2099	1	2526	1
392	1	819	1	1246	1	1673	0	2100	0	2527	0
393	1	820	1	1247	1	1674	1	2101	1	2528	0
394	0	821	0	1248	0	1675	0	2102	1	2529	0
395	0	822	0	1249	1	1676	0	2103	0	2530	1
396	0	823	0	1250	0	1677	1	2104	0	2531	0
397	1	824	0	1251	1	1678	1	2105	0	2532	0
398	0	825	0	1252	1	1679	1	2106	1	2533	0
399	1	826	0	1253	1	1680	0	2107	1	2534	0
400	0	827	0	1254	0	1681	0	2108	0	2535	1
401	0	828	1	1255	1	1682	1	2109	1	2536	0
402	0	829	0	1256	1	1683	1	2110	1	2537	0
403	0	830	1	1257	1	1684	1	2111	1	2538	0
404	0	831	1	1258	0	1685	1	2112	1	2539	1
405	0	832	1	1259	0	1686	1	2113	1	2540	0
406	0	833	0	1260	0	1687	0	2114	0	2541	1
407	1	834	1	1261	0	1688	1	2115	1	2542	1
408	1	835	0	1262	0	1689	1	2116	0	2543	1
409	1	836	0	1263	0	1690	0	2117	1	2544	1
410	1	837	0	1264	1	1691	1	2118	0	2545	1
411	0	838	0	1265	1	1692	1	2119	1	2546	1
412	0	839	1	1266	0	1693	1	2120	1	2547	1
413	1	840	0	1267	0	1694	0	2121	0	2548	1
414	0	841	0	1268	0	1695	1	2122	1	2549	0
415	1	842	1	1269	0	1696	1	2123	1	2550	1
416	1	843	1	1270	1	1697	0	2124	0	2551	0
417	0	844	1	1271	0	1698	1	2125	0	2552	0
418	1	845	1	1272	0	1699	1	2126	0	2553	0
419	1	846	1	1273	1	1700	1	2127	1	2554	0
420	0	847	0	1274	1	1701	1	2128	0	2555	1
421	1	848	0	1275	1	1702	1	2129	0	2556	1
422	1	849	1	1276	1	1703	0	2130	1	2557	1

423	1	850	0	1277	1	1704	0	2131	1		
424	1	851	1	1278	0	1705	1	2132	1		
425	0	852	0	1279	1	1706	1	2133	0		
426	1	853	1	1280	1	1707	0	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