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

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Abstract. The continued fraction conjecture claims that the continued fraction defined by the (a,b)-Thue-Morse sequence is algebraic over $\mathbb{F}_2(x)$ for all pairs of distinct elements (a,b) in $\mathbb{F}_2[x]\setminus\mathbb{F}_2$. In this paper we prove the conjecture for $(a,b)=(z,z^6+z^4+z^2+z)$.

1. Introduction

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

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

as the limit of the finite continued fractions

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

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

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

admits a continued fraction expansion of form (1.1).

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

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

that we shall denote

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

Date: 9/04/2020 19:31:00 .

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

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

* This paper was automatically generated from a computer program developed by the authors, with 57.0 minutes CPU time used.

Theorem 1.1. *When $(a, b) = (z, z^6 + z^4 + z^2 + z)$, 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 $\mathrm{CF}(a, b)$*,*

$$\begin{aligned}
p_0(z) &= z^{18} + z^{15} + z^{11} + z^9 + z^7 + z^6 + z^3 + 1,\\
p_1(z) &= z^{21} + z^{19} + z^{16} + z^{13} + z^{12} + z^{10} + z^8 + z^7 + z^5 + z^4,\\
p_2(z) &= z^{22} + z^{20} + z^{14} + z^{12} + z^{10} + z^4,\\
p_3(z) &= z^{21} + z^{19} + z^{16} + z^{13} + z^{12} + z^{10} + z^8 + z^7 + z^5 + z^4,\\
p_4(z) &= z^{20} + z^{15} + z^{12} + z^{11} + z^9 + z^7 + z^4 + z^3 + 1,
\end{aligned}$$

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

$$\begin{aligned}
p_0(z) &= z^{15} + z^{11} + z^{10} + z^9 + z^7 + z^6 + z^3 + z^2 + 1,\\
p_1(z) &= z^{21} + z^{19} + z^{16} + z^{13} + z^{12} + z^{10} + z^8 + z^7 + z^5 + z^4,\\
p_2(z) &= z^{22} + z^{20} + z^{14} + z^{12} + z^{10} + z^4,\\
p_3(z) &= z^{21} + z^{19} + z^{16} + z^{13} + z^{12} + z^{10} + z^8 + z^7 + z^5 + z^4,\\
p_4(z) &= z^{20} + z^{18} + z^{15} + z^{12} + z^{11} + z^{10} + z^9 + z^7 + z^4 + z^3 + z^2 + 1.
\end{aligned}$$

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

$$\begin{aligned}
M_n(x) = x^{\deg(t_{2^n-1})} &\begin{pmatrix} t_{2^n-1}(1/x) & 1 \\ 1 & 0 \end{pmatrix} \times x^{\deg(t_{2^n-2})} \begin{pmatrix} t_{2^n-2}(1/x) & 1 \\ 1 & 0 \end{pmatrix} \times \\
&\cdots \times x^{\deg(t_0)} \begin{pmatrix} t_0(1/x) & 1 \\ 1 & 0 \end{pmatrix},\\
W_n(x) = x^{\deg(\bar{t}_{2^n-1})} &\begin{pmatrix} \bar{t}_{2^n-1}(1/x) & 1 \\ 1 & 0 \end{pmatrix} \times x^{\deg(\bar{t}_{2^n-2})} \begin{pmatrix} \bar{t}_{2^n-2}(1/x) & 1 \\ 1 & 0 \end{pmatrix} \times \\
&\cdots \times x^{\deg(\bar{t}_0)} \begin{pmatrix} \bar{t}_0(1/x) & 1 \\ 1 & 0 \end{pmatrix},
\end{aligned}$$

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

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

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

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

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

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

for some positive integer d_n. Hence,

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

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

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

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

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

of the vector

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

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

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

Lemma 2.1. *We have*

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

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

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

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

Proof. We give the proof of the identity

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

the proofs of the others being similar.

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

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

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

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

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

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

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

Define

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

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

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

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

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

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

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

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

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

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

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

which can be rewritten as

$$0 = T[[w]_2] + T[[1w]_2] + T[[10w]_2] + T[[11w]_2] + T[[111w]_2], \tag{2.7}$$

$$0 = T[[1w]_2] + T[[10w]_2] + T[[11w]_2] + T[[100w]_2] + T[[1000w]_2], \tag{2.8}$$

$$\begin{aligned} 0 &= T[[w]_2] + T[[10w]_2] + T[[11w]_2] + T[[100w]_2] + T[[101w]_2] \\ &\quad + T[[1001w]_2], \end{aligned} \tag{2.9}$$

$$\begin{aligned} 0 &= T[[w]_2] + T[[1w]_2] + T[[11w]_2] + T[[100w]_2] + T[[101w]_2] \\ &\quad + T[[110w]_2] + T[[1010w]_2], \end{aligned} \tag{2.10}$$

$$0 = T[[11w]_2] + T[[100w]_2] + T[[101w]_2] + T[[110w]_2] + T[[1011w]_2], \tag{2.11}$$

$$\begin{aligned} 0 &= T[[1w]_2] + T[[10w]_2] + T[[11w]_2] + T[[100w]_2] + T[[101w]_2] \\ &\quad + T[[110w]_2] + T[[1100w]_2], \end{aligned} \tag{2.12}$$

$$0 = T[[1w]_2] + T[[100w]_2] + T[[101w]_2] + T[[110w]_2] + T[[1101w]_2], \tag{2.13}$$

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

$$0 = T[[w]_2] + T[[1w]_2] + T[[10w]_2] + T[[11w]_2] + T[[111w]_2], \tag{2.14}$$

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

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

$$\begin{aligned} 0 &= T[[w]_2] + T[[1w]_2] + T[[11w]_2] + T[[100w]_2] + T[[101w]_2] \\ &\quad + T[[110w]_2] + T[[1010w]_2], \end{aligned} \tag{2.17}$$

$$0 = T[[11w]_2] + T[[100w]_2] + T[[101w]_2] + T[[110w]_2] + T[[1011w]_2], \tag{2.18}$$

$$\begin{aligned} 0 &= T[[1w]_2] + T[[10w]_2] + T[[11w]_2] + T[[100w]_2] + T[[101w]_2] \\ &\quad + T[[110w]_2] + T[[1100w]_2], \end{aligned} \tag{2.19}$$

$$0 = T[[1w]_2] + T[[100w]_2] + T[[101w]_2] + T[[110w]_2] + T[[1101w]_2], \tag{2.20}$$

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

First we calculate an 2-automaton that generates T from its minimal polynomial and its first terms. This automaton has 2802 states; its transition function and output function can be found in the annex. Let $A(s, w)$ denote the state reached after reading w from right to left starting from the state s, and τ the output function. Define

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

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

$$0 = \tau(A(s, \epsilon)) + \tau(A(s, 1)) + \tau(A(s, 10)) + \tau(A(s, 11)) + \tau(A(s, 111)), \tag{2.21}$$

$$0 = \tau(A(s, 1)) + \tau(A(s, 10)) + \tau(A(s, 11)) + \tau(A(s, 100))$$

$$+ \tau(A(s,1000)), \tag{2.22}$$

$$\begin{aligned} 0 = &\tau(A(s,\epsilon)) + \tau(A(s,10)) + \tau(A(s,11)) + \tau(A(s,100)) \\ &+ \tau(A(s,101)) + \tau(A(s,1001)), \end{aligned} \tag{2.23}$$

$$\begin{aligned} 0 = &\tau(A(s,\epsilon)) + \tau(A(s,1)) + \tau(A(s,11)) + \tau(A(s,100)) \\ &+ \tau(A(s,101)) + \tau(A(s,110)) + \tau(A(s,1010)), \end{aligned} \tag{2.24}$$

$$\begin{aligned} 0 = &\tau(A(s,11)) + \tau(A(s,100)) + \tau(A(s,101)) + \tau(A(s,110)) \\ &+ \tau(A(s,1011)), \end{aligned} \tag{2.25}$$

$$\begin{aligned} 0 = &\tau(A(s,1)) + \tau(A(s,10)) + \tau(A(s,11)) + \tau(A(s,100)) \\ &+ \tau(A(s,101)) + \tau(A(s,110)) + \tau(A(s,1100)), \end{aligned} \tag{2.26}$$

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

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

$$0 = \tau(A(s,\epsilon)) + \tau(A(s,1)) + \tau(A(s,10)) + \tau(A(s,11)) + \tau(A(s,111)), \tag{2.28}$$

$$\begin{aligned} 0 = &\tau(A(s,1)) + \tau(A(s,10)) + \tau(A(s,11)) + \tau(A(s,100)) \\ &+ \tau(A(s,1000)), \end{aligned} \tag{2.29}$$

$$\begin{aligned} 0 = &\tau(A(s,\epsilon)) + \tau(A(s,10)) + \tau(A(s,11)) + \tau(A(s,100)) \\ &+ \tau(A(s,101)) + \tau(A(s,1001)), \end{aligned} \tag{2.30}$$

$$\begin{aligned} 0 = &\tau(A(s,\epsilon)) + \tau(A(s,1)) + \tau(A(s,11)) + \tau(A(s,100)) \\ &+ \tau(A(s,101)) + \tau(A(s,110)) + \tau(A(s,1010)), \end{aligned} \tag{2.31}$$

$$\begin{aligned} 0 = &\tau(A(s,11)) + \tau(A(s,100)) + \tau(A(s,101)) + \tau(A(s,110)) \\ &+ \tau(A(s,1011)), \end{aligned} \tag{2.32}$$

$$\begin{aligned} 0 = &\tau(A(s,1)) + \tau(A(s,10)) + \tau(A(s,11)) + \tau(A(s,100)) \\ &+ \tau(A(s,101)) + \tau(A(s,110)) + \tau(A(s,1100)), \end{aligned} \tag{2.33}$$

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

for $s = A(i, 0^{2k})$. We find that $(A(i, 0^{32}), E_{32}) = (A(i, 0^{20}), E_{20})$, so that we only have to verify that identities (2.21) through (2.34) hold for $2 \le k \le 16$, 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 $u = 2^{2k-1}$,*

$$M_{2k} = M^e[:7u] + x^{4u} M^e[:3u] + x^{5u} M^e[:2u] + x^{6u} M^e[:u] + x^{7u} R^e,$$
$$W_{2k} = W^e[:7u] + x^{4u} W^e[:3u] + x^{5u} W^e[:2u] + x^{6u} W^e[:u] + x^{7u} R^e.$$

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

$$M_{2k+1} = M^o[:7u] + x^{4u} M^o[:3u] + x^{5u} M^o[:2u] + x^{6u} M^o[:u] + x^{7u} R^o,$$
$$W_{2k+1} = W^o[:7u] + x^{4u} W^o[:3u] + x^{5u} W^o[:2u] + x^{6u} W^o[:u] + x^{7u} R^o.$$

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

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

We give the proof of

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

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

$$W_{2k}M_{2k} = \big(W^e[:7v] + x^{4v}W^e[:3v] + x^{5v}W^e[:2v] + x^{6v}W^e[:v] + x^{7u}R^e\big) \times \big(M^e[:7v] + x^{4v}M^e[:3v] + x^{5v}M^e[:2v] + x^{6v}M^e[:v] + x^{7u}R^e\big); \tag{2.35}$$

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

$$W^e[:14v]M^e[:14v] + x^{8v}W^e[:6v]M^e[:6v] + x^{10v}W^e[:4v]M^e[:4v] + x^{12v}W^e[:2v]M^e[:2v].$$

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

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

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

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 $0 \leq j, k \leq 1$,

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

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

$$\begin{aligned}
q_0(x) &= x^{22} + x^{19} + x^{16} + x^{15} + x^{13} + x^{11} + x^7 + x^4,\\
q_1(x) &= x^{18} + x^{17} + x^{15} + x^{14} + x^{12} + x^{10} + x^9 + x^6 + x^3 + x,\\
q_2(x) &= x^{18} + x^{12} + x^{10} + x^8 + x^2 + 1,\\
q_3(x) &= x^{18} + x^{17} + x^{15} + x^{14} + x^{12} + x^{10} + x^9 + x^6 + x^3 + x,\\
q_4(x) &= x^{22} + x^{19} + x^{18} + x^{15} + x^{13} + x^{11} + x^{10} + x^7 + x^2.
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) = {} & x^{132} + x^{126} + x^{124} + x^{120} + x^{118} + x^{116} + x^{112} + x^{106} + x^{104} + x^{102}\\
& + x^{98} + x^{96} + x^{94} + x^{90} + x^{84} + x^{82} + x^{80} + x^{74} + x^{64} + x^{62} + x^{60}\\
& + x^{56} + x^{52} + x^{50} + x^{46} + x^{42} + x^{38} + x^{34} + x^{32} + x^{30} + x^{28} + x^{22}\\
& + x^{12},\\
p_3(x) = {} & x^{116} + x^{114} + x^{110} + x^{106} + x^{104} + x^{100} + x^{86} + x^{82} + x^{78} + x^{76}\\
& + x^{70} + x^{64} + x^{62} + x^{58} + x^{56} + x^{54} + x^{52} + x^{50} + x^{44} + x^{40} + x^{36}\\
& + x^{32} + x^{30} + x^{28} + x^{24} + x^8,\\
p_6(x) = {} & x^{114} + x^{110} + x^{108} + x^{100} + x^{98} + x^{96} + x^{90} + x^{84} + x^{80} + x^{78} + x^{74}\\
& + x^{72} + x^{70} + x^{66} + x^{64} + x^{58} + x^{52} + x^{50} + x^{48} + x^{46} + x^{44} + x^{40}\\
& + x^{36} + x^{34} + x^{30} + x^{22} + x^{18} + x^{14} + x^{10} + x^4 + x^2 + 1,\\
p_9(x) = {} & x^{106} + x^{104} + x^{102} + x^{100} + x^{96} + x^{90} + x^{84} + x^{82} + x^{70} + x^{68} + x^{62}\\
& + x^{58} + x^{54} + x^{48} + x^{46} + x^{30} + x^{28} + x^{26} + x^{24} + x^{20} + x^{18} + x^{16}
\end{aligned}$$

$$
\begin{aligned}
&+ x^{14} + x^{10} + x^{8} + x^{6} + x^{4} + x^{2},\\
p_{12}(x) &= x^{104} + x^{96} + x^{88} + x^{72} + x^{64} + x^{56} + x^{48} + x^{40} + x^{32} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{117} + x^{116} + x^{114} + x^{112} + x^{110} + x^{107} + x^{104} + x^{103} + x^{101} + x^{99}\\
&+ x^{94} + x^{92} + x^{91} + x^{90} + x^{89} + x^{85} + x^{84} + x^{83} + x^{82} + x^{81} + x^{79}\\
&+ x^{77} + x^{76} + x^{75} + x^{74} + x^{71} + x^{70} + x^{69} + x^{67} + x^{66} + x^{64} + x^{62}\\
&+ x^{61} + x^{60} + x^{59} + x^{58} + x^{56} + x^{54} + x^{53} + x^{52} + x^{48} + x^{47} + x^{46}\\
&+ x^{45} + x^{43} + x^{39} + x^{37} + x^{36} + x^{32} + x^{31} + x^{27} + x^{26} + x^{25} + x^{24}\\
&+ x^{23} + x^{22} + x^{21} + x^{20} + x^{18},\\
p_3(x) &= x^{95} + x^{93} + x^{91} + x^{89} + x^{87} + x^{83} + x^{79} + x^{77} + x^{71} + x^{65} + x^{63}\\
&+ x^{61} + x^{59} + x^{57} + x^{53} + x^{49} + x^{47} + x^{41} + x^{39} + x^{37} + x^{35} + x^{33}\\
&+ x^{31} + x^{27} + x^{23} + x^{21} + x^{15} + x^{9},\\
p_6(x) &= x^{93} + x^{92} + x^{91} + x^{87} + x^{85} + x^{81} + x^{78} + x^{76} + x^{71} + x^{70} + x^{69}\\
&+ x^{67} + x^{66} + x^{65} + x^{64} + x^{61} + x^{59} + x^{57} + x^{56} + x^{55} + x^{54} + x^{53}\\
&+ x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{47} + x^{46} + x^{45} + x^{44} + x^{43} + x^{42}\\
&+ x^{38} + x^{35} + x^{34} + x^{33} + x^{31} + x^{30} + x^{29} + x^{28} + x^{24} + x^{21} + x^{20}\\
&+ x^{18} + x^{16} + x^{15} + x^{14} + x^{12} + x^{11} + x^{8} + x^{6},\\
p_9(x) &= x^{91} + x^{85} + x^{81} + x^{75} + x^{71} + x^{67} + x^{65} + x^{63} + x^{55} + x^{53} + x^{51}\\
&+ x^{47} + x^{43} + x^{37} + x^{35} + x^{33} + x^{31} + x^{29} + x^{27} + x^{23} + x^{21} + x^{17}\\
&+ x^{15} + x^{9} + x^{7} + x^{3},\\
p_{12}(x) &= x^{89} + x^{88} + x^{86} + x^{85} + x^{82} + x^{80} + x^{77} + x^{76} + x^{74} + x^{73} + x^{70}\\
&+ x^{68} + x^{61} + x^{60} + x^{58} + x^{57} + x^{54} + x^{52} + x^{45} + x^{44} + x^{42} + x^{41}\\
&+ x^{38} + x^{36} + x^{29} + x^{28} + x^{26} + x^{25} + x^{22} + x^{20} + x^{13} + x^{12} + x^{10}\\
&+ x^{8} + x^{5} + x^{4} + x^{2} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{117} + x^{116} + x^{114} + x^{112} + x^{110} + x^{107} + x^{104} + x^{103} + x^{101} + x^{99}\\
&+ x^{94} + x^{92} + x^{91} + x^{90} + x^{89} + x^{85} + x^{84} + x^{83} + x^{82} + x^{81} + x^{79}\\
&+ x^{77} + x^{76} + x^{75} + x^{74} + x^{71} + x^{70} + x^{69} + x^{67} + x^{66} + x^{64} + x^{62}\\
&+ x^{61} + x^{60} + x^{59} + x^{58} + x^{56} + x^{54} + x^{53} + x^{52} + x^{48} + x^{47} + x^{46}\\
&+ x^{45} + x^{43} + x^{39} + x^{37} + x^{36} + x^{32} + x^{31} + x^{27} + x^{26} + x^{25} + x^{24}\\
&+ x^{23} + x^{22} + x^{21} + x^{20} + x^{18},\\
p_3(x) &= x^{95} + x^{93} + x^{91} + x^{89} + x^{87} + x^{83} + x^{79} + x^{77} + x^{71} + x^{65} + x^{63}\\
&+ x^{61} + x^{59} + x^{57} + x^{53} + x^{49} + x^{47} + x^{41} + x^{39} + x^{37} + x^{35} + x^{33}
\end{aligned}
$$

$$\begin{aligned}
&+ x^{31} + x^{27} + x^{23} + x^{21} + x^{15} + x^{9},\\
p_6(x) &= x^{93} + x^{92} + x^{91} + x^{87} + x^{85} + x^{81} + x^{78} + x^{76} + x^{71} + x^{70} + x^{69}\\
&+ x^{67} + x^{66} + x^{65} + x^{64} + x^{61} + x^{59} + x^{57} + x^{56} + x^{55} + x^{54} + x^{53}\\
&+ x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{47} + x^{46} + x^{45} + x^{44} + x^{43} + x^{42}\\
&+ x^{38} + x^{35} + x^{34} + x^{33} + x^{31} + x^{30} + x^{29} + x^{28} + x^{24} + x^{21} + x^{20}\\
&+ x^{18} + x^{16} + x^{15} + x^{14} + x^{12} + x^{11} + x^{8} + x^{6},\\
p_9(x) &= x^{91} + x^{85} + x^{81} + x^{75} + x^{71} + x^{67} + x^{65} + x^{63} + x^{55} + x^{53} + x^{51}\\
&+ x^{47} + x^{43} + x^{37} + x^{35} + x^{33} + x^{31} + x^{29} + x^{27} + x^{23} + x^{21} + x^{17}\\
&+ x^{15} + x^{9} + x^{7} + x^{3},\\
p_{12}(x) &= x^{89} + x^{88} + x^{86} + x^{85} + x^{82} + x^{80} + x^{77} + x^{76} + x^{74} + x^{73} + x^{70}\\
&+ x^{68} + x^{61} + x^{60} + x^{58} + x^{57} + x^{54} + x^{52} + x^{45} + x^{44} + x^{42} + x^{41}\\
&+ x^{38} + x^{36} + x^{29} + x^{28} + x^{26} + x^{25} + x^{22} + x^{20} + x^{13} + x^{12} + x^{10}\\
&+ x^{8} + x^{5} + x^{4} + x^{2} + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{102} + x^{100} + x^{90} + x^{88} + x^{78} + x^{74} + x^{68} + x^{66} + x^{58} + x^{56} + x^{52}\\
&+ x^{48} + x^{42} + x^{40} + x^{36} + x^{32} + x^{30} + x^{28} + x^{24},\\
p_3(x) &= x^{86} + x^{82} + x^{74} + x^{72} + x^{70} + x^{66} + x^{64} + x^{62} + x^{60} + x^{58} + x^{50}\\
&+ x^{46} + x^{44} + x^{40} + x^{38} + x^{36} + x^{28} + x^{16} + x^{14} + x^{12} + x^{8} + x^{6},\\
p_6(x) &= x^{84} + x^{82} + x^{80} + x^{78} + x^{76} + x^{70} + x^{66} + x^{64} + x^{60} + x^{58} + x^{52}\\
&+ x^{46} + x^{42} + x^{36} + x^{34} + x^{24} + x^{22} + x^{20} + x^{14} + x^{12} + x^{10} + x^{4}\\
&+ x^{2} + 1,\\
p_9(x) &= x^{76} + x^{70} + x^{68} + x^{66} + x^{64} + x^{52} + x^{48} + x^{44} + x^{40} + x^{36} + x^{34}\\
&+ x^{32} + x^{30} + x^{28} + x^{18} + x^{16} + x^{12} + x^{10} + x^{4} + x^{2},\\
p_{12}(x) &= x^{74} + x^{72} + x^{68} + x^{64} + x^{58} + x^{56} + x^{52} + x^{48} + x^{42} + x^{40} + x^{36}\\
&+ x^{32} + x^{26} + x^{24} + x^{20} + x^{16} + x^{10} + x^{8} + x^{4} + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{102} + x^{100} + x^{98} + x^{96} + x^{92} + x^{82} + x^{80} + x^{76} + x^{74} + x^{72} + x^{66}\\
&+ x^{64} + x^{58} + x^{56} + x^{52} + x^{44} + x^{42} + x^{32} + x^{24} + x^{20} + x^{12},\\
p_3(x) &= x^{86} + x^{74} + x^{72} + x^{70} + x^{66} + x^{64} + x^{62} + x^{60} + x^{58} + x^{54} + x^{50}\\
&+ x^{46} + x^{44} + x^{40} + x^{36} + x^{34} + x^{30} + x^{28} + x^{26} + x^{22} + x^{18} + x^{16}\\
&+ x^{14} + x^{12} + x^{10} + x^{8},\\
p_6(x) &= x^{84} + x^{82} + x^{76} + x^{64} + x^{60} + x^{54} + x^{50} + x^{42} + x^{38} + x^{34} + x^{32}\\
&+ x^{30} + x^{28} + x^{26} + x^{22} + x^{18} + x^{16} + x^{12} + x^{8} + x^{6} + x^{2} + 1,
\end{aligned}$$

$$
\begin{aligned}
p_9(x) &= x^{76} + x^{70} + x^{68} + x^{66} + x^{64} + x^{52} + x^{48} + x^{44} + x^{40} + x^{36} + x^{34} \\
&\quad + x^{32} + x^{30} + x^{28} + x^{18} + x^{16} + x^{12} + x^{10} + x^4 + x^2, \\
p_{12}(x) &= x^{74} + x^{72} + x^{68} + x^{64} + x^{58} + x^{56} + x^{52} + x^{48} + x^{42} + x^{40} + x^{36} \\
&\quad + x^{32} + x^{26} + x^{24} + x^{20} + x^{16} + x^{10} + x^8 + x^4 + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{117} + x^{116} + x^{114} + x^{113} + x^{111} + x^{110} + x^{109} + x^{108} + x^{106} + x^{105} \\
&\quad + x^{100} + x^{98} + x^{97} + x^{96} + x^{91} + x^{90} + x^{89} + x^{88} + x^{87} + x^{86} + x^{85} \\
&\quad + x^{83} + x^{81} + x^{78} + x^{77} + x^{76} + x^{72} + x^{70} + x^{69} + x^{66} + x^{64} + x^{63} \\
&\quad + x^{62} + x^{61} + x^{59} + x^{58} + x^{56} + x^{55} + x^{50} + x^{49} + x^{48} + x^{47} + x^{46} \\
&\quad + x^{42} + x^{40} + x^{38} + x^{35} + x^{32} + x^{27}, \\
p_3(x) &= x^{95} + x^{93} + x^{91} + x^{89} + x^{87} + x^{83} + x^{79} + x^{77} + x^{71} + x^{65} + x^{63} \\
&\quad + x^{61} + x^{59} + x^{57} + x^{53} + x^{49} + x^{47} + x^{41} + x^{39} + x^{37} + x^{35} + x^{33} \\
&\quad + x^{31} + x^{27} + x^{23} + x^{21} + x^{15} + x^9, \\
p_6(x) &= x^{93} + x^{92} + x^{91} + x^{87} + x^{85} + x^{81} + x^{78} + x^{76} + x^{71} + x^{70} + x^{69} \\
&\quad + x^{67} + x^{66} + x^{65} + x^{64} + x^{61} + x^{59} + x^{57} + x^{56} + x^{55} + x^{54} + x^{53} \\
&\quad + x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{47} + x^{46} + x^{45} + x^{44} + x^{43} + x^{42} \\
&\quad + x^{38} + x^{35} + x^{34} + x^{33} + x^{31} + x^{30} + x^{29} + x^{28} + x^{24} + x^{21} + x^{20} \\
&\quad + x^{18} + x^{16} + x^{15} + x^{14} + x^{12} + x^{11} + x^8 + x^6, \\
p_9(x) &= x^{91} + x^{85} + x^{81} + x^{75} + x^{71} + x^{67} + x^{65} + x^{63} + x^{55} + x^{53} + x^{51} \\
&\quad + x^{47} + x^{43} + x^{37} + x^{35} + x^{33} + x^{31} + x^{29} + x^{27} + x^{23} + x^{21} + x^{17} \\
&\quad + x^{15} + x^9 + x^7 + x^3, \\
p_{12}(x) &= x^{89} + x^{88} + x^{86} + x^{85} + x^{82} + x^{80} + x^{77} + x^{76} + x^{74} + x^{73} + x^{70} \\
&\quad + x^{68} + x^{61} + x^{60} + x^{58} + x^{57} + x^{54} + x^{52} + x^{45} + x^{44} + x^{42} + x^{41} \\
&\quad + x^{38} + x^{36} + x^{29} + x^{28} + x^{26} + x^{25} + x^{22} + x^{20} + x^{13} + x^{12} + x^{10} \\
&\quad + x^8 + x^5 + x^4 + x^2 + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{117} + x^{116} + x^{114} + x^{113} + x^{111} + x^{110} + x^{109} + x^{108} + x^{106} + x^{105} \\
&\quad + x^{100} + x^{98} + x^{97} + x^{96} + x^{91} + x^{90} + x^{89} + x^{88} + x^{87} + x^{86} + x^{85} \\
&\quad + x^{83} + x^{81} + x^{78} + x^{77} + x^{76} + x^{72} + x^{70} + x^{69} + x^{66} + x^{64} + x^{63} \\
&\quad + x^{62} + x^{61} + x^{59} + x^{58} + x^{56} + x^{55} + x^{50} + x^{49} + x^{48} + x^{47} + x^{46} \\
&\quad + x^{42} + x^{40} + x^{38} + x^{35} + x^{32} + x^{27}, \\
p_3(x) &= x^{95} + x^{93} + x^{91} + x^{89} + x^{87} + x^{83} + x^{79} + x^{77} + x^{71} + x^{65} + x^{63} \\
&\quad + x^{61} + x^{59} + x^{57} + x^{53} + x^{49} + x^{47} + x^{41} + x^{39} + x^{37} + x^{35} + x^{33}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{31} + x^{27} + x^{23} + x^{21} + x^{15} + x^{9},\\
p_6(x) &= x^{93} + x^{92} + x^{91} + x^{87} + x^{85} + x^{81} + x^{78} + x^{76} + x^{71} + x^{70} + x^{69}\\
&\quad + x^{67} + x^{66} + x^{65} + x^{64} + x^{61} + x^{59} + x^{57} + x^{56} + x^{55} + x^{54} + x^{53}\\
&\quad + x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{47} + x^{46} + x^{45} + x^{44} + x^{43} + x^{42}\\
&\quad + x^{38} + x^{35} + x^{34} + x^{33} + x^{31} + x^{30} + x^{29} + x^{28} + x^{24} + x^{21} + x^{20}\\
&\quad + x^{18} + x^{16} + x^{15} + x^{14} + x^{12} + x^{11} + x^{8} + x^{6},\\
p_9(x) &= x^{91} + x^{85} + x^{81} + x^{75} + x^{71} + x^{67} + x^{65} + x^{63} + x^{55} + x^{53} + x^{51}\\
&\quad + x^{47} + x^{43} + x^{37} + x^{35} + x^{33} + x^{31} + x^{29} + x^{27} + x^{23} + x^{21} + x^{17}\\
&\quad + x^{15} + x^{9} + x^{7} + x^{3},\\
p_{12}(x) &= x^{89} + x^{88} + x^{86} + x^{85} + x^{82} + x^{80} + x^{77} + x^{76} + x^{74} + x^{73} + x^{70}\\
&\quad + x^{68} + x^{61} + x^{60} + x^{58} + x^{57} + x^{54} + x^{52} + x^{45} + x^{44} + x^{42} + x^{41}\\
&\quad + x^{38} + x^{36} + x^{29} + x^{28} + x^{26} + x^{25} + x^{22} + x^{20} + x^{13} + x^{12} + x^{10}\\
&\quad + x^{8} + x^{5} + x^{4} + x^{2} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{132} + x^{128} + x^{126} + x^{124} + x^{120} + x^{116} + x^{104} + x^{92} + x^{88} + x^{86}\\
&\quad + x^{84} + x^{82} + x^{80} + x^{78} + x^{66} + x^{62} + x^{60} + x^{54} + x^{52} + x^{50} + x^{42},\\
p_3(x) &= x^{116} + x^{114} + x^{112} + x^{108} + x^{106} + x^{104} + x^{94} + x^{92} + x^{84} + x^{82}\\
&\quad + x^{80} + x^{78} + x^{76} + x^{72} + x^{70} + x^{68} + x^{58} + x^{54} + x^{50} + x^{36} + x^{32}\\
&\quad + x^{28} + x^{22} + x^{20} + x^{16} + x^{14} + x^{8} + x^{6},\\
p_6(x) &= x^{114} + x^{108} + x^{104} + x^{98} + x^{94} + x^{90} + x^{88} + x^{86} + x^{84} + x^{78} + x^{74}\\
&\quad + x^{72} + x^{70} + x^{68} + x^{66} + x^{62} + x^{60} + x^{58} + x^{50} + x^{46} + x^{36} + x^{34}\\
&\quad + x^{28} + x^{18} + x^{16} + x^{12} + x^{10} + x^{6} + x^{2} + 1,\\
p_9(x) &= x^{106} + x^{104} + x^{102} + x^{100} + x^{96} + x^{90} + x^{84} + x^{82} + x^{70} + x^{68} + x^{62}\\
&\quad + x^{58} + x^{54} + x^{48} + x^{46} + x^{30} + x^{28} + x^{26} + x^{24} + x^{20} + x^{18} + x^{16}\\
&\quad + x^{14} + x^{10} + x^{8} + x^{6} + x^{4} + x^{2},\\
p_{12}(x) &= x^{104} + x^{96} + x^{88} + x^{72} + x^{64} + x^{56} + x^{48} + x^{40} + x^{32} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{117} + x^{116} + x^{115} + x^{112} + x^{111} + x^{110} + x^{104} + x^{103} + x^{101} + x^{100}\\
&\quad + x^{99} + x^{97} + x^{94} + x^{93} + x^{92} + x^{83} + x^{80} + x^{78} + x^{77} + x^{76} + x^{75}\\
&\quad + x^{74} + x^{73} + x^{72} + x^{71} + x^{70} + x^{68} + x^{62} + x^{61} + x^{59} + x^{57} + x^{55}\\
&\quad + x^{54} + x^{51} + x^{50} + x^{49} + x^{48} + x^{47} + x^{44} + x^{42} + x^{40} + x^{35} + x^{30}\\
&\quad + x^{29} + x^{27} + x^{24} + x^{20} + x^{18} + x^{17} + x^{16} + x^{12},\\
p_3(x) &= x^{101} + x^{100} + x^{99} + x^{97} + x^{95} + x^{92} + x^{91} + x^{90} + x^{87} + x^{83} + x^{81}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{80} + x^{78} + x^{77} + x^{74} + x^{71} + x^{70} + x^{68} + x^{65} + x^{63} + x^{62} + x^{60} \\
&+ x^{59} + x^{58} + x^{57} + x^{55} + x^{51} + x^{50} + x^{47} + x^{45} + x^{43} + x^{41} + x^{38} \\
&+ x^{34} + x^{32} + x^{31} + x^{30} + x^{29} + x^{28} + x^{25} + x^{24} + x^{23} + x^{22} + x^{18} \\
&+ x^{16} + x^{13} + x^{12} + x^{8}, \\
p_6(x) = {}& x^{97} + x^{96} + x^{95} + x^{92} + x^{85} + x^{84} + x^{80} + x^{77} + x^{76} + x^{72} + x^{71} \\
&+ x^{70} + x^{68} + x^{67} + x^{66} + x^{65} + x^{64} + x^{63} + x^{62} + x^{60} + x^{59} + x^{58} \\
&+ x^{57} + x^{55} + x^{53} + x^{52} + x^{49} + x^{48} + x^{46} + x^{45} + x^{38} + x^{34} + x^{32} \\
&+ x^{31} + x^{29} + x^{27} + x^{25} + x^{24} + x^{23} + x^{21} + x^{19} + x^{16} + x^{14} + x^{12} \\
&+ x^{10} + x^{9} + x^{8} + x^{5} + x^{2} + 1, \\
p_9(x) = {}& x^{89} + x^{88} + x^{86} + x^{84} + x^{81} + x^{80} + x^{78} + x^{76} + x^{65} + x^{64} + x^{62} \\
&+ x^{60} + x^{49} + x^{48} + x^{46} + x^{44} + x^{33} + x^{32} + x^{30} + x^{28} + x^{17} + x^{16} \\
&+ x^{14} + x^{12} + x^{9} + x^{8} + x^{6} + x^{4}, \\
p_{12}(x) = {}& x^{85} + x^{84} + x^{82} + x^{81} + x^{78} + x^{77} + x^{74} + x^{73} + x^{70} + x^{68} + x^{65} \\
&+ x^{64} + x^{62} + x^{61} + x^{58} + x^{57} + x^{54} + x^{52} + x^{49} + x^{48} + x^{46} + x^{45} \\
&+ x^{42} + x^{41} + x^{38} + x^{36} + x^{33} + x^{32} + x^{30} + x^{29} + x^{26} + x^{25} + x^{22} \\
&+ x^{20} + x^{17} + x^{16} + x^{14} + x^{13} + x^{10} + x^{9} + x^{6} + x^{5} + x^{2} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) = {}& x^{112} + x^{110} + x^{108} + x^{107} + x^{105} + x^{100} + x^{99} + x^{97} + x^{96} + x^{93} \\
&+ x^{92} + x^{84} + x^{82} + x^{74} + x^{72} + x^{69} + x^{68} + x^{67} + x^{66} + x^{64} + x^{58} \\
&+ x^{57} + x^{55} + x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{47} + x^{46} + x^{45} + x^{44} \\
&+ x^{41} + x^{39} + x^{38} + x^{37} + x^{35} + x^{33} + x^{32} + x^{31} + x^{22} + x^{21} + x^{20} \\
&+ x^{18}, \\
p_3(x) = {}& x^{92} + x^{91} + x^{89} + x^{87} + x^{80} + x^{79} + x^{78} + x^{76} + x^{75} + x^{72} + x^{70} \\
&+ x^{65} + x^{60} + x^{59} + x^{57} + x^{55} + x^{52} + x^{51} + x^{49} + x^{48} + x^{46} + x^{41} \\
&+ x^{36} + x^{35} + x^{33} + x^{31} + x^{24} + x^{23} + x^{22} + x^{20} + x^{19} + x^{16} + x^{14} \\
&+ x^{9}, \\
p_6(x) = {}& x^{88} + x^{86} + x^{82} + x^{80} + x^{76} + x^{66} + x^{64} + x^{62} + x^{60} + x^{56} + x^{54} \\
&+ x^{52} + x^{50} + x^{48} + x^{46} + x^{44} + x^{42} + x^{40} + x^{38} + x^{30} + x^{28} + x^{26} \\
&+ x^{24} + x^{16} + x^{10} + x^{6}, \\
p_9(x) = {}& x^{84} + x^{83} + x^{82} + x^{78} + x^{75} + x^{74} + x^{72} + x^{68} + x^{66} + x^{62} + x^{59} \\
&+ x^{58} + x^{56} + x^{52} + x^{50} + x^{46} + x^{43} + x^{42} + x^{40} + x^{36} + x^{34} + x^{30} \\
&+ x^{27} + x^{26} + x^{24} + x^{20} + x^{18} + x^{14} + x^{11} + x^{10} + x^{8} + x^{3}, \\
p_{12}(x) = {}& x^{80} + x^{76} + x^{72} + x^{68} + x^{60} + x^{56} + x^{52} + x^{44} + x^{40} + x^{36} + x^{28} \\
&+ x^{24} + x^{20} + x^{12} + x^{8} + x^{4} + 1,
\end{aligned}
$$

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

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

$$\begin{aligned}
p_0(x) &= x^{132} + x^{130} + x^{127} + x^{125} + x^{123} + x^{122} + x^{121} + x^{119} + x^{118} + x^{117} \\
&\quad + x^{115} + x^{114} + x^{112} + x^{111} + x^{110} + x^{106} + x^{105} + x^{103} + x^{101} \\
&\quad + x^{99} + x^{96} + x^{95} + x^{92} + x^{90} + x^{87} + x^{86} + x^{85} + x^{83} + x^{81} + x^{80} \\
&\quad + x^{73} + x^{70} + x^{68} + x^{65} + x^{63} + x^{59} + x^{58} + x^{57} + x^{56} + x^{55} + x^{52} \\
&\quad + x^{51} + x^{49} + x^{48} + x^{44} + x^{42} + x^{40} + x^{37} + x^{36} + x^{35} + x^{33} + x^{31} \\
&\quad + x^{27}, \\
p_3(x) &= x^{112} + x^{111} + x^{109} + x^{108} + x^{105} + x^{103} + x^{98} + x^{97} + x^{95} + x^{94} \\
&\quad + x^{92} + x^{90} + x^{89} + x^{85} + x^{84} + x^{83} + x^{81} + x^{80} + x^{77} + x^{75} + x^{70} \\
&\quad + x^{69} + x^{68} + x^{66} + x^{65} + x^{64} + x^{63} + x^{62} + x^{61} + x^{57} + x^{54} + x^{53} \\
&\quad + x^{51} + x^{49} + x^{48} + x^{47} + x^{46} + x^{42} + x^{39} + x^{38} + x^{36} + x^{34} + x^{33} \\
&\quad + x^{29} + x^{28} + x^{27} + x^{25} + x^{23} + x^{20} + x^{19} + x^{17} + x^{16} + x^{14} + x^{9}, \\
p_6(x) &= x^{108} + x^{106} + x^{104} + x^{100} + x^{98} + x^{96} + x^{94} + x^{92} + x^{90} + x^{82} + x^{80} \\
&\quad + x^{78} + x^{76} + x^{72} + x^{70} + x^{68} + x^{66} + x^{58} + x^{56} + x^{54} + x^{50} + x^{48} \\
&\quad + x^{44} + x^{34} + x^{28} + x^{26} + x^{22} + x^{18} + x^{16} + x^{14} + x^{10} + x^{6}, \\
p_9(x) &= x^{104} + x^{103} + x^{102} + x^{100} + x^{99} + x^{95} + x^{80} + x^{79} + x^{78} + x^{74} + x^{72} \\
&\quad + x^{67} + x^{64} + x^{63} + x^{62} + x^{58} + x^{56} + x^{51} + x^{48} + x^{47} + x^{46} + x^{42} \\
&\quad + x^{40} + x^{35} + x^{32} + x^{31} + x^{30} + x^{26} + x^{23} + x^{22} + x^{20} + x^{16} + x^{14} \\
&\quad + x^{10} + x^{8} + x^{3}, \\
p_{12}(x) &= x^{100} + x^{88} + x^{80} + x^{72} + x^{68} + x^{56} + x^{52} + x^{40} + x^{36} + x^{24} + x^{4} + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{117} + x^{116} + x^{115} + x^{112} + x^{108} + x^{106} + x^{104} + x^{102} + x^{99} + x^{98} \\
&\quad + x^{91} + x^{89} + x^{88} + x^{87} + x^{86} + x^{85} + x^{80} + x^{76} + x^{74} + x^{73} + x^{71} \\
&\quad + x^{69} + x^{67} + x^{66} + x^{64} + x^{63} + x^{60} + x^{59} + x^{53} + x^{52} + x^{50} + x^{48} \\
&\quad + x^{47} + x^{43} + x^{39} + x^{38} + x^{36} + x^{35} + x^{33}, \\
p_3(x) &= x^{101} + x^{100} + x^{99} + x^{97} + x^{94} + x^{91} + x^{89} + x^{88} + x^{87} + x^{86} + x^{85} \\
&\quad + x^{83} + x^{82} + x^{80} + x^{77} + x^{76} + x^{74} + x^{69} + x^{68} + x^{65} + x^{64} + x^{59} \\
&\quad + x^{56} + x^{53} + x^{52} + x^{51} + x^{50} + x^{48} + x^{46} + x^{43} + x^{41} + x^{40} + x^{39} \\
&\quad + x^{36} + x^{33} + x^{31} + x^{28} + x^{26} + x^{24} + x^{23} + x^{20} + x^{18} + x^{16} + x^{15} \\
&\quad + x^{14} + x^{12}, \\
p_6(x) &= x^{97} + x^{96} + x^{95} + x^{92} + x^{91} + x^{90} + x^{88} + x^{87} + x^{84} + x^{77} + x^{76} \\
&\quad + x^{73} + x^{70} + x^{68} + x^{66} + x^{65} + x^{63} + x^{60} + x^{57} + x^{56} + x^{53} + x^{51} \\
&\quad + x^{48} + x^{47} + x^{45} + x^{43} + x^{40} + x^{37} + x^{36} + x^{35} + x^{34} + x^{33} + x^{30}
\end{aligned}$$

$$
\begin{aligned}
&+ x^{28} + x^{27} + x^{25} + x^{23} + x^{20} + x^{19} + x^{18} + x^{15} + x^{13} + x^{12} + x^{11}\\
&+ x^{5} + x^{4} + x^{2} + 1,\\
p_9(x) &= x^{89} + x^{88} + x^{86} + x^{84} + x^{81} + x^{80} + x^{78} + x^{76} + x^{65} + x^{64} + x^{62}\\
&+ x^{60} + x^{49} + x^{48} + x^{46} + x^{44} + x^{33} + x^{32} + x^{30} + x^{28} + x^{17} + x^{16}\\
&+ x^{14} + x^{12} + x^{9} + x^{8} + x^{6} + x^{4},\\
p_{12}(x) &= x^{85} + x^{84} + x^{82} + x^{81} + x^{78} + x^{77} + x^{74} + x^{73} + x^{70} + x^{68} + x^{65}\\
&+ x^{64} + x^{62} + x^{61} + x^{58} + x^{57} + x^{54} + x^{52} + x^{49} + x^{48} + x^{46} + x^{45}\\
&+ x^{42} + x^{41} + x^{38} + x^{36} + x^{33} + x^{32} + x^{30} + x^{29} + x^{26} + x^{25} + x^{22}\\
&+ x^{20} + x^{17} + x^{16} + x^{14} + x^{13} + x^{10} + x^{9} + x^{6} + x^{5} + x^{2} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{117} + x^{116} + x^{115} + x^{112} + x^{111} + x^{110} + x^{104} + x^{103} + x^{101} + x^{100}\\
&+ x^{99} + x^{97} + x^{94} + x^{93} + x^{92} + x^{83} + x^{80} + x^{78} + x^{77} + x^{76} + x^{75}\\
&+ x^{74} + x^{73} + x^{72} + x^{71} + x^{70} + x^{68} + x^{62} + x^{61} + x^{59} + x^{57} + x^{55}\\
&+ x^{54} + x^{51} + x^{50} + x^{49} + x^{48} + x^{47} + x^{44} + x^{42} + x^{40} + x^{35} + x^{30}\\
&+ x^{29} + x^{27} + x^{24} + x^{20} + x^{18} + x^{17} + x^{16} + x^{12},\\
p_3(x) &= x^{101} + x^{100} + x^{99} + x^{97} + x^{95} + x^{92} + x^{91} + x^{90} + x^{87} + x^{83} + x^{81}\\
&+ x^{80} + x^{78} + x^{77} + x^{74} + x^{71} + x^{70} + x^{68} + x^{65} + x^{63} + x^{62} + x^{60}\\
&+ x^{59} + x^{58} + x^{57} + x^{55} + x^{51} + x^{50} + x^{47} + x^{45} + x^{43} + x^{41} + x^{38}\\
&+ x^{34} + x^{32} + x^{31} + x^{30} + x^{29} + x^{28} + x^{25} + x^{24} + x^{23} + x^{22} + x^{18}\\
&+ x^{16} + x^{13} + x^{12} + x^{8},\\
p_6(x) &= x^{97} + x^{96} + x^{95} + x^{92} + x^{85} + x^{84} + x^{80} + x^{77} + x^{76} + x^{72} + x^{71}\\
&+ x^{70} + x^{68} + x^{67} + x^{66} + x^{65} + x^{64} + x^{63} + x^{62} + x^{60} + x^{59} + x^{58}\\
&+ x^{57} + x^{55} + x^{53} + x^{52} + x^{49} + x^{48} + x^{46} + x^{45} + x^{38} + x^{34} + x^{32}\\
&+ x^{31} + x^{29} + x^{27} + x^{25} + x^{24} + x^{23} + x^{21} + x^{19} + x^{16} + x^{14} + x^{12}\\
&+ x^{10} + x^{9} + x^{8} + x^{5} + x^{2} + 1,\\
p_9(x) &= x^{89} + x^{88} + x^{86} + x^{84} + x^{81} + x^{80} + x^{78} + x^{76} + x^{65} + x^{64} + x^{62}\\
&+ x^{60} + x^{49} + x^{48} + x^{46} + x^{44} + x^{33} + x^{32} + x^{30} + x^{28} + x^{17} + x^{16}\\
&+ x^{14} + x^{12} + x^{9} + x^{8} + x^{6} + x^{4},\\
p_{12}(x) &= x^{85} + x^{84} + x^{82} + x^{81} + x^{78} + x^{77} + x^{74} + x^{73} + x^{70} + x^{68} + x^{65}\\
&+ x^{64} + x^{62} + x^{61} + x^{58} + x^{57} + x^{54} + x^{52} + x^{49} + x^{48} + x^{46} + x^{45}\\
&+ x^{42} + x^{41} + x^{38} + x^{36} + x^{33} + x^{32} + x^{30} + x^{29} + x^{26} + x^{25} + x^{22}\\
&+ x^{20} + x^{17} + x^{16} + x^{14} + x^{13} + x^{10} + x^{9} + x^{6} + x^{5} + x^{2} + 1,
\end{aligned}
$$

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

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

$$\begin{aligned}
p_0(x) = {} & x^{132} + x^{130} + x^{127} + x^{125} + x^{123} + x^{122} + x^{121} + x^{119} + x^{118} + x^{117} \\
& + x^{115} + x^{114} + x^{112} + x^{111} + x^{110} + x^{106} + x^{105} + x^{103} + x^{101} \\
& + x^{99} + x^{96} + x^{95} + x^{92} + x^{90} + x^{87} + x^{86} + x^{85} + x^{83} + x^{81} + x^{80} \\
& + x^{73} + x^{70} + x^{68} + x^{65} + x^{63} + x^{59} + x^{58} + x^{57} + x^{56} + x^{55} + x^{52} \\
& + x^{51} + x^{49} + x^{48} + x^{44} + x^{42} + x^{40} + x^{37} + x^{36} + x^{35} + x^{33} + x^{31} \\
& + x^{27}, \\
p_3(x) = {} & x^{112} + x^{111} + x^{109} + x^{108} + x^{105} + x^{103} + x^{98} + x^{97} + x^{95} + x^{94} \\
& + x^{92} + x^{90} + x^{89} + x^{85} + x^{84} + x^{83} + x^{81} + x^{80} + x^{77} + x^{75} + x^{70} \\
& + x^{69} + x^{68} + x^{66} + x^{65} + x^{64} + x^{63} + x^{62} + x^{61} + x^{57} + x^{54} + x^{53} \\
& + x^{51} + x^{49} + x^{48} + x^{47} + x^{46} + x^{42} + x^{39} + x^{38} + x^{36} + x^{34} + x^{33} \\
& + x^{29} + x^{28} + x^{27} + x^{25} + x^{23} + x^{20} + x^{19} + x^{17} + x^{16} + x^{14} + x^{9}, \\
p_6(x) = {} & x^{108} + x^{106} + x^{104} + x^{100} + x^{98} + x^{96} + x^{94} + x^{92} + x^{90} + x^{82} + x^{80} \\
& + x^{78} + x^{76} + x^{72} + x^{70} + x^{68} + x^{66} + x^{58} + x^{56} + x^{54} + x^{50} + x^{48} \\
& + x^{44} + x^{34} + x^{28} + x^{26} + x^{22} + x^{18} + x^{16} + x^{14} + x^{10} + x^{6}, \\
p_9(x) = {} & x^{104} + x^{103} + x^{102} + x^{100} + x^{99} + x^{95} + x^{80} + x^{79} + x^{78} + x^{74} + x^{72} \\
& + x^{67} + x^{64} + x^{63} + x^{62} + x^{58} + x^{56} + x^{51} + x^{48} + x^{47} + x^{46} + x^{42} \\
& + x^{40} + x^{35} + x^{32} + x^{31} + x^{30} + x^{26} + x^{23} + x^{22} + x^{20} + x^{16} + x^{14} \\
& + x^{10} + x^{8} + x^{3}, \\
p_{12}(x) = {} & x^{100} + x^{88} + x^{80} + x^{72} + x^{68} + x^{56} + x^{52} + x^{40} + x^{36} + x^{24} + x^{4} + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) = {} & x^{112} + x^{110} + x^{108} + x^{107} + x^{105} + x^{100} + x^{99} + x^{97} + x^{96} + x^{93} \\
& + x^{92} + x^{84} + x^{82} + x^{74} + x^{72} + x^{69} + x^{68} + x^{67} + x^{66} + x^{64} + x^{58} \\
& + x^{57} + x^{55} + x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{47} + x^{46} + x^{45} + x^{44} \\
& + x^{41} + x^{39} + x^{38} + x^{37} + x^{35} + x^{33} + x^{32} + x^{31} + x^{22} + x^{21} + x^{20} \\
& + x^{18}, \\
p_3(x) = {} & x^{92} + x^{91} + x^{89} + x^{87} + x^{80} + x^{79} + x^{78} + x^{76} + x^{75} + x^{72} + x^{70} \\
& + x^{65} + x^{60} + x^{59} + x^{57} + x^{55} + x^{52} + x^{51} + x^{49} + x^{48} + x^{46} + x^{41} \\
& + x^{36} + x^{35} + x^{33} + x^{31} + x^{24} + x^{23} + x^{22} + x^{20} + x^{19} + x^{16} + x^{14} \\
& + x^{9}, \\
p_6(x) = {} & x^{88} + x^{86} + x^{82} + x^{80} + x^{76} + x^{66} + x^{64} + x^{62} + x^{60} + x^{56} + x^{54} \\
& + x^{52} + x^{50} + x^{48} + x^{46} + x^{44} + x^{42} + x^{40} + x^{38} + x^{30} + x^{28} + x^{26} \\
& + x^{24} + x^{16} + x^{10} + x^{6}, \\
p_9(x) = {} & x^{84} + x^{83} + x^{82} + x^{78} + x^{75} + x^{74} + x^{72} + x^{68} + x^{66} + x^{62} + x^{59}
\end{aligned}$$

$$
\begin{aligned}
&+x^{58}+x^{56}+x^{52}+x^{50}+x^{46}+x^{43}+x^{42}+x^{40}+x^{36}+x^{34}+x^{30}\\
&+x^{27}+x^{26}+x^{24}+x^{20}+x^{18}+x^{14}+x^{11}+x^{10}+x^{8}+x^{3},\\
p_{12}(x)=&\,x^{80}+x^{76}+x^{72}+x^{68}+x^{60}+x^{56}+x^{52}+x^{44}+x^{40}+x^{36}+x^{28}\\
&+x^{24}+x^{20}+x^{12}+x^{8}+x^{4}+1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x)=&\,x^{117}+x^{116}+x^{115}+x^{112}+x^{108}+x^{106}+x^{104}+x^{102}+x^{99}+x^{98}\\
&+x^{91}+x^{89}+x^{88}+x^{87}+x^{86}+x^{85}+x^{80}+x^{76}+x^{74}+x^{73}+x^{71}\\
&+x^{69}+x^{67}+x^{66}+x^{64}+x^{63}+x^{60}+x^{59}+x^{53}+x^{52}+x^{50}+x^{48}\\
&+x^{47}+x^{43}+x^{39}+x^{38}+x^{36}+x^{35}+x^{33},\\
p_3(x)=&\,x^{101}+x^{100}+x^{99}+x^{97}+x^{94}+x^{91}+x^{89}+x^{88}+x^{87}+x^{86}+x^{85}\\
&+x^{83}+x^{82}+x^{80}+x^{77}+x^{76}+x^{74}+x^{69}+x^{68}+x^{65}+x^{64}+x^{59}\\
&+x^{56}+x^{53}+x^{52}+x^{51}+x^{50}+x^{48}+x^{46}+x^{43}+x^{41}+x^{40}+x^{39}\\
&+x^{36}+x^{33}+x^{31}+x^{28}+x^{26}+x^{24}+x^{23}+x^{20}+x^{18}+x^{16}+x^{15}\\
&+x^{14}+x^{12},\\
p_6(x)=&\,x^{97}+x^{96}+x^{95}+x^{92}+x^{91}+x^{90}+x^{88}+x^{87}+x^{84}+x^{77}+x^{76}\\
&+x^{73}+x^{70}+x^{68}+x^{66}+x^{65}+x^{63}+x^{60}+x^{57}+x^{56}+x^{53}+x^{51}\\
&+x^{48}+x^{47}+x^{45}+x^{43}+x^{40}+x^{37}+x^{36}+x^{35}+x^{34}+x^{33}+x^{30}\\
&+x^{28}+x^{27}+x^{25}+x^{23}+x^{20}+x^{19}+x^{18}+x^{15}+x^{13}+x^{12}+x^{11}\\
&+x^{5}+x^{4}+x^{2}+1,\\
p_9(x)=&\,x^{89}+x^{88}+x^{86}+x^{84}+x^{81}+x^{80}+x^{78}+x^{76}+x^{65}+x^{64}+x^{62}\\
&+x^{60}+x^{49}+x^{48}+x^{46}+x^{44}+x^{33}+x^{32}+x^{30}+x^{28}+x^{17}+x^{16}\\
&+x^{14}+x^{12}+x^{9}+x^{8}+x^{6}+x^{4},\\
p_{12}(x)=&\,x^{85}+x^{84}+x^{82}+x^{81}+x^{78}+x^{77}+x^{74}+x^{73}+x^{70}+x^{68}+x^{65}\\
&+x^{64}+x^{62}+x^{61}+x^{58}+x^{57}+x^{54}+x^{52}+x^{49}+x^{48}+x^{46}+x^{45}\\
&+x^{42}+x^{41}+x^{38}+x^{36}+x^{33}+x^{32}+x^{30}+x^{29}+x^{26}+x^{25}+x^{22}\\
&+x^{20}+x^{17}+x^{16}+x^{14}+x^{13}+x^{10}+x^{9}+x^{6}+x^{5}+x^{2}+1,
\end{aligned}
$$

and the initial terms are [0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 1, 1, 1, 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]	701	[1094, 1095]	1402	[1766, 1544]	2103	[2352, 1798]
1	[3, 4]	702	[387, 963]	1403	[1767, 835]	2104	[2353, 990]
2	[5, 6]	703	[904, 421]	1404	[1768, 1576]	2105	[2354, 753]
3	[7, 8]	704	[1096, 748]	1405	[1769, 280]	2106	[2355, 951]
4	[9, 10]	705	[1097, 320]	1406	[1770, 774]	2107	[749, 2356]

5	[11, 12]	706	[1098, 933]	1407	[1684, 389]	2108	[1731, 1666]
6	[13, 14]	707	[1099, 737]	1408	[923, 323]	2109	[2357, 1638]
7	[15, 16]	708	[1100, 285]	1409	[1771, 1772]	2110	[312, 2358]
8	[17, 18]	709	[1101, 351]	1410	[737, 844]	2111	[874, 2359]
9	[19, 20]	710	[1102, 1103]	1411	[1773, 1013]	2112	[2360, 759]
10	[21, 22]	711	[737, 891]	1412	[1774, 98]	2113	[2361, 1690]
11	[23, 24]	712	[1104, 910]	1413	[1775, 898]	2114	[2362, 25]
12	[25, 26]	713	[1105, 1106]	1414	[1776, 1777]	2115	[2363, 90]
13	[27, 28]	714	[1107, 1108]	1415	[382, 1025]	2116	[2364, 1058]
14	[29, 30]	715	[1109, 235]	1416	[19, 924]	2117	[2319, 877]
15	[31, 32]	716	[257, 1110]	1417	[1778, 1779]	2118	[101, 927]
16	[33, 34]	717	[1111, 301]	1418	[1780, 1710]	2119	[367, 412]
17	[7, 35]	718	[1112, 393]	1419	[1781, 1672]	2120	[403, 2346]
18	[36, 37]	719	[1113, 889]	1420	[420, 861]	2121	[1660, 2222]
19	[38, 39]	720	[1114, 1115]	1421	[1782, 1712]	2122	[981, 304]
20	[40, 41]	721	[1116, 224]	1422	[888, 876]	2123	[745, 1724]
21	[42, 43]	722	[1117, 482]	1423	[1783, 1784]	2124	[2310, 2365]
22	[44, 45]	723	[467, 1118]	1424	[1785, 749]	2125	[2366, 1634]
23	[46, 47]	724	[1119, 1120]	1425	[1786, 66]	2126	[816, 2358]
24	[48, 49]	725	[1121, 687]	1426	[1787, 1547]	2127	[2367, 2247]
25	[50, 51]	726	[1122, 1123]	1427	[759, 942]	2128	[2368, 1568]
26	[52, 53]	727	[1124, 1125]	1428	[1788, 1614]	2129	[2249, 2369]
27	[54, 55]	728	[1126, 1127]	1429	[1789, 1764]	2130	[1076, 1082]
28	[56, 57]	729	[1128, 590]	1430	[1790, 866]	2131	[1551, 1683]
29	[14, 58]	730	[121, 1129]	1431	[1791, 300]	2132	[25, 2370]
30	[59, 60]	731	[125, 1130]	1432	[1792, 857]	2133	[2283, 1701]
31	[61, 62]	732	[1131, 538]	1433	[1793, 367]	2134	[93, 2371]
32	[63, 64]	733	[1132, 1133]	1434	[952, 1794]	2135	[2298, 87]
33	[65, 66]	734	[1134, 196]	1435	[1593, 1592]	2136	[1010, 967]
34	[67, 68]	735	[39, 611]	1436	[1795, 1593]	2137	[1583, 741]
35	[69, 70]	736	[1135, 123]	1437	[1796, 260]	2138	[2372, 2373]
36	[71, 72]	737	[1136, 645]	1438	[1695, 413]	2139	[886, 839]
37	[73, 74]	738	[583, 1137]	1439	[1797, 1798]	2140	[2324, 1051]
38	[75, 76]	739	[1138, 692]	1440	[1799, 1800]	2141	[2374, 69]
39	[77, 78]	740	[1139, 1140]	1441	[1699, 1801]	2142	[396, 2245]
40	[79, 80]	741	[1141, 444]	1442	[1655, 858]	2143	[2375, 925]
41	[81, 82]	742	[1142, 138]	1443	[1802, 1652]	2144	[2376, 390]
42	[83, 84]	743	[53, 1143]	1444	[1089, 1008]	2145	[858, 2377]
43	[85, 86]	744	[719, 1144]	1445	[15, 309]	2146	[2378, 1602]
44	[87, 88]	745	[617, 664]	1446	[1803, 290]	2147	[2240, 1721]
45	[89, 90]	746	[1145, 1146]	1447	[1804, 378]	2148	[2379, 2227]
46	[91, 92]	747	[1147, 499]	1448	[1805, 252]	2149	[2380, 1037]
47	[93, 94]	748	[1148, 437]	1449	[1806, 1504]	2150	[1763, 2381]
48	[95, 96]	749	[1149, 1150]	1450	[841, 1614]	2151	[2190, 785]

49	[97, 98]	750	[1151, 1152]	1451	[1807, 1777]	2152	[994, 1730]
50	[99, 100]	751	[213, 1153]	1452	[1109, 926]	2153	[396, 851]
51	[101, 102]	752	[1154, 537]	1453	[1808, 1616]	2154	[2382, 919]
52	[103, 104]	753	[1155, 1122]	1454	[1809, 1088]	2155	[316, 1097]
53	[105, 106]	754	[639, 1156]	1455	[871, 1794]	2156	[884, 2383]
54	[107, 108]	755	[190, 1157]	1456	[1810, 1811]	2157	[2384, 2217]
55	[109, 110]	756	[1158, 1159]	1457	[1812, 1813]	2158	[1728, 2289]
56	[111, 112]	757	[154, 1127]	1458	[1562, 1814]	2159	[1017, 2385]
57	[113, 114]	758	[1160, 615]	1459	[1815, 1784]	2160	[2196, 803]
58	[28, 115]	759	[1161, 479]	1460	[852, 1657]	2161	[1851, 767]
59	[116, 117]	760	[1162, 164]	1461	[914, 1511]	2162	[2386, 1699]
60	[118, 119]	761	[686, 223]	1462	[333, 1816]	2163	[1648, 2323]
61	[120, 121]	762	[1163, 1164]	1463	[1817, 929]	2164	[1537, 1024]
62	[122, 123]	763	[434, 667]	1464	[1818, 356]	2165	[2387, 605]
63	[124, 125]	764	[1165, 1166]	1465	[343, 1819]	2166	[2388, 1885]
64	[126, 127]	765	[657, 507]	1466	[1016, 1653]	2167	[2389, 1137]
65	[128, 129]	766	[1167, 1168]	1467	[1820, 1821]	2168	[2390, 2034]
66	[130, 131]	767	[1169, 1170]	1468	[1822, 1823]	2169	[1150, 1905]
67	[132, 133]	768	[1171, 204]	1469	[1824, 89]	2170	[2391, 492]
68	[134, 135]	769	[1172, 1173]	1470	[1825, 965]	2171	[2392, 1183]
69	[136, 137]	770	[1174, 1150]	1471	[1826, 1093]	2172	[2393, 504]
70	[138, 139]	771	[139, 438]	1472	[1827, 416]	2173	[2394, 1134]
71	[140, 141]	772	[1175, 534]	1473	[1828, 230]	2174	[711, 1179]
72	[142, 143]	773	[1176, 1177]	1474	[1829, 974]	2175	[2395, 2153]
73	[144, 145]	774	[1178, 1179]	1475	[1830, 1679]	2176	[2396, 1460]
74	[146, 147]	775	[1180, 597]	1476	[1831, 1591]	2177	[2397, 684]
75	[148, 127]	776	[1181, 653]	1477	[392, 1832]	2178	[2398, 2115]
76	[149, 150]	777	[1182, 47]	1478	[1833, 396]	2179	[2399, 165]
77	[151, 152]	778	[1183, 44]	1479	[1834, 792]	2180	[2400, 467]
78	[153, 154]	779	[133, 1184]	1480	[281, 1835]	2181	[2401, 711]
79	[155, 156]	780	[1185, 574]	1481	[1836, 1837]	2182	[2402, 620]
80	[157, 49]	781	[1186, 589]	1482	[1838, 1069]	2183	[2403, 622]
81	[158, 159]	782	[1187, 1188]	1483	[1839, 1003]	2184	[2404, 200]
82	[160, 161]	783	[1189, 607]	1484	[1840, 1841]	2185	[2405, 551]
83	[162, 163]	784	[1190, 133]	1485	[1842, 1067]	2186	[2406, 131]
84	[164, 165]	785	[1191, 573]	1486	[1843, 1108]	2187	[1173, 1115]
85	[166, 167]	786	[1192, 1193]	1487	[745, 68]	2188	[2407, 2408]
86	[161, 168]	787	[1177, 470]	1488	[861, 945]	2189	[2409, 1427]
87	[169, 170]	788	[1194, 1195]	1489	[275, 300]	2190	[2410, 1137]
88	[171, 172]	789	[60, 646]	1490	[1844, 736]	2191	[2411, 215]
89	[173, 174]	790	[1196, 1197]	1491	[1845, 904]	2192	[2412, 1953]
90	[175, 176]	791	[1198, 160]	1492	[1846, 1727]	2193	[2413, 1376]
91	[177, 178]	792	[1199, 1200]	1493	[1847, 1071]	2194	[2414, 548]
92	[179, 180]	793	[220, 207]	1494	[1034, 83]	2195	[1443, 519]

93	[181, 60]	794	[1201, 185]	1495	[1848, 1596]	2196	[2415, 1914]
94	[182, 183]	795	[1202, 213]	1496	[790, 264]	2197	[671, 38]
95	[184, 185]	796	[1203, 1204]	1497	[1849, 1850]	2198	[2416, 2085]
96	[186, 187]	797	[480, 1205]	1498	[1851, 1852]	2199	[2417, 520]
97	[188, 189]	798	[137, 655]	1499	[1853, 1023]	2200	[2418, 641]
98	[41, 190]	799	[1206, 1207]	1500	[1854, 900]	2201	[2419, 512]
99	[191, 192]	800	[1208, 1209]	1501	[1855, 1254]	2202	[1200, 1939]
100	[193, 194]	801	[1210, 1211]	1502	[1355, 157]	2203	[2420, 1186]
101	[195, 196]	802	[488, 1212]	1503	[1856, 10]	2204	[2421, 1142]
102	[197, 159]	803	[1213, 1206]	1504	[1857, 1115]	2205	[2422, 129]
103	[198, 199]	804	[219, 430]	1505	[1858, 713]	2206	[2423, 1197]
104	[200, 201]	805	[1214, 1215]	1506	[1859, 55]	2207	[2424, 1228]
105	[202, 203]	806	[1115, 1216]	1507	[1860, 1861]	2208	[2425, 2408]
106	[204, 185]	807	[1217, 719]	1508	[1120, 511]	2209	[2426, 605]
107	[205, 206]	808	[1218, 1219]	1509	[1862, 1422]	2210	[2427, 1184]
108	[207, 208]	809	[2, 1220]	1510	[1863, 43]	2211	[2428, 160]
109	[209, 145]	810	[1211, 1221]	1511	[1222, 1247]	2212	[2429, 593]
110	[210, 211]	811	[635, 649]	1512	[1864, 438]	2213	[2430, 1885]
111	[212, 213]	812	[710, 1222]	1513	[1865, 684]	2214	[2431, 430]
112	[214, 215]	813	[1223, 1212]	1514	[1866, 656]	2215	[2432, 1461]
113	[216, 217]	814	[1224, 200]	1515	[1867, 1157]	2216	[2433, 483]
114	[218, 219]	815	[1225, 671]	1516	[1868, 1478]	2217	[2434, 1407]
115	[55, 220]	816	[713, 530]	1517	[430, 1188]	2218	[2435, 1399]
116	[221, 222]	817	[1226, 1227]	1518	[1869, 1179]	2219	[1290, 151]
117	[223, 224]	818	[1228, 1229]	1519	[1870, 1168]	2220	[568, 162]
118	[225, 226]	819	[1230, 149]	1520	[1871, 188]	2221	[2436, 456]
119	[227, 228]	820	[1231, 1127]	1521	[1872, 41]	2222	[1898, 1349]
120	[229, 230]	821	[1232, 445]	1522	[575, 540]	2223	[2437, 207]
121	[231, 232]	822	[211, 1233]	1523	[1873, 1211]	2224	[2438, 1914]
122	[233, 234]	823	[1234, 1235]	1524	[1874, 473]	2225	[2439, 213]
123	[235, 236]	824	[1236, 44]	1525	[1875, 522]	2226	[2440, 139]
124	[237, 238]	825	[1237, 1238]	1526	[1876, 1279]	2227	[2441, 1399]
125	[239, 240]	826	[1239, 1240]	1527	[1877, 554]	2228	[655, 1920]
126	[241, 242]	827	[1241, 648]	1528	[1878, 1147]	2229	[2442, 1294]
127	[243, 244]	828	[503, 687]	1529	[1879, 649]	2230	[2443, 149]
128	[245, 246]	829	[573, 1242]	1530	[1880, 1162]	2231	[2444, 218]
129	[247, 248]	830	[1243, 1164]	1531	[1881, 157]	2232	[2445, 204]
130	[249, 250]	831	[597, 199]	1532	[1882, 533]	2233	[2446, 615]
131	[251, 241]	832	[469, 1244]	1533	[1883, 1264]	2234	[2447, 500]
132	[252, 253]	833	[1245, 600]	1534	[1884, 617]	2235	[2448, 1909]
133	[254, 255]	834	[1246, 163]	1535	[685, 1885]	2236	[2449, 1855]
134	[256, 257]	835	[499, 522]	1536	[1886, 576]	2237	[2450, 197]
135	[258, 235]	836	[1247, 1248]	1537	[1461, 1385]	2238	[1156, 500]
136	[259, 260]	837	[1249, 1250]	1538	[1887, 122]	2239	[2451, 1380]

137	[261, 262]	838	[545, 132]	1539	[1888, 171]	2240	[2452, 656]
138	[263, 264]	839	[187, 432]	1540	[1889, 1890]	2241	[2453, 1956]
139	[265, 266]	840	[1251, 1118]	1541	[1891, 1196]	2242	[2149, 2149]
140	[267, 268]	841	[1252, 710]	1542	[1892, 1142]	2243	[1938, 1937]
141	[269, 270]	842	[1253, 474]	1543	[1893, 1894]	2244	[1312, 1436]
142	[271, 118]	843	[1216, 40]	1544	[1361, 627]	2245	[664, 533]
143	[272, 273]	844	[1254, 1122]	1545	[1895, 717]	2246	[2454, 53]
144	[274, 275]	845	[645, 708]	1546	[1896, 168]	2247	[2455, 141]
145	[276, 277]	846	[1255, 1256]	1547	[1897, 560]	2248	[2456, 2039]
146	[278, 279]	847	[1257, 1258]	1548	[552, 1898]	2249	[2457, 590]
147	[280, 281]	848	[1259, 1123]	1549	[1899, 541]	2250	[600, 1988]
148	[282, 283]	849	[1260, 620]	1550	[1900, 52]	2251	[2458, 1483]
149	[284, 285]	850	[1118, 472]	1551	[192, 1159]	2252	[2459, 1237]
150	[286, 287]	851	[1261, 572]	1552	[1901, 182]	2253	[569, 1237]
151	[288, 289]	852	[1262, 170]	1553	[1902, 1493]	2254	[2460, 149]
152	[270, 255]	853	[1235, 468]	1554	[1903, 439]	2255	[2461, 2066]
153	[290, 291]	854	[129, 1263]	1555	[1904, 1905]	2256	[2462, 691]
154	[292, 241]	855	[1264, 1265]	1556	[1906, 473]	2257	[2463, 661]
155	[293, 86]	856	[1266, 675]	1557	[1907, 665]	2258	[2464, 633]
156	[294, 295]	857	[1267, 1195]	1558	[1908, 1909]	2259	[2465, 1205]
157	[296, 297]	858	[1268, 39]	1559	[1910, 1147]	2260	[2466, 38]
158	[298, 299]	859	[571, 692]	1560	[496, 1911]	2261	[2467, 590]
159	[300, 301]	860	[611, 217]	1561	[1909, 670]	2262	[2468, 122]
160	[302, 303]	861	[707, 1269]	1562	[1912, 1265]	2263	[2469, 698]
161	[304, 305]	862	[1270, 494]	1563	[1913, 1914]	2264	[2470, 638]
162	[306, 248]	863	[1271, 166]	1564	[1915, 1242]	2265	[2471, 657]
163	[307, 308]	864	[1272, 208]	1565	[1916, 486]	2266	[2472, 520]
164	[309, 310]	865	[1273, 188]	1566	[1917, 1338]	2267	[2473, 1855]
165	[311, 312]	866	[1274, 1275]	1567	[1918, 1281]	2268	[2474, 2085]
166	[313, 80]	867	[539, 452]	1568	[1919, 1920]	2269	[2475, 1182]
167	[314, 315]	868	[1276, 450]	1569	[1921, 1298]	2270	[2476, 525]
168	[303, 316]	869	[1277, 566]	1570	[1922, 490]	2271	[1493, 1460]
169	[317, 318]	870	[1278, 1151]	1571	[1923, 1292]	2272	[2477, 715]
170	[319, 320]	871	[1279, 1280]	1572	[1924, 1351]	2273	[1969, 1147]
171	[321, 322]	872	[1281, 679]	1573	[1925, 554]	2274	[2478, 1361]
172	[323, 324]	873	[1282, 476]	1574	[1926, 1147]	2275	[2479, 200]
173	[325, 326]	874	[1283, 1284]	1575	[1927, 1372]	2276	[2480, 1427]
174	[327, 281]	875	[1179, 544]	1576	[1928, 1163]	2277	[2481, 614]
175	[328, 329]	876	[1280, 593]	1577	[1929, 1413]	2278	[2482, 1372]
176	[330, 331]	877	[1285, 707]	1578	[629, 1173]	2279	[2483, 2036]
177	[5, 332]	878	[1286, 575]	1579	[1930, 505]	2280	[2484, 215]
178	[333, 334]	879	[1248, 1124]	1580	[1931, 1443]	2281	[2485, 711]
179	[335, 336]	880	[1287, 1288]	1581	[1209, 481]	2282	[2486, 1297]
180	[337, 338]	881	[163, 1193]	1582	[1932, 611]	2283	[2487, 1168]

181	[339, 340]	882	[1289, 1290]	1583	[1933, 47]	2284	[2488, 2489]
182	[341, 342]	883	[1291, 468]	1584	[1934, 1298]	2285	[2490, 586]
183	[343, 344]	884	[1258, 1292]	1585	[1935, 1905]	2286	[2491, 180]
184	[345, 346]	885	[1293, 1294]	1586	[1936, 558]	2287	[2492, 1207]
185	[347, 348]	886	[637, 1227]	1587	[1205, 1312]	2288	[2493, 1953]
186	[349, 112]	887	[1295, 1296]	1588	[1937, 1344]	2289	[1424, 463]
187	[350, 351]	888	[1297, 574]	1589	[1212, 585]	2290	[2494, 1353]
188	[352, 353]	889	[1298, 1289]	1590	[1207, 1938]	2291	[2495, 1355]
189	[354, 355]	890	[1299, 452]	1591	[1476, 1861]	2292	[2496, 467]
190	[356, 357]	891	[123, 637]	1592	[1894, 488]	2293	[2497, 646]
191	[358, 359]	892	[1250, 683]	1593	[1920, 1210]	2294	[2498, 1129]
192	[360, 361]	893	[1300, 566]	1594	[1939, 137]	2295	[2499, 45]
193	[362, 363]	894	[1301, 164]	1595	[1940, 1118]	2296	[2500, 210]
194	[364, 365]	895	[1130, 146]	1596	[1941, 1353]	2297	[2501, 1290]
195	[366, 367]	896	[669, 1293]	1597	[1942, 695]	2298	[2502, 154]
196	[368, 369]	897	[1302, 132]	1598	[1943, 1911]	2299	[2503, 1170]
197	[370, 371]	898	[1220, 656]	1599	[1204, 1371]	2300	[2504, 1233]
198	[372, 373]	899	[517, 1303]	1600	[1944, 1216]	2301	[2505, 611]
199	[374, 375]	900	[1304, 1285]	1601	[432, 192]	2302	[2506, 194]
200	[376, 377]	901	[194, 705]	1602	[1945, 1938]	2303	[2507, 1953]
201	[378, 379]	902	[1305, 1306]	1603	[1946, 1385]	2304	[2508, 647]
202	[380, 381]	903	[554, 1305]	1604	[1379, 1435]	2305	[2509, 1275]
203	[382, 383]	904	[441, 203]	1605	[1947, 627]	2306	[2510, 218]
204	[384, 385]	905	[1307, 692]	1606	[1948, 527]	2307	[2511, 667]
205	[386, 387]	906	[1308, 677]	1607	[1949, 14]	2308	[2512, 1222]
206	[388, 389]	907	[1309, 1177]	1608	[1950, 463]	2309	[37, 194]
207	[390, 391]	908	[1310, 495]	1609	[1951, 564]	2310	[2513, 527]
208	[392, 393]	909	[1311, 1312]	1610	[1952, 697]	2311	[2514, 540]
209	[394, 395]	910	[1313, 705]	1611	[1144, 1953]	2312	[1460, 1347]
210	[18, 396]	911	[1168, 517]	1612	[1954, 1290]	2313	[2515, 515]
211	[397, 398]	912	[1314, 1315]	1613	[1955, 1347]	2314	[2516, 528]
212	[399, 400]	913	[1316, 192]	1614	[1956, 1140]	2315	[2517, 1196]
213	[401, 402]	914	[1317, 40]	1615	[1957, 486]	2316	[2518, 1240]
214	[403, 404]	915	[1153, 1133]	1616	[1958, 559]	2317	[2519, 192]
215	[405, 371]	916	[1123, 1318]	1617	[1303, 581]	2318	[165, 1342]
216	[406, 407]	917	[566, 1319]	1618	[224, 1420]	2319	[702, 434]
217	[408, 409]	918	[1320, 210]	1619	[1959, 175]	2320	[1351, 566]
218	[410, 411]	919	[1321, 1143]	1620	[1960, 1326]	2321	[2520, 223]
219	[412, 413]	920	[1322, 677]	1621	[1961, 1338]	2322	[2521, 152]
220	[108, 414]	921	[1323, 1324]	1622	[1962, 436]	2323	[2522, 513]
221	[415, 416]	922	[1288, 553]	1623	[1963, 562]	2324	[2523, 1460]
222	[417, 418]	923	[1325, 603]	1624	[631, 643]	2325	[2524, 1229]
223	[419, 420]	924	[717, 1326]	1625	[1964, 1127]	2326	[2525, 1376]
224	[421, 422]	925	[1327, 59]	1626	[1965, 1911]	2327	[2526, 1389]

225	[423, 103]	926	[509, 143]	1627	[1966, 1248]	2328	[2527, 1412]
226	[424, 425]	927	[172, 559]	1628	[1967, 172]	2329	[2528, 650]
227	[426, 427]	928	[196, 1328]	1629	[1968, 1969]	2330	[1328, 1389]
228	[428, 242]	929	[1329, 1330]	1630	[43, 582]	2331	[2529, 496]
229	[429, 430]	930	[1331, 622]	1631	[1269, 677]	2332	[2489, 55]
230	[431, 432]	931	[1332, 1333]	1632	[1256, 57]	2333	[2530, 1969]
231	[433, 434]	932	[1334, 1179]	1633	[1970, 14]	2334	[2531, 1402]
232	[435, 42]	933	[1335, 1336]	1634	[1971, 521]	2335	[2532, 698]
233	[436, 437]	934	[1337, 228]	1635	[1972, 1136]	2336	[2533, 456]
234	[438, 439]	935	[1338, 1339]	1636	[1973, 463]	2337	[2534, 485]
235	[440, 441]	936	[8, 681]	1637	[1974, 1198]	2338	[2535, 615]
236	[442, 180]	937	[1340, 490]	1638	[1975, 563]	2339	[2536, 500]
237	[443, 156]	938	[1341, 1342]	1639	[1976, 1152]	2340	[2537, 1237]
238	[168, 444]	939	[585, 479]	1640	[1977, 1405]	2341	[2538, 600]
239	[445, 446]	940	[1166, 1186]	1641	[1978, 531]	2342	[2539, 207]
240	[447, 32]	941	[1343, 1344]	1642	[1979, 520]	2343	[174, 661]
241	[437, 448]	942	[1345, 1134]	1643	[1980, 679]	2344	[2540, 697]
242	[449, 450]	943	[1346, 1347]	1644	[1981, 657]	2345	[2541, 708]
243	[451, 155]	944	[1348, 1349]	1645	[564, 1969]	2346	[2542, 220]
244	[452, 453]	945	[511, 37]	1646	[1982, 1228]	2347	[2543, 1331]
245	[454, 45]	946	[1350, 1351]	1647	[683, 1331]	2348	[1294, 1422]
246	[455, 456]	947	[1240, 1215]	1648	[1983, 1129]	2349	[2544, 1349]
247	[457, 458]	948	[222, 547]	1649	[1984, 489]	2350	[2545, 2036]
248	[208, 459]	949	[1352, 1353]	1650	[1985, 160]	2351	[2546, 1170]
249	[460, 435]	950	[1354, 1355]	1651	[1986, 1939]	2352	[2547, 52]
250	[461, 462]	951	[1356, 504]	1652	[1233, 641]	2353	[2548, 12]
251	[463, 449]	952	[1219, 1296]	1653	[1987, 1988]	2354	[2549, 1130]
252	[464, 465]	953	[1357, 688]	1654	[1416, 647]	2355	[2550, 1338]
253	[466, 467]	954	[1358, 545]	1655	[1989, 571]	2356	[653, 715]
254	[468, 469]	955	[1359, 1297]	1656	[1990, 716]	2357	[2551, 568]
255	[470, 206]	956	[1360, 709]	1657	[623, 1250]	2358	[643, 600]
256	[471, 472]	957	[594, 1361]	1658	[170, 188]	2359	[1152, 551]
257	[10, 440]	958	[1362, 586]	1659	[1991, 716]	2360	[2552, 1345]
258	[473, 474]	959	[1363, 490]	1660	[613, 602]	2361	[2553, 1152]
259	[475, 476]	960	[1364, 1345]	1661	[1992, 441]	2362	[2554, 2054]
260	[477, 478]	961	[1365, 483]	1662	[1413, 1407]	2363	[2555, 686]
261	[479, 480]	962	[1366, 552]	1663	[1993, 1855]	2364	[2556, 1279]
262	[481, 482]	963	[667, 1367]	1664	[560, 1204]	2365	[2557, 450]
263	[483, 484]	964	[1368, 616]	1665	[1994, 1483]	2366	[2558, 2032]
264	[485, 486]	965	[1369, 618]	1666	[1995, 1289]	2367	[2559, 2066]
265	[487, 488]	966	[1164, 570]	1667	[1263, 495]	2368	[2560, 1143]
266	[489, 490]	967	[1370, 125]	1668	[1996, 557]	2369	[2561, 593]
267	[491, 492]	968	[1371, 1372]	1669	[1997, 579]	2370	[1170, 2066]
268	[493, 150]	969	[1373, 1186]	1670	[1998, 10]	2371	[650, 1220]

269	[141, 494]	970	[1374, 124]	1671	[1999, 1262]	2372	[2562, 138]
270	[495, 496]	971	[1375, 147]	1672	[2000, 549]	2373	[2563, 1118]
271	[497, 457]	972	[1376, 1264]	1673	[2001, 439]	2374	[2564, 138]
272	[498, 499]	973	[1377, 638]	1674	[2002, 528]	2375	[2565, 630]
273	[500, 501]	974	[1378, 1379]	1675	[2003, 568]	2376	[2566, 674]
274	[502, 503]	975	[1380, 35]	1676	[2004, 512]	2377	[1157, 1275]
275	[504, 505]	976	[1381, 1382]	1677	[2005, 42]	2378	[2567, 513]
276	[506, 507]	977	[135, 508]	1678	[2006, 1956]	2379	[2568, 483]
277	[508, 509]	978	[1383, 473]	1679	[2007, 466]	2380	[1861, 1200]
278	[510, 511]	979	[1384, 533]	1680	[1344, 1476]	2381	[1324, 527]
279	[512, 513]	980	[1385, 1168]	1681	[2008, 227]	2382	[2569, 2115]
280	[156, 514]	981	[127, 550]	1682	[2009, 1222]	2383	[514, 1416]
281	[444, 515]	982	[1386, 1130]	1683	[536, 144]	2384	[2570, 139]
282	[516, 517]	983	[1387, 551]	1684	[1326, 51]	2385	[1953, 215]
283	[518, 519]	984	[1388, 670]	1685	[2010, 463]	2386	[2571, 165]
284	[520, 521]	985	[1389, 1390]	1686	[2011, 544]	2387	[87, 2572]
285	[522, 523]	986	[1391, 583]	1687	[1911, 10]	2388	[2374, 909]
286	[524, 189]	987	[627, 577]	1688	[2012, 219]	2389	[2167, 2369]
287	[185, 525]	988	[602, 1262]	1689	[2013, 715]	2390	[2209, 1719]
288	[526, 151]	989	[49, 1149]	1690	[2014, 210]	2391	[2170, 2573]
289	[527, 528]	990	[1392, 631]	1691	[2015, 684]	2392	[263, 791]
290	[529, 530]	991	[1393, 440]	1692	[2016, 569]	2393	[1522, 839]
291	[531, 532]	992	[1394, 616]	1693	[2017, 1443]	2394	[2574, 368]
292	[533, 34]	993	[1395, 162]	1694	[2018, 227]	2395	[758, 941]
293	[159, 534]	994	[1396, 1269]	1695	[641, 2019]	2396	[2575, 2576]
294	[535, 536]	995	[1265, 1397]	1696	[2020, 1275]	2397	[2577, 1763]
295	[537, 538]	996	[1398, 587]	1697	[486, 1487]	2398	[2578, 1089]
296	[57, 539]	997	[1372, 1163]	1698	[2021, 1125]	2399	[805, 1687]
297	[540, 541]	998	[530, 1228]	1699	[2022, 570]	2400	[2579, 1011]
298	[542, 124]	999	[1319, 669]	1700	[2023, 207]	2401	[1799, 2580]
299	[543, 126]	1000	[459, 1399]	1701	[2024, 1238]	2402	[2363, 760]
300	[544, 59]	1001	[1400, 1331]	1702	[2025, 194]	2403	[922, 999]
301	[505, 545]	1002	[1401, 1210]	1703	[2026, 582]	2404	[972, 2581]
302	[546, 547]	1003	[456, 1402]	1704	[1306, 1288]	2405	[901, 417]
303	[548, 465]	1004	[1403, 647]	1705	[2027, 512]	2406	[887, 875]
304	[549, 174]	1005	[1404, 1263]	1706	[2028, 638]	2407	[1653, 2385]
305	[550, 435]	1006	[1405, 1258]	1707	[2029, 469]	2408	[1788, 811]
306	[551, 222]	1007	[1406, 1367]	1708	[1478, 1429]	2409	[2582, 1112]
307	[228, 552]	1008	[462, 1142]	1709	[2030, 1162]	2410	[1557, 843]
308	[553, 554]	1009	[1407, 562]	1710	[2031, 2032]	2411	[2583, 2300]
309	[555, 449]	1010	[1408, 1349]	1711	[2033, 2034]	2412	[2584, 1800]
310	[32, 436]	1011	[1409, 481]	1712	[2035, 1361]	2413	[2585, 1638]
311	[556, 446]	1012	[1410, 508]	1713	[2019, 2036]	2414	[1662, 2356]
312	[557, 558]	1013	[1411, 1254]	1714	[2037, 571]	2415	[2314, 1523]

313	[559, 560]	1014	[1412, 1413]	1715	[2038, 2039]	2416	[2198, 2365]
314	[561, 532]	1015	[1414, 1153]	1716	[1184, 1284]	2417	[2182, 862]
315	[562, 563]	1016	[1415, 1416]	1717	[2040, 718]	2418	[346, 1704]
316	[547, 564]	1017	[1417, 161]	1718	[2041, 226]	2419	[2586, 2328]
317	[565, 566]	1018	[1418, 1208]	1719	[2042, 1144]	2420	[1020, 945]
318	[567, 568]	1019	[1419, 1420]	1720	[2043, 2044]	2421	[2337, 263]
319	[465, 569]	1020	[581, 1350]	1721	[2045, 1134]	2422	[292, 428]
320	[570, 571]	1021	[217, 1261]	1722	[2046, 1483]	2423	[2587, 841]
321	[572, 573]	1022	[1421, 1422]	1723	[2047, 702]	2424	[2588, 1729]
322	[574, 575]	1023	[1423, 1331]	1724	[1227, 2048]	2425	[2589, 817]
323	[576, 536]	1024	[494, 1424]	1725	[2049, 1324]	2426	[2590, 410]
324	[577, 182]	1025	[1275, 155]	1726	[2050, 1120]	2427	[1842, 2265]
325	[578, 579]	1026	[608, 52]	1727	[2051, 457]	2428	[2338, 961]
326	[580, 581]	1027	[1425, 1247]	1728	[675, 121]	2429	[2591, 953]
327	[582, 583]	1028	[1426, 1424]	1729	[2052, 1350]	2430	[1609, 1801]
328	[584, 585]	1029	[1427, 718]	1730	[1129, 466]	2431	[2592, 976]
329	[586, 587]	1030	[1428, 1429]	1731	[2053, 1244]	2432	[2593, 290]
330	[588, 589]	1031	[1430, 639]	1732	[2054, 1333]	2433	[2592, 1579]
331	[590, 227]	1032	[1431, 172]	1733	[2055, 162]	2434	[2594, 326]
332	[591, 545]	1033	[1432, 1280]	1734	[2056, 697]	2435	[857, 871]
333	[592, 523]	1034	[1433, 176]	1735	[2057, 622]	2436	[2595, 1766]
334	[593, 594]	1035	[1434, 675]	1736	[695, 126]	2437	[2582, 392]
335	[595, 53]	1036	[1435, 1208]	1737	[2058, 139]	2438	[953, 1732]
336	[596, 146]	1037	[1436, 1379]	1738	[2059, 528]	2439	[2596, 1534]
337	[450, 597]	1038	[1402, 1336]	1739	[2060, 1376]	2440	[987, 2238]
338	[448, 153]	1039	[1133, 1355]	1740	[2061, 1256]	2441	[2597, 2254]
339	[598, 562]	1040	[1437, 1209]	1741	[2062, 1937]	2442	[933, 927]
340	[599, 600]	1041	[1438, 607]	1742	[2063, 1389]	2443	[95, 286]
341	[601, 602]	1042	[1439, 457]	1743	[2064, 557]	2444	[2313, 412]
342	[587, 603]	1043	[1440, 1416]	1744	[2065, 2066]	2445	[1027, 2312]
343	[604, 134]	1044	[1441, 220]	1745	[2067, 436]	2446	[2598, 1568]
344	[605, 218]	1045	[1442, 1443]	1746	[2068, 467]	2447	[254, 831]
345	[606, 539]	1046	[1444, 1224]	1747	[2069, 641]	2448	[304, 400]
346	[607, 608]	1047	[1445, 1162]	1748	[2070, 525]	2449	[1673, 2285]
347	[609, 153]	1048	[1446, 448]	1749	[2071, 557]	2450	[1836, 2263]
348	[439, 178]	1049	[1447, 200]	1750	[2072, 201]	2451	[1073, 2318]
349	[610, 611]	1050	[1448, 49]	1751	[2073, 1328]	2452	[1707, 2332]
350	[612, 613]	1051	[1449, 501]	1752	[2074, 1380]	2453	[1817, 1027]
351	[614, 615]	1052	[1450, 211]	1753	[2075, 1491]	2454	[1705, 2573]
352	[616, 617]	1053	[1451, 1124]	1754	[1292, 1240]	2455	[1052, 821]
353	[618, 134]	1054	[1452, 1297]	1755	[2076, 124]	2456	[732, 2572]
354	[619, 470]	1055	[1453, 623]	1756	[2077, 141]	2457	[2599, 2350]
355	[620, 456]	1056	[1454, 1194]	1757	[2078, 1136]	2458	[104, 2600]
356	[621, 577]	1057	[1455, 657]	1758	[688, 171]	2459	[2601, 2602]

357	[622, 623]	1058	[1456, 12]	1759	[2079, 2080]	2460	[1805, 847]
358	[624, 625]	1059	[1457, 1435]	1760	[2081, 572]	2461	[18, 850]
359	[626, 627]	1060	[1458, 508]	1761	[2082, 447]	2462	[1603, 2603]
360	[628, 629]	1061	[1459, 1460]	1762	[2083, 1371]	2463	[2604, 1747]
361	[630, 631]	1062	[1315, 1461]	1763	[2084, 1898]	2464	[2605, 1105]
362	[632, 633]	1063	[1462, 1143]	1764	[2080, 2085]	2465	[2606, 2277]
363	[634, 635]	1064	[1463, 587]	1765	[2086, 175]	2466	[270, 831]
364	[636, 637]	1065	[1464, 167]	1766	[2087, 1221]	2467	[1717, 426]
365	[638, 639]	1066	[1465, 1233]	1767	[679, 1330]	2468	[1716, 844]
366	[640, 641]	1067	[1466, 1279]	1768	[2088, 661]	2469	[2607, 1011]
367	[642, 643]	1068	[1467, 1288]	1769	[1242, 1194]	2470	[421, 1631]
368	[644, 645]	1069	[1468, 1288]	1770	[2089, 1420]	2471	[2357, 231]
369	[646, 129]	1070	[1469, 701]	1771	[2090, 1134]	2472	[2608, 1101]
370	[647, 648]	1071	[1127, 1235]	1772	[2091, 1333]	2473	[2609, 2166]
371	[649, 650]	1072	[1470, 1156]	1773	[2092, 702]	2474	[770, 2195]
372	[651, 180]	1073	[1471, 1293]	1774	[579, 187]	2475	[1579, 1078]
373	[652, 144]	1074	[521, 1198]	1775	[2093, 1149]	2476	[2610, 1651]
374	[167, 653]	1075	[1472, 1303]	1776	[2094, 1412]	2477	[1512, 233]
375	[189, 485]	1076	[1473, 484]	1777	[2095, 1422]	2478	[1761, 2370]
376	[654, 655]	1077	[1422, 1315]	1778	[2096, 42]	2479	[2281, 392]
377	[656, 657]	1078	[1137, 716]	1779	[2097, 2048]	2480	[108, 2600]
378	[658, 453]	1079	[1474, 1438]	1780	[2098, 587]	2481	[2611, 1811]
379	[541, 576]	1080	[1475, 1476]	1781	[2099, 478]	2482	[1751, 2270]
380	[659, 533]	1081	[446, 1298]	1782	[2100, 593]	2483	[378, 2348]
381	[660, 661]	1082	[1347, 1285]	1783	[2101, 2048]	2484	[1502, 313]
382	[662, 608]	1083	[1197, 1170]	1784	[2102, 700]	2485	[740, 370]
383	[215, 166]	1084	[51, 131]	1785	[1193, 1151]	2486	[2612, 2180]
384	[663, 664]	1085	[1477, 1478]	1786	[2103, 551]	2487	[1533, 854]
385	[476, 665]	1086	[1479, 625]	1787	[2104, 1412]	2488	[1112, 1832]
386	[666, 667]	1087	[1480, 630]	1788	[2105, 1306]	2489	[815, 312]
387	[668, 669]	1088	[1481, 716]	1789	[2106, 550]	2490	[2613, 1543]
388	[534, 447]	1089	[1482, 190]	1790	[2107, 1405]	2491	[74, 2383]
389	[670, 671]	1090	[1483, 1146]	1791	[1905, 1382]	2492	[2614, 2201]
390	[672, 673]	1091	[152, 1136]	1792	[2108, 1219]	2493	[2615, 2616]
391	[674, 675]	1092	[1484, 38]	1793	[2109, 2041]	2494	[2617, 2618]
392	[676, 553]	1093	[1485, 500]	1794	[1125, 124]	2495	[374, 754]
393	[677, 531]	1094	[1486, 1487]	1795	[482, 1894]	2496	[2605, 1507]
394	[678, 679]	1095	[1244, 197]	1796	[2110, 607]	2497	[920, 2619]
395	[680, 38]	1096	[1488, 572]	1797	[2111, 2054]	2498	[2620, 776]
396	[35, 681]	1097	[1367, 1166]	1798	[2112, 1390]	2499	[2621, 333]
397	[682, 683]	1098	[1489, 197]	1799	[2113, 131]	2500	[1691, 397]
398	[684, 685]	1099	[1490, 509]	1800	[2114, 1952]	2501	[2366, 956]
399	[150, 686]	1100	[1491, 709]	1801	[2115, 12]	2502	[1070, 1736]
400	[523, 568]	1101	[1492, 1305]	1802	[2116, 480]	2503	[330, 2622]

401	[180, 445]	1102	[143, 1493]	1803	[2117, 531]	2504	[2623, 2287]
402	[687, 688]	1103	[58, 1281]	1804	[2118, 541]	2505	[2624, 897]
403	[689, 462]	1104	[1494, 1318]	1805	[2119, 1397]	2506	[2625, 2602]
404	[690, 691]	1105	[1495, 1436]	1806	[2120, 1216]	2507	[782, 1025]
405	[692, 503]	1106	[1496, 1443]	1807	[2121, 168]	2508	[2284, 1674]
406	[693, 667]	1107	[1497, 517]	1808	[2122, 160]	2509	[244, 313]
407	[694, 695]	1108	[1498, 715]	1809	[2123, 49]	2510	[2246, 2626]
408	[696, 58]	1109	[661, 442]	1810	[2124, 685]	2511	[267, 278]
409	[697, 698]	1110	[681, 210]	1811	[2125, 548]	2512	[1046, 1064]
410	[699, 514]	1111	[648, 629]	1812	[2126, 430]	2513	[2627, 2628]
411	[700, 492]	1112	[1499, 1339]	1813	[2127, 1389]	2514	[2629, 2317]
412	[490, 701]	1113	[1500, 1319]	1814	[2128, 219]	2515	[2630, 883]
413	[515, 537]	1114	[936, 1501]	1815	[2129, 135]	2516	[2631, 1018]
414	[206, 702]	1115	[1502, 79]	1816	[2036, 2032]	2517	[2632, 1579]
415	[703, 223]	1116	[1503, 1504]	1817	[2130, 1157]	2518	[2224, 2633]
416	[704, 458]	1117	[1505, 1506]	1818	[2131, 1347]	2519	[958, 1739]
417	[532, 618]	1118	[1507, 1106]	1819	[2039, 478]	2520	[1822, 2633]
418	[705, 579]	1119	[949, 286]	1820	[2132, 513]	2521	[2634, 1525]
419	[706, 707]	1120	[1508, 981]	1821	[2133, 1402]	2522	[2635, 328]
420	[708, 549]	1121	[1509, 1076]	1822	[2134, 219]	2523	[1586, 997]
421	[709, 710]	1122	[1510, 1511]	1823	[2135, 476]	2524	[230, 346]
422	[203, 711]	1123	[1512, 899]	1824	[2136, 627]	2525	[734, 2636]
423	[712, 713]	1124	[1031, 115]	1825	[2137, 1242]	2526	[2637, 2618]
424	[714, 442]	1125	[402, 727]	1826	[2138, 537]	2527	[2638, 1775]
425	[715, 122]	1126	[1513, 1514]	1827	[2139, 1905]	2528	[1051, 2377]
426	[716, 717]	1127	[291, 998]	1828	[2140, 1183]	2529	[2639, 2340]
427	[718, 684]	1128	[1515, 1516]	1829	[2141, 1380]	2530	[283, 233]
428	[458, 719]	1129	[230, 1517]	1830	[2142, 35]	2531	[2333, 368]
429	[720, 721]	1130	[238, 280]	1831	[1221, 1206]	2532	[2640, 1507]
430	[722, 723]	1131	[1518, 1519]	1832	[131, 695]	2533	[1789, 2381]
431	[724, 725]	1132	[1520, 1521]	1833	[2143, 1261]	2534	[2641, 807]
432	[726, 727]	1133	[1522, 296]	1834	[2144, 220]	2535	[1553, 2371]
433	[728, 729]	1134	[1523, 329]	1835	[145, 590]	2536	[2642, 1841]
434	[389, 240]	1135	[1524, 1013]	1836	[2145, 182]	2537	[2372, 363]
435	[244, 79]	1136	[1525, 1100]	1837	[2146, 674]	2538	[2643, 2275]
436	[62, 730]	1137	[275, 1111]	1838	[2147, 452]	2539	[1718, 2581]
437	[64, 731]	1138	[1511, 835]	1839	[2148, 2149]	2540	[2344, 332]
438	[732, 88]	1139	[1526, 764]	1840	[2150, 1390]	2541	[915, 980]
439	[733, 734]	1140	[756, 968]	1841	[2151, 35]	2542	[2644, 909]
440	[20, 735]	1141	[1527, 1528]	1842	[2152, 2153]	2543	[2645, 2576]
441	[736, 737]	1142	[769, 106]	1843	[2154, 162]	2544	[2646, 2647]
442	[281, 738]	1143	[816, 1081]	1844	[2155, 1237]	2545	[2648, 2311]
443	[739, 740]	1144	[1529, 405]	1845	[1420, 613]	2546	[2649, 105]
444	[741, 742]	1145	[1530, 341]	1846	[2156, 1248]	2547	[785, 2622]

445	[336, 743]	1146	[1531, 379]	1847	[2157, 2019]	2548	[1637, 987]
446	[744, 745]	1147	[917, 84]	1848	[2158, 635]	2549	[2650, 1053]
447	[746, 747]	1148	[1532, 748]	1849	[2159, 700]	2550	[2651, 1821]
448	[748, 292]	1149	[96, 287]	1850	[2160, 138]	2551	[118, 854]
449	[749, 750]	1150	[98, 375]	1851	[2161, 1318]	2552	[2635, 1523]
450	[751, 388]	1151	[1533, 119]	1852	[2162, 1260]	2553	[2181, 2619]
451	[752, 294]	1152	[315, 762]	1853	[2163, 576]	2554	[2588, 994]
452	[753, 365]	1153	[1534, 1535]	1854	[2164, 1184]	2555	[2652, 419]
453	[754, 755]	1154	[896, 884]	1855	[899, 234]	2556	[1614, 1601]
454	[756, 757]	1155	[1536, 1076]	1856	[2165, 2166]	2557	[2268, 288]
455	[758, 759]	1156	[1537, 77]	1857	[2167, 2168]	2558	[1072, 263]
456	[760, 761]	1157	[82, 293]	1858	[90, 2169]	2559	[2653, 2307]
457	[277, 730]	1158	[1538, 1539]	1859	[2170, 1706]	2560	[2378, 265]
458	[762, 763]	1159	[727, 916]	1860	[2171, 1813]	2561	[2589, 2311]
459	[764, 765]	1160	[1540, 722]	1861	[1588, 798]	2562	[796, 1816]
460	[766, 767]	1161	[1541, 1542]	1862	[63, 1683]	2563	[2261, 785]
461	[768, 769]	1162	[1543, 1544]	1863	[2172, 827]	2564	[2654, 265]
462	[770, 771]	1163	[1062, 418]	1864	[2173, 733]	2565	[335, 1007]
463	[772, 751]	1164	[1545, 273]	1865	[1666, 2174]	2566	[1688, 1059]
464	[773, 774]	1165	[1546, 1547]	1866	[2175, 1651]	2567	[2655, 1002]
465	[775, 289]	1166	[1548, 399]	1867	[2176, 2177]	2568	[412, 2197]
466	[776, 777]	1167	[1549, 1550]	1868	[2178, 109]	2569	[1638, 2656]
467	[778, 779]	1168	[1551, 64]	1869	[2179, 2180]	2570	[2657, 732]
468	[780, 781]	1169	[1552, 1553]	1870	[2181, 921]	2571	[2658, 397]
469	[782, 383]	1170	[841, 811]	1871	[2182, 354]	2572	[1349, 1297]
470	[268, 279]	1171	[1554, 347]	1872	[2183, 356]	2573	[2659, 1130]
471	[783, 784]	1172	[1555, 1556]	1873	[2184, 1506]	2574	[2660, 646]
472	[785, 331]	1173	[1557, 21]	1874	[30, 788]	2575	[2661, 1351]
473	[786, 787]	1174	[1558, 419]	1875	[2185, 864]	2576	[2662, 459]
474	[788, 789]	1175	[1559, 746]	1876	[2186, 1666]	2577	[2663, 1129]
475	[790, 791]	1176	[239, 1560]	1877	[1021, 2187]	2578	[2664, 1328]
476	[792, 793]	1177	[1561, 388]	1878	[2188, 1837]	2579	[2665, 2044]
477	[794, 795]	1178	[1562, 1563]	1879	[2189, 1028]	2580	[2666, 165]
478	[796, 334]	1179	[383, 1026]	1880	[2190, 330]	2581	[199, 504]
479	[797, 673]	1180	[1564, 993]	1881	[2191, 2192]	2582	[2667, 677]
480	[798, 261]	1181	[1565, 1566]	1882	[353, 67]	2583	[2668, 1260]
481	[799, 800]	1182	[1567, 952]	1883	[2193, 1571]	2584	[2669, 1244]
482	[801, 802]	1183	[1568, 814]	1884	[2194, 1670]	2585	[2670, 435]
483	[803, 804]	1184	[72, 903]	1885	[2195, 1009]	2586	[2671, 1229]
484	[805, 806]	1185	[1569, 834]	1886	[935, 999]	2587	[2672, 635]
485	[353, 745]	1186	[1547, 238]	1887	[1725, 1814]	2588	[2673, 1324]
486	[807, 337]	1187	[1570, 1571]	1888	[2176, 1715]	2589	[2674, 462]
487	[808, 809]	1188	[721, 806]	1889	[2196, 1059]	2590	[2675, 700]
488	[802, 810]	1189	[1572, 721]	1890	[1517, 867]	2591	[2676, 1260]

489	[811, 812]	1190	[1573, 72]	1891	[1695, 2197]	2592	[2677, 2048]
490	[813, 814]	1191	[1574, 1539]	1892	[2198, 2199]	2593	[2678, 695]
491	[815, 816]	1192	[1575, 1070]	1893	[2200, 2201]	2594	[2679, 548]
492	[817, 818]	1193	[1576, 315]	1894	[2202, 262]	2595	[2680, 1361]
493	[819, 820]	1194	[1577, 1535]	1895	[2203, 1686]	2596	[2681, 685]
494	[821, 822]	1195	[1578, 902]	1896	[2204, 741]	2597	[2682, 614]
495	[823, 63]	1196	[1080, 1041]	1897	[2205, 864]	2598	[2683, 1224]
496	[824, 21]	1197	[1579, 977]	1898	[2206, 1077]	2599	[2684, 1371]
497	[825, 417]	1198	[861, 1021]	1899	[249, 2207]	2600	[147, 473]
498	[826, 827]	1199	[1580, 1542]	1900	[2208, 1553]	2601	[2685, 698]
499	[828, 829]	1200	[1581, 261]	1901	[2209, 343]	2602	[2686, 675]
500	[830, 420]	1201	[794, 1582]	1902	[2210, 2211]	2603	[45, 614]
501	[831, 832]	1202	[1583, 1056]	1903	[2212, 333]	2604	[2687, 1890]
502	[833, 834]	1203	[1584, 1585]	1904	[2213, 2214]	2605	[2688, 1496]
503	[835, 836]	1204	[1586, 291]	1905	[2215, 352]	2606	[2689, 1402]
504	[837, 838]	1205	[1587, 1588]	1906	[1063, 1047]	2607	[2690, 656]
505	[839, 297]	1206	[1589, 802]	1907	[2216, 2217]	2608	[2691, 178]
506	[840, 841]	1207	[1590, 801]	1908	[2218, 1534]	2609	[2692, 459]
507	[842, 425]	1208	[1591, 1036]	1909	[2219, 338]	2610	[2693, 1233]
508	[843, 22]	1209	[1592, 801]	1910	[321, 828]	2611	[2694, 1399]
509	[844, 845]	1210	[1037, 800]	1911	[1767, 1630]	2612	[2695, 1952]
510	[846, 407]	1211	[810, 1593]	1912	[910, 2220]	2613	[2696, 2697]
511	[847, 253]	1212	[262, 1594]	1913	[2221, 1839]	2614	[2698, 2041]
512	[848, 849]	1213	[1595, 1596]	1914	[972, 1754]	2615	[2699, 1294]
513	[850, 851]	1214	[1597, 1598]	1915	[1074, 2222]	2616	[2700, 1328]
514	[740, 405]	1215	[1074, 1599]	1916	[1748, 2223]	2617	[2701, 1429]
515	[316, 319]	1216	[1501, 1110]	1917	[2224, 1823]	2618	[2702, 708]
516	[852, 853]	1217	[1600, 256]	1918	[2225, 1065]	2619	[2703, 1265]
517	[854, 855]	1218	[811, 1601]	1919	[2226, 2227]	2620	[2704, 1182]
518	[856, 857]	1219	[1602, 266]	1920	[2228, 810]	2621	[2705, 2034]
519	[858, 859]	1220	[1603, 348]	1921	[1785, 1662]	2622	[2048, 457]
520	[860, 861]	1221	[800, 1604]	1922	[2229, 1017]	2623	[2706, 525]
521	[862, 355]	1222	[725, 879]	1923	[2230, 373]	2624	[2707, 183]
522	[863, 244]	1223	[1605, 1606]	1924	[276, 62]	2625	[2708, 674]
523	[864, 306]	1224	[104, 414]	1925	[2231, 1672]	2626	[2709, 554]
524	[865, 866]	1225	[1607, 883]	1926	[2232, 2233]	2627	[2710, 620]
525	[346, 867]	1226	[1608, 970]	1927	[315, 877]	2628	[2711, 1290]
526	[868, 869]	1227	[61, 277]	1928	[2234, 1545]	2629	[2712, 504]
527	[870, 398]	1228	[784, 385]	1929	[2235, 2236]	2630	[2713, 545]
528	[871, 872]	1229	[1609, 1610]	1930	[2237, 1519]	2631	[2714, 691]
529	[873, 784]	1230	[296, 1611]	1931	[342, 2238]	2632	[2715, 135]
530	[874, 369]	1231	[245, 1086]	1932	[1734, 408]	2633	[2716, 607]
531	[875, 876]	1232	[1612, 1613]	1933	[1692, 1728]	2634	[2717, 1491]
532	[877, 763]	1233	[1614, 812]	1934	[2239, 2223]	2635	[2718, 586]

533	[878, 879]	1234	[1615, 1616]	1935	[2240, 1722]	2636	[1195, 1338]
534	[299, 63]	1235	[1617, 1618]	1936	[2241, 18]	2637	[2719, 55]
535	[880, 243]	1236	[1619, 89]	1937	[2242, 1592]	2638	[2720, 1220]
536	[881, 882]	1237	[1620, 97]	1938	[2243, 1594]	2639	[2721, 1262]
537	[883, 838]	1238	[74, 885]	1939	[2244, 1036]	2640	[2722, 1885]
538	[884, 885]	1239	[1578, 421]	1940	[850, 2245]	2641	[2723, 450]
539	[886, 296]	1240	[373, 76]	1941	[2246, 2247]	2642	[2724, 1438]
540	[887, 888]	1241	[1621, 1005]	1942	[2248, 1514]	2643	[2725, 2697]
541	[889, 881]	1242	[361, 30]	1943	[2249, 2168]	2644	[2726, 633]
542	[388, 239]	1243	[1622, 894]	1944	[2250, 85]	2645	[2727, 1115]
543	[890, 243]	1244	[781, 322]	1945	[2251, 1772]	2646	[2728, 154]
544	[891, 845]	1245	[1548, 304]	1946	[2252, 1636]	2647	[2729, 182]
545	[838, 892]	1246	[1623, 1576]	1947	[1090, 2253]	2648	[2730, 1228]
546	[893, 894]	1247	[1624, 738]	1948	[91, 2254]	2649	[2731, 2036]
547	[416, 117]	1248	[879, 402]	1949	[2255, 1007]	2650	[2732, 1342]
548	[895, 896]	1249	[1625, 1070]	1950	[2256, 1045]	2651	[2733, 489]
549	[897, 898]	1250	[1616, 82]	1951	[2257, 340]	2652	[2734, 708]
550	[283, 899]	1251	[1626, 16]	1952	[1698, 734]	2653	[2735, 478]
551	[119, 855]	1252	[1627, 725]	1953	[2250, 293]	2654	[2736, 489]
552	[900, 901]	1253	[1628, 1629]	1954	[754, 1647]	2655	[2737, 625]
553	[902, 422]	1254	[1630, 836]	1955	[1849, 2258]	2656	[1318, 1855]
554	[903, 904]	1255	[902, 1631]	1956	[2259, 391]	2657	[2738, 171]
555	[905, 906]	1256	[1632, 886]	1957	[892, 1662]	2658	[2739, 2039]
556	[907, 908]	1257	[1633, 955]	1958	[2260, 294]	2659	[1676, 278]
557	[909, 70]	1258	[1634, 957]	1959	[2261, 330]	2660	[864, 247]
558	[910, 911]	1259	[1635, 1636]	1960	[2262, 746]	2661	[1515, 2740]
559	[322, 829]	1260	[1637, 342]	1961	[1664, 1660]	2662	[2741, 1763]
560	[912, 901]	1261	[981, 399]	1962	[295, 853]	2663	[2362, 1761]
561	[913, 914]	1262	[965, 352]	1963	[726, 915]	2664	[2386, 1609]
562	[326, 303]	1263	[948, 1618]	1964	[117, 1617]	2665	[2644, 69]
563	[915, 916]	1264	[1638, 232]	1965	[256, 1501]	2666	[2742, 1707]
564	[894, 917]	1265	[1571, 972]	1966	[27, 1031]	2667	[1033, 875]
565	[918, 919]	1266	[1639, 842]	1967	[2188, 2263]	2668	[368, 2359]
566	[747, 427]	1267	[1640, 1521]	1968	[766, 1852]	2669	[2584, 2580]
567	[920, 921]	1268	[1641, 1598]	1969	[1791, 1111]	2670	[894, 83]
568	[922, 307]	1269	[933, 102]	1970	[1624, 1835]	2671	[2290, 1582]
569	[896, 74]	1270	[1642, 869]	1971	[2264, 983]	2672	[1001, 1027]
570	[923, 357]	1271	[1643, 299]	1972	[1066, 2265]	2673	[2295, 2331]
571	[273, 924]	1272	[1644, 764]	1973	[2239, 1749]	2674	[2208, 93]
572	[925, 361]	1273	[1103, 1645]	1974	[2266, 807]	2675	[2648, 817]
573	[399, 305]	1274	[1646, 404]	1975	[2267, 1779]	2676	[2743, 994]
574	[926, 236]	1275	[357, 324]	1976	[1750, 247]	2677	[746, 426]
575	[834, 889]	1276	[375, 1647]	1977	[2268, 775]	2678	[947, 1617]
576	[927, 928]	1277	[1648, 1649]	1978	[2269, 2270]	2679	[2744, 775]

577	[929, 930]	1278	[1650, 1566]	1979	[319, 2271]	2680	[2221, 1002]
578	[931, 354]	1279	[1651, 1652]	1980	[280, 1624]	2681	[2217, 2195]
579	[365, 886]	1280	[1653, 1654]	1981	[2272, 842]	2682	[2745, 24]
580	[932, 933]	1281	[30, 1103]	1982	[424, 2273]	2683	[2607, 376]
581	[934, 935]	1282	[1655, 1051]	1983	[1701, 2220]	2684	[1815, 2746]
582	[827, 275]	1283	[1656, 1061]	1984	[1540, 1741]	2685	[817, 2330]
583	[936, 257]	1284	[255, 832]	1985	[2274, 2275]	2686	[2585, 231]
584	[937, 938]	1285	[1657, 1658]	1986	[2276, 2277]	2687	[769, 2747]
585	[939, 798]	1286	[1659, 61]	1987	[2278, 729]	2688	[2610, 1802]
586	[765, 940]	1287	[285, 1660]	1988	[1021, 946]	2689	[2195, 2343]
587	[941, 942]	1288	[1661, 903]	1989	[2206, 1082]	2690	[1079, 1040]
588	[943, 944]	1289	[1662, 750]	1990	[2279, 2233]	2691	[1028, 1090]
589	[945, 946]	1290	[787, 270]	1991	[781, 828]	2692	[1094, 2174]
590	[947, 948]	1291	[1663, 824]	1992	[2280, 382]	2693	[1834, 1018]
591	[949, 96]	1292	[1664, 1074]	1993	[273, 20]	2694	[2748, 2628]
592	[950, 951]	1293	[1033, 888]	1994	[2281, 1112]	2695	[231, 2656]
593	[857, 952]	1294	[295, 1657]	1995	[2282, 1629]	2696	[2368, 813]
594	[953, 849]	1295	[1665, 733]	1996	[2283, 910]	2697	[952, 872]
595	[311, 816]	1296	[1666, 1095]	1997	[788, 1645]	2698	[1038, 2636]
596	[954, 955]	1297	[1077, 1083]	1998	[2284, 2285]	2699	[1675, 2207]
597	[956, 957]	1298	[908, 787]	1999	[73, 884]	2700	[2743, 1729]
598	[958, 959]	1299	[98, 754]	2000	[2286, 820]	2701	[2586, 2749]
599	[960, 961]	1300	[889, 1667]	2001	[967, 757]	2702	[2353, 408]
600	[962, 963]	1301	[1668, 311]	2002	[1829, 2287]	2703	[2578, 776]
601	[964, 965]	1302	[1669, 1670]	2003	[2288, 1550]	2704	[1552, 93]
602	[966, 319]	1303	[853, 1658]	2004	[1833, 850]	2705	[2750, 347]
603	[967, 968]	1304	[1671, 1545]	2005	[82, 85]	2706	[2751, 1040]
604	[969, 970]	1305	[1672, 114]	2006	[765, 2289]	2707	[89, 760]
605	[971, 972]	1306	[904, 902]	2007	[2290, 795]	2708	[105, 2747]
606	[973, 753]	1307	[1673, 1674]	2008	[1085, 246]	2709	[2325, 984]
607	[974, 975]	1308	[1675, 250]	2009	[327, 1624]	2710	[1810, 2752]
608	[976, 977]	1309	[1676, 268]	2010	[744, 67]	2711	[2744, 288]
609	[978, 979]	1310	[1677, 824]	2011	[2291, 1005]	2712	[2753, 2214]
610	[727, 980]	1311	[1678, 1679]	2012	[2292, 722]	2713	[2754, 252]
611	[76, 981]	1312	[1680, 1604]	2013	[2293, 2294]	2714	[2175, 1802]
612	[982, 983]	1313	[1681, 1043]	2014	[2295, 1707]	2715	[824, 843]
613	[984, 985]	1314	[1682, 914]	2015	[2296, 1073]	2716	[2632, 976]
614	[986, 411]	1315	[1683, 731]	2016	[2297, 1525]	2717	[2755, 1101]
615	[987, 988]	1316	[1684, 239]	2017	[2298, 732]	2718	[2360, 941]
616	[989, 892]	1317	[1685, 1686]	2018	[251, 428]	2719	[2756, 2757]
617	[990, 409]	1318	[1511, 1630]	2019	[1017, 1654]	2720	[733, 1038]
618	[991, 258]	1319	[1667, 882]	2020	[2299, 2300]	2721	[362, 2373]
619	[992, 993]	1320	[721, 1687]	2021	[2301, 1065]	2722	[2335, 390]
620	[994, 995]	1321	[1688, 803]	2022	[2302, 2211]	2723	[2758, 956]

621	[996, 341]	1322	[1689, 1690]	2023	[2303, 378]	2724	[870, 1000]
622	[997, 998]	1323	[1691, 870]	2024	[2304, 2192]	2725	[410, 2759]
623	[999, 308]	1324	[1692, 765]	2025	[966, 1097]	2726	[2579, 376]
624	[397, 1000]	1325	[1693, 1072]	2026	[2305, 740]	2727	[2760, 2761]
625	[342, 988]	1326	[1686, 781]	2027	[2306, 2307]	2728	[1783, 2746]
626	[1001, 929]	1327	[1694, 118]	2028	[1781, 113]	2729	[2750, 1603]
627	[1002, 1003]	1328	[367, 1695]	2029	[2308, 100]	2730	[2762, 1609]
628	[1004, 382]	1329	[1696, 906]	2030	[385, 2309]	2731	[2351, 953]
629	[1005, 935]	1330	[1103, 789]	2031	[2310, 2199]	2732	[103, 108]
630	[1006, 316]	1331	[1697, 881]	2032	[2311, 818]	2733	[986, 2759]
631	[1007, 743]	1332	[1698, 1038]	2033	[929, 2312]	2734	[2638, 897]
632	[776, 1008]	1333	[1699, 1610]	2034	[2313, 1695]	2735	[2763, 2764]
633	[771, 1009]	1334	[258, 926]	2035	[2314, 328]	2736	[2598, 813]
634	[1010, 756]	1335	[1700, 311]	2036	[2217, 771]	2737	[2623, 974]
635	[1011, 377]	1336	[1701, 911]	2037	[1714, 2177]	2738	[356, 323]
636	[1012, 61]	1337	[1702, 900]	2038	[2212, 796]	2739	[2765, 410]
637	[1013, 258]	1338	[1703, 1100]	2039	[345, 1517]	2740	[2766, 45]
638	[1014, 353]	1339	[1660, 1599]	2040	[2315, 1072]	2741	[2767, 2080]
639	[1015, 985]	1340	[1517, 1704]	2041	[2287, 975]	2742	[2768, 1478]
640	[1016, 1017]	1341	[1705, 1706]	2042	[2316, 2317]	2743	[2769, 1265]
641	[1018, 793]	1342	[1707, 1708]	2043	[109, 2318]	2744	[2770, 527]
642	[1019, 908]	1343	[1709, 1710]	2044	[1029, 1091]	2745	[2771, 1142]
643	[1020, 1021]	1344	[1594, 1588]	2045	[1104, 1701]	2746	[2772, 650]
644	[1022, 1023]	1345	[90, 761]	2046	[1804, 1531]	2747	[2034, 1353]
645	[1024, 78]	1346	[1711, 1712]	2047	[1738, 959]	2748	[2773, 1333]
646	[117, 948]	1347	[1071, 1713]	2048	[2319, 762]	2749	[2774, 168]
647	[1025, 1026]	1348	[1714, 1715]	2049	[16, 2320]	2750	[2775, 2489]
648	[924, 735]	1349	[1716, 891]	2050	[839, 1611]	2751	[2776, 1390]
649	[1027, 930]	1350	[1717, 747]	2051	[2269, 1752]	2752	[2777, 579]
650	[1028, 1029]	1351	[935, 307]	2052	[2321, 1556]	2753	[2778, 1496]
651	[1030, 1031]	1352	[971, 1718]	2053	[1529, 370]	2754	[2779, 466]
652	[1032, 1033]	1353	[1719, 344]	2054	[2322, 1029]	2755	[2780, 614]
653	[1034, 917]	1354	[1720, 1721]	2055	[1697, 1667]	2756	[2781, 211]
654	[1035, 809]	1355	[1521, 97]	2056	[2322, 1090]	2757	[2782, 1242]
655	[1036, 1037]	1356	[1720, 1722]	2057	[1759, 2323]	2758	[2783, 594]
656	[1038, 1039]	1357	[1723, 979]	2058	[2324, 858]	2759	[2408, 512]
657	[1040, 1041]	1358	[67, 1724]	2059	[1719, 1819]	2760	[2784, 32]
658	[1042, 1043]	1359	[1725, 1563]	2060	[1639, 424]	2761	[2785, 439]
659	[1044, 1045]	1360	[1726, 1727]	2061	[2325, 1015]	2762	[2786, 1952]
660	[1046, 1047]	1361	[1728, 940]	2062	[2326, 938]	2763	[2787, 1397]
661	[1048, 337]	1362	[1729, 1730]	2063	[1571, 1718]	2764	[2788, 1420]
662	[1049, 103]	1363	[1731, 1094]	2064	[760, 2169]	2765	[2789, 650]
663	[1050, 925]	1364	[848, 1732]	2065	[2327, 2328]	2766	[2590, 986]
664	[892, 749]	1365	[720, 805]	2066	[1553, 94]	2767	[2742, 2331]

665	[1051, 859]	1366	[1733, 283]	2067	[2329, 1850]	2768	[2741, 1789]
666	[1052, 1053]	1367	[1053, 822]	2068	[2311, 2330]	2769	[2790, 1761]
667	[963, 896]	1368	[1734, 990]	2069	[2186, 1094]	2770	[1567, 871]
668	[1054, 1033]	1369	[4, 256]	2070	[2331, 2332]	2771	[2791, 2792]
669	[1055, 295]	1370	[1735, 944]	2071	[2333, 874]	2772	[1554, 1603]
670	[1056, 742]	1371	[901, 1062]	2072	[2334, 1028]	2773	[2793, 2794]
671	[338, 77]	1372	[1736, 1713]	2073	[842, 2273]	2774	[2218, 1577]
672	[1057, 1058]	1373	[960, 1737]	2074	[2335, 2259]	2775	[2577, 1789]
673	[673, 673]	1374	[1738, 1739]	2075	[1097, 2271]	2776	[2613, 1766]
674	[734, 1039]	1375	[1740, 387]	2076	[2336, 359]	2777	[2755, 350]
675	[1059, 804]	1376	[1741, 723]	2077	[389, 1560]	2778	[347, 2603]
676	[1060, 1061]	1377	[1742, 1015]	2078	[338, 1024]	2779	[784, 778]
677	[825, 1062]	1378	[1743, 1744]	2079	[309, 2320]	2780	[341, 987]
678	[1063, 1064]	1379	[1604, 1591]	2080	[2337, 790]	2781	[2327, 2749]
679	[1065, 751]	1380	[385, 779]	2081	[2338, 1737]	2782	[2596, 1577]
680	[1066, 1067]	1381	[1745, 318]	2082	[2339, 2340]	2783	[764, 1728]
681	[16, 310]	1382	[375, 755]	2083	[1847, 1736]	2784	[2347, 2740]
682	[1068, 1069]	1383	[1746, 1747]	2084	[2341, 1585]	2785	[2765, 986]
683	[1070, 1071]	1384	[1748, 1749]	2085	[2331, 1708]	2786	[2620, 1089]
684	[1072, 790]	1385	[1750, 306]	2086	[778, 2309]	2787	[2367, 2626]
685	[1073, 110]	1386	[831, 1084]	2087	[2342, 1744]	2788	[1742, 984]
686	[285, 1074]	1387	[1751, 1752]	2088	[1102, 788]	2789	[2795, 343]
687	[1075, 292]	1388	[1753, 1613]	2089	[945, 2187]	2790	[2796, 52]
688	[1076, 1077]	1389	[1729, 995]	2090	[771, 2343]	2791	[2797, 594]
689	[976, 1078]	1390	[1718, 1754]	2091	[2344, 6]	2792	[2798, 1248]
690	[1079, 1080]	1391	[1755, 395]	2092	[402, 915]	2793	[2799, 183]
691	[312, 1081]	1392	[1756, 1528]	2093	[2345, 2236]	2794	[2800, 188]
692	[1082, 1083]	1393	[1757, 736]	2094	[1024, 1758]	2795	[2801, 459]
693	[255, 1084]	1394	[77, 1758]	2095	[2329, 2258]	2796	[768, 105]
694	[1085, 1086]	1395	[1759, 1649]	2096	[1646, 2346]	2797	[2597, 92]
695	[102, 928]	1396	[1760, 381]	2097	[2347, 1516]	2798	[2255, 336]
696	[1087, 1088]	1397	[1761, 26]	2098	[1029, 2253]	2799	[2611, 2752]
697	[1089, 777]	1398	[1762, 967]	2099	[384, 778]	2800	[2608, 350]
698	[1090, 1091]	1399	[1763, 1764]	2100	[1531, 2348]	2801	[2178, 1073]
699	[1092, 1093]	1400	[290, 997]	2101	[2349, 2350]		
700	[107, 104]	1401	[1765, 1606]	2102	[2351, 848]		

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	468	0	936	0	1404	1	1872	0	2340	1
1	0	469	1	937	0	1405	1	1873	1	2341	0
2	0	470	1	938	1	1406	0	1874	0	2342	0
3	0	471	1	939	0	1407	1	1875	0	2343	0
4	0	472	1	940	1	1408	1	1876	1	2344	1

5	0	473	1	941	0	1409	1	1877	1	2345	1
6	0	474	0	942	0	1410	0	1878	0	2346	1
7	0	475	1	943	0	1411	1	1879	0	2347	1
8	0	476	0	944	1	1412	1	1880	1	2348	1
9	0	477	1	945	0	1413	1	1881	1	2349	0
10	1	478	1	946	0	1414	0	1882	0	2350	0
11	0	479	1	947	1	1415	0	1883	0	2351	1
12	0	480	1	948	1	1416	0	1884	1	2352	1
13	0	481	1	949	1	1417	1	1885	0	2353	1
14	0	482	0	950	0	1418	1	1886	1	2354	1
15	0	483	0	951	0	1419	1	1887	0	2355	1
16	0	484	0	952	0	1420	1	1888	0	2356	1
17	0	485	0	953	0	1421	1	1889	1	2357	1
18	1	486	1	954	1	1422	1	1890	0	2358	0
19	0	487	1	955	0	1423	0	1891	1	2359	1
20	1	488	1	956	0	1424	0	1892	0	2360	0
21	1	489	1	957	0	1425	1	1893	1	2361	0
22	1	490	0	958	1	1426	1	1894	0	2362	1
23	0	491	1	959	0	1427	1	1895	0	2363	0
24	0	492	0	960	1	1428	1	1896	0	2364	0
25	0	493	1	961	0	1429	1	1897	1	2365	1
26	1	494	0	962	1	1430	0	1898	0	2366	1
27	0	495	1	963	1	1431	1	1899	1	2367	0
28	1	496	0	964	0	1432	0	1900	1	2368	1
29	0	497	1	965	0	1433	1	1901	0	2369	1
30	0	498	1	966	0	1434	0	1902	0	2370	0
31	0	499	1	967	1	1435	0	1903	0	2371	1
32	0	500	1	968	0	1436	0	1904	0	2372	1
33	0	501	0	969	1	1437	0	1905	1	2373	0
34	1	502	1	970	0	1438	1	1906	0	2374	0
35	1	503	1	971	1	1439	0	1907	1	2375	0
36	1	504	0	972	1	1440	0	1908	1	2376	0
37	1	505	0	973	0	1441	1	1909	0	2377	0
38	0	506	1	974	1	1442	0	1910	0	2378	1
39	1	507	0	975	0	1443	0	1911	1	2379	0
40	1	508	0	976	0	1444	1	1912	1	2380	1
41	0	509	0	977	1	1445	0	1913	0	2381	1
42	1	510	0	978	1	1446	0	1914	1	2382	0
43	0	511	0	979	0	1447	0	1915	0	2383	1
44	1	512	1	980	1	1448	1	1916	0	2384	0
45	1	513	0	981	0	1449	0	1917	0	2385	1
46	0	514	1	982	0	1450	0	1918	0	2386	1
47	1	515	1	983	0	1451	1	1919	1	2387	1
48	0	516	0	984	1	1452	0	1920	0	2388	0

49	0	517	0	985	1	1453	0	1921	0	2389	0
50	0	518	1	986	1	1454	0	1922	1	2390	0
51	0	519	1	987	1	1455	1	1923	0	2391	0
52	1	520	0	988	0	1456	1	1924	1	2392	0
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56	1	524	1	992	1	1460	0	1928	0	2396	0
57	1	525	1	993	1	1461	1	1929	0	2397	1
58	1	526	1	994	0	1462	0	1930	1	2398	1
59	0	527	1	995	0	1463	1	1931	0	2399	0
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61	0	529	0	997	1	1465	1	1933	1	2401	0
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64	1	532	1	1000	0	1468	1	1936	1	2404	1
65	0	533	1	1001	0	1469	1	1937	1	2405	0
66	1	534	0	1002	1	1470	1	1938	0	2406	1
67	1	535	1	1003	1	1471	1	1939	0	2407	0
68	1	536	0	1004	1	1472	1	1940	0	2408	1
69	1	537	1	1005	1	1473	1	1941	1	2409	0
70	0	538	1	1006	1	1474	0	1942	0	2410	1
71	1	539	1	1007	0	1475	1	1943	1	2411	1
72	1	540	1	1008	1	1476	1	1944	1	2412	1
73	1	541	0	1009	1	1477	1	1945	0	2413	0
74	0	542	0	1010	1	1478	0	1946	0	2414	1
75	0	543	0	1011	1	1479	0	1947	0	2415	1
76	0	544	1	1012	0	1480	1	1948	0	2416	0
77	1	545	1	1013	1	1481	1	1949	1	2417	0
78	0	546	0	1014	1	1482	1	1950	0	2418	1
79	1	547	1	1015	0	1483	0	1951	0	2419	0
80	1	548	0	1016	0	1484	0	1952	1	2420	0
81	0	549	0	1017	1	1485	0	1953	1	2421	0
82	0	550	1	1018	1	1486	0	1954	0	2422	1
83	1	551	1	1019	1	1487	0	1955	1	2423	0
84	1	552	1	1020	0	1488	1	1956	0	2424	1
85	0	553	0	1021	1	1489	0	1957	1	2425	1
86	0	554	0	1022	1	1490	1	1958	1	2426	0
87	1	555	1	1023	0	1491	1	1959	0	2427	0
88	0	556	0	1024	0	1492	1	1960	1	2428	0
89	1	557	0	1025	1	1493	0	1961	0	2429	0
90	0	558	1	1026	0	1494	1	1962	1	2430	0
91	0	559	0	1027	1	1495	1	1963	0	2431	1
92	0	560	0	1028	1	1496	1	1964	0	2432	1

93	1	561	1	1029	1	1497	1	1965	1	2433	1
94	0	562	1	1030	1	1498	0	1966	0	2434	0
95	0	563	1	1031	0	1499	0	1967	0	2435	1
96	0	564	0	1032	1	1500	1	1968	1	2436	0
97	0	565	1	1033	0	1501	0	1969	1	2437	0
98	0	566	0	1034	1	1502	0	1970	0	2438	0
99	0	567	1	1035	0	1503	1	1971	1	2439	0
100	0	568	0	1036	0	1504	0	1972	1	2440	1
101	0	569	0	1037	0	1505	0	1973	1	2441	1
102	1	570	1	1038	0	1506	0	1974	1	2442	1
103	1	571	1	1039	0	1507	0	1975	0	2443	0
104	0	572	0	1040	0	1508	1	1976	1	2444	0
105	1	573	1	1041	1	1509	0	1977	1	2445	1
106	1	574	0	1042	0	1510	0	1978	1	2446	0
107	0	575	0	1043	0	1511	0	1979	0	2447	0
108	1	576	0	1044	1	1512	0	1980	1	2448	0
109	0	577	0	1045	0	1513	1	1981	0	2449	1
110	1	578	1	1046	1	1514	1	1982	1	2450	1
111	1	579	1	1047	0	1515	0	1983	0	2451	1
112	0	580	1	1048	0	1516	1	1984	1	2452	1
113	1	581	0	1049	0	1517	0	1985	1	2453	1
114	0	582	0	1050	1	1518	0	1986	1	2454	1
115	0	583	0	1051	0	1519	0	1987	0	2455	0
116	0	584	0	1052	0	1520	0	1988	1	2456	0
117	0	585	0	1053	1	1521	0	1989	0	2457	1
118	1	586	0	1054	0	1522	0	1990	0	2458	0
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121	1	589	0	1057	1	1525	0	1993	1	2461	1
122	1	590	1	1058	1	1526	1	1994	1	2462	0
123	1	591	1	1059	1	1527	1	1995	1	2463	0
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125	1	593	1	1061	1	1529	0	1997	0	2465	0
126	1	594	0	1062	0	1530	1	1998	0	2466	1
127	0	595	0	1063	0	1531	1	1999	1	2467	0
128	0	596	1	1064	1	1532	0	2000	0	2468	1
129	0	597	0	1065	1	1533	0	2001	1	2469	0
130	1	598	1	1066	1	1534	1	2002	0	2470	1
131	0	599	1	1067	0	1535	1	2003	0	2471	1
132	1	600	1	1068	0	1536	1	2004	0	2472	1
133	0	601	0	1069	1	1537	1	2005	0	2473	0
134	1	602	0	1070	1	1538	0	2006	0	2474	1
135	1	603	1	1071	0	1539	0	2007	0	2475	1
136	1	604	1	1072	1	1540	1	2008	1	2476	0

137	1	605	1	1073	1	1541	1	2009	0	2477	0
138	0	606	0	1074	0	1542	0	2010	1	2478	1
139	1	607	1	1075	1	1543	1	2011	1	2479	1
140	1	608	0	1076	1	1544	1	2012	0	2480	1
141	1	609	1	1077	1	1545	0	2013	1	2481	0
142	1	610	0	1078	0	1546	0	2014	1	2482	0
143	1	611	0	1079	0	1547	1	2015	0	2483	0
144	1	612	0	1080	1	1548	1	2016	1	2484	0
145	1	613	1	1081	1	1549	1	2017	1	2485	1
146	0	614	1	1082	0	1550	1	2018	0	2486	1
147	1	615	1	1083	1	1551	1	2019	1	2487	0
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150	1	618	0	1086	0	1554	0	2022	1	2490	1
151	1	619	1	1087	1	1555	0	2023	1	2491	0
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153	0	621	0	1089	1	1557	1	2025	0	2493	0
154	1	622	1	1090	0	1558	1	2026	1	2494	0
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156	1	624	0	1092	0	1560	0	2028	1	2496	0
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161	0	629	1	1097	1	1565	0	2033	0	2501	1
162	1	630	1	1098	0	1566	0	2034	0	2502	1
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166	0	634	1	1102	1	1570	1	2038	0	2506	1
167	1	635	1	1103	1	1571	0	2039	0	2507	1
168	0	636	0	1104	1	1572	1	2040	0	2508	0
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170	0	638	1	1106	1	1574	1	2042	0	2510	1
171	0	639	0	1107	1	1575	1	2043	0	2511	1
172	0	640	0	1108	0	1576	0	2044	1	2512	1
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176	0	644	1	1112	0	1580	0	2048	0	2516	1
177	0	645	0	1113	1	1581	0	2049	0	2517	0
178	0	646	0	1114	0	1582	0	2050	0	2518	0
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181	1	649	1	1117	0	1585	1	2053	0	2521	0
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192	1	660	1	1128	0	1596	1	2064	1	2532	1
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201	0	669	0	1137	0	1605	0	2073	0	2541	1
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203	0	671	0	1139	1	1607	1	2075	1	2543	1
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207	1	675	1	1143	1	1611	0	2079	1	2547	1
208	1	676	1	1144	0	1612	0	2080	0	2548	1
209	0	677	1	1145	1	1613	1	2081	0	2549	1
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211	0	679	1	1147	0	1615	1	2083	0	2551	1
212	1	680	1	1148	0	1616	1	2084	0	2552	0
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215	0	683	1	1151	0	1619	0	2087	0	2555	0
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218	0	686	1	1154	0	1622	1	2090	1	2558	1
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232	1	700	0	1168	1	1636	1	2104	1	2572	1
233	1	701	0	1169	0	1637	1	2105	1	2573	0
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238	0	706	0	1174	1	1642	0	2110	0	2578	1
239	1	707	1	1175	0	1643	1	2111	0	2579	1
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249	1	717	0	1185	0	1653	0	2121	1	2589	1
250	0	718	0	1186	1	1654	0	2122	0	2590	0
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252	1	720	0	1188	1	1656	0	2124	1	2592	1
253	0	721	1	1189	1	1657	1	2125	1	2593	1
254	0	722	0	1190	0	1658	0	2126	1	2594	0
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258	1	726	0	1194	0	1662	1	2130	1	2598	0
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260	1	728	1	1196	1	1664	0	2132	0	2600	1
261	1	729	0	1197	1	1665	1	2133	0	2601	0
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263	0	731	1	1199	0	1667	1	2135	1	2603	1
264	0	732	0	1200	0	1668	0	2136	1	2604	0
265	1	733	0	1201	1	1669	0	2137	1	2605	0
266	1	734	1	1202	1	1670	0	2138	1	2606	0
267	1	735	1	1203	1	1671	1	2139	1	2607	0
268	1	736	0	1204	1	1672	0	2140	1	2608	1

269	1	737	0	1205	1	1673	1	2141	0	2609	0
270	1	738	0	1206	1	1674	0	2142	1	2610	0
271	1	739	0	1207	1	1675	0	2143	0	2611	0
272	1	740	1	1208	1	1676	0	2144	0	2612	1
273	1	741	1	1209	0	1677	0	2145	1	2613	1
274	1	742	0	1210	0	1678	0	2146	1	2614	0
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279	1	747	0	1215	0	1683	0	2151	1	2619	1
280	1	748	0	1216	0	1684	1	2152	0	2620	0
281	1	749	0	1217	1	1685	1	2153	1	2621	1
282	0	750	0	1218	1	1686	1	2154	0	2622	0
283	1	751	1	1219	0	1687	1	2155	1	2623	1
284	0	752	0	1220	0	1688	0	2156	1	2624	1
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288	1	756	0	1224	0	1692	1	2160	1	2628	0
289	1	757	1	1225	1	1693	1	2161	0	2629	1
290	0	758	1	1226	0	1694	0	2162	1	2630	0
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292	1	760	1	1228	0	1696	0	2164	1	2632	0
293	1	761	1	1229	0	1697	1	2165	1	2633	0
294	1	762	0	1230	1	1698	1	2166	0	2634	0
295	1	763	0	1231	0	1699	1	2167	0	2635	0
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297	1	765	0	1233	0	1701	0	2169	0	2637	1
298	0	766	1	1234	1	1702	0	2170	0	2638	0
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301	0	769	0	1237	1	1705	1	2173	0	2641	0
302	0	770	1	1238	0	1706	1	2174	0	2642	1
303	0	771	1	1239	1	1707	1	2175	1	2643	0
304	0	772	0	1240	1	1708	0	2176	0	2644	1
305	1	773	1	1241	0	1709	0	2177	1	2645	1
306	1	774	1	1242	1	1710	1	2178	1	2646	0
307	0	775	0	1243	1	1711	0	2179	0	2647	1
308	0	776	0	1244	1	1712	1	2180	1	2648	0
309	1	777	0	1245	1	1713	1	2181	0	2649	1
310	0	778	1	1246	0	1714	1	2182	0	2650	1
311	0	779	0	1247	0	1715	0	2183	0	2651	1
312	0	780	0	1248	0	1716	1	2184	1	2652	0

313	0	781	1	1249	0	1717	0	2185	0	2653	0
314	1	782	1	1250	1	1718	0	2186	1	2654	0
315	1	783	1	1251	1	1719	0	2187	1	2655	1
316	1	784	0	1252	0	1720	0	2188	0	2656	0
317	1	785	1	1253	0	1721	1	2189	0	2657	0
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319	0	787	0	1255	0	1723	0	2191	1	2659	0
320	1	788	0	1256	0	1724	0	2192	1	2660	0
321	0	789	1	1257	0	1725	0	2193	0	2661	0
322	0	790	1	1258	1	1726	0	2194	1	2662	0
323	0	791	1	1259	1	1727	1	2195	0	2663	1
324	0	792	0	1260	1	1728	1	2196	1	2664	1
325	1	793	1	1261	0	1729	1	2197	0	2665	1
326	1	794	1	1262	0	1730	1	2198	0	2666	0
327	0	795	1	1263	1	1731	0	2199	0	2667	0
328	0	796	1	1264	0	1732	0	2200	1	2668	1
329	0	797	1	1265	0	1733	1	2201	0	2669	1
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466	0	934	0	1402	0	1870	0	2338	0		
467	1	935	1	1403	1	1871	0	2339	1		

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