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

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

1. Introduction

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

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

as the limit of the finite continued fractions

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

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

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

admits a continued fraction expansion of form (1.1).

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

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

that we shall denote

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

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

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

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

$$\begin{aligned}
p_0(z) &= z^{18}+z^{16}+z^{15}+z^{11}+z^{10}+z^9+z^7+z^6+z^3+z^2+1,\\
p_1(z) &= z^{18}+z^{16}+z^{15}+z^{11}+z^{10}+z^9+z^7+z^4+z^3+z^2,\\
p_2(z) &= z^{24}+z^{16}+z^6+z^4,\\
p_3(z) &= z^{18}+z^{16}+z^{15}+z^{11}+z^{10}+z^9+z^7+z^4+z^3+z^2,\\
p_4(z) &= z^{18}+z^{16}+z^{15}+z^{12}+z^{11}+z^{10}+z^9+z^8+z^7+z^4+z^3+z^2,
\end{aligned}$$

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

$$\begin{aligned}
p_0(z) &= z^{18}+z^{16}+z^{15}+z^{11}+z^{10}+z^9+z^7+z^6+z^3+z^2,\\
p_1(z) &= z^{18}+z^{16}+z^{15}+z^{11}+z^{10}+z^9+z^7+z^4+z^3+z^2,\\
p_2(z) &= z^{24}+z^{16}+z^6+z^4,\\
p_3(z) &= z^{18}+z^{16}+z^{15}+z^{11}+z^{10}+z^9+z^7+z^4+z^3+z^2,\\
p_4(z) &= z^{18}+z^{16}+z^{15}+z^{12}+z^{11}+z^{10}+z^9+z^8+z^7+z^4+z^3+z^2+1.
\end{aligned}$$

2. Proof

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

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

By the basic properties of continued fractions, we have

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

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

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

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

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

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

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

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

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

for some positive integer d_n. Hence,

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

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

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

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

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

of the vector

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

where $T = M_{12,i,j}$ (resp. $M_{11,i,j}$, $W_{12,i,j}$, and $W_{11,i,j}$), found by the Derksen algorithm. We take the first 8 terms of $M_{12,i,j}$ (resp. $M_{11,i,j}$, $W_{12,i,j}$, and $W_{11,i,j}$) as initial conditions for $\phi(M^e,i,j)$ (resp. $\phi(M^o,i,j)$, $\phi(W^e,i,j)$, and $\phi(W^o,i,j)$). The following fact will be used to ensure that the solution exists and is unique: let $P(x,y) \in \mathbb{F}_2[x,y]$ and for each series $f(x) = \sum_{n=0}^{\infty} a_n x^n \in \mathbb{F}_2[[x]]$ denote the partial sum $\sum_{j=0}^{n-1} a_j x^j$ by $f_n(x)$ for $n \ge 0$. If for some $n \ge 0$ and $a_0, a_1, \dots, a_{n-1} \in \mathbb{F}_2$ $P(x, \sum_{j=0}^{n-1} a_j x^j) = O(x^n)$ 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 540 and substitute it for y in $Q(x,y)$. We get a series of valuation less than 540, which proves that $Q(x,y)$ is not an annihilating polynomial of $W^o_{0,0}M^o_{0,0}$. We find the minimal polynomial $\phi_1(x,y)$ of $W^o_{0,1}M^o_{1,0}$ in a similar way.

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

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

is an annihilating of $W^o_{0,0}M^o_{0,0} + W^o_{0,1}M^o_{1,0}$. We verify that $\phi(M^e,0,0)$ is an irreducible factor of $S(x,y)$ of multiplicity μ, and that $Q(x,y) := S(x,y)/\phi(M^e,0,0)^\mu$ is not an annihilating polynomial of $W^o_{0,0}M^o_{0,0}+W^o_{0,1}M^o_{1,0}$. To see the last point, we truncate $W^o_{0,0}M^o_{0,0} + W^o_{0,1}M^o_{1,0}$ to order 660 and substitute it for y in $Q(x,y)$. We get a series of valuation less than 660, and therefore $Q(x,y)$ is not an annihilating polynomial of $W^o_{0,0}M^o_{0,0} + W^o_{0,1}M^o_{1,0}$.

Finally, the first 32 terms of $M^e_{0,0}$ and $W^o_{0,0}M^o_{0,0} + W^o_{0,1}M^o_{1,0}$ coincide. As these first terms determine a unique solution of $\phi(M^e,0,0)$, we know that the two series are one and the same. □

Define

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

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

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

$$+ x^{5u}W^e[:4u] + x^{6u}W^e[:3u] + x^{7u}W^e[:2u] + x^{7u}W^e[:5u] + (x^{6u} + x^{8u} + x^{9u})R^e.$$

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

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

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

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

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

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

which can be rewritten as

$$0 = T[[10w]_2] + T[[11w]_2] + T[[100w]_2] + T[[110w]_2], \tag{2.7}$$

$$0 = T[[11w]_2] + T[[100w]_2] + T[[101w]_2] + T[[111w]_2], \tag{2.8}$$

$$0 = T[[10w]_2] + T[[11w]_2] + T[[101w]_2] + T[[1000w]_2], \tag{2.9}$$

$$0 = T[[10w]_2] + T[[1001w]_2], \tag{2.10}$$

$$0 = T[[11w]_2] + T[[1010w]_2], \tag{2.11}$$

$$0 = T[[100w]_2] + T[[1011w]_2], \tag{2.12}$$

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

$$0 = T[[10w]_2] + T[[11w]_2] + T[[100w]_2] + T[[110w]_2], \tag{2.13}$$

$$0 = T[[11w]_2] + T[[100w]_2] + T[[101w]_2] + T[[111w]_2], \tag{2.14}$$

$$0 = T[[10w]_2] + T[[11w]_2] + T[[101w]_2] + T[[1000w]_2], \tag{2.15}$$
$$0 = T[[10w]_2] + T[[1001w]_2], \tag{2.16}$$
$$0 = T[[11w]_2] + T[[1010w]_2], \tag{2.17}$$
$$0 = T[[100w]_2] + T[[1011w]_2], \tag{2.18}$$

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

First we calculate an 2-automaton that generates T from its minimal polynomial and its first terms. This automaton has 3080 states; its transition function and output function can be found in the annex. Let $A(s, w)$ denote the state reached after reading w from right to left starting from the state s, and τ the output function. Define

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

Identities (2.7) through (2.18) can be written as

$$0 = \tau(A(s, 10)) + \tau(A(s, 11)) + \tau(A(s, 100)) + \tau(A(s, 110)), \tag{2.19}$$
$$0 = \tau(A(s, 11)) + \tau(A(s, 100)) + \tau(A(s, 101)) + \tau(A(s, 111)), \tag{2.20}$$
$$0 = \tau(A(s, 10)) + \tau(A(s, 11)) + \tau(A(s, 101)) + \tau(A(s, 1000)), \tag{2.21}$$
$$0 = \tau(A(s, 10)) + \tau(A(s, 1001)), \tag{2.22}$$
$$0 = \tau(A(s, 11)) + \tau(A(s, 1010)), \tag{2.23}$$
$$0 = \tau(A(s, 100)) + \tau(A(s, 1011)), \tag{2.24}$$

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

$$0 = \tau(A(s, 10)) + \tau(A(s, 11)) + \tau(A(s, 100)) + \tau(A(s, 110)), \tag{2.25}$$
$$0 = \tau(A(s, 11)) + \tau(A(s, 100)) + \tau(A(s, 101)) + \tau(A(s, 111)), \tag{2.26}$$
$$0 = \tau(A(s, 10)) + \tau(A(s, 11)) + \tau(A(s, 101)) + \tau(A(s, 1000)), \tag{2.27}$$
$$0 = \tau(A(s, 10)) + \tau(A(s, 1001)), \tag{2.28}$$
$$0 = \tau(A(s, 11)) + \tau(A(s, 1010)), \tag{2.29}$$
$$0 = \tau(A(s, 100)) + \tau(A(s, 1011)), \tag{2.30}$$

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 (2.19) through (2.30) hold for $2 \leq k \leq 16$, which turns out to be true. □

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

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

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

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

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

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

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

Call this expression lhs. Note that both sides of identity M_{2k+1} have the same term of highest degree $x^{12v}R^o$. Therefore we only need to prove that their difference is $O(x^{12v})$. Using Lemma 2.1 it can be seen that the right side of identity M_{2k+1} is congruent, modulo x^{12v}, to

$$\begin{aligned} W^e[:12v]M^e[:12v] + x^{4v}W^e[:8v]M^e[:8v] + x^{6v}W^e[:6v]M^e[:6v] \\ + x^{8v}W^e[:4v]M^e[:4v]. \end{aligned}$$

For all $n \leq 12$, replace the occurrences of $W^e[:n \cdot v]$ and $M^e[:n \cdot v]$ in the above expression by the reduction modulo $x^{n \cdot v}$ of the right side of the corresponding identity in Lemma 2.2 and get a new expression, which we call rhs. Define

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

Using the notation introduced above, we can represent the expressions lhs (2.31) and rhs as polynomials in $\mathbb{F}_2[a_1, ..., a_{12}, b_1, ..., b_{12}, c][X]$. Note that it is not a problem that a_j commutes with b_k while W^e does not commute with M^e, because in the expressions concerned, the products of W^e-terms and M^e-terms are always in the same order. We let the computer do the simplification and check that the difference between these two polynomials is indeed $O(X^{12})$, which completes the proof. $\square$

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

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

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

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

The polynomial $Q(x,y)$ is the candidate for the minimal polynomial of $f(x)$ found by Padé-Hermite approximation. To prove that it is indeed the minimal polynomial of $f(x)$, we only need to prove that it is an irreducible factor of $P(x,y)$ of multiplicity m and $R(x,y) := P(x,y)/Q(x,y)^m$ is not an annihilating polynomial of $f(x)$. We verify the first point directly. For the second point, we find that when we truncate $f(x)$ to order 186, and substitute it for y in $R(z,y)$, we get a series with valuation smaller than 186, which proves that $R(z,y)$ is not an annihilating polynomial of $f(x)$. Finally, $z^{12}Q(1/z,y)$ is the minimal polynomial of $\mathrm{CF}(a,b) = f(1/z)$. □

3. Annexe

All 16 polynomials are of the form

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

The coefficients $p_j(x)$ and the 32 initial terms to determine the solutions uniquely are given below.

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

$$\begin{aligned}
p_0(x) &= x^{126}+x^{122}+x^{120}+x^{114}+x^{112}+x^{108}+x^{102}+x^{98}+x^{96}+x^{94}\\
&\quad+x^{92}+x^{90}+x^{88}+x^{86}+x^{84}+x^{82}+x^{80}+x^{78}+x^{76}+x^{74}+x^{72}\\
&\quad+x^{70}+x^{64}+x^{62}+x^{58}+x^{52}+x^{50}+x^{44}+x^{40}+x^{38}+x^{36},\\
p_3(x) &= x^{118}+x^{114}+x^{110}+x^{96}+x^{94}+x^{92}+x^{90}+x^{84}+x^{80}+x^{78}+x^{76}\\
&\quad+x^{64}+x^{62}+x^{58}+x^{56}+x^{52}+x^{46}+x^{44}+x^{42}+x^{40}+x^{38}+x^{36}\\
&\quad+x^{26}+x^{24},\\
p_6(x) &= x^{114}+x^{112}+x^{108}+x^{96}+x^{94}+x^{92}+x^{88}+x^{84}+x^{80}+x^{78}+x^{76}\\
&\quad+x^{74}+x^{72}+x^{70}+x^{62}+x^{60}+x^{58}+x^{48}+x^{46}+x^{40}+x^{34}+x^{32}\\
&\quad+x^{26}+x^{24}+x^{10}+x^8+x^2+1,
\end{aligned}$$

$$\begin{aligned}
p_9(x) &= x^{122} + x^{120} + x^{118} + x^{114} + x^{110} + x^{96} + x^{92} + x^{88} + x^{86} + x^{84} + x^{74} \\
&\quad + x^{72} + x^{70} + x^{64} + x^{56} + x^{44} + x^{42} + x^{30} + x^{22} + x^{16} + x^{14} + x^{12}, \\
p_{12}(x) &= x^{122} + x^{120} + x^{106} + x^{104} + x^{98} + x^{96} + x^{90} + x^{88} + x^{66} + x^{64} + x^{50} \\
&\quad + x^{48} + x^{42} + x^{40} + x^{34} + x^{32} + x^{26} + x^{24} + x^{10} + x^8 + x^2 + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{126} + x^{124} + x^{123} + x^{116} + x^{115} + x^{114} + x^{112} + x^{110} + x^{109} + x^{108} \\
&\quad + x^{106} + x^{105} + x^{104} + x^{103} + x^{102} + x^{101} + x^{95} + x^{94} + x^{92} + x^{90} \\
&\quad + x^{89} + x^{87} + x^{86} + x^{83} + x^{81} + x^{80} + x^{76} + x^{74} + x^{72} + x^{68} + x^{67} \\
&\quad + x^{66} + x^{64} + x^{62} + x^{61} + x^{60} + x^{59} + x^{53} + x^{51} + x^{45} + x^{43} + x^{42} \\
&\quad + x^{39} + x^{38} + x^{36}, \\
p_3(x) &= x^{122} + x^{120} + x^{110} + x^{106} + x^{104} + x^{102} + x^{98} + x^{96} + x^{94} + x^{90} \\
&\quad + x^{88} + x^{74} + x^{72} + x^{70} + x^{62} + x^{54}, \\
p_6(x) &= x^{120} + x^{119} + x^{117} + x^{116} + x^{115} + x^{112} + x^{110} + x^{109} + x^{108} + x^{105} \\
&\quad + x^{104} + x^{102} + x^{100} + x^{99} + x^{98} + x^{95} + x^{93} + x^{89} + x^{87} + x^{86} + x^{85} \\
&\quad + x^{84} + x^{83} + x^{82} + x^{81} + x^{80} + x^{79} + x^{78} + x^{77} + x^{76} + x^{75} + x^{74} \\
&\quad + x^{73} + x^{72} + x^{71} + x^{70} + x^{69} + x^{66} + x^{64} + x^{63} + x^{62} + x^{59} + x^{57} \\
&\quad + x^{53} + x^{52} + x^{50} + x^{46} + x^{45} + x^{43} + x^{39} + x^{38} + x^{36}, \\
p_9(x) &= x^{118} + x^{112} + x^{108} + x^{96} + x^{92} + x^{90} + x^{86} + x^{84} + x^{82} + x^{80} + x^{78} \\
&\quad + x^{76} + x^{70} + x^{66} + x^{62} + x^{60} + x^{58} + x^{50} + x^{48} + x^{46} + x^{42} + x^{30} \\
&\quad + x^{26} + x^{24} + x^{22} + x^{18}, \\
p_{12}(x) &= x^{116} + x^{115} + x^{114} + x^{111} + x^{110} + x^{107} + x^{106} + x^{104} + x^{100} + x^{99} \\
&\quad + x^{98} + x^{96} + x^{84} + x^{83} + x^{82} + x^{79} + x^{78} + x^{75} + x^{74} + x^{72} + x^{64} \\
&\quad + x^{63} + x^{62} + x^{59} + x^{58} + x^{56} + x^{48} + x^{47} + x^{46} + x^{43} + x^{42} + x^{40} \\
&\quad + x^{36} + x^{35} + x^{34} + x^{32} + x^{20} + x^{19} + x^{18} + x^{15} + x^{14} + x^{11} + x^{10} \\
&\quad + x^8 + x^4 + x^3 + x^2 + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{126} + x^{124} + x^{123} + x^{116} + x^{115} + x^{114} + x^{112} + x^{110} + x^{109} + x^{108} \\
&\quad + x^{106} + x^{105} + x^{104} + x^{103} + x^{102} + x^{101} + x^{95} + x^{94} + x^{92} + x^{90} \\
&\quad + x^{89} + x^{87} + x^{86} + x^{83} + x^{81} + x^{80} + x^{76} + x^{74} + x^{72} + x^{68} + x^{67} \\
&\quad + x^{66} + x^{64} + x^{62} + x^{61} + x^{60} + x^{59} + x^{53} + x^{51} + x^{45} + x^{43} + x^{42} \\
&\quad + x^{39} + x^{38} + x^{36}, \\
p_3(x) &= x^{122} + x^{120} + x^{110} + x^{106} + x^{104} + x^{102} + x^{98} + x^{96} + x^{94} + x^{90}
\end{aligned}$$

$$
\begin{aligned}
&+ x^{88} + x^{74} + x^{72} + x^{70} + x^{62} + x^{54},\\
p_6(x) &= x^{120} + x^{119} + x^{117} + x^{116} + x^{115} + x^{112} + x^{110} + x^{109} + x^{108} + x^{105}\\
&+ x^{104} + x^{102} + x^{100} + x^{99} + x^{98} + x^{95} + x^{93} + x^{89} + x^{87} + x^{86} + x^{85}\\
&+ x^{84} + x^{83} + x^{82} + x^{81} + x^{80} + x^{79} + x^{78} + x^{77} + x^{76} + x^{75} + x^{74}\\
&+ x^{73} + x^{72} + x^{71} + x^{70} + x^{69} + x^{66} + x^{64} + x^{63} + x^{62} + x^{59} + x^{57}\\
&+ x^{53} + x^{52} + x^{50} + x^{46} + x^{45} + x^{43} + x^{39} + x^{38} + x^{36},\\
p_9(x) &= x^{118} + x^{112} + x^{108} + x^{96} + x^{92} + x^{90} + x^{86} + x^{84} + x^{82} + x^{80} + x^{78}\\
&+ x^{76} + x^{70} + x^{66} + x^{62} + x^{60} + x^{58} + x^{50} + x^{48} + x^{46} + x^{42} + x^{30}\\
&+ x^{26} + x^{24} + x^{22} + x^{18},\\
p_{12}(x) &= x^{116} + x^{115} + x^{114} + x^{111} + x^{110} + x^{107} + x^{106} + x^{104} + x^{100} + x^{99}\\
&+ x^{98} + x^{96} + x^{84} + x^{83} + x^{82} + x^{79} + x^{78} + x^{75} + x^{74} + x^{72} + x^{64}\\
&+ x^{63} + x^{62} + x^{59} + x^{58} + x^{56} + x^{48} + x^{47} + x^{46} + x^{43} + x^{42} + x^{40}\\
&+ x^{36} + x^{35} + x^{34} + x^{32} + x^{20} + x^{19} + x^{18} + x^{15} + x^{14} + x^{11} + x^{10}\\
&+ x^{8} + x^{4} + x^{3} + x^{2} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{126} + x^{114} + x^{112} + x^{110} + x^{108} + x^{106} + x^{104} + x^{102} + x^{96} + x^{94}\\
&+ x^{88} + x^{86} + x^{80} + x^{78} + x^{76} + x^{70} + x^{64} + x^{54} + x^{52} + x^{46} + x^{44}\\
&+ x^{42} + x^{40} + x^{38} + x^{36},\\
p_3(x) &= x^{114} + x^{112} + x^{110} + x^{108} + x^{102} + x^{96} + x^{94} + x^{92} + x^{90} + x^{84} + x^{80}\\
&+ x^{78} + x^{76} + x^{70} + x^{60} + x^{58} + x^{48} + x^{46} + x^{42} + x^{30} + x^{26} + x^{24},\\
p_6(x) &= x^{114} + x^{112} + x^{108} + x^{102} + x^{98} + x^{96} + x^{92} + x^{90} + x^{88} + x^{86} + x^{84}\\
&+ x^{82} + x^{80} + x^{76} + x^{74} + x^{72} + x^{60} + x^{50} + x^{48} + x^{46} + x^{42} + x^{40}\\
&+ x^{38} + x^{34} + x^{32} + x^{30} + x^{26} + x^{24} + x^{14} + x^{10} + x^{8} + x^{6} + x^{2} + 1,\\
p_9(x) &= x^{110} + x^{96} + x^{92} + x^{90} + x^{84} + x^{82} + x^{66} + x^{64} + x^{58} + x^{54} + x^{50}\\
&+ x^{44} + x^{42} + x^{30} + x^{26} + x^{24} + x^{18} + x^{16} + x^{14} + x^{12},\\
p_{12}(x) &= x^{110} + x^{106} + x^{104} + x^{102} + x^{98} + x^{96} + x^{78} + x^{74} + x^{72} + x^{70} + x^{66}\\
&+ x^{64} + x^{62} + x^{58} + x^{56} + x^{54} + x^{50} + x^{48} + x^{46} + x^{42} + x^{40} + x^{38}\\
&+ x^{34} + x^{32} + x^{14} + x^{10} + x^{8} + x^{6} + x^{2} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{126} + x^{118} + x^{114} + x^{110} + x^{106} + x^{104} + x^{96} + x^{94} + x^{88} + x^{86}\\
&+ x^{82} + x^{78} + x^{74} + x^{72} + x^{64} + x^{60} + x^{58} + x^{56} + x^{52} + x^{50} + x^{48}\\
&+ x^{46} + x^{44} + x^{42} + x^{40} + x^{38} + x^{36},
\end{aligned}
$$

$$\begin{aligned}
p_3(x) &= x^{114} + x^{112} + x^{110} + x^{108} + x^{106} + x^{104} + x^{102} + x^{96} + x^{90} + x^{86} \\
&\quad + x^{82} + x^{70} + x^{66} + x^{64} + x^{60} + x^{58} + x^{54} + x^{52} + x^{48} + x^{44} + x^{40} \\
&\quad + x^{38} + x^{36} + x^{30} + x^{26} + x^{24}, \\
p_6(x) &= x^{114} + x^{112} + x^{108} + x^{106} + x^{104} + x^{98} + x^{92} + x^{88} + x^{84} + x^{80} + x^{76} \\
&\quad + x^{74} + x^{72} + x^{70} + x^{62} + x^{60} + x^{56} + x^{48} + x^{40} + x^{38} + x^{34} + x^{32} \\
&\quad + x^{14} + x^{10} + x^{8} + x^{6} + x^{2} + 1, \\
p_9(x) &= x^{110} + x^{96} + x^{92} + x^{90} + x^{84} + x^{82} + x^{66} + x^{64} + x^{58} + x^{54} + x^{50} \\
&\quad + x^{44} + x^{42} + x^{30} + x^{26} + x^{24} + x^{18} + x^{16} + x^{14} + x^{12}, \\
p_{12}(x) &= x^{110} + x^{106} + x^{104} + x^{102} + x^{98} + x^{96} + x^{78} + x^{74} + x^{72} + x^{70} + x^{66} \\
&\quad + x^{64} + x^{62} + x^{58} + x^{56} + x^{54} + x^{50} + x^{48} + x^{46} + x^{42} + x^{40} + x^{38} \\
&\quad + x^{34} + x^{32} + x^{14} + x^{10} + x^{8} + x^{6} + x^{2} + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{126} + x^{120} + x^{119} + x^{118} + x^{117} + x^{116} + x^{115} + x^{112} + x^{111} + x^{110} \\
&\quad + x^{104} + x^{103} + x^{101} + x^{100} + x^{99} + x^{98} + x^{95} + x^{91} + x^{90} + x^{89} \\
&\quad + x^{86} + x^{85} + x^{84} + x^{81} + x^{80} + x^{79} + x^{78} + x^{76} + x^{75} + x^{72} + x^{71} \\
&\quad + x^{69} + x^{66} + x^{64} + x^{63} + x^{61} + x^{59} + x^{53} + x^{51} + x^{45} + x^{43} + x^{42} \\
&\quad + x^{39} + x^{38} + x^{36}, \\
p_3(x) &= x^{122} + x^{120} + x^{110} + x^{106} + x^{104} + x^{102} + x^{98} + x^{96} + x^{94} + x^{90} \\
&\quad + x^{88} + x^{74} + x^{72} + x^{70} + x^{62} + x^{54}, \\
p_6(x) &= x^{120} + x^{119} + x^{117} + x^{116} + x^{115} + x^{112} + x^{110} + x^{109} + x^{108} + x^{105} \\
&\quad + x^{104} + x^{102} + x^{100} + x^{99} + x^{98} + x^{95} + x^{93} + x^{89} + x^{87} + x^{86} + x^{85} \\
&\quad + x^{84} + x^{83} + x^{82} + x^{81} + x^{80} + x^{79} + x^{78} + x^{77} + x^{76} + x^{75} + x^{74} \\
&\quad + x^{73} + x^{72} + x^{71} + x^{70} + x^{69} + x^{66} + x^{64} + x^{63} + x^{62} + x^{59} + x^{57} \\
&\quad + x^{53} + x^{52} + x^{50} + x^{46} + x^{45} + x^{43} + x^{39} + x^{38} + x^{36}, \\
p_9(x) &= x^{118} + x^{112} + x^{108} + x^{96} + x^{92} + x^{90} + x^{86} + x^{84} + x^{82} + x^{80} + x^{78} \\
&\quad + x^{76} + x^{70} + x^{66} + x^{62} + x^{60} + x^{58} + x^{50} + x^{48} + x^{46} + x^{42} + x^{30} \\
&\quad + x^{26} + x^{24} + x^{22} + x^{18}, \\
p_{12}(x) &= x^{116} + x^{115} + x^{114} + x^{111} + x^{110} + x^{107} + x^{106} + x^{104} + x^{100} + x^{99} \\
&\quad + x^{98} + x^{96} + x^{84} + x^{83} + x^{82} + x^{79} + x^{78} + x^{75} + x^{74} + x^{72} + x^{64} \\
&\quad + x^{63} + x^{62} + x^{59} + x^{58} + x^{56} + x^{48} + x^{47} + x^{46} + x^{43} + x^{42} + x^{40} \\
&\quad + x^{36} + x^{35} + x^{34} + x^{32} + x^{20} + x^{19} + x^{18} + x^{15} + x^{14} + x^{11} + x^{10} \\
&\quad + x^{8} + x^{4} + x^{3} + x^{2} + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{126} + x^{120} + x^{119} + x^{118} + x^{117} + x^{116} + x^{115} + x^{112} + x^{111} + x^{110} \\
&\quad + x^{104} + x^{103} + x^{101} + x^{100} + x^{99} + x^{98} + x^{95} + x^{91} + x^{90} + x^{89} \\
&\quad + x^{86} + x^{85} + x^{84} + x^{81} + x^{80} + x^{79} + x^{78} + x^{76} + x^{75} + x^{72} + x^{71} \\
&\quad + x^{69} + x^{66} + x^{64} + x^{63} + x^{61} + x^{59} + x^{53} + x^{51} + x^{45} + x^{43} + x^{42} \\
&\quad + x^{39} + x^{38} + x^{36}, \\
p_3(x) &= x^{122} + x^{120} + x^{110} + x^{106} + x^{104} + x^{102} + x^{98} + x^{96} + x^{94} + x^{90} \\
&\quad + x^{88} + x^{74} + x^{72} + x^{70} + x^{62} + x^{54}, \\
p_6(x) &= x^{120} + x^{119} + x^{117} + x^{116} + x^{115} + x^{112} + x^{110} + x^{109} + x^{108} + x^{105} \\
&\quad + x^{104} + x^{102} + x^{100} + x^{99} + x^{98} + x^{95} + x^{93} + x^{89} + x^{87} + x^{86} + x^{85} \\
&\quad + x^{84} + x^{83} + x^{82} + x^{81} + x^{80} + x^{79} + x^{78} + x^{77} + x^{76} + x^{75} + x^{74} \\
&\quad + x^{73} + x^{72} + x^{71} + x^{70} + x^{69} + x^{66} + x^{64} + x^{63} + x^{62} + x^{59} + x^{57} \\
&\quad + x^{53} + x^{52} + x^{50} + x^{46} + x^{45} + x^{43} + x^{39} + x^{38} + x^{36}, \\
p_9(x) &= x^{118} + x^{112} + x^{108} + x^{96} + x^{92} + x^{90} + x^{86} + x^{84} + x^{82} + x^{80} + x^{78} \\
&\quad + x^{76} + x^{70} + x^{66} + x^{62} + x^{60} + x^{58} + x^{50} + x^{48} + x^{46} + x^{42} + x^{30} \\
&\quad + x^{26} + x^{24} + x^{22} + x^{18}, \\
p_{12}(x) &= x^{116} + x^{115} + x^{114} + x^{111} + x^{110} + x^{107} + x^{106} + x^{104} + x^{100} + x^{99} \\
&\quad + x^{98} + x^{96} + x^{84} + x^{83} + x^{82} + x^{79} + x^{78} + x^{75} + x^{74} + x^{72} + x^{64} \\
&\quad + x^{63} + x^{62} + x^{59} + x^{58} + x^{56} + x^{48} + x^{47} + x^{46} + x^{43} + x^{42} + x^{40} \\
&\quad + x^{36} + x^{35} + x^{34} + x^{32} + x^{20} + x^{19} + x^{18} + x^{15} + x^{14} + x^{11} + x^{10} \\
&\quad + x^{8} + x^{4} + x^{3} + x^{2} + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{126} + x^{118} + x^{112} + x^{110} + x^{108} + x^{106} + x^{104} + x^{92} + x^{90} + x^{88} \\
&\quad + x^{84} + x^{82} + x^{78} + x^{66} + x^{64} + x^{60} + x^{56} + x^{52} + x^{48} + x^{44} + x^{40} \\
&\quad + x^{38} + x^{36}, \\
p_3(x) &= x^{114} + x^{112} + x^{108} + x^{96} + x^{94} + x^{92} + x^{90} + x^{84} + x^{80} + x^{78} + x^{76} \\
&\quad + x^{70} + x^{62} + x^{60} + x^{58} + x^{48} + x^{46} + x^{42} + x^{26} + x^{24}, \\
p_6(x) &= x^{118} + x^{112} + x^{108} + x^{106} + x^{104} + x^{98} + x^{94} + x^{92} + x^{88} + x^{84} + x^{80} \\
&\quad + x^{78} + x^{76} + x^{74} + x^{72} + x^{66} + x^{60} + x^{58} + x^{56} + x^{54} + x^{50} + x^{48} \\
&\quad + x^{42} + x^{40} + x^{34} + x^{32} + x^{10} + x^{8} + x^{2} + 1, \\
p_9(x) &= x^{122} + x^{120} + x^{118} + x^{114} + x^{110} + x^{96} + x^{92} + x^{88} + x^{86} + x^{84} + x^{74} \\
&\quad + x^{72} + x^{70} + x^{64} + x^{56} + x^{44} + x^{42} + x^{30} + x^{22} + x^{16} + x^{14} + x^{12}, \\
p_{12}(x) &= x^{122} + x^{120} + x^{106} + x^{104} + x^{98} + x^{96} + x^{90} + x^{88} + x^{66} + x^{64} + x^{50}
\end{aligned}$$

$$+ x^{48} + x^{42} + x^{40} + x^{34} + x^{32} + x^{26} + x^{24} + x^{10} + x^8 + x^2 + 1,$$

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

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

$$\begin{aligned}
p_0(x) &= x^{126} + x^{124} + x^{123} + x^{122} + x^{120} + x^{116} + x^{115} + x^{114} + x^{112} + x^{109} \\
&\quad + x^{107} + x^{105} + x^{103} + x^{101} + x^{96} + x^{92} + x^{91} + x^{90} + x^{89} + x^{88} \\
&\quad + x^{86} + x^{84} + x^{83} + x^{81} + x^{80} + x^{79} + x^{77} + x^{76} + x^{75} + x^{73} + x^{72} \\
&\quad + x^{68} + x^{67} + x^{66} + x^{63} + x^{60} + x^{58} + x^{57} + x^{56} + x^{54} + x^{53} + x^{51} \\
&\quad + x^{48} + x^{46} + x^{45} + x^{43} + x^{39} + x^{38} + x^{36}, \\
p_3(x) &= x^{124} + x^{123} + x^{120} + x^{119} + x^{117} + x^{114} + x^{112} + x^{111} + x^{110} + x^{109} \\
&\quad + x^{106} + x^{105} + x^{98} + x^{96} + x^{93} + x^{91} + x^{89} + x^{88} + x^{85} + x^{84} + x^{81} \\
&\quad + x^{80} + x^{77} + x^{76} + x^{74} + x^{73} + x^{72} + x^{71} + x^{69} + x^{66} + x^{62} + x^{58} \\
&\quad + x^{57} + x^{56} + x^{54} + x^{53} + x^{51} + x^{48} + x^{46} + x^{45} + x^{43} + x^{39} + x^{38} \\
&\quad + x^{36}, \\
p_6(x) &= x^{124} + x^{123} + x^{120} + x^{119} + x^{117} + x^{112} + x^{107} + x^{106} + x^{104} + x^{100} \\
&\quad + x^{99} + x^{98} + x^{91} + x^{90} + x^{88} + x^{87} + x^{85} + x^{84} + x^{82} + x^{80} + x^{78} \\
&\quad + x^{76} + x^{74} + x^{71} + x^{69} + x^{68} + x^{67} + x^{64} + x^{62} + x^{60} + x^{55} + x^{54} \\
&\quad + x^{53} + x^{52} + x^{51} + x^{46} + x^{44} + x^{43} + x^{40} + x^{36} + x^{35} + x^{34} + x^{32} \\
&\quad + x^{30} + x^{28} + x^{27} + x^{26} + x^{23} + x^{21} + x^{18} + x^{12} + x^{11} + x^{10} + x^8 \\
&\quad + x^4 + x^3 + x^2 + 1, \\
p_9(x) &= x^{124} + x^{123} + x^{122} + x^{120} + x^{92} + x^{91} + x^{90} + x^{88} + x^{76} + x^{75} + x^{74} \\
&\quad + x^{72} + x^{60} + x^{59} + x^{58} + x^{56} + x^{28} + x^{27} + x^{26} + x^{24}, \\
p_{12}(x) &= x^{124} + x^{123} + x^{122} + x^{120} + x^{116} + x^{115} + x^{114} + x^{111} + x^{110} + x^{107} \\
&\quad + x^{106} + x^{104} + x^{100} + x^{99} + x^{98} + x^{96} + x^{92} + x^{91} + x^{90} + x^{88} + x^{84} \\
&\quad + x^{83} + x^{82} + x^{79} + x^{78} + x^{76} + x^{64} + x^{63} + x^{62} + x^{60} + x^{48} + x^{47} \\
&\quad + x^{46} + x^{43} + x^{42} + x^{40} + x^{36} + x^{35} + x^{34} + x^{32} + x^{28} + x^{27} + x^{26} \\
&\quad + x^{24} + x^{20} + x^{19} + x^{18} + x^{15} + x^{14} + x^{11} + x^{10} + x^8 + x^4 + x^3 + x^2 \\
&\quad + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{132} + x^{126} + x^{125} + x^{124} + x^{123} + x^{120} + x^{117} + x^{115} + x^{113} + x^{112} \\
&\quad + x^{111} + x^{104} + x^{101} + x^{99} + x^{98} + x^{96} + x^{95} + x^{94} + x^{93} + x^{91} + x^{89} \\
&\quad + x^{88} + x^{87} + x^{72} + x^{69} + x^{68} + x^{64} + x^{61} + x^{56} + x^{53} + x^{50} + x^{49} \\
&\quad + x^{46} + x^{45} + x^{36}, \\
p_3(x) &= x^{118} + x^{117} + x^{115} + x^{111} + x^{110} + x^{108} + x^{106} + x^{105} + x^{104} + x^{101}
\end{aligned}$$

$$
\begin{aligned}
&+ x^{99} + x^{95} + x^{93} + x^{92} + x^{91} + x^{90} + x^{89} + x^{88} + x^{87} + x^{86} + x^{85}\\
&+ x^{84} + x^{83} + x^{82} + x^{81} + x^{80} + x^{79} + x^{76} + x^{74} + x^{73} + x^{72} + x^{69}\\
&+ x^{67} + x^{63} + x^{62} + x^{60} + x^{58} + x^{57} + x^{56} + x^{54},\\
p_6(x) &= x^{120} + x^{118} + x^{114} + x^{112} + x^{110} + x^{102} + x^{100} + x^{94} + x^{92} + x^{88}\\
&+ x^{68} + x^{66} + x^{64} + x^{58} + x^{56} + x^{50} + x^{46} + x^{44} + x^{42} + x^{36},\\
p_9(x) &= x^{122} + x^{121} + x^{120} + x^{117} + x^{116} + x^{114} + x^{90} + x^{89} + x^{88} + x^{85}\\
&+ x^{84} + x^{82} + x^{74} + x^{73} + x^{72} + x^{69} + x^{68} + x^{66} + x^{58} + x^{57} + x^{56}\\
&+ x^{53} + x^{52} + x^{50} + x^{26} + x^{25} + x^{24} + x^{21} + x^{20} + x^{18},\\
p_{12}(x) &= x^{124} + x^{120} + x^{116} + x^{104} + x^{100} + x^{96} + x^{92} + x^{88} + x^{84} + x^{76} + x^{64}\\
&+ x^{60} + x^{48} + x^{40} + x^{36} + x^{32} + x^{28} + x^{24} + x^{20} + x^{8} + x^{4} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{128} + x^{125} + x^{123} + x^{122} + x^{121} + x^{120} + x^{118} + x^{117} + x^{116} + x^{114}\\
&+ x^{113} + x^{112} + x^{109} + x^{108} + x^{107} + x^{106} + x^{105} + x^{102} + x^{95} + x^{94}\\
&+ x^{93} + x^{91} + x^{87} + x^{86} + x^{85} + x^{82} + x^{81} + x^{80} + x^{78} + x^{76} + x^{72}\\
&+ x^{70} + x^{68} + x^{66} + x^{65} + x^{61} + x^{58} + x^{57} + x^{53} + x^{52} + x^{50} + x^{49}\\
&+ x^{48} + x^{46} + x^{45} + x^{36},\\
p_3(x) &= x^{126} + x^{125} + x^{123} + x^{122} + x^{121} + x^{118} + x^{116} + x^{115} + x^{114} + x^{111}\\
&+ x^{109} + x^{108} + x^{107} + x^{104} + x^{102} + x^{101} + x^{100} + x^{97} + x^{95} + x^{94}\\
&+ x^{93} + x^{90} + x^{88} + x^{87} + x^{86} + x^{83} + x^{81} + x^{80} + x^{79} + x^{78} + x^{77}\\
&+ x^{76} + x^{75} + x^{72} + x^{68} + x^{67} + x^{66} + x^{63} + x^{62} + x^{60} + x^{58} + x^{57}\\
&+ x^{56} + x^{54},\\
p_6(x) &= x^{128} + x^{126} + x^{124} + x^{120} + x^{112} + x^{110} + x^{108} + x^{104} + x^{100} + x^{98}\\
&+ x^{96} + x^{90} + x^{86} + x^{84} + x^{82} + x^{80} + x^{78} + x^{72} + x^{64} + x^{62} + x^{58}\\
&+ x^{56} + x^{54} + x^{52} + x^{50} + x^{48} + x^{46} + x^{44} + x^{42} + x^{36},\\
p_9(x) &= x^{130} + x^{129} + x^{128} + x^{126} + x^{122} + x^{121} + x^{120} + x^{117} + x^{116} + x^{114}\\
&+ x^{98} + x^{97} + x^{96} + x^{94} + x^{90} + x^{89} + x^{88} + x^{85} + x^{84} + x^{81} + x^{80}\\
&+ x^{78} + x^{74} + x^{73} + x^{72} + x^{69} + x^{68} + x^{65} + x^{64} + x^{62} + x^{58} + x^{57}\\
&+ x^{56} + x^{53} + x^{52} + x^{50} + x^{34} + x^{33} + x^{32} + x^{30} + x^{26} + x^{25} + x^{24}\\
&+ x^{21} + x^{20} + x^{18},\\
p_{12}(x) &= x^{132} + x^{108} + x^{104} + x^{96} + x^{84} + x^{76} + x^{72} + x^{64} + x^{60} + x^{56} + x^{52}\\
&+ x^{48} + x^{44} + x^{40} + x^{32} + x^{12} + x^{8} + x^{4} + 1,
\end{aligned}
$$

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

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

$$\begin{aligned}
p_0(x) = {} & x^{126} + x^{122} + x^{120} + x^{116} + x^{115} + x^{112} + x^{111} + x^{102} + x^{98} + x^{96} \\
& + x^{95} + x^{93} + x^{92} + x^{91} + x^{90} + x^{89} + x^{88} + x^{86} + x^{82} + x^{81} + x^{80} \\
& + x^{77} + x^{76} + x^{74} + x^{73} + x^{68} + x^{67} + x^{66} + x^{64} + x^{62} + x^{60} + x^{59} \\
& + x^{57} + x^{54} + x^{53} + x^{52} + x^{50} + x^{46} + x^{45} + x^{43} + x^{39} + x^{38} + x^{36}, \\
p_3(x) = {} & x^{124} + x^{123} + x^{112} + x^{111} + x^{110} + x^{109} + x^{108} + x^{107} + x^{105} + x^{103} \\
& + x^{101} + x^{100} + x^{99} + x^{98} + x^{96} + x^{95} + x^{92} + x^{89} + x^{88} + x^{87} + x^{84} \\
& + x^{82} + x^{81} + x^{80} + x^{77} + x^{76} + x^{74} + x^{73} + x^{68} + x^{67} + x^{66} + x^{64} \\
& + x^{62} + x^{60} + x^{59} + x^{57} + x^{54} + x^{53} + x^{52} + x^{50} + x^{46} + x^{45} + x^{43} \\
& + x^{39} + x^{38} + x^{36}, \\
p_6(x) = {} & x^{124} + x^{123} + x^{114} + x^{111} + x^{109} + x^{107} + x^{106} + x^{105} + x^{102} + x^{100} \\
& + x^{99} + x^{98} + x^{94} + x^{93} + x^{92} + x^{91} + x^{90} + x^{89} + x^{87} + x^{82} + x^{81} \\
& + x^{78} + x^{77} + x^{76} + x^{75} + x^{73} + x^{72} + x^{70} + x^{68} + x^{67} + x^{66} + x^{64} \\
& + x^{62} + x^{59} + x^{57} + x^{55} + x^{54} + x^{52} + x^{48} + x^{45} + x^{44} + x^{40} + x^{39} \\
& + x^{38} + x^{35} + x^{34} + x^{32} + x^{30} + x^{24} + x^{23} + x^{21} + x^{18} + x^{12} + x^{11} \\
& + x^{10} + x^{8} + x^{4} + x^{3} + x^{2} + 1, \\
p_9(x) = {} & x^{124} + x^{123} + x^{122} + x^{120} + x^{92} + x^{91} + x^{90} + x^{88} + x^{76} + x^{75} + x^{74} \\
& + x^{72} + x^{60} + x^{59} + x^{58} + x^{56} + x^{28} + x^{27} + x^{26} + x^{24}, \\
p_{12}(x) = {} & x^{124} + x^{123} + x^{122} + x^{120} + x^{116} + x^{115} + x^{114} + x^{111} + x^{110} + x^{107} \\
& + x^{106} + x^{104} + x^{100} + x^{99} + x^{98} + x^{96} + x^{92} + x^{91} + x^{90} + x^{88} + x^{84} \\
& + x^{83} + x^{82} + x^{79} + x^{78} + x^{76} + x^{64} + x^{63} + x^{62} + x^{60} + x^{48} + x^{47} \\
& + x^{46} + x^{43} + x^{42} + x^{40} + x^{36} + x^{35} + x^{34} + x^{32} + x^{28} + x^{27} + x^{26} \\
& + x^{24} + x^{20} + x^{19} + x^{18} + x^{15} + x^{14} + x^{11} + x^{10} + x^{8} + x^{4} + x^{3} + x^{2} \\
& + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) = {} & x^{126} + x^{124} + x^{123} + x^{122} + x^{120} + x^{116} + x^{115} + x^{114} + x^{112} + x^{109} \\
& + x^{107} + x^{105} + x^{103} + x^{101} + x^{96} + x^{92} + x^{91} + x^{90} + x^{89} + x^{88} \\
& + x^{86} + x^{84} + x^{83} + x^{81} + x^{80} + x^{79} + x^{77} + x^{76} + x^{75} + x^{73} + x^{72} \\
& + x^{68} + x^{67} + x^{66} + x^{63} + x^{60} + x^{58} + x^{57} + x^{56} + x^{54} + x^{53} + x^{51} \\
& + x^{48} + x^{46} + x^{45} + x^{43} + x^{39} + x^{38} + x^{36}, \\
p_3(x) = {} & x^{124} + x^{123} + x^{120} + x^{119} + x^{117} + x^{114} + x^{112} + x^{111} + x^{110} + x^{109} \\
& + x^{106} + x^{105} + x^{98} + x^{96} + x^{93} + x^{91} + x^{89} + x^{88} + x^{85} + x^{84} + x^{81} \\
& + x^{80} + x^{77} + x^{76} + x^{74} + x^{73} + x^{72} + x^{71} + x^{69} + x^{66} + x^{62} + x^{58}
\end{aligned}$$

$$+ x^{57} + x^{56} + x^{54} + x^{53} + x^{51} + x^{48} + x^{46} + x^{45} + x^{43} + x^{39} + x^{38} + x^{36},$$

$$\begin{aligned}
p_6(x) &= x^{124} + x^{123} + x^{120} + x^{119} + x^{117} + x^{112} + x^{107} + x^{106} + x^{104} + x^{100} \\
&+ x^{99} + x^{98} + x^{91} + x^{90} + x^{88} + x^{87} + x^{85} + x^{84} + x^{82} + x^{80} + x^{78} \\
&+ x^{76} + x^{74} + x^{71} + x^{69} + x^{68} + x^{67} + x^{64} + x^{62} + x^{60} + x^{55} + x^{54} \\
&+ x^{53} + x^{52} + x^{51} + x^{46} + x^{44} + x^{43} + x^{40} + x^{36} + x^{35} + x^{34} + x^{32} \\
&+ x^{30} + x^{28} + x^{27} + x^{26} + x^{23} + x^{21} + x^{18} + x^{12} + x^{11} + x^{10} + x^{8} \\
&+ x^{4} + x^{3} + x^{2} + 1, \\
p_9(x) &= x^{124} + x^{123} + x^{122} + x^{120} + x^{92} + x^{91} + x^{90} + x^{88} + x^{76} + x^{75} + x^{74} \\
&+ x^{72} + x^{60} + x^{59} + x^{58} + x^{56} + x^{28} + x^{27} + x^{26} + x^{24}, \\
p_{12}(x) &= x^{124} + x^{123} + x^{122} + x^{120} + x^{116} + x^{115} + x^{114} + x^{111} + x^{110} + x^{107} \\
&+ x^{106} + x^{104} + x^{100} + x^{99} + x^{98} + x^{96} + x^{92} + x^{91} + x^{90} + x^{88} + x^{84} \\
&+ x^{83} + x^{82} + x^{79} + x^{78} + x^{76} + x^{64} + x^{63} + x^{62} + x^{60} + x^{48} + x^{47} \\
&+ x^{46} + x^{43} + x^{42} + x^{40} + x^{36} + x^{35} + x^{34} + x^{32} + x^{28} + x^{27} + x^{26} \\
&+ x^{24} + x^{20} + x^{19} + x^{18} + x^{15} + x^{14} + x^{11} + x^{10} + x^{8} + x^{4} + x^{3} + x^{2} \\
&+ 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{128} + x^{125} + x^{123} + x^{122} + x^{121} + x^{120} + x^{118} + x^{117} + x^{116} + x^{114} \\
&+ x^{113} + x^{112} + x^{109} + x^{108} + x^{107} + x^{106} + x^{105} + x^{102} + x^{95} + x^{94} \\
&+ x^{93} + x^{91} + x^{87} + x^{86} + x^{85} + x^{82} + x^{81} + x^{80} + x^{78} + x^{76} + x^{72} \\
&+ x^{70} + x^{68} + x^{66} + x^{65} + x^{61} + x^{58} + x^{57} + x^{53} + x^{52} + x^{50} + x^{49} \\
&+ x^{48} + x^{46} + x^{45} + x^{36}, \\
p_3(x) &= x^{126} + x^{125} + x^{123} + x^{122} + x^{121} + x^{118} + x^{116} + x^{115} + x^{114} + x^{111} \\
&+ x^{109} + x^{108} + x^{107} + x^{104} + x^{102} + x^{101} + x^{100} + x^{97} + x^{95} + x^{94} \\
&+ x^{93} + x^{90} + x^{88} + x^{87} + x^{86} + x^{83} + x^{81} + x^{80} + x^{79} + x^{78} + x^{77} \\
&+ x^{76} + x^{75} + x^{72} + x^{68} + x^{67} + x^{66} + x^{63} + x^{62} + x^{60} + x^{58} + x^{57} \\
&+ x^{56} + x^{54}, \\
p_6(x) &= x^{128} + x^{126} + x^{124} + x^{120} + x^{112} + x^{110} + x^{108} + x^{104} + x^{100} + x^{98} \\
&+ x^{96} + x^{90} + x^{86} + x^{84} + x^{82} + x^{80} + x^{78} + x^{72} + x^{64} + x^{62} + x^{58} \\
&+ x^{56} + x^{54} + x^{52} + x^{50} + x^{48} + x^{46} + x^{44} + x^{42} + x^{36}, \\
p_9(x) &= x^{130} + x^{129} + x^{128} + x^{126} + x^{122} + x^{121} + x^{120} + x^{117} + x^{116} + x^{114} \\
&+ x^{98} + x^{97} + x^{96} + x^{94} + x^{90} + x^{89} + x^{88} + x^{85} + x^{84} + x^{81} + x^{80} \\
&+ x^{78} + x^{74} + x^{73} + x^{72} + x^{69} + x^{68} + x^{65} + x^{64} + x^{62} + x^{58} + x^{57}
\end{aligned}$$

$$+ x^{56} + x^{53} + x^{52} + x^{50} + x^{34} + x^{33} + x^{32} + x^{30} + x^{26} + x^{25} + x^{24} + x^{21} + x^{20} + x^{18},$$
$$p_{12}(x) = x^{132} + x^{108} + x^{104} + x^{96} + x^{84} + x^{76} + x^{72} + x^{64} + x^{60} + x^{56} + x^{52} + x^{48} + x^{44} + x^{40} + x^{32} + x^{12} + x^{8} + x^{4} + 1,$$

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

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

$$p_0(x) = x^{132} + x^{126} + x^{125} + x^{124} + x^{123} + x^{120} + x^{117} + x^{115} + x^{113} + x^{112} + x^{111} + x^{104} + x^{101} + x^{99} + x^{98} + x^{96} + x^{95} + x^{94} + x^{93} + x^{91} + x^{89} + x^{88} + x^{87} + x^{72} + x^{69} + x^{68} + x^{64} + x^{61} + x^{56} + x^{53} + x^{50} + x^{49} + x^{46} + x^{45} + x^{36},$$
$$p_3(x) = x^{118} + x^{117} + x^{115} + x^{111} + x^{110} + x^{108} + x^{106} + x^{105} + x^{104} + x^{101} + x^{99} + x^{95} + x^{93} + x^{92} + x^{91} + x^{90} + x^{89} + x^{88} + x^{87} + x^{86} + x^{85} + x^{84} + x^{83} + x^{82} + x^{81} + x^{80} + x^{79} + x^{76} + x^{74} + x^{73} + x^{72} + x^{69} + x^{67} + x^{63} + x^{62} + x^{60} + x^{58} + x^{57} + x^{56} + x^{54},$$
$$p_6(x) = x^{120} + x^{118} + x^{114} + x^{112} + x^{110} + x^{102} + x^{100} + x^{94} + x^{92} + x^{88} + x^{68} + x^{66} + x^{64} + x^{58} + x^{56} + x^{50} + x^{46} + x^{44} + x^{42} + x^{36},$$
$$p_9(x) = x^{122} + x^{121} + x^{120} + x^{117} + x^{116} + x^{114} + x^{90} + x^{89} + x^{88} + x^{85} + x^{84} + x^{82} + x^{74} + x^{73} + x^{72} + x^{69} + x^{68} + x^{66} + x^{58} + x^{57} + x^{56} + x^{53} + x^{52} + x^{50} + x^{26} + x^{25} + x^{24} + x^{21} + x^{20} + x^{18},$$
$$p_{12}(x) = x^{124} + x^{120} + x^{116} + x^{104} + x^{100} + x^{96} + x^{92} + x^{88} + x^{84} + x^{76} + x^{64} + x^{60} + x^{48} + x^{40} + x^{36} + x^{32} + x^{28} + x^{24} + x^{20} + x^{8} + x^{4} + 1,$$

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

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

$$p_0(x) = x^{126} + x^{122} + x^{120} + x^{116} + x^{115} + x^{112} + x^{111} + x^{102} + x^{98} + x^{96} + x^{95} + x^{93} + x^{92} + x^{91} + x^{90} + x^{89} + x^{88} + x^{86} + x^{82} + x^{81} + x^{80} + x^{77} + x^{76} + x^{74} + x^{73} + x^{68} + x^{67} + x^{66} + x^{64} + x^{62} + x^{60} + x^{59} + x^{57} + x^{54} + x^{53} + x^{52} + x^{50} + x^{46} + x^{45} + x^{43} + x^{39} + x^{38} + x^{36},$$
$$p_3(x) = x^{124} + x^{123} + x^{112} + x^{111} + x^{110} + x^{109} + x^{108} + x^{107} + x^{105} + x^{103} + x^{101} + x^{100} + x^{99} + x^{98} + x^{96} + x^{95} + x^{92} + x^{89} + x^{88} + x^{87} + x^{84} + x^{82} + x^{81} + x^{80} + x^{77} + x^{76} + x^{74} + x^{73} + x^{68} + x^{67} + x^{66} + x^{64} + x^{62} + x^{60} + x^{59} + x^{57} + x^{54} + x^{53} + x^{52} + x^{50} + x^{46} + x^{45} + x^{43} + x^{39} + x^{38} + x^{36},$$
$$p_6(x) = x^{124} + x^{123} + x^{114} + x^{111} + x^{109} + x^{107} + x^{106} + x^{105} + x^{102} + x^{100} + x^{99} + x^{98} + x^{94} + x^{93} + x^{92} + x^{91} + x^{90} + x^{89} + x^{87} + x^{82} + x^{81}$$

$$
\begin{aligned}
&+ x^{78} + x^{77} + x^{76} + x^{75} + x^{73} + x^{72} + x^{70} + x^{68} + x^{67} + x^{66} + x^{64}\\
&+ x^{62} + x^{59} + x^{57} + x^{55} + x^{54} + x^{52} + x^{48} + x^{45} + x^{44} + x^{40} + x^{39}\\
&+ x^{38} + x^{35} + x^{34} + x^{32} + x^{30} + x^{24} + x^{23} + x^{21} + x^{18} + x^{12} + x^{11}\\
&+ x^{10} + x^{8} + x^{4} + x^{3} + x^{2} + 1,\\
p_9(x) &= x^{124} + x^{123} + x^{122} + x^{120} + x^{92} + x^{91} + x^{90} + x^{88} + x^{76} + x^{75} + x^{74}\\
&+ x^{72} + x^{60} + x^{59} + x^{58} + x^{56} + x^{28} + x^{27} + x^{26} + x^{24},\\
p_{12}(x) &= x^{124} + x^{123} + x^{122} + x^{120} + x^{116} + x^{115} + x^{114} + x^{111} + x^{110} + x^{107}\\
&+ x^{106} + x^{104} + x^{100} + x^{99} + x^{98} + x^{96} + x^{92} + x^{91} + x^{90} + x^{88} + x^{84}\\
&+ x^{83} + x^{82} + x^{79} + x^{78} + x^{76} + x^{64} + x^{63} + x^{62} + x^{60} + x^{48} + x^{47}\\
&+ x^{46} + x^{43} + x^{42} + x^{40} + x^{36} + x^{35} + x^{34} + x^{32} + x^{28} + x^{27} + x^{26}\\
&+ x^{24} + x^{20} + x^{19} + x^{18} + x^{15} + x^{14} + x^{11} + x^{10} + x^{8} + x^{4} + x^{3} + x^{2}\\
&+ 1,
\end{aligned}
$$

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

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

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

n	$\Lambda(n)$	n	$\Lambda(n)$	n	$\Lambda(n)$	n	$\Lambda(n)$
0	[1, 2]	771	[1240, 1241]	1542	[2087, 911]	2313	[2677, 295]
1	[3, 4]	772	[1242, 663]	1543	[2088, 2089]	2314	[2678, 279]
2	[5, 6]	773	[1162, 1243]	1544	[66, 1958]	2315	[1090, 2679]
3	[7, 8]	774	[1244, 1245]	1545	[2090, 1133]	2316	[1060, 2674]
4	[9, 10]	775	[1246, 1247]	1546	[298, 972]	2317	[2680, 2681]
5	[11, 12]	776	[1248, 1249]	1547	[369, 2091]	2318	[2028, 967]
6	[13, 14]	777	[609, 576]	1548	[2092, 799]	2319	[2682, 896]
7	[15, 16]	778	[1250, 1251]	1549	[2093, 2094]	2320	[1819, 762]
8	[17, 18]	779	[1252, 1253]	1550	[2095, 1979]	2321	[2683, 2121]
9	[19, 20]	780	[1254, 639]	1551	[2096, 1062]	2322	[2105, 2684]
10	[21, 22]	781	[680, 1255]	1552	[1836, 1882]	2323	[2685, 2686]
11	[23, 24]	782	[169, 1256]	1553	[2097, 957]	2324	[2687, 858]
12	[25, 26]	783	[495, 1257]	1554	[2098, 291]	2325	[2688, 853]
13	[27, 28]	784	[1258, 1259]	1555	[2099, 247]	2326	[245, 1730]
14	[29, 30]	785	[1260, 1261]	1556	[259, 851]	2327	[2689, 15]
15	[31, 32]	786	[1262, 1263]	1557	[2100, 1991]	2328	[2690, 1009]
16	[33, 34]	787	[1264, 1265]	1558	[714, 2101]	2329	[2691, 854]
17	[35, 36]	788	[419, 147]	1559	[2102, 250]	2330	[2692, 2693]
18	[37, 38]	789	[1266, 1267]	1560	[2103, 1792]	2331	[2694, 731]
19	[39, 40]	790	[1268, 146]	1561	[1944, 784]	2332	[2695, 2696]
20	[41, 42]	791	[1269, 1270]	1562	[2104, 2105]	2333	[2697, 1120]
21	[43, 44]	792	[1271, 1272]	1563	[1810, 2106]	2334	[2698, 695]
22	[45, 46]	793	[130, 1273]	1564	[2107, 2108]	2335	[2699, 2129]

23	[11, 47]	794	[1274, 1275]	1565	[398, 1784]	2336	[2700, 264]
24	[48, 49]	795	[1242, 1252]	1566	[993, 1721]	2337	[2701, 72]
25	[50, 51]	796	[1276, 406]	1567	[1006, 289]	2338	[1785, 1777]
26	[52, 53]	797	[459, 1277]	1568	[2109, 265]	2339	[2702, 2684]
27	[54, 55]	798	[1278, 586]	1569	[2110, 2111]	2340	[2703, 264]
28	[56, 57]	799	[1279, 675]	1570	[880, 2112]	2341	[2704, 219]
29	[58, 32]	800	[1280, 1281]	1571	[2113, 2114]	2342	[2705, 999]
30	[59, 60]	801	[1282, 132]	1572	[1728, 1843]	2343	[2140, 293]
31	[61, 62]	802	[1283, 1188]	1573	[2115, 1687]	2344	[1898, 1988]
32	[63, 64]	803	[1206, 1251]	1574	[1931, 1650]	2345	[1646, 2014]
33	[65, 66]	804	[439, 1284]	1575	[2116, 1790]	2346	[2679, 2579]
34	[67, 68]	805	[1285, 1286]	1576	[2117, 719]	2347	[2706, 1663]
35	[69, 70]	806	[1287, 1288]	1577	[2118, 1040]	2348	[1000, 1753]
36	[71, 72]	807	[1289, 675]	1578	[2119, 898]	2349	[2707, 108]
37	[73, 74]	808	[1290, 1291]	1579	[1814, 1676]	2350	[2708, 219]
38	[75, 76]	809	[1292, 692]	1580	[2120, 2121]	2351	[1023, 2709]
39	[77, 78]	810	[425, 466]	1581	[2122, 2123]	2352	[2153, 320]
40	[79, 80]	811	[648, 467]	1582	[2124, 781]	2353	[2710, 1933]
41	[81, 82]	812	[598, 124]	1583	[2061, 2125]	2354	[2711, 1877]
42	[83, 84]	813	[1293, 1275]	1584	[2126, 1098]	2355	[2712, 2648]
43	[85, 86]	814	[1294, 1295]	1585	[2127, 2128]	2356	[2123, 1893]
44	[87, 88]	815	[1296, 1297]	1586	[772, 397]	2357	[757, 2713]
45	[89, 90]	816	[1298, 1168]	1587	[2129, 1092]	2358	[2714, 2617]
46	[91, 92]	817	[1299, 1300]	1588	[2130, 1931]	2359	[2715, 1710]
47	[93, 94]	818	[1272, 1301]	1589	[2131, 327]	2360	[2716, 312]
48	[95, 96]	819	[1264, 1302]	1590	[878, 2019]	2361	[1715, 2585]
49	[97, 98]	820	[1303, 1304]	1591	[2132, 2133]	2362	[721, 1037]
50	[99, 100]	821	[480, 1305]	1592	[2134, 1102]	2363	[2717, 839]
51	[101, 102]	822	[213, 607]	1593	[2135, 1071]	2364	[2718, 895]
52	[103, 104]	823	[1306, 492]	1594	[2136, 1878]	2365	[2719, 883]
53	[105, 106]	824	[1307, 496]	1595	[2137, 1763]	2366	[2720, 330]
54	[6, 107]	825	[1308, 616]	1596	[1859, 342]	2367	[2721, 743]
55	[108, 109]	826	[1309, 1310]	1597	[2069, 894]	2368	[302, 833]
56	[110, 111]	827	[1311, 1312]	1598	[2138, 2015]	2369	[2722, 1020]
57	[112, 75]	828	[40, 514]	1599	[2075, 816]	2370	[2723, 2724]
58	[113, 114]	829	[1165, 1313]	1600	[2139, 1692]	2371	[2086, 723]
59	[115, 84]	830	[1314, 149]	1601	[904, 1744]	2372	[2725, 805]
60	[84, 116]	831	[1315, 1316]	1602	[2106, 2140]	2373	[2726, 2626]
61	[117, 118]	832	[1317, 1318]	1603	[2141, 796]	2374	[2727, 2644]
62	[119, 120]	833	[1319, 469]	1604	[2142, 789]	2375	[2728, 2102]
63	[121, 122]	834	[567, 1320]	1605	[2143, 1870]	2376	[2729, 1084]
64	[123, 124]	835	[1321, 1322]	1606	[2144, 1834]	2377	[2730, 996]
65	[125, 126]	836	[520, 674]	1607	[2145, 1084]	2378	[2731, 2026]
66	[127, 128]	837	[1323, 1324]	1608	[2146, 2147]	2379	[2732, 991]

67	[129, 130]	838	[1325, 1326]	1609	[2148, 1974]	2380	[2733, 370]
68	[131, 132]	839	[1327, 1328]	1610	[822, 2149]	2381	[2734, 1765]
69	[133, 134]	840	[629, 1212]	1611	[2150, 2151]	2382	[2735, 1072]
70	[135, 136]	841	[1329, 643]	1612	[2152, 2147]	2383	[2736, 2591]
71	[137, 138]	842	[680, 1330]	1613	[710, 2153]	2384	[2737, 2061]
72	[139, 140]	843	[1331, 1218]	1614	[2154, 820]	2385	[2738, 1764]
73	[141, 52]	844	[1187, 1332]	1615	[2155, 1697]	2386	[397, 2556]
74	[142, 143]	845	[1333, 1334]	1616	[2156, 1643]	2387	[2739, 1857]
75	[144, 145]	846	[1335, 1336]	1617	[1716, 804]	2388	[2740, 2741]
76	[146, 147]	847	[1337, 1338]	1618	[2157, 972]	2389	[300, 1964]
77	[148, 149]	848	[1339, 689]	1619	[2158, 974]	2390	[2742, 1705]
78	[149, 150]	849	[1305, 527]	1620	[718, 989]	2391	[1665, 2551]
79	[151, 54]	850	[623, 544]	1621	[2159, 1045]	2392	[2743, 2744]
80	[152, 153]	851	[1340, 1341]	1622	[2160, 1046]	2393	[2745, 964]
81	[154, 155]	852	[668, 1342]	1623	[2161, 1805]	2394	[1916, 383]
82	[156, 157]	853	[1343, 450]	1624	[2162, 2163]	2395	[2746, 1899]
83	[158, 159]	854	[1301, 1344]	1625	[2164, 767]	2396	[2747, 1881]
84	[160, 161]	855	[561, 7]	1626	[2165, 1770]	2397	[2748, 1734]
85	[162, 163]	856	[1345, 1346]	1627	[324, 943]	2398	[1667, 2123]
86	[164, 165]	857	[1347, 1348]	1628	[1043, 992]	2399	[2749, 2133]
87	[166, 167]	858	[1349, 1350]	1629	[2166, 368]	2400	[2750, 2751]
88	[168, 169]	859	[119, 1351]	1630	[1, 1349]	2401	[2615, 1661]
89	[170, 171]	860	[1352, 660]	1631	[1596, 2167]	2402	[2752, 1954]
90	[172, 173]	861	[678, 1353]	1632	[1353, 2168]	2403	[1822, 2148]
91	[174, 36]	862	[1354, 1355]	1633	[1465, 1250]	2404	[2753, 2754]
92	[175, 176]	863	[1356, 1357]	1634	[2169, 2170]	2405	[2755, 1656]
93	[177, 178]	864	[1358, 1359]	1635	[2171, 1434]	2406	[2756, 370]
94	[179, 180]	865	[1360, 57]	1636	[2172, 523]	2407	[2757, 398]
95	[181, 182]	866	[1361, 567]	1637	[1295, 1384]	2408	[308, 1814]
96	[183, 184]	867	[1362, 1363]	1638	[1387, 635]	2409	[2758, 329]
97	[185, 186]	868	[427, 198]	1639	[2173, 1346]	2410	[2759, 2751]
98	[187, 188]	869	[1364, 1365]	1640	[1543, 1547]	2411	[1868, 2693]
99	[147, 189]	870	[543, 515]	1641	[551, 409]	2412	[2760, 1895]
100	[151, 190]	871	[1366, 1359]	1642	[2174, 581]	2413	[2761, 1785]
101	[191, 192]	872	[1367, 1368]	1643	[1291, 504]	2414	[2762, 1035]
102	[193, 194]	873	[1369, 436]	1644	[164, 1533]	2415	[2763, 2115]
103	[195, 196]	874	[1370, 1371]	1645	[2175, 2176]	2416	[2764, 2765]
104	[197, 198]	875	[1372, 1373]	1646	[2177, 415]	2417	[2766, 1715]
105	[199, 120]	876	[1277, 1374]	1647	[2178, 645]	2418	[2022, 2032]
106	[200, 201]	877	[1375, 1376]	1648	[2179, 1220]	2419	[1960, 2767]
107	[12, 202]	878	[1377, 1378]	1649	[2180, 603]	2420	[2768, 1075]
108	[203, 204]	879	[1379, 1380]	1650	[134, 1438]	2421	[2769, 1097]
109	[205, 206]	880	[1381, 1382]	1651	[415, 1508]	2422	[2770, 951]
110	[207, 208]	881	[156, 1383]	1652	[2181, 454]	2423	[2617, 310]

111	[209, 53]	882	[1371, 493]	1653	[2182, 2183]	2424	[2771, 1639]
112	[210, 211]	883	[1384, 1385]	1654	[568, 2184]	2425	[2772, 2727]
113	[212, 213]	884	[436, 1386]	1655	[2185, 1516]	2426	[2773, 855]
114	[214, 215]	885	[1387, 516]	1656	[2186, 1490]	2427	[1638, 1025]
115	[216, 217]	886	[1388, 1272]	1657	[2187, 1481]	2428	[2774, 1026]
116	[159, 218]	887	[1389, 138]	1658	[2188, 2189]	2429	[2775, 2569]
117	[219, 220]	888	[208, 1390]	1659	[1260, 2190]	2430	[988, 1641]
118	[221, 222]	889	[1391, 131]	1660	[2191, 187]	2431	[712, 874]
119	[223, 224]	890	[1392, 142]	1661	[2192, 2193]	2432	[291, 29]
120	[225, 106]	891	[1393, 531]	1662	[577, 2194]	2433	[2776, 2727]
121	[226, 227]	892	[1394, 1395]	1663	[582, 1264]	2434	[263, 105]
122	[228, 229]	893	[625, 1396]	1664	[645, 2195]	2435	[2777, 817]
123	[230, 231]	894	[1397, 591]	1665	[406, 180]	2436	[1838, 2599]
124	[232, 233]	895	[1398, 1399]	1666	[2196, 2197]	2437	[267, 2778]
125	[234, 235]	896	[1225, 1400]	1667	[480, 526]	2438	[2779, 2571]
126	[236, 237]	897	[1199, 1401]	1668	[55, 1482]	2439	[2780, 1841]
127	[238, 239]	898	[1402, 1403]	1669	[2198, 1354]	2440	[2781, 2642]
128	[240, 241]	899	[642, 1404]	1670	[2199, 594]	2441	[2782, 2041]
129	[242, 243]	900	[1405, 162]	1671	[2200, 2201]	2442	[1923, 2553]
130	[244, 245]	901	[1406, 1407]	1672	[458, 2202]	2443	[1705, 2609]
131	[246, 247]	902	[1408, 1247]	1673	[2203, 1480]	2444	[2783, 801]
132	[248, 249]	903	[1409, 1410]	1674	[2204, 1204]	2445	[1096, 731]
133	[250, 251]	904	[1411, 535]	1675	[2205, 1367]	2446	[2784, 2072]
134	[252, 253]	905	[1412, 1413]	1676	[2206, 2207]	2447	[2785, 29]
135	[254, 255]	906	[185, 1301]	1677	[2208, 2209]	2448	[2786, 742]
136	[256, 257]	907	[1414, 1415]	1678	[1550, 2210]	2449	[2787, 2089]
137	[258, 259]	908	[1416, 52]	1679	[1149, 2211]	2450	[2111, 222]
138	[260, 261]	909	[1346, 1417]	1680	[678, 1402]	2451	[2788, 1041]
139	[262, 263]	910	[493, 1418]	1681	[1544, 190]	2452	[313, 2789]
140	[264, 265]	911	[1419, 1420]	1682	[2212, 1214]	2453	[1832, 295]
141	[266, 267]	912	[1270, 1421]	1683	[1628, 463]	2454	[2790, 1877]
142	[268, 269]	913	[159, 1422]	1684	[2213, 1153]	2455	[2791, 30]
143	[270, 271]	914	[1423, 1424]	1685	[181, 2214]	2456	[2792, 1790]
144	[272, 273]	915	[1425, 1261]	1686	[418, 146]	2457	[2793, 979]
145	[274, 275]	916	[1384, 1426]	1687	[2215, 1573]	2458	[2794, 287]
146	[276, 277]	917	[448, 508]	1688	[2216, 39]	2459	[2795, 800]
147	[278, 3]	918	[1427, 513]	1689	[2217, 49]	2460	[2796, 2106]
148	[279, 280]	919	[1428, 1429]	1690	[2218, 1515]	2461	[2797, 353]
149	[281, 282]	920	[655, 681]	1691	[2219, 2220]	2462	[2798, 918]
150	[280, 283]	921	[1164, 1342]	1692	[554, 495]	2463	[2799, 1840]
151	[284, 108]	922	[538, 565]	1693	[467, 1189]	2464	[1070, 2764]
152	[285, 273]	923	[1137, 690]	1694	[2221, 1195]	2465	[2800, 1711]
153	[286, 287]	924	[1430, 1241]	1695	[426, 197]	2466	[2801, 1922]
154	[288, 289]	925	[523, 59]	1696	[2222, 197]	2467	[1720, 961]

155	[290, 291]	926	[118, 1431]	1697	[2223, 422]	2468	[2802, 1941]
156	[292, 293]	927	[1432, 204]	1698	[198, 123]	2469	[2803, 311]
157	[294, 68]	928	[1433, 1150]	1699	[466, 649]	2470	[2804, 2736]
158	[295, 296]	929	[1434, 136]	1700	[134, 436]	2471	[2805, 905]
159	[297, 298]	930	[1321, 600]	1701	[2224, 2225]	2472	[2806, 329]
160	[299, 300]	931	[1357, 1145]	1702	[1360, 2226]	2473	[2807, 726]
161	[293, 301]	932	[1435, 602]	1703	[2227, 520]	2474	[2808, 1818]
162	[16, 302]	933	[1436, 609]	1704	[643, 2228]	2475	[2809, 1730]
163	[303, 304]	934	[1437, 1245]	1705	[476, 2229]	2476	[2133, 1890]
164	[305, 306]	935	[1438, 437]	1706	[2230, 1524]	2477	[2810, 1916]
165	[307, 308]	936	[1439, 519]	1707	[147, 1223]	2478	[2811, 1689]
166	[309, 248]	937	[1440, 1441]	1708	[1156, 1243]	2479	[2812, 1669]
167	[310, 311]	938	[1442, 1443]	1709	[2231, 1395]	2480	[2813, 1928]
168	[312, 313]	939	[1444, 8]	1710	[2232, 1604]	2481	[2814, 1068]
169	[247, 314]	940	[1137, 1445]	1711	[1624, 2179]	2482	[2815, 2778]
170	[315, 316]	941	[1446, 1414]	1712	[462, 1629]	2483	[2816, 927]
171	[317, 318]	942	[1447, 636]	1713	[1268, 419]	2484	[2817, 1083]
172	[319, 320]	943	[580, 1448]	1714	[2233, 2234]	2485	[2818, 1689]
173	[321, 322]	944	[1449, 1450]	1715	[2235, 522]	2486	[2819, 828]
174	[323, 324]	945	[1451, 1452]	1716	[2236, 406]	2487	[2778, 1059]
175	[325, 326]	946	[1453, 677]	1717	[1565, 629]	2488	[2820, 2696]
176	[327, 328]	947	[1176, 1454]	1718	[2237, 2238]	2489	[2821, 310]
177	[329, 330]	948	[205, 1418]	1719	[1274, 2239]	2490	[2822, 894]
178	[331, 332]	949	[1368, 1455]	1720	[1417, 2182]	2491	[789, 1710]
179	[333, 334]	950	[1445, 691]	1721	[128, 1136]	2492	[2823, 2619]
180	[335, 336]	951	[1456, 1284]	1722	[1378, 1441]	2493	[2824, 2681]
181	[337, 338]	952	[1457, 1458]	1723	[434, 1505]	2494	[2825, 2050]
182	[339, 340]	953	[1459, 1460]	1724	[2240, 1273]	2495	[2826, 1101]
183	[341, 342]	954	[1461, 1462]	1725	[2241, 2242]	2496	[70, 2086]
184	[343, 301]	955	[1463, 1464]	1726	[2243, 2244]	2497	[2827, 1952]
185	[344, 345]	956	[506, 482]	1727	[2245, 1249]	2498	[1758, 2111]
186	[346, 347]	957	[1154, 1304]	1728	[171, 2197]	2499	[2828, 943]
187	[348, 349]	958	[1326, 1465]	1729	[486, 2246]	2500	[2829, 1980]
188	[350, 351]	959	[1466, 167]	1730	[2247, 171]	2501	[975, 327]
189	[352, 353]	960	[1467, 1468]	1731	[494, 1308]	2502	[2830, 1087]
190	[354, 275]	961	[1469, 1470]	1732	[2248, 627]	2503	[18, 2569]
191	[355, 356]	962	[1195, 424]	1733	[2249, 45]	2504	[2831, 952]
192	[357, 358]	963	[1471, 598]	1734	[2250, 1140]	2505	[2832, 1067]
193	[359, 326]	964	[1472, 1473]	1735	[1616, 550]	2506	[2833, 2560]
194	[360, 308]	965	[1474, 1475]	1736	[625, 2251]	2507	[328, 227]
195	[361, 362]	966	[1476, 497]	1737	[2232, 2252]	2508	[2834, 905]
196	[363, 364]	967	[1477, 1248]	1738	[2253, 1255]	2509	[2835, 2044]
197	[365, 366]	968	[1478, 161]	1739	[1386, 2254]	2510	[2836, 2740]
198	[367, 232]	969	[411, 159]	1740	[631, 2244]	2511	[2837, 1716]

199	[347, 316]	970	[1479, 1341]	1741	[1577, 2255]	2512	[2838, 1927]
200	[368, 369]	971	[1480, 130]	1742	[1364, 525]	2513	[2839, 944]
201	[370, 371]	972	[1481, 194]	1743	[2243, 2256]	2514	[2840, 1968]
202	[24, 372]	973	[667, 1238]	1744	[457, 2229]	2515	[2841, 2740]
203	[373, 338]	974	[1353, 1403]	1745	[1329, 1404]	2516	[2842, 878]
204	[374, 375]	975	[1222, 548]	1746	[520, 655]	2517	[2843, 1634]
205	[376, 377]	976	[1482, 453]	1747	[488, 2255]	2518	[2844, 1037]
206	[378, 379]	977	[1483, 455]	1748	[2257, 2258]	2519	[2845, 2149]
207	[380, 381]	978	[1484, 1315]	1749	[2259, 637]	2520	[743, 1984]
208	[382, 383]	979	[1485, 1316]	1750	[1540, 2260]	2521	[939, 2021]
209	[384, 385]	980	[1486, 1487]	1751	[2261, 1504]	2522	[937, 1895]
210	[338, 386]	981	[467, 672]	1752	[2262, 2202]	2523	[1085, 745]
211	[387, 388]	982	[1488, 488]	1753	[2211, 1197]	2524	[2846, 1975]
212	[389, 390]	983	[1489, 1490]	1754	[2263, 2264]	2525	[900, 2164]
213	[388, 391]	984	[1491, 1363]	1755	[437, 2254]	2526	[2847, 2105]
214	[111, 392]	985	[1492, 571]	1756	[1465, 1206]	2527	[2848, 2849]
215	[393, 336]	986	[1414, 445]	1757	[1602, 2243]	2528	[2850, 2072]
216	[394, 395]	987	[1493, 1494]	1758	[549, 404]	2529	[1805, 2724]
217	[396, 397]	988	[1495, 1182]	1759	[2265, 2266]	2530	[1729, 2851]
218	[296, 398]	989	[1496, 1328]	1760	[443, 2267]	2531	[2852, 278]
219	[399, 38]	990	[1497, 145]	1761	[2268, 2269]	2532	[1966, 2853]
220	[400, 401]	991	[1498, 521]	1762	[2270, 1627]	2533	[2854, 2713]
221	[402, 403]	992	[1499, 1146]	1763	[2271, 1213]	2534	[2855, 283]
222	[404, 405]	993	[1500, 1378]	1764	[2272, 2273]	2535	[2741, 268]
223	[406, 407]	994	[646, 1417]	1765	[1214, 2274]	2536	[2856, 1909]
224	[408, 409]	995	[1501, 521]	1766	[1166, 1271]	2537	[2857, 279]
225	[410, 411]	996	[1502, 1296]	1767	[404, 1564]	2538	[2858, 2853]
226	[412, 413]	997	[1503, 1504]	1768	[1233, 573]	2539	[2686, 1050]
227	[414, 415]	998	[527, 1505]	1769	[1339, 2275]	2540	[2859, 1751]
228	[416, 417]	999	[1506, 633]	1770	[1541, 1293]	2541	[850, 927]
229	[418, 419]	1000	[1507, 1508]	1771	[1619, 577]	2542	[2860, 2065]
230	[420, 421]	1001	[1509, 1510]	1772	[2202, 2276]	2543	[2861, 2384]
231	[422, 423]	1002	[1511, 585]	1773	[2277, 2278]	2544	[1566, 2271]
232	[424, 425]	1003	[649, 672]	1774	[505, 481]	2545	[2358, 2211]
233	[426, 427]	1004	[1512, 1513]	1775	[2279, 1562]	2546	[2862, 470]
234	[428, 429]	1005	[1514, 1477]	1776	[2280, 619]	2547	[545, 1262]
235	[430, 431]	1006	[1515, 1516]	1777	[2281, 127]	2548	[2863, 1162]
236	[432, 433]	1007	[1323, 403]	1778	[1244, 2282]	2549	[145, 2864]
237	[434, 435]	1008	[1517, 652]	1779	[1392, 1554]	2550	[2865, 2348]
238	[436, 437]	1009	[1518, 1300]	1780	[1540, 2267]	2551	[1171, 168]
239	[438, 439]	1010	[1519, 1223]	1781	[2283, 1318]	2552	[2178, 1433]
240	[440, 217]	1011	[1333, 1520]	1782	[488, 2284]	2553	[2866, 484]
241	[441, 128]	1012	[1521, 201]	1783	[2206, 2285]	2554	[1210, 1142]
242	[442, 443]	1013	[499, 1522]	1784	[1269, 2238]	2555	[2867, 1537]

243	[444, 445]	1014	[1523, 1225]	1785	[2286, 1601]	2556	[663, 1253]
244	[446, 447]	1015	[1524, 1525]	1786	[2287, 7]	2557	[2196, 2542]
245	[184, 448]	1016	[589, 153]	1787	[2288, 1618]	2558	[400, 556]
246	[449, 450]	1017	[1526, 1199]	1788	[2289, 2290]	2559	[1478, 172]
247	[451, 452]	1018	[1527, 1480]	1789	[2291, 1185]	2560	[2461, 1454]
248	[453, 454]	1019	[1448, 131]	1790	[2292, 1187]	2561	[1609, 1144]
249	[455, 37]	1020	[1528, 1338]	1791	[2293, 1487]	2562	[685, 1445]
250	[456, 457]	1021	[1375, 1529]	1792	[2294, 2295]	2563	[1394, 2439]
251	[458, 459]	1022	[1530, 1180]	1793	[2296, 601]	2564	[2868, 2515]
252	[460, 461]	1023	[1531, 628]	1794	[2297, 1434]	2565	[1196, 2417]
253	[462, 463]	1024	[1532, 1533]	1795	[493, 206]	2566	[1313, 1271]
254	[464, 465]	1025	[1534, 1181]	1796	[2298, 2209]	2567	[2869, 671]
255	[466, 467]	1026	[1535, 509]	1797	[1180, 442]	2568	[2381, 2390]
256	[468, 469]	1027	[677, 615]	1798	[2299, 1242]	2569	[2870, 1296]
257	[470, 471]	1028	[660, 1283]	1799	[2300, 2301]	2570	[2871, 1426]
258	[472, 473]	1029	[1250, 1207]	1800	[2302, 2303]	2571	[1296, 2872]
259	[474, 475]	1030	[1536, 1537]	1801	[2304, 1215]	2572	[1588, 1573]
260	[456, 476]	1031	[152, 1538]	1802	[1203, 2305]	2573	[1370, 492]
261	[477, 478]	1032	[213, 1539]	1803	[2306, 2307]	2574	[2873, 144]
262	[479, 480]	1033	[442, 1540]	1804	[2175, 2308]	2575	[2874, 2875]
263	[481, 482]	1034	[1541, 1274]	1805	[2309, 2269]	2576	[199, 1351]
264	[483, 484]	1035	[1542, 486]	1806	[2310, 606]	2577	[176, 1463]
265	[485, 486]	1036	[1220, 621]	1807	[2311, 1448]	2578	[1212, 1398]
266	[487, 488]	1037	[1446, 444]	1808	[2312, 1360]	2579	[2541, 2337]
267	[489, 215]	1038	[1161, 1543]	1809	[2313, 410]	2580	[2876, 1315]
268	[490, 491]	1039	[1544, 54]	1810	[1187, 1420]	2581	[2451, 1145]
269	[492, 493]	1040	[1213, 1399]	1811	[2314, 1348]	2582	[528, 2409]
270	[494, 495]	1041	[1545, 452]	1812	[2315, 462]	2583	[161, 2444]
271	[496, 497]	1042	[623, 1499]	1813	[2316, 2189]	2584	[1198, 1428]
272	[498, 39]	1043	[1546, 1547]	1814	[555, 405]	2585	[2349, 2458]
273	[499, 500]	1044	[1548, 1549]	1815	[2317, 2318]	2586	[2401, 2877]
274	[501, 502]	1045	[1550, 683]	1816	[474, 1392]	2587	[2878, 1461]
275	[503, 504]	1046	[1551, 1552]	1817	[546, 1263]	2588	[1494, 1295]
276	[505, 506]	1047	[1553, 583]	1818	[2319, 1229]	2589	[2879, 580]
277	[507, 508]	1048	[1554, 143]	1819	[2320, 438]	2590	[1140, 453]
278	[417, 509]	1049	[1555, 1172]	1820	[2321, 2225]	2591	[2880, 1210]
279	[510, 511]	1050	[1556, 554]	1821	[472, 2322]	2592	[620, 2341]
280	[512, 513]	1051	[1557, 1558]	1822	[2323, 2324]	2593	[2881, 2882]
281	[514, 515]	1052	[692, 1149]	1823	[2325, 1305]	2594	[2883, 417]
282	[516, 517]	1053	[432, 1559]	1824	[2326, 1219]	2595	[1471, 123]
283	[511, 518]	1054	[1560, 1293]	1825	[1556, 494]	2596	[427, 1471]
284	[492, 205]	1055	[1561, 1562]	1826	[2327, 561]	2597	[2223, 1194]
285	[59, 519]	1056	[504, 1563]	1827	[1472, 126]	2598	[1581, 2525]
286	[14, 520]	1057	[555, 1564]	1828	[2328, 465]	2599	[612, 140]

287	[521, 522]	1058	[1565, 1566]	1829	[2329, 2330]	2600	[2248, 1531]
288	[41, 523]	1059	[1567, 491]	1830	[1235, 1142]	2601	[2884, 2885]
289	[524, 525]	1060	[1450, 635]	1831	[559, 1323]	2602	[2886, 1570]
290	[526, 527]	1061	[192, 1228]	1832	[2331, 1281]	2603	[2405, 1309]
291	[42, 59]	1062	[664, 1464]	1833	[1476, 634]	2604	[36, 2887]
292	[528, 529]	1063	[1568, 14]	1834	[2332, 2333]	2605	[2296, 1435]
293	[530, 531]	1064	[1569, 1570]	1835	[1561, 2334]	2606	[2888, 2889]
294	[532, 533]	1065	[1571, 1380]	1836	[2335, 401]	2607	[2532, 1406]
295	[534, 535]	1066	[586, 1572]	1837	[2336, 612]	2608	[2890, 1326]
296	[536, 537]	1067	[1573, 1574]	1838	[2337, 548]	2609	[2891, 2438]
297	[538, 539]	1068	[1575, 1576]	1839	[583, 1302]	2610	[214, 2892]
298	[540, 541]	1069	[1488, 1577]	1840	[2338, 1425]	2611	[2535, 659]
299	[542, 543]	1070	[39, 542]	1841	[1591, 1167]	2612	[2265, 2472]
300	[155, 544]	1071	[1494, 1578]	1842	[1309, 2339]	2613	[1614, 1309]
301	[545, 546]	1072	[1306, 1371]	1843	[2209, 1307]	2614	[2893, 2413]
302	[32, 547]	1073	[1579, 1558]	1844	[1201, 1552]	2615	[2195, 1151]
303	[548, 549]	1074	[1580, 174]	1845	[2340, 1443]	2616	[2894, 2396]
304	[202, 550]	1075	[1581, 1582]	1846	[2341, 1331]	2617	[2895, 46]
305	[551, 552]	1076	[1583, 410]	1847	[2316, 2249]	2618	[593, 2896]
306	[553, 554]	1077	[190, 55]	1848	[2342, 594]	2619	[1618, 2450]
307	[549, 555]	1078	[1584, 1368]	1849	[615, 1353]	2620	[2865, 2329]
308	[556, 557]	1079	[1585, 1181]	1850	[605, 40]	2621	[2897, 1551]
309	[477, 558]	1080	[1262, 1586]	1851	[2343, 160]	2622	[2501, 175]
310	[559, 402]	1081	[649, 1189]	1852	[1587, 1392]	2623	[1451, 1512]
311	[46, 457]	1082	[124, 1194]	1853	[1307, 1476]	2624	[1167, 2471]
312	[560, 561]	1083	[145, 1413]	1854	[1554, 626]	2625	[2898, 2899]
313	[562, 563]	1084	[1294, 1578]	1855	[1303, 1155]	2626	[1454, 1382]
314	[564, 565]	1085	[1587, 475]	1856	[179, 407]	2627	[2900, 2901]
315	[566, 567]	1086	[1588, 1589]	1857	[2344, 2324]	2628	[2428, 614]
316	[568, 569]	1087	[1590, 176]	1858	[2319, 1465]	2629	[630, 2243]
317	[570, 196]	1088	[1277, 1591]	1859	[2329, 2345]	2630	[1140, 2181]
318	[571, 571]	1089	[1592, 1593]	1860	[2198, 1524]	2631	[1449, 1387]
319	[572, 573]	1090	[1594, 1461]	1861	[166, 1595]	2632	[1438, 1386]
320	[574, 439]	1091	[1466, 1595]	1862	[2346, 1529]	2633	[1315, 2902]
321	[575, 576]	1092	[1596, 431]	1863	[2347, 1576]	2634	[1398, 2410]
322	[577, 578]	1093	[1597, 1475]	1864	[2348, 2345]	2635	[2903, 2904]
323	[579, 580]	1094	[1598, 1256]	1865	[2300, 2264]	2636	[1254, 2508]
324	[581, 500]	1095	[1599, 443]	1866	[2349, 1424]	2637	[1246, 2469]
325	[582, 583]	1096	[1600, 661]	1867	[2350, 1462]	2638	[1592, 2303]
326	[445, 584]	1097	[1601, 1248]	1868	[613, 2351]	2639	[1177, 2889]
327	[585, 586]	1098	[583, 1265]	1869	[2352, 448]	2640	[2461, 1381]
328	[548, 587]	1099	[575, 33]	1870	[2297, 135]	2641	[2394, 1422]
329	[588, 589]	1100	[1553, 1264]	1871	[1166, 1388]	2642	[2884, 1259]
330	[590, 591]	1101	[1602, 631]	1872	[1433, 2195]	2643	[2531, 2905]

331	[592, 593]	1102	[1603, 1604]	1873	[2353, 2354]	2644	[2341, 1217]
332	[594, 595]	1103	[546, 1586]	1874	[2355, 1291]	2645	[1605, 2906]
333	[596, 597]	1104	[1605, 1458]	1875	[1210, 1617]	2646	[2907, 2908]
334	[198, 598]	1105	[1606, 1607]	1876	[8, 162]	2647	[2226, 2909]
335	[599, 600]	1106	[1608, 585]	1877	[1555, 168]	2648	[2888, 1178]
336	[601, 602]	1107	[1183, 1590]	1878	[2356, 1242]	2649	[2281, 441]
337	[204, 603]	1108	[1609, 545]	1879	[1456, 1611]	2650	[2910, 433]
338	[604, 569]	1109	[1610, 157]	1880	[2357, 1373]	2651	[2233, 1607]
339	[605, 542]	1110	[439, 1611]	1881	[1229, 1250]	2652	[2911, 1214]
340	[606, 607]	1111	[1612, 1613]	1882	[2358, 1196]	2653	[8, 536]
341	[608, 609]	1112	[1527, 129]	1883	[2359, 593]	2654	[2262, 459]
342	[610, 611]	1113	[1614, 1615]	1884	[593, 2201]	2655	[1524, 1355]
343	[40, 543]	1114	[1439, 60]	1885	[408, 552]	2656	[2912, 2286]
344	[612, 613]	1115	[12, 1616]	1886	[46, 476]	2657	[2913, 2408]
345	[614, 615]	1116	[1617, 588]	1887	[2360, 1171]	2658	[2914, 2882]
346	[495, 616]	1117	[1618, 1619]	1888	[2276, 1591]	2659	[581, 1522]
347	[617, 547]	1118	[608, 575]	1889	[2361, 1468]	2660	[2477, 411]
348	[618, 619]	1119	[1620, 1613]	1890	[2362, 680]	2661	[146, 1519]
349	[620, 621]	1120	[1589, 1574]	1891	[2363, 1542]	2662	[1170, 1466]
350	[622, 623]	1121	[1621, 1622]	1892	[2364, 1407]	2663	[622, 155]
351	[624, 625]	1122	[208, 1161]	1893	[658, 2365]	2664	[2332, 2915]
352	[142, 626]	1123	[1623, 449]	1894	[2366, 2367]	2665	[2188, 2249]
353	[627, 628]	1124	[1236, 1400]	1895	[2368, 1334]	2666	[2195, 2376]
354	[591, 629]	1125	[1624, 1219]	1896	[2369, 660]	2667	[2913, 528]
355	[630, 631]	1126	[186, 1344]	1897	[2370, 178]	2668	[2529, 2367]
356	[632, 633]	1127	[1625, 471]	1898	[1452, 1513]	2669	[2394, 218]
357	[496, 634]	1128	[1506, 1208]	1899	[2371, 502]	2670	[1285, 1410]
358	[635, 517]	1129	[1626, 455]	1900	[2372, 462]	2671	[1149, 1196]
359	[636, 637]	1130	[36, 1627]	1901	[1390, 1543]	2672	[566, 1231]
360	[638, 639]	1131	[1628, 1629]	1902	[453, 2373]	2673	[2916, 2904]
361	[640, 641]	1132	[591, 1566]	1903	[2364, 2374]	2674	[2174, 499]
362	[642, 643]	1133	[1415, 584]	1904	[1599, 1540]	2675	[2917, 451]
363	[644, 645]	1134	[1630, 392]	1905	[2261, 2375]	2676	[2918, 144]
364	[646, 647]	1135	[1631, 67]	1906	[1150, 2376]	2677	[1405, 536]
365	[648, 649]	1136	[765, 893]	1907	[2377, 1349]	2678	[2919, 2920]
366	[650, 426]	1137	[330, 1016]	1908	[2378, 2220]	2679	[2921, 2484]
367	[423, 426]	1138	[1632, 887]	1909	[2379, 1455]	2680	[589, 1538]
368	[401, 557]	1139	[959, 1633]	1910	[2380, 1521]	2681	[2539, 2207]
369	[651, 652]	1140	[275, 840]	1911	[2381, 1447]	2682	[2922, 564]
370	[653, 10]	1141	[741, 1634]	1912	[2382, 2290]	2683	[1463, 2923]
371	[654, 655]	1142	[1635, 992]	1913	[2383, 2384]	2684	[1231, 1320]
372	[47, 202]	1143	[1636, 924]	1914	[2385, 578]	2685	[1615, 2339]
373	[656, 470]	1144	[1637, 1638]	1915	[2386, 2273]	2686	[2924, 2497]
374	[657, 122]	1145	[1639, 843]	1916	[461, 541]	2687	[580, 1391]

375	[124, 422]	1146	[269, 1640]	1917	[1578, 1384]	2688	[2925, 1225]
376	[658, 659]	1147	[1641, 959]	1918	[2387, 506]	2689	[609, 33]
377	[660, 661]	1148	[1642, 783]	1919	[161, 173]	2690	[2926, 2492]
378	[662, 663]	1149	[1643, 1052]	1920	[1489, 2388]	2691	[1425, 2190]
379	[527, 435]	1150	[1644, 1078]	1921	[2172, 42]	2692	[2870, 2502]
380	[176, 664]	1151	[826, 931]	1922	[2389, 1183]	2693	[615, 1402]
381	[665, 418]	1152	[1645, 1646]	1923	[189, 1224]	2694	[2927, 2307]
382	[666, 667]	1153	[1647, 1648]	1924	[665, 1268]	2695	[1205, 2514]
383	[668, 669]	1154	[1649, 256]	1925	[2183, 563]	2696	[2928, 1452]
384	[670, 671]	1155	[1650, 1127]	1926	[2390, 636]	2697	[640, 2441]
385	[672, 420]	1156	[1651, 1652]	1927	[2226, 2391]	2698	[2929, 2348]
386	[673, 127]	1157	[961, 1653]	1928	[1346, 647]	2699	[2449, 1619]
387	[654, 674]	1158	[1654, 1655]	1929	[1371, 205]	2700	[2363, 485]
388	[675, 676]	1159	[794, 1656]	1930	[1283, 2392]	2701	[2202, 1277]
389	[677, 678]	1160	[1657, 298]	1931	[2180, 1147]	2702	[1159, 2322]
390	[679, 680]	1161	[1658, 369]	1932	[2276, 1374]	2703	[1217, 2536]
391	[674, 681]	1162	[1659, 313]	1933	[1409, 1286]	2704	[2215, 1589]
392	[682, 683]	1163	[1660, 1661]	1934	[2393, 1414]	2705	[2177, 1507]
393	[684, 685]	1164	[1662, 74]	1935	[411, 2394]	2706	[2383, 2930]
394	[686, 429]	1165	[925, 1663]	1936	[2395, 2396]	2707	[2257, 2278]
395	[687, 447]	1166	[1648, 1664]	1937	[2237, 1270]	2708	[2931, 2932]
396	[688, 689]	1167	[779, 1665]	1938	[2397, 676]	2709	[1180, 1599]
397	[690, 691]	1168	[876, 1066]	1939	[2398, 2399]	2710	[57, 2909]
398	[535, 692]	1169	[1666, 1667]	1940	[1427, 2400]	2711	[2423, 166]
399	[693, 694]	1170	[1668, 1669]	1941	[1221, 2337]	2712	[416, 1535]
400	[695, 696]	1171	[1670, 1671]	1942	[2263, 2301]	2713	[2933, 2534]
401	[697, 698]	1172	[1672, 1652]	1943	[2401, 2402]	2714	[1184, 1266]
402	[699, 700]	1173	[1673, 1674]	1944	[2238, 1421]	2715	[414, 1507]
403	[701, 702]	1174	[895, 112]	1945	[2403, 2404]	2716	[2182, 562]
404	[703, 704]	1175	[1675, 1676]	1946	[1437, 2282]	2717	[2934, 174]
405	[705, 706]	1176	[1677, 956]	1947	[2380, 200]	2718	[1354, 1525]
406	[707, 708]	1177	[1678, 1112]	1948	[2405, 1615]	2719	[2277, 2258]
407	[709, 710]	1178	[1679, 1000]	1949	[576, 34]	2720	[512, 2400]
408	[711, 712]	1179	[1680, 1681]	1950	[475, 1554]	2721	[2235, 1211]
409	[713, 714]	1180	[1682, 1683]	1951	[2406, 2407]	2722	[2369, 1600]
410	[715, 716]	1181	[1684, 739]	1952	[2408, 2409]	2723	[2935, 562]
411	[717, 718]	1182	[1685, 394]	1953	[1615, 1310]	2724	[2456, 1313]
412	[719, 360]	1183	[1686, 1687]	1954	[1326, 1229]	2725	[9, 477]
413	[720, 721]	1184	[1688, 937]	1955	[1213, 2410]	2726	[1142, 2936]
414	[722, 723]	1185	[1689, 995]	1956	[1453, 614]	2727	[2937, 402]
415	[724, 76]	1186	[1690, 712]	1957	[1474, 2411]	2728	[2938, 2402]
416	[725, 726]	1187	[1691, 1003]	1958	[2412, 627]	2729	[1512, 2939]
417	[727, 728]	1188	[1692, 782]	1959	[2353, 2413]	2730	[1148, 2358]
418	[729, 730]	1189	[1693, 1694]	1960	[2414, 1563]	2731	[2868, 2460]

419	[731, 732]	1190	[1695, 812]	1961	[2415, 2416]	2732	[2933, 2404]
420	[385, 733]	1191	[1696, 1697]	1962	[2211, 2417]	2733	[2227, 654]
421	[734, 735]	1192	[1192, 1192]	1963	[2418, 2419]	2734	[2940, 668]
422	[231, 708]	1193	[1698, 985]	1964	[2387, 481]	2735	[1319, 2464]
423	[736, 737]	1194	[1699, 334]	1965	[2420, 2421]	2736	[2241, 2512]
424	[733, 738]	1195	[318, 375]	1966	[2422, 587]	2737	[1266, 2454]
425	[735, 255]	1196	[1133, 26]	1967	[2408, 529]	2738	[1485, 2902]
426	[708, 367]	1197	[1052, 1056]	1968	[38, 651]	2739	[2929, 2329]
427	[737, 739]	1198	[1700, 259]	1969	[2423, 1466]	2740	[2941, 1307]
428	[740, 741]	1199	[1701, 286]	1970	[2424, 1357]	2741	[2942, 1350]
429	[742, 743]	1200	[1702, 1703]	1971	[2425, 2426]	2742	[2880, 1235]
430	[744, 745]	1201	[1704, 1705]	1972	[1300, 1460]	2743	[155, 1499]
431	[746, 747]	1202	[1706, 1707]	1973	[118, 1336]	2744	[2871, 1385]
432	[748, 749]	1203	[1708, 762]	1974	[125, 1473]	2745	[1352, 1600]
433	[750, 751]	1204	[1709, 870]	1975	[2427, 2428]	2746	[536, 163]
434	[752, 753]	1205	[1710, 1711]	1976	[430, 2167]	2747	[428, 2943]
435	[754, 755]	1206	[1712, 1124]	1977	[2429, 2407]	2748	[2944, 2901]
436	[756, 757]	1207	[1126, 1713]	1978	[2222, 427]	2749	[2945, 2486]
437	[758, 759]	1208	[1714, 1715]	1979	[2430, 2214]	2750	[1509, 2946]
438	[760, 761]	1209	[320, 1716]	1980	[2431, 1582]	2751	[1185, 1267]
439	[762, 239]	1210	[1717, 1718]	1981	[2348, 2330]	2752	[2947, 1435]
440	[763, 764]	1211	[1719, 339]	1982	[1390, 1546]	2753	[2935, 2183]
441	[702, 765]	1212	[995, 1720]	1983	[2412, 1531]	2754	[2502, 2872]
442	[766, 767]	1213	[1721, 1722]	1984	[2432, 1568]	2755	[2310, 213]
443	[768, 769]	1214	[1723, 1724]	1985	[553, 494]	2756	[2948, 2920]
444	[770, 245]	1215	[1725, 1726]	1986	[685, 690]	2757	[2949, 1269]
445	[771, 772]	1216	[1727, 277]	1987	[2433, 1406]	2758	[2482, 1425]
446	[773, 774]	1217	[917, 1728]	1988	[2434, 2295]	2759	[1388, 185]
447	[775, 776]	1218	[1036, 1729]	1989	[2435, 1549]	2760	[2476, 686]
448	[342, 777]	1219	[755, 1035]	1990	[2436, 37]	2761	[656, 1625]
449	[778, 779]	1220	[1730, 917]	1991	[2437, 2438]	2762	[2169, 2950]
450	[780, 781]	1221	[1731, 1732]	1992	[51, 1447]	2763	[651, 2951]
451	[782, 783]	1222	[1733, 990]	1993	[524, 1365]	2764	[1577, 2284]
452	[784, 785]	1223	[277, 956]	1994	[2231, 2439]	2765	[542, 514]
453	[786, 787]	1224	[1734, 1735]	1995	[2440, 2441]	2766	[1444, 1405]
454	[788, 789]	1225	[1736, 1721]	1996	[2442, 2421]	2767	[2494, 651]
455	[790, 75]	1226	[1737, 1738]	1997	[2443, 2318]	2768	[2181, 2373]
456	[791, 792]	1227	[1739, 1114]	1998	[2203, 129]	2769	[606, 1539]
457	[793, 794]	1228	[356, 1740]	1999	[1239, 1476]	2770	[2928, 1512]
458	[795, 796]	1229	[1129, 741]	2000	[172, 2444]	2771	[621, 1331]
459	[797, 798]	1230	[1741, 1742]	2001	[2445, 1268]	2772	[2302, 1593]
460	[799, 800]	1231	[1743, 1744]	2002	[1470, 188]	2773	[2952, 2461]
461	[801, 802]	1232	[1745, 1746]	2003	[486, 2446]	2774	[2428, 677]
462	[803, 804]	1233	[1747, 771]	2004	[2447, 2333]	2775	[2893, 2354]

463	[805, 261]	1234	[1748, 1640]	2005	[2448, 428]	2776	[1220, 2341]
464	[806, 807]	1235	[1063, 991]	2006	[2449, 2450]	2777	[2953, 1510]
465	[808, 809]	1236	[1749, 1048]	2007	[2451, 624]	2778	[2487, 1450]
466	[810, 811]	1237	[1750, 16]	2008	[2452, 2416]	2779	[1272, 186]
467	[812, 104]	1238	[1751, 98]	2009	[2221, 421]	2780	[2238, 2954]
468	[813, 114]	1239	[1752, 1753]	2010	[567, 1232]	2781	[1381, 2955]
469	[814, 257]	1240	[340, 240]	2011	[2453, 2266]	2782	[2503, 1521]
470	[815, 816]	1241	[1754, 1755]	2012	[1503, 2375]	2783	[1600, 1283]
471	[817, 818]	1242	[1756, 971]	2013	[1185, 2454]	2784	[52, 2956]
472	[819, 820]	1243	[1757, 1758]	2014	[1482, 2181]	2785	[2861, 2930]
473	[821, 822]	1244	[1655, 924]	2015	[2455, 150]	2786	[175, 1200]
474	[823, 268]	1245	[1759, 1760]	2016	[2456, 1166]	2787	[2957, 1481]
475	[824, 270]	1246	[1761, 312]	2017	[1551, 1202]	2788	[2958, 449]
476	[825, 826]	1247	[1762, 1763]	2018	[2457, 2251]	2789	[1532, 165]
477	[827, 705]	1248	[1764, 1765]	2019	[1308, 1257]	2790	[1495, 2959]
478	[20, 828]	1249	[955, 1766]	2020	[2291, 1266]	2791	[443, 2260]
479	[818, 829]	1250	[753, 332]	2021	[2398, 511]	2792	[129, 2240]
480	[830, 831]	1251	[1767, 1077]	2022	[1423, 2458]	2793	[667, 2527]
481	[832, 733]	1252	[1768, 321]	2023	[2459, 2460]	2794	[2919, 2960]
482	[833, 834]	1253	[971, 747]	2024	[1175, 2461]	2795	[2506, 2446]
483	[835, 696]	1254	[1769, 1770]	2025	[614, 678]	2796	[2863, 1156]
484	[836, 837]	1255	[1118, 1771]	2026	[2191, 1470]	2797	[2961, 1494]
485	[838, 302]	1256	[1652, 1772]	2027	[2286, 1477]	2798	[1526, 1428]
486	[839, 91]	1257	[777, 1755]	2028	[1406, 2374]	2799	[1379, 2499]
487	[840, 841]	1258	[1773, 1774]	2029	[2440, 641]	2800	[2494, 1517]
488	[842, 843]	1259	[1775, 706]	2030	[197, 1471]	2801	[1519, 189]
489	[844, 845]	1260	[1776, 792]	2031	[1591, 1298]	2802	[2936, 589]
490	[846, 847]	1261	[1777, 1097]	2032	[2445, 418]	2803	[586, 2905]
491	[848, 379]	1262	[1778, 882]	2033	[2462, 461]	2804	[2907, 1169]
492	[849, 378]	1263	[1779, 1780]	2034	[2463, 597]	2805	[1271, 185]
493	[395, 270]	1264	[1781, 738]	2035	[468, 2464]	2806	[1270, 2954]
494	[351, 850]	1265	[983, 1782]	2036	[2465, 2286]	2807	[186, 2505]
495	[851, 761]	1266	[1783, 1784]	2037	[2466, 208]	2808	[135, 2962]
496	[852, 853]	1267	[704, 1785]	2038	[2204, 2305]	2809	[2366, 2530]
497	[854, 855]	1268	[1786, 278]	2039	[2467, 1162]	2810	[2963, 668]
498	[371, 856]	1269	[1787, 813]	2040	[2468, 1171]	2811	[2964, 1501]
499	[857, 737]	1270	[1788, 1789]	2041	[1160, 1390]	2812	[2470, 2176]
500	[392, 858]	1271	[1790, 1724]	2042	[1436, 575]	2813	[2533, 1542]
501	[859, 860]	1272	[872, 700]	2043	[1408, 2469]	2814	[653, 477]
502	[861, 862]	1273	[243, 1760]	2044	[2171, 135]	2815	[2941, 1239]
503	[863, 347]	1274	[1791, 736]	2045	[2470, 2308]	2816	[2965, 2419]
504	[864, 865]	1275	[1792, 1006]	2046	[1298, 2471]	2817	[2926, 2528]
505	[866, 833]	1276	[1793, 335]	2047	[459, 2276]	2818	[664, 2923]
506	[867, 868]	1277	[1794, 1795]	2048	[2453, 2472]	2819	[1515, 2966]

507	[869, 850]	1278	[1796, 1728]	2049	[2473, 1312]	2820	[1480, 2240]
508	[301, 870]	1279	[1797, 1798]	2050	[1566, 1212]	2821	[2938, 2877]
509	[871, 872]	1280	[1799, 1100]	2051	[158, 2394]	2822	[2271, 1398]
510	[873, 874]	1281	[1800, 1729]	2052	[613, 2474]	2823	[2467, 1156]
511	[875, 876]	1282	[1801, 1671]	2053	[2475, 2193]	2824	[2967, 1360]
512	[877, 878]	1283	[1802, 1692]	2054	[2476, 428]	2825	[645, 1150]
513	[879, 880]	1284	[968, 776]	2055	[2477, 158]	2826	[419, 1519]
514	[78, 78]	1285	[1803, 945]	2056	[2478, 1184]	2827	[178, 685]
515	[80, 27]	1286	[1804, 1735]	2057	[2479, 2480]	2828	[487, 1577]
516	[881, 378]	1287	[949, 1805]	2058	[1190, 648]	2829	[2968, 1184]
517	[882, 883]	1288	[1806, 339]	2059	[2481, 2386]	2830	[2969, 2932]
518	[874, 884]	1289	[1807, 1112]	2060	[2253, 1330]	2831	[1518, 1459]
519	[885, 281]	1290	[1808, 864]	2061	[587, 404]	2832	[629, 2271]
520	[265, 886]	1291	[1809, 1810]	2062	[661, 2392]	2833	[2874, 2970]
521	[887, 798]	1292	[809, 1643]	2063	[51, 2390]	2834	[2953, 2946]
522	[787, 888]	1293	[1811, 233]	2064	[47, 1616]	2835	[160, 172]
523	[889, 890]	1294	[1812, 769]	2065	[1335, 1431]	2836	[209, 2956]
524	[106, 891]	1295	[1813, 1814]	2066	[1428, 1401]	2837	[2910, 1559]
525	[892, 893]	1296	[1815, 886]	2067	[604, 2184]	2838	[2948, 2960]
526	[894, 895]	1297	[1816, 889]	2068	[2482, 1260]	2839	[682, 2210]
527	[853, 896]	1298	[1817, 111]	2069	[2483, 2484]	2840	[509, 2908]
528	[897, 898]	1299	[1818, 1819]	2070	[2485, 2486]	2841	[1, 2942]
529	[899, 900]	1300	[1820, 1720]	2071	[2487, 1387]	2842	[554, 1308]
530	[901, 115]	1301	[1724, 1810]	2072	[2325, 526]	2843	[2971, 47]
531	[902, 116]	1302	[1821, 1127]	2073	[572, 1234]	2844	[599, 1322]
532	[903, 904]	1303	[728, 1822]	2074	[1374, 1298]	2845	[673, 441]
533	[905, 906]	1304	[1823, 1782]	2075	[2488, 1568]	2846	[38, 1517]
534	[907, 908]	1305	[1824, 754]	2076	[2489, 2480]	2847	[32, 2972]
535	[909, 372]	1306	[1825, 395]	2077	[10, 478]	2848	[2921, 2973]
536	[910, 911]	1307	[1826, 854]	2078	[2448, 686]	2849	[1199, 1429]
537	[349, 912]	1308	[1827, 968]	2079	[2490, 480]	2850	[2377, 2942]
538	[913, 703]	1309	[1828, 1192]	2080	[2491, 2492]	2851	[621, 1217]
539	[914, 915]	1310	[1656, 822]	2081	[2493, 1269]	2852	[2974, 2970]
540	[916, 917]	1311	[222, 871]	2082	[1235, 1617]	2853	[2230, 1354]
541	[918, 919]	1312	[1829, 1771]	2083	[399, 2494]	2854	[644, 1433]
542	[856, 920]	1313	[1830, 872]	2084	[1279, 2397]	2855	[588, 152]
543	[921, 922]	1314	[1831, 1832]	2085	[2495, 2408]	2856	[2422, 549]
544	[847, 243]	1315	[1833, 1080]	2086	[2496, 2497]	2857	[14, 654]
545	[923, 772]	1316	[1834, 837]	2087	[2498, 1618]	2858	[2975, 413]
546	[924, 925]	1317	[1835, 1836]	2088	[564, 539]	2859	[1469, 187]
547	[62, 926]	1318	[1837, 1838]	2089	[2304, 2274]	2860	[2368, 1520]
548	[927, 703]	1319	[1839, 62]	2090	[2385, 2194]	2861	[2976, 856]
549	[928, 705]	1320	[1840, 1841]	2091	[2189, 45]	2862	[792, 817]
550	[94, 695]	1321	[1842, 335]	2092	[1571, 2499]	2863	[2977, 362]

551	[929, 930]	1322	[1843, 1844]	2093	[2500, 612]	2864	[2978, 2041]
552	[931, 932]	1323	[1845, 345]	2094	[2501, 1590]	2865	[2979, 1646]
553	[933, 934]	1324	[386, 1033]	2095	[1419, 1332]	2866	[820, 2129]
554	[935, 777]	1325	[1846, 1847]	2096	[2502, 1297]	2867	[2980, 2758]
555	[936, 937]	1326	[1848, 753]	2097	[2503, 200]	2868	[287, 918]
556	[938, 939]	1327	[1121, 20]	2098	[1610, 1383]	2869	[2981, 996]
557	[696, 940]	1328	[1849, 953]	2099	[2504, 564]	2870	[2982, 2148]
558	[941, 942]	1329	[1850, 1851]	2100	[1301, 2505]	2871	[2983, 716]
559	[943, 944]	1330	[1852, 1853]	2101	[1161, 1546]	2872	[2042, 1982]
560	[377, 945]	1331	[1854, 988]	2102	[2506, 2246]	2873	[2984, 2985]
561	[946, 947]	1332	[1855, 234]	2103	[2507, 1515]	2874	[2986, 1878]
562	[948, 813]	1333	[1856, 1857]	2104	[1361, 1231]	2875	[2987, 919]
563	[698, 949]	1334	[1858, 1859]	2105	[1369, 1438]	2876	[2988, 1834]
564	[950, 951]	1335	[953, 974]	2106	[410, 158]	2877	[2989, 2990]
565	[952, 953]	1336	[1860, 906]	2107	[7, 1405]	2878	[2991, 1998]
566	[886, 355]	1337	[1861, 244]	2108	[57, 2391]	2879	[1746, 2665]
567	[954, 955]	1338	[1862, 271]	2109	[1313, 1388]	2880	[2992, 2613]
568	[956, 957]	1339	[1863, 1847]	2110	[638, 2508]	2881	[2993, 2679]
569	[958, 959]	1340	[1864, 934]	2111	[2509, 2428]	2882	[2994, 1807]
570	[960, 961]	1341	[1865, 322]	2112	[1374, 1167]	2883	[2995, 871]
571	[962, 963]	1342	[1866, 1867]	2113	[504, 2510]	2884	[2996, 993]
572	[932, 964]	1343	[1640, 1795]	2114	[2511, 2512]	2885	[2997, 2108]
573	[965, 966]	1344	[345, 1868]	2115	[2513, 211]	2886	[800, 2654]
574	[967, 968]	1345	[1869, 1870]	2116	[532, 2514]	2887	[2998, 1911]
575	[969, 241]	1346	[1871, 1872]	2117	[2459, 2515]	2888	[316, 1798]
576	[970, 971]	1347	[1873, 220]	2118	[2399, 518]	2889	[2644, 2999]
577	[972, 973]	1348	[1874, 1875]	2119	[2516, 1183]	2890	[2671, 1129]
578	[974, 975]	1349	[1867, 718]	2120	[2517, 1501]	2891	[3000, 1777]
579	[976, 977]	1350	[4, 1876]	2121	[2518, 2170]	2892	[2619, 710]
580	[978, 979]	1351	[1877, 87]	2122	[2186, 2388]	2893	[912, 2069]
581	[980, 981]	1352	[1878, 1742]	2123	[2519, 160]	2894	[1040, 2575]
582	[982, 983]	1353	[1879, 1666]	2124	[587, 555]	2895	[3001, 793]
583	[984, 985]	1354	[1880, 328]	2125	[2326, 2179]	2896	[3002, 2118]
584	[986, 359]	1355	[306, 1881]	2126	[2520, 51]	2897	[3003, 1836]
585	[987, 988]	1356	[1882, 749]	2127	[2521, 1551]	2898	[3004, 780]
586	[989, 730]	1357	[1883, 1884]	2128	[2522, 1622]	2899	[3005, 888]
587	[990, 22]	1358	[1885, 1819]	2129	[2523, 184]	2900	[3006, 3007]
588	[991, 286]	1359	[1886, 1704]	2130	[2524, 134]	2901	[3008, 2139]
589	[992, 929]	1360	[1887, 1665]	2131	[2431, 2525]	2902	[3009, 1651]
590	[241, 993]	1361	[1888, 1840]	2132	[56, 2226]	2903	[2053, 1922]
591	[994, 995]	1362	[1889, 1890]	2133	[647, 2182]	2904	[2626, 2802]
592	[996, 997]	1363	[1891, 755]	2134	[202, 2526]	2905	[3010, 2055]
593	[68, 793]	1364	[1892, 1893]	2135	[2218, 2185]	2906	[3011, 2804]
594	[998, 732]	1365	[1894, 1727]	2136	[1514, 1601]	2907	[3012, 1664]

595	[999, 1000]	1366	[1895, 1896]	2137	[510, 2399]	2908	[3013, 2006]
596	[1001, 355]	1367	[1897, 1898]	2138	[1237, 2527]	2909	[3014, 2136]
597	[1002, 975]	1368	[1899, 1718]	2139	[1172, 169]	2910	[1068, 1639]
598	[366, 1003]	1369	[1900, 759]	2140	[1143, 545]	2911	[807, 2004]
599	[1004, 258]	1370	[944, 764]	2141	[688, 2275]	2912	[311, 904]
600	[1005, 1006]	1371	[1901, 1060]	2142	[2491, 2528]	2913	[700, 2758]
601	[1007, 1008]	1372	[1902, 839]	2143	[2529, 2530]	2914	[1120, 805]
602	[1009, 1010]	1373	[1903, 1904]	2144	[2531, 1572]	2915	[3015, 3016]
603	[1011, 1012]	1374	[798, 876]	2145	[2532, 2364]	2916	[3017, 381]
604	[1013, 983]	1375	[1905, 1826]	2146	[2533, 485]	2917	[3018, 784]
605	[1014, 922]	1376	[1906, 1653]	2147	[2403, 2534]	2918	[3019, 274]
606	[1015, 1016]	1377	[1907, 1121]	2148	[2393, 444]	2919	[1066, 1832]
607	[1017, 751]	1378	[1908, 232]	2149	[2535, 2365]	2920	[3020, 2709]
608	[1018, 970]	1379	[1909, 952]	2150	[1450, 516]	2921	[3021, 1732]
609	[1019, 67]	1380	[1910, 1911]	2151	[2457, 1396]	2922	[1890, 2114]
610	[336, 1020]	1381	[1912, 17]	2152	[1331, 2536]	2923	[3022, 2615]
611	[1021, 782]	1382	[353, 1071]	2153	[2450, 577]	2924	[3023, 1792]
612	[1022, 1023]	1383	[1913, 1914]	2154	[2537, 118]	2925	[362, 1933]
613	[1024, 28]	1384	[1915, 1916]	2155	[2538, 2426]	2926	[3024, 997]
614	[1025, 358]	1385	[898, 1107]	2156	[2539, 2285]	2927	[1102, 1975]
615	[1026, 1027]	1386	[759, 253]	2157	[2540, 667]	2928	[3025, 2686]
616	[1028, 1029]	1387	[1917, 882]	2158	[2541, 1222]	2929	[22, 2587]
617	[1030, 811]	1388	[1918, 1919]	2159	[171, 2542]	2930	[3016, 2753]
618	[1031, 864]	1389	[1920, 1921]	2160	[2311, 1391]	2931	[3026, 2985]
619	[1032, 1033]	1390	[1922, 1923]	2161	[1299, 1459]	2932	[3027, 290]
620	[1034, 802]	1391	[1924, 1925]	2162	[1144, 1262]	2933	[3028, 2042]
621	[1035, 1036]	1392	[1926, 377]	2163	[1134, 499]	2934	[3029, 71]
622	[1037, 847]	1393	[1012, 82]	2164	[1404, 2228]	2935	[3030, 939]
623	[1038, 269]	1394	[1661, 100]	2165	[662, 1252]	2936	[3031, 1966]
624	[1039, 1040]	1395	[1927, 1746]	2166	[1603, 2252]	2937	[3032, 386]
625	[1041, 246]	1396	[843, 1928]	2167	[2543, 1739]	2938	[3033, 356]
626	[1042, 1043]	1397	[1929, 1774]	2168	[2544, 1762]	2939	[3034, 2741]
627	[1044, 963]	1398	[1930, 1931]	2169	[957, 1118]	2940	[3035, 2736]
628	[1045, 1046]	1399	[1932, 880]	2170	[2545, 1740]	2941	[3036, 314]
629	[1047, 1048]	1400	[1933, 1704]	2171	[2546, 256]	2942	[3037, 296]
630	[1049, 1050]	1401	[1934, 1935]	2172	[1851, 115]	2943	[3038, 2851]
631	[1051, 1052]	1402	[358, 728]	2173	[2547, 1079]	2944	[1753, 24]
632	[1053, 1054]	1403	[1027, 719]	2174	[2548, 845]	2945	[391, 3039]
633	[1055, 1056]	1404	[1936, 788]	2175	[2549, 1104]	2946	[3040, 1843]
634	[1057, 1058]	1405	[1937, 349]	2176	[2550, 2551]	2947	[1116, 807]
635	[1059, 1060]	1406	[1938, 754]	2177	[2055, 860]	2948	[3041, 280]
636	[102, 1061]	1407	[1939, 380]	2178	[2552, 2553]	2949	[3042, 2609]
637	[1062, 1063]	1408	[1940, 1941]	2179	[2554, 865]	2950	[2851, 1938]
638	[1064, 73]	1409	[1942, 15]	2180	[2555, 735]	2951	[3043, 2144]

639	[1065, 1066]	1410	[1943, 1944]	2181	[2556, 1004]	2952	[3044, 1991]
640	[1067, 1068]	1411	[239, 1054]	2182	[1078, 698]	2953	[2751, 999]
641	[1069, 1070]	1412	[1945, 107]	2183	[1949, 1953]	2954	[3045, 2990]
642	[1071, 1072]	1413	[273, 1070]	2184	[1911, 1012]	2955	[3046, 2581]
643	[1073, 840]	1414	[942, 986]	2185	[283, 80]	2956	[3047, 87]
644	[1074, 1075]	1415	[1946, 1638]	2186	[2557, 2128]	2957	[1669, 1761]
645	[1076, 794]	1416	[1947, 105]	2187	[2558, 360]	2958	[390, 780]
646	[1077, 1078]	1417	[1948, 1949]	2188	[2559, 89]	2959	[3048, 2582]
647	[1079, 1080]	1418	[1950, 1749]	2189	[855, 2560]	2960	[3049, 1818]
648	[985, 64]	1419	[1951, 231]	2190	[2561, 2562]	2961	[2693, 2119]
649	[1081, 385]	1420	[930, 1952]	2191	[888, 96]	2962	[3050, 2764]
650	[1082, 981]	1421	[1953, 1954]	2192	[2563, 2163]	2963	[2853, 1104]
651	[694, 324]	1422	[1955, 1956]	2193	[2564, 1868]	2964	[3051, 887]
652	[76, 1083]	1423	[1957, 1958]	2194	[2565, 2566]	2965	[3052, 2119]
653	[1084, 1085]	1424	[1959, 1960]	2195	[2553, 1872]	2966	[3053, 2753]
654	[1086, 1087]	1425	[1961, 92]	2196	[2567, 1694]	2967	[3054, 86]
655	[282, 1023]	1426	[1962, 6]	2197	[224, 1859]	2968	[3055, 3039]
656	[1088, 799]	1427	[1963, 1964]	2198	[2568, 1108]	2969	[1925, 274]
657	[1089, 1090]	1428	[1965, 1966]	2199	[2569, 2053]	2970	[1653, 2002]
658	[1091, 1092]	1429	[1921, 290]	2200	[2570, 90]	2971	[3056, 3007]
659	[1093, 1094]	1430	[1967, 1109]	2201	[997, 2571]	2972	[3057, 1864]
660	[1095, 1096]	1431	[220, 1968]	2202	[2091, 2572]	2973	[3058, 2144]
661	[1020, 1096]	1432	[1969, 1641]	2203	[2573, 2073]	2974	[114, 1998]
662	[1097, 66]	1433	[1970, 826]	2204	[257, 1674]	2975	[3059, 1761]
663	[891, 300]	1434	[1971, 812]	2205	[2574, 2575]	2976	[2447, 2915]
664	[326, 1098]	1435	[1972, 757]	2206	[2576, 2140]	2977	[1590, 1200]
665	[1099, 1100]	1436	[723, 774]	2207	[2577, 785]	2978	[506, 3060]
666	[1101, 1102]	1437	[1973, 1974]	2208	[2578, 2579]	2979	[2250, 1482]
667	[870, 1103]	1438	[1975, 1008]	2209	[2580, 2015]	2980	[2898, 1288]
668	[1094, 694]	1439	[1976, 890]	2210	[2581, 2582]	2981	[2279, 2334]
669	[1104, 862]	1440	[1977, 1978]	2211	[2583, 94]	2982	[1357, 624]
670	[1105, 4]	1441	[1979, 714]	2212	[2584, 2585]	2983	[2200, 2896]
671	[1106, 1107]	1442	[816, 1980]	2213	[2586, 2587]	2984	[3061, 2215]
672	[64, 318]	1443	[1981, 1982]	2214	[2588, 834]	2985	[2974, 2875]
673	[1108, 1109]	1444	[1983, 1103]	2215	[2589, 1722]	2986	[2294, 3062]
674	[1110, 263]	1445	[332, 1884]	2216	[2590, 2591]	2987	[2936, 152]
675	[1111, 3]	1446	[1798, 771]	2217	[1857, 350]	2988	[2937, 1323]
676	[1112, 1019]	1447	[1984, 1062]	2218	[2592, 1090]	2989	[2433, 2364]
677	[1113, 1114]	1448	[977, 248]	2219	[2593, 841]	2990	[3063, 1599]
678	[1115, 1116]	1449	[1985, 235]	2220	[2594, 1786]	2991	[2209, 1239]
679	[1117, 1118]	1450	[1986, 925]	2221	[2595, 868]	2992	[444, 1415]
680	[1119, 1027]	1451	[1987, 1988]	2222	[2596, 2058]	2993	[1454, 2955]
681	[1087, 1120]	1452	[1989, 367]	2223	[2597, 736]	2994	[212, 606]
682	[26, 1121]	1453	[1990, 1789]	2224	[920, 71]	2995	[3064, 1367]

683	[1122, 394]	1454	[1991, 947]	2225	[1782, 849]	2996	[1597, 2411]
684	[1123, 1124]	1455	[1098, 1992]	2226	[2598, 2599]	2997	[1606, 2234]
685	[1125, 391]	1456	[1993, 765]	2227	[2600, 282]	2998	[481, 3060]
686	[98, 1126]	1457	[1994, 1079]	2228	[1072, 1917]	2999	[402, 1324]
687	[1127, 970]	1458	[1995, 1130]	2229	[92, 1130]	3000	[2434, 3062]
688	[1128, 1129]	1459	[1996, 1932]	2230	[1954, 306]	3001	[1560, 1274]
689	[1130, 380]	1460	[1896, 1926]	2231	[2601, 1984]	3002	[2483, 2973]
690	[1131, 1041]	1461	[1997, 1036]	2232	[2602, 2603]	3003	[692, 2358]
691	[1016, 1132]	1462	[1998, 1999]	2233	[2604, 2022]	3004	[2414, 2510]
692	[908, 1133]	1463	[2000, 1898]	2234	[2605, 931]	3005	[2537, 1335]
693	[1134, 581]	1464	[1703, 1927]	2235	[2606, 2572]	3006	[1402, 2168]
694	[1135, 1136]	1465	[2001, 1126]	2236	[2607, 258]	3007	[2289, 3065]
695	[178, 1137]	1466	[2002, 1925]	2237	[2608, 1953]	3008	[686, 2943]
696	[154, 623]	1467	[2003, 2004]	2238	[2609, 1026]	3009	[2511, 2242]
697	[1138, 1139]	1468	[2005, 2006]	2239	[2610, 1844]	3010	[1440, 3066]
698	[55, 1140]	1469	[2007, 350]	2240	[2611, 986]	3011	[2361, 3067]
699	[1141, 1139]	1470	[2008, 18]	2241	[2612, 2613]	3012	[2518, 2950]
700	[1142, 588]	1471	[2009, 1978]	2242	[2614, 2615]	3013	[1378, 3066]
701	[1143, 1144]	1472	[2010, 1059]	2243	[2616, 2617]	3014	[617, 2972]
702	[1145, 625]	1473	[2011, 359]	2244	[1050, 2139]	3015	[1467, 3067]
703	[544, 1146]	1474	[2012, 829]	2245	[2618, 102]	3016	[140, 2351]
704	[204, 1147]	1475	[2013, 2014]	2246	[911, 2619]	3017	[1258, 2885]
705	[1148, 1149]	1476	[2015, 831]	2247	[2620, 224]	3018	[2338, 1260]
706	[1150, 1151]	1477	[2016, 955]	2248	[2621, 1045]	3019	[1290, 503]
707	[1152, 1153]	1478	[1771, 321]	2249	[2622, 91]	3020	[2507, 2185]
708	[421, 424]	1479	[2017, 851]	2250	[2623, 2556]	3021	[2346, 1376]
709	[1154, 1155]	1480	[88, 1869]	2251	[2624, 1990]	3022	[37, 2494]
710	[1156, 1157]	1481	[2018, 2019]	2252	[2625, 2626]	3023	[1531, 1158]
711	[627, 1158]	1482	[2020, 788]	2253	[2627, 1116]	3024	[140, 2474]
712	[1159, 473]	1483	[761, 73]	2254	[1008, 2628]	3025	[2947, 601]
713	[1160, 1161]	1484	[2021, 2022]	2255	[2629, 2630]	3026	[1517, 2951]
714	[1162, 1157]	1485	[1755, 1949]	2256	[2631, 2632]	3027	[2185, 2966]
715	[1163, 192]	1486	[2023, 390]	2257	[2585, 2075]	3028	[2430, 182]
716	[1164, 669]	1487	[2024, 1713]	2258	[1083, 1707]	3029	[2336, 139]
717	[1165, 1166]	1488	[2025, 2026]	2259	[2633, 1683]	3030	[139, 613]
718	[1167, 1168]	1489	[1722, 1685]	2260	[2634, 1733]	3031	[1176, 1381]
719	[509, 1169]	1490	[2027, 2028]	2261	[2635, 1025]	3032	[3063, 442]
720	[1170, 166]	1491	[2029, 742]	2262	[890, 2603]	3033	[1616, 2526]
721	[684, 1137]	1492	[2030, 962]	2263	[2114, 977]	3034	[489, 2892]
722	[1171, 1172]	1493	[2031, 2032]	2264	[1735, 2630]	3035	[2335, 556]
723	[1173, 438]	1494	[2033, 1915]	2265	[2636, 2125]	3036	[3068, 451]
724	[1174, 44]	1495	[2034, 366]	2266	[2108, 900]	3037	[631, 2256]
725	[1175, 1176]	1496	[2035, 1085]	2267	[767, 2082]	3038	[1289, 2397]
726	[1177, 1178]	1497	[2036, 929]	2268	[2637, 89]	3039	[2382, 3065]

727	[1179, 1180]	1498	[2037, 787]	2269	[2638, 912]	3040	[2897, 1201]
728	[1181, 1182]	1499	[2038, 1869]	2270	[2639, 990]	3041	[2270, 2887]
729	[1183, 175]	1500	[2039, 1979]	2271	[2640, 1932]	3042	[2883, 1535]
730	[1184, 1185]	1501	[2040, 1004]	2272	[2641, 109]	3043	[1617, 2936]
731	[1186, 1187]	1502	[2041, 2042]	2273	[2642, 954]	3044	[2952, 1176]
732	[661, 1188]	1503	[2043, 2044]	2274	[2004, 388]	3045	[1452, 2939]
733	[1189, 420]	1504	[2045, 949]	2275	[2643, 2644]	3046	[1434, 2962]
734	[1190, 466]	1505	[2046, 2047]	2276	[796, 779]	3047	[2924, 3069]
735	[1191, 1192]	1506	[2048, 908]	2277	[2645, 1681]	3048	[2344, 3070]
736	[1193, 425]	1507	[2049, 2050]	2278	[2646, 1882]	3049	[2495, 528]
737	[1194, 423]	1508	[860, 2051]	2279	[2647, 1863]	3050	[1621, 3071]
738	[420, 1195]	1509	[2052, 2053]	2280	[1744, 2648]	3051	[1511, 1278]
739	[425, 648]	1510	[2054, 2055]	2281	[2649, 240]	3052	[1457, 2906]
740	[10, 558]	1511	[2056, 989]	2282	[2650, 950]	3053	[1502, 2502]
741	[1196, 1197]	1512	[2057, 2058]	2283	[2651, 2021]	3054	[2493, 2237]
742	[1198, 1199]	1513	[1988, 2028]	2284	[2026, 1680]	3055	[2500, 139]
743	[1200, 664]	1514	[2059, 973]	2285	[1010, 1972]	3056	[1608, 1278]
744	[1201, 1202]	1515	[2060, 920]	2286	[2652, 1764]	3057	[2496, 3069]
745	[1203, 1204]	1516	[227, 2061]	2287	[249, 17]	3058	[1287, 2899]
746	[1205, 533]	1517	[2062, 70]	2288	[2653, 2654]	3059	[1412, 2864]
747	[1206, 1207]	1518	[2063, 1896]	2289	[2128, 1851]	3060	[3072, 340]
748	[632, 1208]	1519	[2064, 1734]	2290	[1707, 2655]	3061	[3073, 2789]
749	[1209, 1210]	1520	[1992, 2065]	2291	[2656, 704]	3062	[2551, 1864]
750	[521, 1211]	1521	[2066, 1923]	2292	[2657, 930]	3063	[3074, 1061]
751	[1212, 1213]	1522	[2067, 1903]	2293	[2658, 1017]	3064	[3075, 1899]
752	[1214, 1215]	1523	[2068, 2069]	2294	[2659, 267]	3065	[3076, 954]
753	[1216, 595]	1524	[2070, 1703]	2295	[2660, 926]	3066	[3077, 932]
754	[1217, 1218]	1525	[2071, 1637]	2296	[2661, 1009]	3067	[3078, 1667]
755	[1219, 1220]	1526	[2072, 1921]	2297	[2662, 1822]	3068	[841, 1863]
756	[1221, 1222]	1527	[96, 244]	2298	[906, 1826]	3069	[2006, 234]
757	[1223, 1224]	1528	[858, 2073]	2299	[2663, 891]	3070	[2990, 1903]
758	[1225, 1226]	1529	[304, 1758]	2300	[2664, 2665]	3071	[2709, 1655]
759	[1227, 1228]	1530	[2074, 2075]	2301	[2666, 1680]	3072	[2522, 3071]
760	[1229, 1206]	1531	[2076, 962]	2302	[706, 1751]	3073	[2355, 503]
761	[475, 142]	1532	[845, 1108]	2303	[2667, 2581]	3074	[3079, 2386]
762	[1230, 611]	1533	[1876, 2077]	2304	[776, 1919]	3075	[2949, 2237]
763	[1231, 1232]	1534	[2078, 1685]	2305	[2668, 2669]	3076	[1200, 1463]
764	[1233, 1234]	1535	[2079, 1666]	2306	[2670, 251]	3077	[2323, 3070]
765	[1144, 546]	1536	[2080, 1101]	2307	[1056, 2671]	3078	[2521, 1201]
766	[1209, 1235]	1537	[2081, 2082]	2308	[2672, 2136]	3079	[2587, 2642]
767	[162, 537]	1538	[2083, 1960]	2309	[2673, 2674]		
768	[1236, 1226]	1539	[2084, 250]	2310	[2050, 1017]		
769	[1237, 1238]	1540	[1061, 1915]	2311	[2675, 246]		
770	[1239, 496]	1541	[2085, 2086]	2312	[2676, 112]		

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	514	1	1028	1	1542	0	2056	0	2570	0
1	0	515	1	1029	1	1543	0	2057	0	2571	0
2	0	516	1	1030	0	1544	1	2058	0	2572	0
3	0	517	1	1031	1	1545	1	2059	1	2573	1
4	0	518	1	1032	0	1546	1	2060	0	2574	1
5	0	519	0	1033	0	1547	1	2061	1	2575	0
6	1	520	1	1034	1	1548	0	2062	0	2576	0
7	0	521	1	1035	0	1549	1	2063	0	2577	1
8	1	522	0	1036	0	1550	1	2064	0	2578	1
9	0	523	1	1037	0	1551	1	2065	1	2579	0
10	0	524	1	1038	0	1552	1	2066	0	2580	0
11	0	525	0	1039	1	1553	1	2067	1	2581	0
12	1	526	1	1040	0	1554	0	2068	1	2582	1
13	1	527	0	1041	1	1555	0	2069	1	2583	1
14	1	528	1	1042	0	1556	0	2070	1	2584	1
15	0	529	0	1043	1	1557	1	2071	0	2585	1
16	0	530	1	1044	0	1558	0	2072	0	2586	0
17	1	531	0	1045	1	1559	0	2073	0	2587	0
18	1	532	1	1046	1	1560	0	2074	0	2588	0
19	0	533	0	1047	1	1561	1	2075	1	2589	1
20	1	534	0	1048	0	1562	0	2076	1	2590	1
21	0	535	1	1049	0	1563	0	2077	0	2591	1
22	1	536	1	1050	0	1564	0	2078	0	2592	1
23	0	537	1	1051	1	1565	1	2079	0	2593	0
24	0	538	1	1052	0	1566	0	2080	0	2594	0
25	1	539	0	1053	0	1567	0	2081	1	2595	1
26	0	540	1	1054	0	1568	0	2082	0	2596	1
27	1	541	0	1055	1	1569	1	2083	0	2597	0
28	1	542	1	1056	0	1570	1	2084	1	2598	0
29	1	543	0	1057	0	1571	0	2085	1	2599	0
30	1	544	1	1058	1	1572	1	2086	0	2600	0
31	0	545	0	1059	0	1573	0	2087	0	2601	1
32	1	546	0	1060	1	1574	1	2088	0	2602	0
33	0	547	1	1061	1	1575	1	2089	0	2603	0
34	0	548	0	1062	1	1576	0	2090	1	2604	0
35	1	549	0	1063	0	1577	0	2091	1	2605	0
36	0	550	0	1064	1	1578	0	2092	0	2606	0
37	1	551	1	1065	0	1579	0	2093	1	2607	1
38	0	552	1	1066	0	1580	1	2094	0	2608	0
39	0	553	1	1067	0	1581	0	2095	1	2609	1
40	0	554	0	1068	1	1582	1	2096	1	2610	1

41	1	555	0	1069	0	1583	1	2097	1	2611	1
42	0	556	0	1070	0	1584	0	2098	0	2612	0
43	0	557	1	1071	0	1585	1	2099	0	2613	1
44	1	558	0	1072	0	1586	0	2100	1	2614	0
45	1	559	1	1073	0	1587	1	2101	0	2615	0
46	0	560	1	1074	1	1588	0	2102	0	2616	0
47	0	561	1	1075	0	1589	1	2103	0	2617	0
48	0	562	0	1076	1	1590	1	2104	0	2618	1
49	0	563	1	1077	0	1591	1	2105	0	2619	0
50	1	564	0	1078	0	1592	0	2106	1	2620	0
51	0	565	1	1079	1	1593	1	2107	0	2621	0
52	0	566	1	1080	1	1594	1	2108	1	2622	0
53	0	567	1	1081	0	1595	0	2109	0	2623	0
54	1	568	0	1082	1	1596	1	2110	1	2624	1
55	1	569	0	1083	1	1597	1	2111	1	2625	1
56	1	570	1	1084	1	1598	1	2112	0	2626	0
57	1	571	1	1085	1	1599	1	2113	0	2627	0
58	1	572	0	1086	0	1600	0	2114	1	2628	0
59	1	573	0	1087	1	1601	1	2115	0	2629	0
60	1	574	0	1088	1	1602	1	2116	1	2630	1
61	0	575	1	1089	0	1603	1	2117	0	2631	1
62	1	576	1	1090	1	1604	0	2118	0	2632	0
63	1	577	0	1091	0	1605	0	2119	0	2633	0
64	0	578	1	1092	1	1606	1	2120	1	2634	1
65	0	579	0	1093	1	1607	1	2121	0	2635	1
66	1	580	1	1094	1	1608	1	2122	0	2636	0
67	0	581	0	1095	1	1609	1	2123	1	2637	1
68	1	582	0	1096	0	1610	0	2124	1	2638	0
69	1	583	1	1097	1	1611	1	2125	0	2639	1
70	0	584	0	1098	1	1612	0	2126	0	2640	0
71	0	585	1	1099	1	1613	1	2127	1	2641	0
72	1	586	0	1100	1	1614	1	2128	0	2642	1
73	1	587	1	1101	1	1615	0	2129	1	2643	1
74	1	588	0	1102	1	1616	1	2130	0	2644	1
75	0	589	0	1103	0	1617	1	2131	1	2645	0
76	0	590	0	1104	0	1618	0	2132	1	2646	0
77	0	591	0	1105	1	1619	0	2133	1	2647	0
78	1	592	0	1106	1	1620	1	2134	0	2648	0
79	0	593	1	1107	1	1621	1	2135	1	2649	0
80	1	594	0	1108	1	1622	0	2136	1	2650	1
81	1	595	1	1109	0	1623	1	2137	0	2651	0
82	1	596	0	1110	0	1624	1	2138	1	2652	0
83	0	597	0	1111	0	1625	1	2139	0	2653	1
84	1	598	1	1112	0	1626	1	2140	0	2654	1

85	0	599	0	1113	1	1627	0	2141	1	2655	1
86	1	600	1	1114	0	1628	1	2142	0	2656	0
87	1	601	1	1115	1	1629	1	2143	0	2657	0
88	1	602	0	1116	1	1630	0	2144	1	2658	1
89	1	603	0	1117	0	1631	1	2145	1	2659	0
90	0	604	1	1118	0	1632	1	2146	1	2660	0
91	0	605	1	1119	1	1633	0	2147	0	2661	0
92	0	606	1	1120	1	1634	1	2148	1	2662	1
93	0	607	0	1121	1	1635	0	2149	1	2663	0
94	0	608	0	1122	1	1636	0	2150	1	2664	0
95	0	609	0	1123	1	1637	1	2151	0	2665	0
96	0	610	1	1124	0	1638	0	2152	0	2666	0
97	0	611	1	1125	1	1639	0	2153	1	2667	0
98	1	612	0	1126	0	1640	0	2154	1	2668	0
99	1	613	0	1127	1	1641	1	2155	0	2669	0
100	0	614	0	1128	1	1642	1	2156	1	2670	0
101	0	615	0	1129	1	1643	0	2157	0	2671	0
102	1	616	1	1130	0	1644	1	2158	0	2672	1
103	0	617	0	1131	1	1645	1	2159	1	2673	0
104	0	618	1	1132	0	1646	0	2160	0	2674	1
105	0	619	0	1133	0	1647	0	2161	1	2675	0
106	1	620	1	1134	0	1648	1	2162	1	2676	0
107	1	621	0	1135	1	1649	1	2163	0	2677	0
108	1	622	0	1136	1	1650	1	2164	1	2678	0
109	0	623	0	1137	0	1651	1	2165	1	2679	0
110	1	624	1	1138	1	1652	0	2166	1	2680	0
111	1	625	1	1139	0	1653	0	2167	1	2681	1
112	1	626	0	1140	1	1654	0	2168	0	2682	1
113	1	627	0	1141	0	1655	1	2169	1	2683	0
114	1	628	1	1142	0	1656	0	2170	1	2684	0
115	1	629	1	1143	0	1657	0	2171	0	2685	0
116	1	630	0	1144	1	1658	0	2172	0	2686	1
117	0	631	1	1145	0	1659	0	2173	0	2687	1
118	0	632	0	1146	0	1660	1	2174	1	2688	0
119	1	633	1	1147	1	1661	0	2175	1	2689	0
120	1	634	0	1148	1	1662	0	2176	0	2690	1
121	1	635	0	1149	0	1663	0	2177	0	2691	1
122	1	636	1	1150	1	1664	1	2178	0	2692	1
123	0	637	1	1151	1	1665	1	2179	1	2693	0
124	1	638	1	1152	1	1666	0	2180	1	2694	1
125	0	639	0	1153	0	1667	1	2181	0	2695	0
126	0	640	0	1154	1	1668	1	2182	0	2696	1
127	1	641	0	1155	1	1669	1	2183	1	2697	0
128	0	642	0	1156	1	1670	1	2184	1	2698	1

129	0	643	0	1157	0	1671	0	2185	1	2699	1
130	0	644	1	1158	0	1672	0	2186	0	2700	0
131	1	645	1	1159	1	1673	1	2187	0	2701	1
132	1	646	0	1160	0	1674	0	2188	0	2702	1
133	1	647	1	1161	0	1675	1	2189	1	2703	1
134	1	648	0	1162	0	1676	0	2190	1	2704	1
135	0	649	0	1163	1	1677	1	2191	1	2705	0
136	0	650	1	1164	0	1678	1	2192	0	2706	0
137	0	651	1	1165	1	1679	0	2193	1	2707	1
138	1	652	0	1166	1	1680	1	2194	0	2708	0
139	1	653	1	1167	1	1681	1	2195	0	2709	1
140	1	654	0	1168	1	1682	1	2196	0	2710	1
141	1	655	1	1169	0	1683	1	2197	0	2711	0
142	1	656	1	1170	1	1684	0	2198	1	2712	1
143	1	657	0	1171	1	1685	0	2199	1	2713	1
144	0	658	0	1172	0	1686	1	2200	0	2714	1
145	1	659	1	1173	1	1687	1	2201	0	2715	1
146	0	660	1	1174	1	1688	1	2202	1	2716	0
147	1	661	0	1175	1	1689	1	2203	1	2717	0
148	0	662	1	1176	1	1690	1	2204	0	2718	0
149	1	663	0	1177	1	1691	0	2205	1	2719	0
150	1	664	1	1178	0	1692	0	2206	0	2720	1
151	0	665	1	1179	1	1693	1	2207	1	2721	0
152	1	666	1	1180	1	1694	1	2208	1	2722	0
153	1	667	0	1181	0	1695	0	2209	0	2723	1
154	1	668	1	1182	0	1696	1	2210	0	2724	0
155	1	669	0	1183	1	1697	0	2211	1	2725	0
156	1	670	1	1184	1	1698	0	2212	1	2726	0
157	1	671	1	1185	1	1699	1	2213	0	2727	0
158	0	672	0	1186	1	1700	1	2214	0	2728	1
159	1	673	1	1187	0	1701	1	2215	1	2729	0
160	1	674	0	1188	0	1702	0	2216	1	2730	1
161	1	675	0	1189	1	1703	0	2217	1	2731	1
162	0	676	0	1190	0	1704	0	2218	1	2732	1
163	0	677	1	1191	1	1705	1	2219	0	2733	0
164	1	678	1	1192	0	1706	0	2220	0	2734	1
165	0	679	0	1193	0	1707	1	2221	1	2735	1
166	1	680	1	1194	1	1708	1	2222	1	2736	0
167	1	681	1	1195	1	1709	1	2223	0	2737	0
168	1	682	0	1196	0	1710	0	2224	1	2738	1
169	0	683	1	1197	0	1711	1	2225	1	2739	1
170	1	684	1	1198	1	1712	0	2226	0	2740	1
171	1	685	1	1199	1	1713	0	2227	0	2741	1
172	0	686	1	1200	0	1714	0	2228	0	2742	1

173	1	687	1	1201	0	1715	0	2229	0	2743	1
174	0	688	1	1202	0	1716	1	2230	0	2744	0
175	0	689	0	1203	1	1717	1	2231	1	2745	1
176	1	690	1	1204	1	1718	0	2232	0	2746	1
177	0	691	0	1205	0	1719	1	2233	0	2747	0
178	0	692	0	1206	0	1720	0	2234	0	2748	1
179	0	693	0	1207	0	1721	0	2235	0	2749	0
180	0	694	1	1208	0	1722	1	2236	1	2750	0
181	0	695	0	1209	0	1723	1	2237	0	2751	1
182	1	696	1	1210	1	1724	1	2238	1	2752	1
183	0	697	1	1211	1	1725	0	2239	1	2753	1
184	0	698	1	1212	1	1726	0	2240	1	2754	1
185	0	699	0	1213	0	1727	1	2241	0	2755	0
186	0	700	0	1214	1	1728	1	2242	0	2756	1
187	1	701	0	1215	0	1729	1	2243	0	2757	0
188	0	702	0	1216	1	1730	0	2244	0	2758	1
189	1	703	1	1217	1	1731	1	2245	1	2759	1
190	0	704	0	1218	0	1732	0	2246	1	2760	1
191	0	705	1	1219	0	1733	0	2247	0	2761	1
192	1	706	1	1220	0	1734	0	2248	0	2762	1
193	1	707	1	1221	1	1735	1	2249	0	2763	1
194	1	708	0	1222	0	1736	1	2250	0	2764	0
195	0	709	1	1223	0	1737	0	2251	1	2765	1
196	1	710	1	1224	0	1738	0	2252	1	2766	1
197	0	711	0	1225	1	1739	0	2253	0	2767	1
198	0	712	1	1226	0	1740	1	2254	0	2768	0
199	0	713	0	1227	0	1741	0	2255	0	2769	1
200	1	714	0	1228	0	1742	0	2256	1	2770	1
201	1	715	1	1229	1	1743	0	2257	1	2771	0
202	0	716	0	1230	0	1744	0	2258	1	2772	1
203	1	717	1	1231	0	1745	1	2259	0	2773	0
204	0	718	1	1232	1	1746	1	2260	1	2774	0
205	0	719	1	1233	1	1747	1	2261	1	2775	0
206	1	720	1	1234	1	1748	1	2262	1	2776	0
207	1	721	1	1235	0	1749	0	2263	1	2777	1
208	1	722	1	1236	0	1750	1	2264	1	2778	0
209	1	723	1	1237	1	1751	1	2265	0	2779	1
210	1	724	1	1238	1	1752	1	2266	1	2780	1
211	0	725	1	1239	1	1753	1	2267	0	2781	1
212	1	726	1	1240	1	1754	1	2268	1	2782	1
213	0	727	1	1241	1	1755	1	2269	0	2783	0
214	1	728	0	1242	0	1756	0	2270	1	2784	0
215	1	729	1	1243	1	1757	1	2271	0	2785	1
216	1	730	1	1244	1	1758	0	2272	0	2786	0

217	1	731	1	1245	0	1759	0	2273	1	2787	1
218	1	732	0	1246	1	1760	0	2274	1	2788	0
219	0	733	1	1247	1	1761	1	2275	1	2789	0
220	0	734	0	1248	0	1762	1	2276	0	2790	1
221	0	735	1	1249	0	1763	0	2277	0	2791	0
222	1	736	0	1250	1	1764	0	2278	0	2792	0
223	1	737	1	1251	1	1765	1	2279	0	2793	0
224	0	738	0	1252	1	1766	1	2280	0	2794	0
225	1	739	1	1253	1	1767	1	2281	0	2795	0
226	1	740	0	1254	0	1768	1	2282	1	2796	1
227	1	741	0	1255	0	1769	0	2283	0	2797	0
228	1	742	1	1256	0	1770	1	2284	1	2798	0
229	1	743	0	1257	0	1771	0	2285	0	2799	1
230	0	744	0	1258	0	1772	1	2286	0	2800	1
231	0	745	1	1259	0	1773	0	2287	0	2801	0
232	1	746	0	1260	0	1774	0	2288	1	2802	1
233	0	747	0	1261	0	1775	0	2289	0	2803	0
234	0	748	0	1262	1	1776	0	2290	1	2804	0
235	0	749	0	1263	1	1777	0	2291	0	2805	0
236	0	750	1	1264	0	1778	1	2292	0	2806	0
237	1	751	1	1265	1	1779	1	2293	1	2807	0
238	1	752	1	1266	0	1780	1	2294	0	2808	0
239	1	753	1	1267	0	1781	0	2295	0	2809	1
240	0	754	1	1268	0	1782	1	2296	0	2810	0
241	0	755	0	1269	1	1783	0	2297	1	2811	0
242	0	756	1	1270	0	1784	1	2298	0	2812	0
243	1	757	0	1271	0	1785	0	2299	0	2813	1
244	0	758	1	1272	1	1786	0	2300	0	2814	1
245	0	759	0	1273	1	1787	1	2301	0	2815	1
246	1	760	1	1274	1	1788	0	2302	1	2816	1
247	0	761	0	1275	0	1789	0	2303	0	2817	1
248	1	762	0	1276	0	1790	0	2304	0	2818	1
249	0	763	0	1277	1	1791	1	2305	0	2819	0
250	1	764	1	1278	0	1792	0	2306	0	2820	1
251	0	765	1	1279	1	1793	0	2307	0	2821	1
252	1	766	0	1280	0	1794	1	2308	1	2822	0
253	0	767	0	1281	1	1795	1	2309	0	2823	0
254	0	768	0	1282	0	1796	0	2310	0	2824	1
255	1	769	1	1283	1	1797	1	2311	0	2825	1
256	0	770	1	1284	0	1798	0	2312	0	2826	1
257	0	771	1	1285	0	1799	0	2313	0	2827	0
258	0	772	0	1286	1	1800	1	2314	0	2828	1
259	0	773	0	1287	0	1801	0	2315	1	2829	1
260	1	774	1	1288	0	1802	1	2316	1	2830	1

261	1	775	1	1289	0	1803	0	2317	0	2831	0
262	1	776	0	1290	0	1804	1	2318	1	2832	1
263	1	777	0	1291	0	1805	0	2319	1	2833	0
264	1	778	1	1292	0	1806	0	2320	0	2834	1
265	1	779	1	1293	0	1807	0	2321	0	2835	1
266	1	780	0	1294	1	1808	0	2322	0	2836	1
267	0	781	1	1295	1	1809	0	2323	0	2837	1
268	1	782	0	1296	0	1810	0	2324	1	2838	1
269	0	783	0	1297	0	1811	0	2325	0	2839	0
270	1	784	0	1298	0	1812	1	2326	0	2840	1
271	1	785	0	1299	1	1813	1	2327	0	2841	0
272	0	786	1	1300	0	1814	0	2328	1	2842	0
273	1	787	0	1301	1	1815	0	2329	1	2843	1
274	1	788	1	1302	0	1816	0	2330	1	2844	0
275	1	789	0	1303	0	1817	0	2331	1	2845	1
276	0	790	0	1304	0	1818	1	2332	0	2846	0
277	0	791	1	1305	0	1819	0	2333	0	2847	1
278	1	792	0	1306	0	1820	0	2334	1	2848	0
279	0	793	0	1307	0	1821	0	2335	1	2849	1
280	1	794	1	1308	1	1822	0	2336	0	2850	1
281	1	795	0	1309	1	1823	0	2337	1	2851	0
282	1	796	0	1310	0	1824	0	2338	0	2852	1
283	1	797	0	1311	1	1825	0	2339	1	2853	0
284	0	798	0	1312	1	1826	0	2340	1	2854	1
285	1	799	1	1313	0	1827	1	2341	1	2855	0
286	1	800	0	1314	1	1828	1	2342	0	2856	1
287	1	801	0	1315	0	1829	1	2343	0	2857	1
288	1	802	1	1316	0	1830	0	2344	1	2858	0
289	1	803	0	1317	1	1831	1	2345	0	2859	0
290	1	804	0	1318	0	1832	1	2346	0	2860	1
291	0	805	0	1319	1	1833	0	2347	0	2861	1
292	1	806	0	1320	0	1834	0	2348	0	2862	0
293	1	807	0	1321	1	1835	1	2349	1	2863	1
294	1	808	0	1322	0	1836	1	2350	0	2864	0
295	0	809	0	1323	1	1837	0	2351	1	2865	0
296	1	810	1	1324	1	1838	1	2352	1	2866	0
297	1	811	0	1325	1	1839	1	2353	1	2867	1
298	1	812	1	1326	0	1840	0	2354	0	2868	1
299	1	813	0	1327	1	1841	1	2355	1	2869	0
300	1	814	1	1328	0	1842	1	2356	1	2870	1
301	0	815	0	1329	1	1843	0	2357	0	2871	0
302	1	816	0	1330	1	1844	0	2358	1	2872	1
303	0	817	1	1331	0	1845	1	2359	1	2873	1
304	0	818	1	1332	0	1846	1	2360	0	2874	0

305	1	819	0	1333	0	1847	1	2361	0	2875	1
306	1	820	0	1334	1	1848	0	2362	1	2876	0
307	0	821	1	1335	1	1849	0	2363	0	2877	0
308	0	822	0	1336	1	1850	1	2364	0	2878	0
309	1	823	0	1337	1	1851	0	2365	0	2879	1
310	1	824	0	1338	0	1852	1	2366	1	2880	1
311	0	825	1	1339	0	1853	0	2367	0	2881	0
312	1	826	1	1340	0	1854	0	2368	1	2882	1
313	0	827	1	1341	0	1855	0	2369	0	2883	0
314	0	828	0	1342	1	1856	0	2370	1	2884	1
315	1	829	1	1343	0	1857	1	2371	0	2885	1
316	0	830	1	1344	0	1858	1	2372	0	2886	0
317	1	831	0	1345	1	1859	1	2373	0	2887	1
318	1	832	1	1346	1	1860	1	2374	0	2888	0
319	0	833	1	1347	1	1861	1	2375	1	2889	1
320	0	834	1	1348	1	1862	0	2376	0	2890	0
321	1	835	1	1349	0	1863	0	2377	1	2891	1
322	0	836	1	1350	0	1864	0	2378	1	2892	0
323	0	837	1	1351	0	1865	0	2379	1	2893	0
324	0	838	1	1352	1	1866	1	2380	0	2894	0
325	0	839	1	1353	1	1867	0	2381	1	2895	0
326	1	840	1	1354	0	1868	0	2382	1	2896	1
327	1	841	1	1355	1	1869	1	2383	0	2897	0
328	0	842	1	1356	1	1870	1	2384	0	2898	1
329	0	843	0	1357	1	1871	1	2385	1	2899	1
330	0	844	0	1358	0	1872	0	2386	1	2900	0
331	0	845	0	1359	0	1873	1	2387	1	2901	1
332	0	846	1	1360	0	1874	1	2388	1	2902	1
333	0	847	1	1361	0	1875	1	2389	1	2903	1
334	0	848	0	1362	0	1876	1	2390	1	2904	0
335	0	849	0	1363	0	1877	0	2391	1	2905	0
336	1	850	0	1364	0	1878	1	2392	1	2906	0
337	0	851	0	1365	1	1879	1	2393	1	2907	0
338	1	852	1	1366	1	1880	0	2394	0	2908	1
339	1	853	0	1367	1	1881	1	2395	1	2909	0
340	1	854	1	1368	0	1882	1	2396	0	2910	1
341	0	855	1	1369	0	1883	1	2397	1	2911	0
342	1	856	1	1370	1	1884	1	2398	1	2912	0
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344	0	858	0	1372	1	1886	0	2400	0	2914	1
345	0	859	1	1373	0	1887	0	2401	0	2915	1
346	0	860	1	1374	0	1888	0	2402	1	2916	0
347	0	861	1	1375	1	1889	0	2403	0	2917	0
348	1	862	0	1376	1	1890	1	2404	1	2918	0

349	1	863	1	1377	1	1891	0	2405	0	2919	0
350	0	864	0	1378	1	1892	0	2406	1	2920	0
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352	1	866	0	1380	0	1894	1	2408	0	2922	1
353	0	867	0	1381	1	1895	1	2409	1	2923	1
354	0	868	1	1382	0	1896	0	2410	1	2924	1
355	0	869	0	1383	0	1897	1	2411	0	2925	0
356	0	870	0	1384	1	1898	1	2412	1	2926	1
357	1	871	1	1385	0	1899	0	2413	1	2927	1
358	0	872	1	1386	0	1900	0	2414	1	2928	1
359	1	873	0	1387	0	1901	1	2415	1	2929	1
360	1	874	1	1388	1	1902	1	2416	0	2930	1
361	0	875	1	1389	1	1903	0	2417	1	2931	0
362	0	876	1	1390	1	1904	1	2418	0	2932	1
363	1	877	1	1391	1	1905	1	2419	1	2933	1
364	0	878	1	1392	1	1906	1	2420	0	2934	0
365	0	879	1	1393	0	1907	1	2421	1	2935	1
366	1	880	1	1394	0	1908	1	2422	1	2936	1
367	0	881	1	1395	0	1909	1	2423	0	2937	0
368	1	882	1	1396	0	1910	0	2424	0	2938	1
369	1	883	1	1397	1	1911	1	2425	1	2939	0
370	1	884	1	1398	1	1912	1	2426	0	2940	1
371	0	885	0	1399	0	1913	0	2427	0	2941	1
372	0	886	1	1400	1	1914	1	2428	0	2942	1
373	1	887	1	1401	1	1915	1	2429	0	2943	0
374	0	888	1	1402	0	1916	0	2430	1	2944	1
375	1	889	1	1403	1	1917	0	2431	1	2945	0
376	0	890	1	1404	1	1918	1	2432	0	2946	0
377	1	891	0	1405	0	1919	1	2433	0	2947	1
378	1	892	0	1406	1	1920	1	2434	1	2948	1
379	0	893	1	1407	1	1921	0	2435	1	2949	0
380	1	894	1	1408	0	1922	1	2436	1	2950	0
381	1	895	1	1409	1	1923	1	2437	0	2951	1
382	1	896	1	1410	0	1924	1	2438	1	2952	0
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384	1	898	0	1412	0	1926	1	2440	1	2954	1
385	0	899	0	1413	1	1927	0	2441	1	2955	1
386	1	900	0	1414	0	1928	1	2442	1	2956	1
387	0	901	1	1415	0	1929	1	2443	1	2957	1
388	0	902	0	1416	0	1930	1	2444	0	2958	0
389	1	903	1	1417	0	1931	1	2445	0	2959	1
390	0	904	1	1418	0	1932	0	2446	0	2960	1
391	0	905	0	1419	1	1933	1	2447	1	2961	0
392	0	906	0	1420	1	1934	1	2448	0	2962	1

393	1	907	0	1421	0	1935	1	2449	1	2963	0
394	1	908	0	1422	0	1936	1	2450	1	2964	0
395	1	909	1	1423	0	1937	0	2451	0	2965	1
396	1	910	1	1424	1	1938	1	2452	0	2966	0
397	1	911	1	1425	1	1939	1	2453	1	2967	1
398	1	912	0	1426	1	1940	0	2454	1	2968	1
399	0	913	1	1427	0	1941	1	2455	0	2969	1
400	0	914	0	1428	0	1942	1	2456	0	2970	0
401	1	915	1	1429	0	1943	0	2457	0	2971	1
402	0	916	1	1430	0	1944	1	2458	0	2972	0
403	0	917	1	1431	0	1945	0	2459	0	2973	0
404	1	918	0	1432	0	1946	0	2460	1	2974	1
405	1	919	0	1433	0	1947	0	2461	0	2975	0
406	1	920	1	1434	1	1948	0	2462	0	2976	1
407	1	921	0	1435	0	1949	1	2463	1	2977	1
408	0	922	1	1436	1	1950	0	2464	0	2978	0
409	0	923	0	1437	0	1951	1	2465	1	2979	0
410	1	924	0	1438	0	1952	0	2466	0	2980	1
411	1	925	1	1439	0	1953	0	2467	0	2981	0
412	1	926	0	1440	0	1954	0	2468	1	2982	1
413	1	927	0	1441	1	1955	0	2469	0	2983	0
414	1	928	0	1442	0	1956	1	2470	0	2984	1
415	1	929	1	1443	0	1957	0	2471	0	2985	1
416	1	930	1	1444	1	1958	1	2472	0	2986	0
417	1	931	1	1445	0	1959	1	2473	0	2987	1
418	1	932	0	1446	0	1960	1	2474	0	2988	0
419	1	933	1	1447	0	1961	1	2475	1	2989	0
420	0	934	0	1448	0	1962	1	2476	1	2990	0
421	0	935	0	1449	1	1963	0	2477	0	2991	0
422	0	936	0	1450	1	1964	1	2478	0	2992	1
423	0	937	0	1451	0	1965	0	2479	0	2993	0
424	1	938	0	1452	1	1966	1	2480	1	2994	1
425	1	939	1	1453	1	1967	0	2481	1	2995	0
426	0	940	0	1454	0	1968	0	2482	1	2996	1
427	1	941	0	1455	1	1969	0	2483	1	2997	1
428	0	942	0	1456	1	1970	0	2484	1	2998	1
429	1	943	1	1457	1	1971	1	2485	1	2999	0
430	0	944	1	1458	1	1972	0	2486	0	3000	1
431	0	945	0	1459	1	1973	0	2487	0	3001	0
432	0	946	1	1460	0	1974	0	2488	1	3002	1
433	1	947	1	1461	1	1975	0	2489	1	3003	0
434	1	948	0	1462	1	1976	0	2490	0	3004	1
435	1	949	0	1463	0	1977	0	2491	0	3005	1
436	1	950	0	1464	0	1978	1	2492	0	3006	0

437	1	951	1	1465	0	1979	1	2493	1	3007	0
438	1	952	1	1466	0	1980	1	2494	1	3008	1
439	0	953	1	1467	1	1981	0	2495	1	3009	1
440	0	954	1	1468	0	1982	1	2496	0	3010	0
441	0	955	0	1469	0	1983	1	2497	0	3011	0
442	0	956	0	1470	0	1984	0	2498	0	3012	0
443	0	957	1	1471	1	1985	1	2499	1	3013	1
444	1	958	0	1472	1	1986	1	2500	1	3014	0
445	1	959	0	1473	1	1987	0	2501	0	3015	1
446	0	960	1	1474	0	1988	1	2502	1	3016	1
447	1	961	0	1475	1	1989	1	2503	1	3017	0
448	1	962	1	1476	0	1990	1	2504	0	3018	0
449	1	963	1	1477	0	1991	0	2505	1	3019	0
450	0	964	1	1478	0	1992	0	2506	0	3020	0
451	0	965	0	1479	1	1993	1	2507	0	3021	0
452	0	966	0	1480	1	1994	1	2508	1	3022	1
453	1	967	0	1481	0	1995	1	2509	1	3023	1
454	1	968	0	1482	0	1996	1	2510	1	3024	1
455	0	969	1	1483	0	1997	1	2511	1	3025	1
456	1	970	1	1484	1	1998	1	2512	1	3026	0
457	0	971	1	1485	1	1999	1	2513	0	3027	1
458	0	972	0	1486	0	2000	0	2514	1	3028	1
459	0	973	0	1487	1	2001	0	2515	0	3029	0
460	1	974	1	1488	0	2002	0	2516	0	3030	1
461	0	975	0	1489	1	2003	1	2517	1	3031	1
462	0	976	0	1490	0	2004	1	2518	0	3032	0
463	0	977	0	1491	1	2005	0	2519	1	3033	1
464	0	978	1	1492	0	2006	1	2520	0	3034	0
465	0	979	1	1493	1	2007	0	2521	1	3035	1
466	1	980	0	1494	0	2008	0	2522	0	3036	1
467	1	981	1	1495	1	2009	1	2523	1	3037	1
468	0	982	0	1496	0	2010	1	2524	0	3038	0
469	1	983	1	1497	1	2011	1	2525	0	3039	1
470	0	984	1	1498	0	2012	0	2526	1	3040	0
471	1	985	0	1499	0	2013	1	2527	0	3041	1
472	0	986	0	1500	0	2014	0	2528	1	3042	0
473	1	987	1	1501	1	2015	0	2529	0	3043	1
474	0	988	1	1502	0	2016	0	2530	1	3044	0
475	0	989	0	1503	0	2017	1	2531	1	3045	1
476	1	990	1	1504	0	2018	0	2532	1	3046	1
477	1	991	0	1505	0	2019	1	2533	1	3047	1
478	1	992	0	1506	1	2020	0	2534	0	3048	1
479	1	993	0	1507	0	2021	1	2535	1	3049	1
480	1	994	0	1508	1	2022	0	2536	1	3050	1

481	1	995	1	1509	0	2023	0	2537	1	3051	0
482	1	996	0	1510	1	2024	1	2538	0	3052	1
483	1	997	0	1511	0	2025	0	2539	1	3053	0
484	1	998	0	1512	0	2026	1	2540	0	3054	1
485	1	999	1	1513	1	2027	0	2541	0	3055	1
486	1	1000	0	1514	1	2028	1	2542	1	3056	1
487	1	1001	0	1515	0	2029	1	2543	1	3057	0
488	1	1002	0	1516	1	2030	0	2544	0	3058	0
489	0	1003	0	1517	0	2031	1	2545	1	3059	0
490	1	1004	0	1518	0	2032	0	2546	0	3060	0
491	0	1005	1	1519	0	2033	0	2547	0	3061	1
492	0	1006	0	1520	0	2034	1	2548	1	3062	1
493	1	1007	1	1521	0	2035	0	2549	1	3063	0
494	1	1008	0	1522	1	2036	1	2550	0	3064	0
495	0	1009	0	1523	1	2037	0	2551	1	3065	0
496	1	1010	0	1524	1	2038	0	2552	0	3066	0
497	1	1011	0	1525	0	2039	0	2553	0	3067	1
498	0	1012	0	1526	0	2040	1	2554	1	3068	1
499	1	1013	1	1527	0	2041	0	2555	1	3069	1
500	0	1014	1	1528	0	2042	1	2556	0	3070	0
501	1	1015	1	1529	0	2043	0	2557	0	3071	1
502	1	1016	0	1530	0	2044	0	2558	0	3072	0
503	1	1017	0	1531	1	2045	0	2559	0	3073	1
504	0	1018	0	1532	0	2046	0	2560	0	3074	0
505	0	1019	0	1533	1	2047	0	2561	1	3075	0
506	0	1020	0	1534	0	2048	1	2562	1	3076	0
507	0	1021	1	1535	0	2049	0	2563	0	3077	0
508	0	1022	0	1536	0	2050	0	2564	1	3078	1
509	1	1023	1	1537	1	2051	0	2565	0	3079	0
510	0	1024	0	1538	0	2052	0	2566	0		
511	1	1025	0	1539	1	2053	1	2567	0		
512	1	1026	0	1540	1	2054	1	2568	1		
513	1	1027	1	1541	1	2055	0	2569	1		

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