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

GUO-NIU HAN* AND YINING HU*

Abstract. The continued fraction conjecture claims that the continued fraction defined by the (a,b)-Thue-Morse sequence is algebraic over $\mathbb{F}_2(x)$ for all pairs of distinct elements (a,b) in $\mathbb{F}_2[x]\setminus\mathbb{F}_2$. In this paper we prove the conjecture for $(a,b)=(z^6+z^5+z^4+z^2+1,z+1)$.

1. Introduction

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

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

as the limit of the finite continued fractions

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

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

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

admits a continued fraction expansion of form (1.1).

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

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

that we shall denote

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

Date: runone at : 30/04/2020 07:08:14 .

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

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

* This paper was automatically generated from a computer program developed by the authors, with 1.3 hours CPU time used.

Theorem 1.1. *When $(a,b)=(z^6+z^5+z^4+z^2+1, z+1)$, the two power series $\mathrm{CF}(a,b)$ and $\mathrm{CF}(b,a)$ are algebraic over $\mathbb{F}_2(z)$, with minimal polynomials of the form*

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

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

$$\begin{aligned}
p_0(z) &= z^{21}+z^{19}+z^{18}+z^{13}+z^{11}+z^9+z^4+z^3+z+1,\\
p_1(z) &= z^{27}+z^{26}+z^{23}+z^{21}+z^{20}+z^{19}+z^{14}+z^{13}+z^{12}+z^9+z^4+z,\\
p_2(z) &= z^{28}+z^{26}+z^{24}+z^{22}+z^{20}+z^{18}+z^{16}+z^{14}+z^{12}+z^4+z^2+1,\\
p_3(z) &= z^{27}+z^{26}+z^{23}+z^{21}+z^{20}+z^{19}+z^{14}+z^{13}+z^{12}+z^9+z^4+z,\\
p_4(z) &= z^{26}+z^{22}+z^{21}+z^{19}+z^{16}+z^{14}+z^{13}+z^{11}+z^9+z^3+z^2+z+1,
\end{aligned}$$

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

$$\begin{aligned}
p_0(z) &= z^{24}+z^{21}+z^{20}+z^{19}+z^{18}+z^{16}+z^{13}+z^{11}+z^9+z^8+z^3+z+1,\\
p_1(z) &= z^{27}+z^{26}+z^{23}+z^{21}+z^{20}+z^{19}+z^{14}+z^{13}+z^{12}+z^9+z^4+z,\\
p_2(z) &= z^{28}+z^{26}+z^{24}+z^{22}+z^{20}+z^{18}+z^{16}+z^{14}+z^{12}+z^4+z^2+1,\\
p_3(z) &= z^{27}+z^{26}+z^{23}+z^{21}+z^{20}+z^{19}+z^{14}+z^{13}+z^{12}+z^9+z^4+z,\\
p_4(z) &= z^{26}+z^{24}+z^{22}+z^{21}+z^{20}+z^{19}+z^{14}+z^{13}+z^{11}+z^9+z^8+z^4+z^3\\
&\quad +z^2+z+1.
\end{aligned}$$

2. Proof

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

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

By the basic properties of continued fractions, we have

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

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

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

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

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

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

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

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

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

for some positive integer d_n. Hence,

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

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

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

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

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

of the vector

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

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

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

Lemma 2.1. *We have*

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

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

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

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

Proof. We give the proof of the identity

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

the proofs of the others being similar.

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

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

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

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

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

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

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

Define

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

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

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

$$+ x^{5u}W^e[:5u] + x^{6u}W^e[:4u] + x^{7u}W^e[:3u] + x^{7u}W^e[:7u]$$
$$+ x^{9u}W^e[:5u] + x^{10u}W^e[:4u] + (x^{7u} + x^{9u} + x^{10u})R^e.$$

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

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

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

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

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

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

which can be rewritten as

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

$$0 = T[[11w]_2] + T[[100w]_2] + T[[110w]_2] + T[[1101w]_2], \tag{2.13}$$

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

$$1 = T[[11w]_2] + T[[100w]_2] + T[[101w]_2] + T[[111w]_2], \tag{2.14}$$

$$0 = T[[100w]_2] + T[[101w]_2] + T[[110w]_2] + T[[1000w]_2], \tag{2.15}$$

$$1 = T[[w]_2] + T[[11w]_2] + T[[100w]_2] + T[[110w]_2] + T[[1001w]_2], \tag{2.16}$$

$$1 = T[[w]_2] + T[[1w]_2] + T[[11w]_2] + T[[1010w]_2], \tag{2.17}$$

$$0 = T[[1w]_2] + T[[10w]_2] + T[[100w]_2] + T[[1011w]_2], \tag{2.18}$$

$$0 = T[[10w]_2] + T[[11w]_2] + T[[101w]_2] + T[[1100w]_2], \tag{2.19}$$

$$0 = T[[11w]_2] + T[[100w]_2] + T[[110w]_2] + T[[1101w]_2], \tag{2.20}$$

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

First we calculate an 2-automaton that generates T from its minimal polynomial and its first terms. This automaton has 2904 states; its transition function and output function can be found in the annex. Let $A(s, w)$ denote the state reached after reading w from right to left starting from the state s, and τ the output function. Define

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

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

$$0 = \tau(A(s, 11)) + \tau(A(s, 100)) + \tau(A(s, 101)) + \tau(A(s, 111)), \tag{2.21}$$

$$0 = \tau(A(s, 100)) + \tau(A(s, 101)) + \tau(A(s, 110)) + \tau(A(s, 1000)), \tag{2.22}$$

$$\begin{aligned} 0 = {} & \tau(A(s, \epsilon)) + \tau(A(s, 11)) + \tau(A(s, 100)) + \tau(A(s, 110)) \\ & + \tau(A(s, 1001)), \end{aligned} \tag{2.23}$$

$$0 = \tau(A(s, \epsilon)) + \tau(A(s, 1)) + \tau(A(s, 11)) + \tau(A(s, 1010)), \tag{2.24}$$

$$0 = \tau(A(s, 1)) + \tau(A(s, 10)) + \tau(A(s, 100)) + \tau(A(s, 1011)), \tag{2.25}$$

$$0 = \tau(A(s, 10)) + \tau(A(s, 11)) + \tau(A(s, 101)) + \tau(A(s, 1100)), \tag{2.26}$$

$$0 = \tau(A(s, 11)) + \tau(A(s, 100)) + \tau(A(s, 110)) + \tau(A(s, 1101)), \tag{2.27}$$

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

$$1 = \tau(A(s, 11)) + \tau(A(s, 100)) + \tau(A(s, 101)) + \tau(A(s, 111)), \tag{2.28}$$

$$0 = \tau(A(s, 100)) + \tau(A(s, 101)) + \tau(A(s, 110)) + \tau(A(s, 1000)), \tag{2.29}$$

$$\begin{aligned} 1 = {} & \tau(A(s, \epsilon)) + \tau(A(s, 11)) + \tau(A(s, 100)) + \tau(A(s, 110)) \\ & + \tau(A(s, 1001)), \end{aligned} \tag{2.30}$$

$$1 = \tau(A(s, \epsilon)) + \tau(A(s, 1)) + \tau(A(s, 11)) + \tau(A(s, 1010)), \tag{2.31}$$

$$0 = \tau(A(s, 1)) + \tau(A(s, 10)) + \tau(A(s, 100)) + \tau(A(s, 1011)), \tag{2.32}$$

$$0 = \tau(A(s, 10)) + \tau(A(s, 11)) + \tau(A(s, 101)) + \tau(A(s, 1100)), \tag{2.33}$$

$$0 = \tau(A(s, 11)) + \tau(A(s, 100)) + \tau(A(s, 110)) + \tau(A(s, 1101)), \tag{2.34}$$

for $s = A(i, 0^{2k})$. We find that $(A(i, 0^{30}), E_{30}) = (A(i, 0^{18}), E_{18})$, so that we only have to verify that identities (2.21) through (2.34) hold for $2 \leq k \leq 15$, which turns out to be true. $\square$

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

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

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

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

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

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

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

We give the proof of

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

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

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

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

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

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

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

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

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

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

Let $z = 1/x$. By the convergence theorem and identity (2.2),

$$\mathrm{CF}(a,b) = \frac{M^e_{0,1}(x)}{M^e_{0,0}(x)}.$$

By definition, $\phi(M^e,0,1)$ and $\phi(M^e,0,0)$ are minimal polynomials of $M^e_{0,1}$ and $M^e_{0,0}$. Therefore

$$P(x,y) = \mathrm{Res}_t\left(\phi(M^e,0,1)(x,t), y^{12}\phi(M^e,0,1)(x,t/y)\right)$$

is an annihilating polynomial of $f(x) = M^e_{0,1}/M^e_{0,0}$.

Define

$$Q(x,y) = q_4(x)y^4 + q_3(x)y^3 + q_2(x)y^2 + q_1(x)y + q_0(x),$$

where

$$\begin{aligned}
q_0(x) &= x^{28}+x^{27}+x^{25}+x^{24}+x^{19}+x^{17}+x^{15}+x^{10}+x^9+x^7,\\
q_1(x) &= x^{27}+x^{24}+x^{19}+x^{16}+x^{15}+x^{14}+x^9+x^8+x^7+x^5+x^2+x,\\
q_2(x) &= x^{28}+x^{26}+x^{24}+x^{16}+x^{14}+x^{12}+x^{10}+x^8+x^6+x^4+x^2+1,\\
q_3(x) &= x^{27}+x^{24}+x^{19}+x^{16}+x^{15}+x^{14}+x^9+x^8+x^7+x^5+x^2+x,\\
q_4(x) &= x^{28}+x^{27}+x^{26}+x^{25}+x^{19}+x^{17}+x^{15}+x^{14}+x^{12}+x^9+x^7+x^6\\
&\quad +x^2.
\end{aligned}$$

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

3. Annexe

All 16 polynomials are of the form

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

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

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

$$\begin{aligned}
p_0(x) &= x^{132}+x^{130}+x^{128}+x^{126}+x^{124}+x^{118}+x^{114}+x^{110}+x^{102}+x^{86}\\
&\quad +x^{82}+x^{80}+x^{74}+x^{70}+x^{68}+x^{66}+x^{64}+x^{62}+x^{60}+x^{58}+x^{54}
\end{aligned}$$

$$
\begin{aligned}
&+ x^{50} + x^{42} + x^{38} + x^{36} + x^{32} + x^{30} + x^{28} + x^{22} + x^{20} + x^{16} + x^{14} \\
&+ x^{12}, \\
p_3(x) &= x^{130} + x^{128} + x^{124} + x^{120} + x^{118} + x^{116} + x^{106} + x^{104} + x^{102} + x^{100} \\
&+ x^{98} + x^{94} + x^{86} + x^{82} + x^{80} + x^{78} + x^{66} + x^{64} + x^{62} + x^{58} + x^{52} \\
&+ x^{48} + x^{46} + x^{44} + x^{34} + x^{32} + x^{30} + x^{24} + x^{20} + x^{14} + x^{12} + x^{8}, \\
p_6(x) &= x^{130} + x^{122} + x^{118} + x^{108} + x^{106} + x^{104} + x^{102} + x^{96} + x^{90} + x^{86} \\
&+ x^{84} + x^{82} + x^{78} + x^{76} + x^{72} + x^{66} + x^{62} + x^{60} + x^{54} + x^{46} + x^{44} \\
&+ x^{40} + x^{38} + x^{36} + x^{22} + x^{18} + x^{12} + 1, \\
p_9(x) &= x^{130} + x^{128} + x^{126} + x^{124} + x^{120} + x^{118} + x^{110} + x^{104} + x^{96} + x^{94} \\
&+ x^{92} + x^{88} + x^{82} + x^{80} + x^{78} + x^{74} + x^{72} + x^{68} + x^{66} + x^{64} + x^{60} \\
&+ x^{58} + x^{56} + x^{48} + x^{42} + x^{40} + x^{38} + x^{36} + x^{34} + x^{30} + x^{16} + x^{6} \\
&+ x^{4} + x^{2}, \\
p_{12}(x) &= x^{132} + x^{128} + x^{122} + x^{116} + x^{114} + x^{112} + x^{84} + x^{80} + x^{74} + x^{68} \\
&+ x^{66} + x^{64} + x^{52} + x^{48} + x^{42} + x^{34} + x^{26} + x^{18} + x^{10} + x^{4} + x^{2} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{147} + x^{146} + x^{145} + x^{142} + x^{140} + x^{139} + x^{137} + x^{134} + x^{130} + x^{128} \\
&+ x^{121} + x^{119} + x^{118} + x^{117} + x^{116} + x^{115} + x^{114} + x^{112} + x^{110} \\
&+ x^{106} + x^{98} + x^{97} + x^{96} + x^{95} + x^{94} + x^{93} + x^{90} + x^{88} + x^{85} + x^{84} \\
&+ x^{83} + x^{82} + x^{81} + x^{80} + x^{79} + x^{78} + x^{77} + x^{76} + x^{75} + x^{73} + x^{72} \\
&+ x^{68} + x^{67} + x^{66} + x^{65} + x^{64} + x^{63} + x^{59} + x^{57} + x^{56} + x^{55} + x^{54} \\
&+ x^{50} + x^{47} + x^{46} + x^{44} + x^{42} + x^{40} + x^{39} + x^{36} + x^{34} + x^{32} + x^{31} \\
&+ x^{29} + x^{27}, \\
p_3(x) &= x^{138} + x^{137} + x^{136} + x^{133} + x^{132} + x^{128} + x^{126} + x^{122} + x^{119} + x^{118} \\
&+ x^{116} + x^{115} + x^{108} + x^{107} + x^{106} + x^{103} + x^{101} + x^{100} + x^{98} + x^{97} \\
&+ x^{90} + x^{89} + x^{88} + x^{85} + x^{84} + x^{80} + x^{78} + x^{73} + x^{72} + x^{71} + x^{70} \\
&+ x^{69} + x^{67} + x^{66} + x^{65} + x^{62} + x^{61} + x^{59} + x^{56} + x^{53} + x^{51} + x^{49} \\
&+ x^{47} + x^{46} + x^{41} + x^{40} + x^{39} + x^{36} + x^{35} + x^{34} + x^{31} + x^{30} + x^{26} \\
&+ x^{23} + x^{21} + x^{19} + x^{17} + x^{15} + x^{13} + x^{12} + x^{10} + x^{9}, \\
p_6(x) &= x^{141} + x^{140} + x^{139} + x^{138} + x^{136} + x^{134} + x^{132} + x^{128} + x^{126} + x^{125} \\
&+ x^{124} + x^{123} + x^{121} + x^{120} + x^{119} + x^{116} + x^{115} + x^{114} + x^{110} \\
&+ x^{107} + x^{105} + x^{103} + x^{101} + x^{100} + x^{99} + x^{96} + x^{89} + x^{88} + x^{87} \\
&+ x^{86} + x^{85} + x^{82} + x^{81} + x^{80} + x^{76} + x^{72} + x^{71} + x^{69} + x^{68} + x^{67} \\
&+ x^{66} + x^{63} + x^{62} + x^{61} + x^{59} + x^{58} + x^{57} + x^{54} + x^{51} + x^{50} + x^{49} \\
&+ x^{48} + x^{46} + x^{45} + x^{43} + x^{40} + x^{29} + x^{28} + x^{27} + x^{26} + x^{24} + x^{23}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{20} + x^{18} + x^{17} + x^{15} + x^{14} + x^{13} + x^{12} + x^{9} + x^{8} + x^{6},\\
p_9(x) &= x^{144} + x^{143} + x^{142} + x^{139} + x^{137} + x^{135} + x^{133} + x^{131} + x^{129} + x^{128}\\
&+ x^{124} + x^{121} + x^{119} + x^{118} + x^{116} + x^{115} + x^{112} + x^{111} + x^{109}\\
&+ x^{106} + x^{104} + x^{102} + x^{101} + x^{96} + x^{95} + x^{94} + x^{92} + x^{88} + x^{86}\\
&+ x^{81} + x^{80} + x^{79} + x^{76} + x^{75} + x^{73} + x^{72} + x^{71} + x^{70} + x^{69} + x^{68}\\
&+ x^{66} + x^{61} + x^{57} + x^{56} + x^{55} + x^{52} + x^{51} + x^{50} + x^{48} + x^{46} + x^{45}\\
&+ x^{44} + x^{43} + x^{42} + x^{39} + x^{37} + x^{35} + x^{34} + x^{32} + x^{31} + x^{30} + x^{29}\\
&+ x^{27} + x^{26} + x^{25} + x^{22} + x^{21} + x^{19} + x^{15} + x^{14} + x^{13} + x^{8} + x^{7} + x^{5}\\
&+ x^{4} + x^{3},\\
p_{12}(x) &= x^{147} + x^{146} + x^{145} + x^{144} + x^{142} + x^{141} + x^{138} + x^{137} + x^{134} + x^{133}\\
&+ x^{130} + x^{129} + x^{127} + x^{124} + x^{119} + x^{118} + x^{117} + x^{116} + x^{115}\\
&+ x^{112} + x^{99} + x^{98} + x^{97} + x^{96} + x^{94} + x^{93} + x^{90} + x^{89} + x^{86} + x^{85}\\
&+ x^{82} + x^{81} + x^{79} + x^{76} + x^{71} + x^{70} + x^{69} + x^{68} + x^{66} + x^{65} + x^{62}\\
&+ x^{61} + x^{58} + x^{57} + x^{54} + x^{53} + x^{51} + x^{48} + x^{47} + x^{46} + x^{45} + x^{44}\\
&+ x^{42} + x^{41} + x^{39} + x^{36} + x^{31} + x^{30} + x^{29} + x^{28} + x^{26} + x^{25} + x^{23}\\
&+ x^{20} + x^{19} + x^{18} + x^{17} + x^{16} + x^{15} + x^{12} + x^{7} + x^{6} + x^{5} + x^{4} + x^{3}\\
&+ 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{147} + x^{146} + x^{145} + x^{142} + x^{140} + x^{139} + x^{137} + x^{134} + x^{130} + x^{128}\\
&+ x^{121} + x^{119} + x^{118} + x^{117} + x^{116} + x^{115} + x^{114} + x^{112} + x^{110}\\
&+ x^{106} + x^{98} + x^{97} + x^{96} + x^{95} + x^{94} + x^{93} + x^{90} + x^{88} + x^{85} + x^{84}\\
&+ x^{83} + x^{82} + x^{81} + x^{80} + x^{79} + x^{78} + x^{77} + x^{76} + x^{75} + x^{73} + x^{72}\\
&+ x^{68} + x^{67} + x^{66} + x^{65} + x^{64} + x^{63} + x^{59} + x^{57} + x^{56} + x^{55} + x^{54}\\
&+ x^{50} + x^{47} + x^{46} + x^{44} + x^{42} + x^{40} + x^{39} + x^{36} + x^{34} + x^{32} + x^{31}\\
&+ x^{29} + x^{27},\\
p_3(x) &= x^{138} + x^{137} + x^{136} + x^{133} + x^{132} + x^{128} + x^{126} + x^{122} + x^{119} + x^{118}\\
&+ x^{116} + x^{115} + x^{108} + x^{107} + x^{106} + x^{103} + x^{101} + x^{100} + x^{98} + x^{97}\\
&+ x^{90} + x^{89} + x^{88} + x^{85} + x^{84} + x^{80} + x^{78} + x^{73} + x^{72} + x^{71} + x^{70}\\
&+ x^{69} + x^{67} + x^{66} + x^{65} + x^{62} + x^{61} + x^{59} + x^{56} + x^{53} + x^{51} + x^{49}\\
&+ x^{47} + x^{46} + x^{41} + x^{40} + x^{39} + x^{36} + x^{35} + x^{34} + x^{31} + x^{30} + x^{26}\\
&+ x^{23} + x^{21} + x^{19} + x^{17} + x^{15} + x^{13} + x^{12} + x^{10} + x^{9},\\
p_6(x) &= x^{141} + x^{140} + x^{139} + x^{138} + x^{136} + x^{134} + x^{132} + x^{128} + x^{126} + x^{125}\\
&+ x^{124} + x^{123} + x^{121} + x^{120} + x^{119} + x^{116} + x^{115} + x^{114} + x^{110}\\
&+ x^{107} + x^{105} + x^{103} + x^{101} + x^{100} + x^{99} + x^{96} + x^{89} + x^{88} + x^{87}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{86} + x^{85} + x^{82} + x^{81} + x^{80} + x^{76} + x^{72} + x^{71} + x^{69} + x^{68} + x^{67}\\
&+ x^{66} + x^{63} + x^{62} + x^{61} + x^{59} + x^{58} + x^{57} + x^{54} + x^{51} + x^{50} + x^{49}\\
&+ x^{48} + x^{46} + x^{45} + x^{43} + x^{40} + x^{29} + x^{28} + x^{27} + x^{26} + x^{24} + x^{23}\\
&+ x^{20} + x^{18} + x^{17} + x^{15} + x^{14} + x^{13} + x^{12} + x^{9} + x^{8} + x^{6},\\
p_9(x) &= x^{144} + x^{143} + x^{142} + x^{139} + x^{137} + x^{135} + x^{133} + x^{131} + x^{129} + x^{128}\\
&+ x^{124} + x^{121} + x^{119} + x^{118} + x^{116} + x^{115} + x^{112} + x^{111} + x^{109}\\
&+ x^{106} + x^{104} + x^{102} + x^{101} + x^{96} + x^{95} + x^{94} + x^{92} + x^{88} + x^{86}\\
&+ x^{81} + x^{80} + x^{79} + x^{76} + x^{75} + x^{73} + x^{72} + x^{71} + x^{70} + x^{69} + x^{68}\\
&+ x^{66} + x^{61} + x^{57} + x^{56} + x^{55} + x^{52} + x^{51} + x^{50} + x^{48} + x^{46} + x^{45}\\
&+ x^{44} + x^{43} + x^{42} + x^{39} + x^{37} + x^{35} + x^{34} + x^{32} + x^{31} + x^{30} + x^{29}\\
&+ x^{27} + x^{26} + x^{25} + x^{22} + x^{21} + x^{19} + x^{15} + x^{14} + x^{13} + x^{8} + x^{7} + x^{5}\\
&+ x^{4} + x^{3},\\
p_{12}(x) &= x^{147} + x^{146} + x^{145} + x^{144} + x^{142} + x^{141} + x^{138} + x^{137} + x^{134} + x^{133}\\
&+ x^{130} + x^{129} + x^{127} + x^{124} + x^{119} + x^{118} + x^{117} + x^{116} + x^{115}\\
&+ x^{112} + x^{99} + x^{98} + x^{97} + x^{96} + x^{94} + x^{93} + x^{90} + x^{89} + x^{86} + x^{85}\\
&+ x^{82} + x^{81} + x^{79} + x^{76} + x^{71} + x^{70} + x^{69} + x^{68} + x^{66} + x^{65} + x^{62}\\
&+ x^{61} + x^{58} + x^{57} + x^{54} + x^{53} + x^{51} + x^{48} + x^{47} + x^{46} + x^{45} + x^{44}\\
&+ x^{42} + x^{41} + x^{39} + x^{36} + x^{31} + x^{30} + x^{29} + x^{28} + x^{26} + x^{25} + x^{23}\\
&+ x^{20} + x^{19} + x^{18} + x^{17} + x^{16} + x^{15} + x^{12} + x^{7} + x^{6} + x^{5} + x^{4} + x^{3}\\
&+ 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{162} + x^{156} + x^{150} + x^{142} + x^{136} + x^{134} + x^{128} + x^{126} + x^{122} + x^{118}\\
&+ x^{112} + x^{108} + x^{96} + x^{94} + x^{86} + x^{84} + x^{78} + x^{76} + x^{74} + x^{70} + x^{68}\\
&+ x^{62} + x^{60} + x^{56} + x^{54} + x^{50} + x^{46} + x^{44} + x^{42},\\
p_3(x) &= x^{160} + x^{156} + x^{152} + x^{148} + x^{142} + x^{140} + x^{138} + x^{136} + x^{130} + x^{126}\\
&+ x^{124} + x^{118} + x^{116} + x^{114} + x^{104} + x^{100} + x^{96} + x^{92} + x^{76} + x^{72}\\
&+ x^{68} + x^{66} + x^{64} + x^{62} + x^{60} + x^{58} + x^{56} + x^{52} + x^{46} + x^{40} + x^{38}\\
&+ x^{36} + x^{34} + x^{32} + x^{30} + x^{26} + x^{24} + x^{20} + x^{16} + x^{14} + x^{8} + x^{6},\\
p_6(x) &= x^{160} + x^{156} + x^{154} + x^{152} + x^{142} + x^{140} + x^{134} + x^{124} + x^{122} + x^{120}\\
&+ x^{118} + x^{112} + x^{108} + x^{104} + x^{102} + x^{98} + x^{94} + x^{92} + x^{88} + x^{82}\\
&+ x^{70} + x^{64} + x^{62} + x^{58} + x^{56} + x^{54} + x^{50} + x^{46} + x^{44} + x^{40} + x^{34}\\
&+ x^{32} + x^{30} + x^{26} + x^{24} + x^{22} + x^{12} + x^{8} + x^{6} + 1,\\
p_9(x) &= x^{160} + x^{156} + x^{142} + x^{140} + x^{138} + x^{136} + x^{134} + x^{132} + x^{130} + x^{128}\\
&+ x^{124} + x^{122} + x^{116} + x^{114} + x^{110} + x^{108} + x^{106} + x^{104} + x^{102}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{100} + x^{98} + x^{96} + x^{92} + x^{90} + x^{88} + x^{82} + x^{78} + x^{76} + x^{74} + x^{72}\\
&+ x^{62} + x^{56} + x^{46} + x^{36} + x^{30} + x^{24} + x^{22} + x^{20} + x^{18} + x^{10} + x^{4}\\
&+ x^{2},\\
p_{12}(x) &= x^{162} + x^{160} + x^{146} + x^{144} + x^{130} + x^{128} + x^{122} + x^{120} + x^{98} + x^{96}\\
&+ x^{74} + x^{72} + x^{66} + x^{64} + x^{50} + x^{48} + x^{42} + x^{40} + x^{34} + x^{32} + x^{26}\\
&+ x^{24} + x^{10} + x^{8} + x^{2} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{162} + x^{158} + x^{152} + x^{148} + x^{140} + x^{138} + x^{136} + x^{134} + x^{130} + x^{118}\\
&+ x^{112} + x^{106} + x^{96} + x^{94} + x^{92} + x^{82} + x^{80} + x^{78} + x^{74} + x^{72} + x^{70}\\
&+ x^{68} + x^{66} + x^{64} + x^{62} + x^{60} + x^{58} + x^{56} + x^{52} + x^{50} + x^{48} + x^{46}\\
&+ x^{42} + x^{38} + x^{36} + x^{30} + x^{20} + x^{18} + x^{16} + x^{14} + x^{12},\\
p_3(x) &= x^{160} + x^{154} + x^{146} + x^{144} + x^{142} + x^{140} + x^{138} + x^{136} + x^{128} + x^{126}\\
&+ x^{110} + x^{104} + x^{102} + x^{100} + x^{98} + x^{96} + x^{88} + x^{80} + x^{74} + x^{72}\\
&+ x^{70} + x^{68} + x^{56} + x^{54} + x^{52} + x^{50} + x^{48} + x^{44} + x^{42} + x^{40} + x^{34}\\
&+ x^{32} + x^{26} + x^{22} + x^{20} + x^{18} + x^{10} + x^{8},\\
p_6(x) &= x^{160} + x^{158} + x^{156} + x^{148} + x^{134} + x^{122} + x^{120} + x^{118} + x^{114} + x^{112}\\
&+ x^{104} + x^{94} + x^{90} + x^{88} + x^{82} + x^{80} + x^{78} + x^{74} + x^{70} + x^{68} + x^{64}\\
&+ x^{60} + x^{56} + x^{54} + x^{52} + x^{50} + x^{42} + x^{40} + x^{38} + x^{36} + x^{24} + x^{6}\\
&+ x^{4} + 1,\\
p_9(x) &= x^{160} + x^{156} + x^{142} + x^{140} + x^{138} + x^{136} + x^{134} + x^{132} + x^{130} + x^{128}\\
&+ x^{124} + x^{122} + x^{116} + x^{114} + x^{110} + x^{108} + x^{106} + x^{104} + x^{102}\\
&+ x^{100} + x^{98} + x^{96} + x^{92} + x^{90} + x^{88} + x^{82} + x^{78} + x^{76} + x^{74} + x^{72}\\
&+ x^{62} + x^{56} + x^{46} + x^{36} + x^{30} + x^{24} + x^{22} + x^{20} + x^{18} + x^{10} + x^{4}\\
&+ x^{2},\\
p_{12}(x) &= x^{162} + x^{160} + x^{146} + x^{144} + x^{130} + x^{128} + x^{122} + x^{120} + x^{98} + x^{96}\\
&+ x^{74} + x^{72} + x^{66} + x^{64} + x^{50} + x^{48} + x^{42} + x^{40} + x^{34} + x^{32} + x^{26}\\
&+ x^{24} + x^{10} + x^{8} + x^{2} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{147} + x^{146} + x^{145} + x^{142} + x^{141} + x^{138} + x^{135} + x^{134} + x^{133} + x^{129}\\
&+ x^{128} + x^{125} + x^{124} + x^{123} + x^{122} + x^{119} + x^{117} + x^{116} + x^{115}\\
&+ x^{114} + x^{113} + x^{111} + x^{110} + x^{109} + x^{108} + x^{107} + x^{105} + x^{101}\\
&+ x^{100} + x^{99} + x^{97} + x^{93} + x^{92} + x^{91} + x^{89} + x^{88} + x^{87} + x^{86} + x^{83}\\
&+ x^{82} + x^{76} + x^{74} + x^{72} + x^{65} + x^{64} + x^{62} + x^{58} + x^{57} + x^{49} + x^{44}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{42} + x^{39} + x^{38} + x^{37} + x^{36} + x^{35} + x^{34} + x^{33} + x^{28} + x^{26} + x^{23}\\
&+ x^{20} + x^{18},\\
p_3(x) = {}& x^{138} + x^{137} + x^{136} + x^{133} + x^{132} + x^{128} + x^{126} + x^{122} + x^{119} + x^{118}\\
&+ x^{116} + x^{115} + x^{108} + x^{107} + x^{106} + x^{103} + x^{101} + x^{100} + x^{98} + x^{97}\\
&+ x^{90} + x^{89} + x^{88} + x^{85} + x^{84} + x^{80} + x^{78} + x^{73} + x^{72} + x^{71} + x^{70}\\
&+ x^{69} + x^{67} + x^{66} + x^{65} + x^{62} + x^{61} + x^{59} + x^{56} + x^{53} + x^{51} + x^{49}\\
&+ x^{47} + x^{46} + x^{41} + x^{40} + x^{39} + x^{36} + x^{35} + x^{34} + x^{31} + x^{30} + x^{26}\\
&+ x^{23} + x^{21} + x^{19} + x^{17} + x^{15} + x^{13} + x^{12} + x^{10} + x^{9},\\
p_6(x) = {}& x^{141} + x^{140} + x^{139} + x^{138} + x^{136} + x^{134} + x^{132} + x^{128} + x^{126} + x^{125}\\
&+ x^{124} + x^{123} + x^{121} + x^{120} + x^{119} + x^{116} + x^{115} + x^{114} + x^{110}\\
&+ x^{107} + x^{105} + x^{103} + x^{101} + x^{100} + x^{99} + x^{96} + x^{89} + x^{88} + x^{87}\\
&+ x^{86} + x^{85} + x^{82} + x^{81} + x^{80} + x^{76} + x^{72} + x^{71} + x^{69} + x^{68} + x^{67}\\
&+ x^{66} + x^{63} + x^{62} + x^{61} + x^{59} + x^{58} + x^{57} + x^{54} + x^{51} + x^{50} + x^{49}\\
&+ x^{48} + x^{46} + x^{45} + x^{43} + x^{40} + x^{29} + x^{28} + x^{27} + x^{26} + x^{24} + x^{23}\\
&+ x^{20} + x^{18} + x^{17} + x^{15} + x^{14} + x^{13} + x^{12} + x^{9} + x^{8} + x^{6},\\
p_9(x) = {}& x^{144} + x^{143} + x^{142} + x^{139} + x^{137} + x^{135} + x^{133} + x^{131} + x^{129} + x^{128}\\
&+ x^{124} + x^{121} + x^{119} + x^{118} + x^{116} + x^{115} + x^{112} + x^{111} + x^{109}\\
&+ x^{106} + x^{104} + x^{102} + x^{101} + x^{96} + x^{95} + x^{94} + x^{92} + x^{88} + x^{86}\\
&+ x^{81} + x^{80} + x^{79} + x^{76} + x^{75} + x^{73} + x^{72} + x^{71} + x^{70} + x^{69} + x^{68}\\
&+ x^{66} + x^{61} + x^{57} + x^{56} + x^{55} + x^{52} + x^{51} + x^{50} + x^{48} + x^{46} + x^{45}\\
&+ x^{44} + x^{43} + x^{42} + x^{39} + x^{37} + x^{35} + x^{34} + x^{32} + x^{31} + x^{30} + x^{29}\\
&+ x^{27} + x^{26} + x^{25} + x^{22} + x^{21} + x^{19} + x^{15} + x^{14} + x^{13} + x^{8} + x^{7} + x^{5}\\
&+ x^{4} + x^{3},\\
p_{12}(x) = {}& x^{147} + x^{146} + x^{145} + x^{144} + x^{142} + x^{141} + x^{138} + x^{137} + x^{134} + x^{133}\\
&+ x^{130} + x^{129} + x^{127} + x^{124} + x^{119} + x^{118} + x^{117} + x^{116} + x^{115}\\
&+ x^{112} + x^{99} + x^{98} + x^{97} + x^{96} + x^{94} + x^{93} + x^{90} + x^{89} + x^{86} + x^{85}\\
&+ x^{82} + x^{81} + x^{79} + x^{76} + x^{71} + x^{70} + x^{69} + x^{68} + x^{66} + x^{65} + x^{62}\\
&+ x^{61} + x^{58} + x^{57} + x^{54} + x^{53} + x^{51} + x^{48} + x^{47} + x^{46} + x^{45} + x^{44}\\
&+ x^{42} + x^{41} + x^{39} + x^{36} + x^{31} + x^{30} + x^{29} + x^{28} + x^{26} + x^{25} + x^{23}\\
&+ x^{20} + x^{19} + x^{18} + x^{17} + x^{16} + x^{15} + x^{12} + x^{7} + x^{6} + x^{5} + x^{4} + x^{3}\\
&+ 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) = {}& x^{147} + x^{146} + x^{145} + x^{142} + x^{141} + x^{138} + x^{135} + x^{134} + x^{133} + x^{129}\\
&+ x^{128} + x^{125} + x^{124} + x^{123} + x^{122} + x^{119} + x^{117} + x^{116} + x^{115}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{114} + x^{113} + x^{111} + x^{110} + x^{109} + x^{108} + x^{107} + x^{105} + x^{101}\\
&+ x^{100} + x^{99} + x^{97} + x^{93} + x^{92} + x^{91} + x^{89} + x^{88} + x^{87} + x^{86} + x^{83}\\
&+ x^{82} + x^{76} + x^{74} + x^{72} + x^{65} + x^{64} + x^{62} + x^{58} + x^{57} + x^{49} + x^{44}\\
&+ x^{42} + x^{39} + x^{38} + x^{37} + x^{36} + x^{35} + x^{34} + x^{33} + x^{28} + x^{26} + x^{23}\\
&+ x^{20} + x^{18},\\
p_3(x) = &\; x^{138} + x^{137} + x^{136} + x^{133} + x^{132} + x^{128} + x^{126} + x^{122} + x^{119} + x^{118}\\
&+ x^{116} + x^{115} + x^{108} + x^{107} + x^{106} + x^{103} + x^{101} + x^{100} + x^{98} + x^{97}\\
&+ x^{90} + x^{89} + x^{88} + x^{85} + x^{84} + x^{80} + x^{78} + x^{73} + x^{72} + x^{71} + x^{70}\\
&+ x^{69} + x^{67} + x^{66} + x^{65} + x^{62} + x^{61} + x^{59} + x^{56} + x^{53} + x^{51} + x^{49}\\
&+ x^{47} + x^{46} + x^{41} + x^{40} + x^{39} + x^{36} + x^{35} + x^{34} + x^{31} + x^{30} + x^{26}\\
&+ x^{23} + x^{21} + x^{19} + x^{17} + x^{15} + x^{13} + x^{12} + x^{10} + x^{9},\\
p_6(x) = &\; x^{141} + x^{140} + x^{139} + x^{138} + x^{136} + x^{134} + x^{132} + x^{128} + x^{126} + x^{125}\\
&+ x^{124} + x^{123} + x^{121} + x^{120} + x^{119} + x^{116} + x^{115} + x^{114} + x^{110}\\
&+ x^{107} + x^{105} + x^{103} + x^{101} + x^{100} + x^{99} + x^{96} + x^{89} + x^{88} + x^{87}\\
&+ x^{86} + x^{85} + x^{82} + x^{81} + x^{80} + x^{76} + x^{72} + x^{71} + x^{69} + x^{68} + x^{67}\\
&+ x^{66} + x^{63} + x^{62} + x^{61} + x^{59} + x^{58} + x^{57} + x^{54} + x^{51} + x^{50} + x^{49}\\
&+ x^{48} + x^{46} + x^{45} + x^{43} + x^{40} + x^{29} + x^{28} + x^{27} + x^{26} + x^{24} + x^{23}\\
&+ x^{20} + x^{18} + x^{17} + x^{15} + x^{14} + x^{13} + x^{12} + x^{9} + x^{8} + x^{6},\\
p_9(x) = &\; x^{144} + x^{143} + x^{142} + x^{139} + x^{137} + x^{135} + x^{133} + x^{131} + x^{129} + x^{128}\\
&+ x^{124} + x^{121} + x^{119} + x^{118} + x^{116} + x^{115} + x^{112} + x^{111} + x^{109}\\
&+ x^{106} + x^{104} + x^{102} + x^{101} + x^{96} + x^{95} + x^{94} + x^{92} + x^{88} + x^{86}\\
&+ x^{81} + x^{80} + x^{79} + x^{76} + x^{75} + x^{73} + x^{72} + x^{71} + x^{70} + x^{69} + x^{68}\\
&+ x^{66} + x^{61} + x^{57} + x^{56} + x^{55} + x^{52} + x^{51} + x^{50} + x^{48} + x^{46} + x^{45}\\
&+ x^{44} + x^{43} + x^{42} + x^{39} + x^{37} + x^{35} + x^{34} + x^{32} + x^{31} + x^{30} + x^{29}\\
&+ x^{27} + x^{26} + x^{25} + x^{22} + x^{21} + x^{19} + x^{15} + x^{14} + x^{13} + x^{8} + x^{7} + x^{5}\\
&+ x^{4} + x^{3},\\
p_{12}(x) = &\; x^{147} + x^{146} + x^{145} + x^{144} + x^{142} + x^{141} + x^{138} + x^{137} + x^{134} + x^{133}\\
&+ x^{130} + x^{129} + x^{127} + x^{124} + x^{119} + x^{118} + x^{117} + x^{116} + x^{115}\\
&+ x^{112} + x^{99} + x^{98} + x^{97} + x^{96} + x^{94} + x^{93} + x^{90} + x^{89} + x^{86} + x^{85}\\
&+ x^{82} + x^{81} + x^{79} + x^{76} + x^{71} + x^{70} + x^{69} + x^{68} + x^{66} + x^{65} + x^{62}\\
&+ x^{61} + x^{58} + x^{57} + x^{54} + x^{53} + x^{51} + x^{48} + x^{47} + x^{46} + x^{45} + x^{44}\\
&+ x^{42} + x^{41} + x^{39} + x^{36} + x^{31} + x^{30} + x^{29} + x^{28} + x^{26} + x^{25} + x^{23}\\
&+ x^{20} + x^{19} + x^{18} + x^{17} + x^{16} + x^{15} + x^{12} + x^{7} + x^{6} + x^{5} + x^{4} + x^{3}\\
&+ 1,
\end{aligned}
$$

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

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

$$\begin{aligned}
p_0(x) &= x^{132}+x^{130}+x^{126}+x^{122}+x^{114}+x^{106}+x^{104}+x^{102}+x^{100}+x^{92}\\
&\quad +x^{88}+x^{84}+x^{82}+x^{80}+x^{76}+x^{70}+x^{60}+x^{58}+x^{56}+x^{54}+x^{46}\\
&\quad +x^{44}+x^{38}+x^{30}+x^{28}+x^{26}+x^{24},\\
p_3(x) &= x^{130}+x^{128}+x^{126}+x^{124}+x^{110}+x^{108}+x^{100}+x^{88}+x^{84}+x^{82}\\
&\quad +x^{80}+x^{78}+x^{76}+x^{62}+x^{54}+x^{52}+x^{50}+x^{46}+x^{44}+x^{36}+x^{34}\\
&\quad +x^{30}+x^{28}+x^{24}+x^{18}+x^{14}+x^{8}+x^{6},\\
p_6(x) &= x^{130}+x^{128}+x^{126}+x^{124}+x^{122}+x^{120}+x^{118}+x^{108}+x^{106}+x^{100}\\
&\quad +x^{96}+x^{94}+x^{92}+x^{90}+x^{88}+x^{86}+x^{84}+x^{82}+x^{80}+x^{76}+x^{74}\\
&\quad +x^{70}+x^{68}+x^{64}+x^{60}+x^{50}+x^{48}+x^{42}+x^{40}+x^{38}+x^{36}+x^{34}\\
&\quad +x^{32}+x^{28}+x^{24}+x^{20}+x^{18}+x^{14}+x^{12}+x^{10}+x^{4}+1,\\
p_9(x) &= x^{130}+x^{128}+x^{126}+x^{124}+x^{120}+x^{118}+x^{110}+x^{104}+x^{96}+x^{94}\\
&\quad +x^{92}+x^{88}+x^{82}+x^{80}+x^{78}+x^{74}+x^{72}+x^{68}+x^{66}+x^{64}+x^{60}\\
&\quad +x^{58}+x^{56}+x^{48}+x^{42}+x^{40}+x^{38}+x^{36}+x^{34}+x^{30}+x^{16}+x^{6}\\
&\quad +x^{4}+x^{2},\\
p_{12}(x) &= x^{132}+x^{128}+x^{122}+x^{116}+x^{114}+x^{112}+x^{84}+x^{80}+x^{74}+x^{68}\\
&\quad +x^{66}+x^{64}+x^{52}+x^{48}+x^{42}+x^{34}+x^{26}+x^{18}+x^{10}+x^{4}+x^{2}+1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{147}+x^{146}+x^{140}+x^{137}+x^{135}+x^{132}+x^{124}+x^{119}+x^{118}+x^{117}\\
&\quad +x^{114}+x^{113}+x^{112}+x^{110}+x^{109}+x^{108}+x^{107}+x^{106}+x^{103}\\
&\quad +x^{101}+x^{100}+x^{98}+x^{97}+x^{96}+x^{94}+x^{90}+x^{87}+x^{85}+x^{83}+x^{79}\\
&\quad +x^{78}+x^{77}+x^{76}+x^{75}+x^{74}+x^{73}+x^{72}+x^{71}+x^{69}+x^{67}+x^{65}\\
&\quad +x^{62}+x^{61}+x^{60}+x^{59}+x^{58}+x^{57}+x^{56}+x^{55}+x^{53}+x^{51}+x^{50}\\
&\quad +x^{49}+x^{48}+x^{45}+x^{44}+x^{42}+x^{41}+x^{39}+x^{38}+x^{36}+x^{35}+x^{34}\\
&\quad +x^{31}+x^{30}+x^{29}+x^{28}+x^{27}+x^{25}+x^{24}+x^{20}+x^{18}+x^{15}+x^{14}\\
&\quad +x^{12},\\
p_3(x) &= x^{143}+x^{142}+x^{139}+x^{138}+x^{136}+x^{133}+x^{132}+x^{131}+x^{130}+x^{129}\\
&\quad +x^{128}+x^{126}+x^{124}+x^{123}+x^{122}+x^{120}+x^{117}+x^{113}+x^{112}\\
&\quad +x^{110}+x^{109}+x^{106}+x^{104}+x^{100}+x^{99}+x^{98}+x^{97}+x^{96}+x^{95}\\
&\quad +x^{92}+x^{91}+x^{88}+x^{86}+x^{85}+x^{80}+x^{78}+x^{75}+x^{72}+x^{71}+x^{69}\\
&\quad +x^{68}+x^{64}+x^{63}+x^{61}+x^{59}+x^{58}+x^{57}+x^{56}+x^{52}+x^{51}+x^{49}\\
&\quad +x^{46}+x^{41}+x^{40}+x^{38}+x^{36}+x^{35}+x^{33}+x^{32}+x^{25}+x^{24}+x^{23}\\
&\quad +x^{20}+x^{18}+x^{17}+x^{16}+x^{15}+x^{14}+x^{12}+x^{11}+x^{10}+x^{8},\\
p_6(x) &= x^{145}+x^{144}+x^{142}+x^{141}+x^{140}+x^{138}+x^{135}+x^{133}+x^{132}+x^{131}
\end{aligned}$$

$$
\begin{aligned}
&+ x^{130} + x^{129} + x^{127} + x^{126} + x^{122} + x^{121} + x^{120} + x^{119} + x^{117}\\
&+ x^{116} + x^{114} + x^{113} + x^{112} + x^{111} + x^{109} + x^{107} + x^{104} + x^{102}\\
&+ x^{101} + x^{100} + x^{99} + x^{93} + x^{92} + x^{91} + x^{90} + x^{89} + x^{87} + x^{86} + x^{84}\\
&+ x^{83} + x^{82} + x^{81} + x^{77} + x^{76} + x^{75} + x^{72} + x^{71} + x^{70} + x^{69} + x^{65}\\
&+ x^{64} + x^{63} + x^{62} + x^{61} + x^{60} + x^{56} + x^{55} + x^{53} + x^{47} + x^{46} + x^{45}\\
&+ x^{44} + x^{43} + x^{42} + x^{41} + x^{40} + x^{39} + x^{36} + x^{33} + x^{30} + x^{27} + x^{25}\\
&+ x^{24} + x^{23} + x^{21} + x^{18} + x^{17} + x^{15} + x^{14} + x^{13} + x^{11} + x^{10} + x^{8}\\
&+ x^{5} + x^{3} + 1,\\
p_9(x) = {}& x^{143} + x^{142} + x^{141} + x^{140} + x^{138} + x^{137} + x^{135} + x^{132} + x^{131} + x^{130}\\
&+ x^{129} + x^{128} + x^{126} + x^{125} + x^{122} + x^{121} + x^{119} + x^{116} + x^{95} + x^{94}\\
&+ x^{93} + x^{92} + x^{90} + x^{89} + x^{87} + x^{84} + x^{83} + x^{82} + x^{81} + x^{80} + x^{78}\\
&+ x^{77} + x^{74} + x^{73} + x^{71} + x^{68} + x^{63} + x^{62} + x^{61} + x^{60} + x^{58} + x^{57}\\
&+ x^{55} + x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{47} + x^{44} + x^{35} + x^{34} + x^{33}\\
&+ x^{32} + x^{31} + x^{28} + x^{19} + x^{18} + x^{17} + x^{16} + x^{14} + x^{13} + x^{10} + x^{9}\\
&+ x^{7} + x^{4},\\
p_{12}(x) = {}& x^{147} + x^{146} + x^{145} + x^{144} + x^{143} + x^{140} + x^{135} + x^{134} + x^{133} + x^{132}\\
&+ x^{131} + x^{128} + x^{127} + x^{126} + x^{125} + x^{124} + x^{122} + x^{121} + x^{118}\\
&+ x^{117} + x^{115} + x^{112} + x^{99} + x^{98} + x^{97} + x^{96} + x^{95} + x^{92} + x^{87} + x^{86}\\
&+ x^{85} + x^{84} + x^{83} + x^{80} + x^{79} + x^{78} + x^{77} + x^{76} + x^{74} + x^{73} + x^{70}\\
&+ x^{69} + x^{66} + x^{65} + x^{63} + x^{60} + x^{55} + x^{54} + x^{53} + x^{52} + x^{50} + x^{49}\\
&+ x^{46} + x^{45} + x^{42} + x^{41} + x^{39} + x^{36} + x^{35} + x^{34} + x^{33} + x^{32} + x^{30}\\
&+ x^{29} + x^{26} + x^{25} + x^{23} + x^{20} + x^{15} + x^{14} + x^{13} + x^{12} + x^{10} + x^{9}\\
&+ x^{6} + x^{5} + x^{3} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) = {}& x^{164} + x^{161} + x^{160} + x^{159} + x^{158} + x^{157} + x^{156} + x^{155} + x^{151} + x^{150}\\
&+ x^{147} + x^{144} + x^{139} + x^{138} + x^{137} + x^{135} + x^{134} + x^{132} + x^{128}\\
&+ x^{127} + x^{125} + x^{122} + x^{121} + x^{120} + x^{119} + x^{118} + x^{114} + x^{112}\\
&+ x^{111} + x^{106} + x^{103} + x^{102} + x^{99} + x^{98} + x^{97} + x^{95} + x^{94} + x^{92}\\
&+ x^{91} + x^{89} + x^{86} + x^{85} + x^{83} + x^{82} + x^{81} + x^{78} + x^{77} + x^{76} + x^{74}\\
&+ x^{73} + x^{72} + x^{71} + x^{70} + x^{69} + x^{68} + x^{67} + x^{66} + x^{65} + x^{64} + x^{62}\\
&+ x^{61} + x^{59} + x^{55} + x^{54} + x^{53} + x^{51} + x^{49} + x^{47} + x^{46} + x^{43} + x^{42}\\
&+ x^{36} + x^{33} + x^{31} + x^{30} + x^{27},\\
p_3(x) = {}& x^{155} + x^{153} + x^{152} + x^{151} + x^{150} + x^{148} + x^{147} + x^{145} + x^{144} + x^{141}\\
&+ x^{139} + x^{138} + x^{136} + x^{135} + x^{129} + x^{128} + x^{122} + x^{119} + x^{117}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{116} + x^{115} + x^{113} + x^{108} + x^{106} + x^{104} + x^{98} + x^{96} + x^{93} + x^{90} \\
&+ x^{89} + x^{86} + x^{84} + x^{81} + x^{80} + x^{79} + x^{78} + x^{77} + x^{76} + x^{73} + x^{68} \\
&+ x^{66} + x^{63} + x^{60} + x^{57} + x^{55} + x^{53} + x^{52} + x^{46} + x^{44} + x^{43} + x^{40} \\
&+ x^{39} + x^{37} + x^{36} + x^{35} + x^{34} + x^{33} + x^{31} + x^{29} + x^{26} + x^{23} + x^{22} \\
&+ x^{15} + x^{14} + x^{12} + x^{11} + x^{10} + x^{9}, \\
p_6(x) = {}& x^{158} + x^{154} + x^{152} + x^{150} + x^{148} + x^{144} + x^{142} + x^{138} + x^{136} + x^{130} \\
&+ x^{124} + x^{118} + x^{114} + x^{108} + x^{106} + x^{104} + x^{102} + x^{100} + x^{92} + x^{90} \\
&+ x^{82} + x^{78} + x^{76} + x^{72} + x^{70} + x^{64} + x^{58} + x^{56} + x^{54} + x^{52} + x^{46} \\
&+ x^{42} + x^{40} + x^{36} + x^{32} + x^{30} + x^{28} + x^{26} + x^{24} + x^{20} + x^{18} + x^{14} \\
&+ x^{8} + x^{6}, \\
p_9(x) = {}& x^{161} + x^{159} + x^{158} + x^{156} + x^{149} + x^{148} + x^{147} + x^{146} + x^{145} + x^{143} \\
&+ x^{139} + x^{137} + x^{136} + x^{135} + x^{131} + x^{129} + x^{127} + x^{124} + x^{123} \\
&+ x^{122} + x^{121} + x^{120} + x^{116} + x^{115} + x^{113} + x^{111} + x^{110} + x^{108} \\
&+ x^{101} + x^{100} + x^{99} + x^{98} + x^{97} + x^{95} + x^{91} + x^{89} + x^{88} + x^{87} + x^{83} \\
&+ x^{78} + x^{75} + x^{74} + x^{73} + x^{72} + x^{69} + x^{66} + x^{62} + x^{60} + x^{59} + x^{57} \\
&+ x^{56} + x^{55} + x^{53} + x^{52} + x^{50} + x^{49} + x^{47} + x^{46} + x^{42} + x^{39} + x^{37} \\
&+ x^{35} + x^{34} + x^{28} + x^{26} + x^{23} + x^{20} + x^{17} + x^{15} + x^{12} + x^{11} + x^{10} \\
&+ x^{9} + x^{8} + x^{4} + x^{3}, \\
p_{12}(x) = {}& x^{164} + x^{156} + x^{152} + x^{148} + x^{144} + x^{136} + x^{128} + x^{120} + x^{116} + x^{112} \\
&+ x^{108} + x^{104} + x^{100} + x^{96} + x^{88} + x^{84} + x^{80} + x^{76} + x^{60} + x^{44} + x^{40} \\
&+ x^{36} + x^{32} + x^{8} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) = {}& x^{144} + x^{141} + x^{139} + x^{131} + x^{129} + x^{127} + x^{124} + x^{123} + x^{121} + x^{120} \\
&+ x^{117} + x^{116} + x^{114} + x^{113} + x^{111} + x^{110} + x^{106} + x^{105} + x^{103} \\
&+ x^{100} + x^{99} + x^{98} + x^{96} + x^{93} + x^{92} + x^{91} + x^{89} + x^{85} + x^{84} + x^{83} \\
&+ x^{82} + x^{81} + x^{80} + x^{79} + x^{77} + x^{75} + x^{73} + x^{71} + x^{70} + x^{69} + x^{68} \\
&+ x^{66} + x^{64} + x^{63} + x^{58} + x^{56} + x^{55} + x^{53} + x^{51} + x^{49} + x^{46} + x^{44} \\
&+ x^{43} + x^{40} + x^{38} + x^{34} + x^{33} + x^{30} + x^{29} + x^{27} + x^{26} + x^{25} + x^{22} \\
&+ x^{21} + x^{18}, \\
p_3(x) = {}& x^{135} + x^{133} + x^{132} + x^{130} + x^{129} + x^{127} + x^{126} + x^{124} + x^{123} + x^{122} \\
&+ x^{121} + x^{120} + x^{119} + x^{116} + x^{114} + x^{113} + x^{112} + x^{109} + x^{103} \\
&+ x^{102} + x^{100} + x^{99} + x^{98} + x^{97} + x^{87} + x^{85} + x^{84} + x^{82} + x^{81} + x^{79} \\
&+ x^{78} + x^{76} + x^{75} + x^{74} + x^{73} + x^{72} + x^{69} + x^{64} + x^{62} + x^{59} + x^{56} \\
&+ x^{55} + x^{52} + x^{50} + x^{49} + x^{47} + x^{45} + x^{44} + x^{42} + x^{41} + x^{40} + x^{38}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{35} + x^{31} + x^{29} + x^{28} + x^{26} + x^{25} + x^{24} + x^{23} + x^{22} + x^{21} + x^{20}\\
&+ x^{19} + x^{18} + x^{17} + x^{15} + x^{14} + x^{12} + x^{11} + x^{10} + x^{9},\\
p_6(x) &= x^{138} + x^{132} + x^{130} + x^{126} + x^{124} + x^{122} + x^{120} + x^{116} + x^{112} + x^{110}\\
&+ x^{108} + x^{102} + x^{100} + x^{96} + x^{86} + x^{82} + x^{78} + x^{76} + x^{74} + x^{70} + x^{62}\\
&+ x^{60} + x^{58} + x^{54} + x^{48} + x^{40} + x^{26} + x^{16} + x^{8} + x^{6},\\
p_9(x) &= x^{141} + x^{139} + x^{138} + x^{137} + x^{136} + x^{135} + x^{134} + x^{133} + x^{132} + x^{131}\\
&+ x^{130} + x^{122} + x^{121} + x^{120} + x^{116} + x^{115} + x^{93} + x^{91} + x^{90} + x^{89}\\
&+ x^{88} + x^{87} + x^{86} + x^{85} + x^{84} + x^{83} + x^{82} + x^{74} + x^{73} + x^{72} + x^{68}\\
&+ x^{67} + x^{61} + x^{59} + x^{58} + x^{57} + x^{56} + x^{55} + x^{54} + x^{53} + x^{52} + x^{51}\\
&+ x^{50} + x^{45} + x^{43} + x^{39} + x^{38} + x^{37} + x^{34} + x^{29} + x^{27} + x^{23} + x^{22}\\
&+ x^{21} + x^{18} + x^{10} + x^{9} + x^{8} + x^{4} + x^{3},\\
p_{12}(x) &= x^{144} + x^{140} + x^{132} + x^{128} + x^{124} + x^{112} + x^{96} + x^{92} + x^{84} + x^{80}\\
&+ x^{76} + x^{60} + x^{52} + x^{36} + x^{32} + x^{20} + x^{12} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{147} + x^{146} + x^{143} + x^{142} + x^{140} + x^{139} + x^{137} + x^{135} + x^{134} + x^{133}\\
&+ x^{131} + x^{130} + x^{128} + x^{126} + x^{125} + x^{119} + x^{115} + x^{114} + x^{113}\\
&+ x^{112} + x^{111} + x^{109} + x^{108} + x^{107} + x^{106} + x^{105} + x^{104} + x^{103}\\
&+ x^{102} + x^{100} + x^{99} + x^{97} + x^{96} + x^{95} + x^{93} + x^{91} + x^{90} + x^{89} + x^{86}\\
&+ x^{81} + x^{80} + x^{78} + x^{73} + x^{69} + x^{67} + x^{62} + x^{61} + x^{59} + x^{58} + x^{57}\\
&+ x^{56} + x^{55} + x^{53} + x^{52} + x^{51} + x^{50} + x^{49} + x^{44} + x^{41} + x^{37} + x^{36}\\
&+ x^{35} + x^{33},\\
p_3(x) &= x^{143} + x^{142} + x^{136} + x^{135} + x^{133} + x^{132} + x^{131} + x^{130} + x^{129} + x^{124}\\
&+ x^{123} + x^{121} + x^{120} + x^{116} + x^{114} + x^{113} + x^{112} + x^{110} + x^{108}\\
&+ x^{106} + x^{105} + x^{104} + x^{103} + x^{102} + x^{100} + x^{97} + x^{95} + x^{92} + x^{90}\\
&+ x^{88} + x^{87} + x^{86} + x^{85} + x^{73} + x^{72} + x^{67} + x^{62} + x^{60} + x^{59} + x^{57}\\
&+ x^{55} + x^{53} + x^{50} + x^{48} + x^{46} + x^{43} + x^{40} + x^{37} + x^{35} + x^{32} + x^{26}\\
&+ x^{24} + x^{22} + x^{21} + x^{19} + x^{12},\\
p_6(x) &= x^{145} + x^{144} + x^{143} + x^{141} + x^{140} + x^{135} + x^{134} + x^{133} + x^{131} + x^{130}\\
&+ x^{129} + x^{128} + x^{127} + x^{125} + x^{124} + x^{121} + x^{120} + x^{119} + x^{117}\\
&+ x^{116} + x^{114} + x^{110} + x^{109} + x^{108} + x^{107} + x^{106} + x^{103} + x^{101}\\
&+ x^{99} + x^{95} + x^{94} + x^{90} + x^{85} + x^{84} + x^{83} + x^{80} + x^{77} + x^{75} + x^{70}\\
&+ x^{68} + x^{63} + x^{54} + x^{53} + x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{47} + x^{44}\\
&+ x^{43} + x^{40} + x^{39} + x^{38} + x^{37} + x^{36} + x^{35} + x^{33} + x^{32} + x^{30} + x^{29}\\
&+ x^{28} + x^{26} + x^{25} + x^{23} + x^{22} + x^{19} + x^{16} + x^{12} + x^{8} + x^{7} + x^{6} + x^{5}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{4} + x^{3} + 1,\\
p_9(x) = {}& x^{143} + x^{142} + x^{141} + x^{140} + x^{138} + x^{137} + x^{135} + x^{132} + x^{131} + x^{130}\\
&+ x^{129} + x^{128} + x^{126} + x^{125} + x^{122} + x^{121} + x^{119} + x^{116} + x^{95} + x^{94}\\
&+ x^{93} + x^{92} + x^{90} + x^{89} + x^{87} + x^{84} + x^{83} + x^{82} + x^{81} + x^{80} + x^{78}\\
&+ x^{77} + x^{74} + x^{73} + x^{71} + x^{68} + x^{63} + x^{62} + x^{61} + x^{60} + x^{58} + x^{57}\\
&+ x^{55} + x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{47} + x^{44} + x^{35} + x^{34} + x^{33}\\
&+ x^{32} + x^{31} + x^{28} + x^{19} + x^{18} + x^{17} + x^{16} + x^{14} + x^{13} + x^{10} + x^{9}\\
&+ x^{7} + x^{4},\\
p_{12}(x) = {}& x^{147} + x^{146} + x^{145} + x^{144} + x^{143} + x^{140} + x^{135} + x^{134} + x^{133} + x^{132}\\
&+ x^{131} + x^{128} + x^{127} + x^{126} + x^{125} + x^{124} + x^{122} + x^{121} + x^{118}\\
&+ x^{117} + x^{115} + x^{112} + x^{99} + x^{98} + x^{97} + x^{96} + x^{95} + x^{92} + x^{87} + x^{86}\\
&+ x^{85} + x^{84} + x^{83} + x^{80} + x^{79} + x^{78} + x^{77} + x^{76} + x^{74} + x^{73} + x^{70}\\
&+ x^{69} + x^{66} + x^{65} + x^{63} + x^{60} + x^{55} + x^{54} + x^{53} + x^{52} + x^{50} + x^{49}\\
&+ x^{46} + x^{45} + x^{42} + x^{41} + x^{39} + x^{36} + x^{35} + x^{34} + x^{33} + x^{32} + x^{30}\\
&+ x^{29} + x^{26} + x^{25} + x^{23} + x^{20} + x^{15} + x^{14} + x^{13} + x^{12} + x^{10} + x^{9}\\
&+ x^{6} + x^{5} + x^{3} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) = {}& x^{147} + x^{146} + x^{140} + x^{137} + x^{135} + x^{132} + x^{124} + x^{119} + x^{118} + x^{117}\\
&+ x^{114} + x^{113} + x^{112} + x^{110} + x^{109} + x^{108} + x^{107} + x^{106} + x^{103}\\
&+ x^{101} + x^{100} + x^{98} + x^{97} + x^{96} + x^{94} + x^{90} + x^{87} + x^{85} + x^{83} + x^{79}\\
&+ x^{78} + x^{77} + x^{76} + x^{75} + x^{74} + x^{73} + x^{72} + x^{71} + x^{69} + x^{67} + x^{65}\\
&+ x^{62} + x^{61} + x^{60} + x^{59} + x^{58} + x^{57} + x^{56} + x^{55} + x^{53} + x^{51} + x^{50}\\
&+ x^{49} + x^{48} + x^{45} + x^{44} + x^{42} + x^{41} + x^{39} + x^{38} + x^{36} + x^{35} + x^{34}\\
&+ x^{31} + x^{30} + x^{29} + x^{28} + x^{27} + x^{25} + x^{24} + x^{20} + x^{18} + x^{15} + x^{14}\\
&+ x^{12},\\
p_3(x) = {}& x^{143} + x^{142} + x^{139} + x^{138} + x^{136} + x^{133} + x^{132} + x^{131} + x^{130} + x^{129}\\
&+ x^{128} + x^{126} + x^{124} + x^{123} + x^{122} + x^{120} + x^{117} + x^{113} + x^{112}\\
&+ x^{110} + x^{109} + x^{106} + x^{104} + x^{100} + x^{99} + x^{98} + x^{97} + x^{96} + x^{95}\\
&+ x^{92} + x^{91} + x^{88} + x^{86} + x^{85} + x^{80} + x^{78} + x^{75} + x^{72} + x^{71} + x^{69}\\
&+ x^{68} + x^{64} + x^{63} + x^{61} + x^{59} + x^{58} + x^{57} + x^{56} + x^{52} + x^{51} + x^{49}\\
&+ x^{46} + x^{41} + x^{40} + x^{38} + x^{36} + x^{35} + x^{33} + x^{32} + x^{25} + x^{24} + x^{23}\\
&+ x^{20} + x^{18} + x^{17} + x^{16} + x^{15} + x^{14} + x^{12} + x^{11} + x^{10} + x^{8},\\
p_6(x) = {}& x^{145} + x^{144} + x^{142} + x^{141} + x^{140} + x^{138} + x^{135} + x^{133} + x^{132} + x^{131}\\
&+ x^{130} + x^{129} + x^{127} + x^{126} + x^{122} + x^{121} + x^{120} + x^{119} + x^{117}
\end{aligned}
$$

$$+ x^{116} + x^{114} + x^{113} + x^{112} + x^{111} + x^{109} + x^{107} + x^{104} + x^{102}$$
$$+ x^{101} + x^{100} + x^{99} + x^{93} + x^{92} + x^{91} + x^{90} + x^{89} + x^{87} + x^{86} + x^{84}$$
$$+ x^{83} + x^{82} + x^{81} + x^{77} + x^{76} + x^{75} + x^{72} + x^{71} + x^{70} + x^{69} + x^{65}$$
$$+ x^{64} + x^{63} + x^{62} + x^{61} + x^{60} + x^{56} + x^{55} + x^{53} + x^{47} + x^{46} + x^{45}$$
$$+ x^{44} + x^{43} + x^{42} + x^{41} + x^{40} + x^{39} + x^{36} + x^{33} + x^{30} + x^{27} + x^{25}$$
$$+ x^{24} + x^{23} + x^{21} + x^{18} + x^{17} + x^{15} + x^{14} + x^{13} + x^{11} + x^{10} + x^{8}$$
$$+ x^{5} + x^{3} + 1,$$

$$\begin{aligned} p_9(x) = {} & x^{143} + x^{142} + x^{141} + x^{140} + x^{138} + x^{137} + x^{135} + x^{132} + x^{131} + x^{130} \\ & + x^{129} + x^{128} + x^{126} + x^{125} + x^{122} + x^{121} + x^{119} + x^{116} + x^{95} + x^{94} \\ & + x^{93} + x^{92} + x^{90} + x^{89} + x^{87} + x^{84} + x^{83} + x^{82} + x^{81} + x^{80} + x^{78} \\ & + x^{77} + x^{74} + x^{73} + x^{71} + x^{68} + x^{63} + x^{62} + x^{61} + x^{60} + x^{58} + x^{57} \\ & + x^{55} + x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{47} + x^{44} + x^{35} + x^{34} + x^{33} \\ & + x^{32} + x^{31} + x^{28} + x^{19} + x^{18} + x^{17} + x^{16} + x^{14} + x^{13} + x^{10} + x^{9} \\ & + x^{7} + x^{4}, \end{aligned}$$

$$\begin{aligned} p_{12}(x) = {} & x^{147} + x^{146} + x^{145} + x^{144} + x^{143} + x^{140} + x^{135} + x^{134} + x^{133} + x^{132} \\ & + x^{131} + x^{128} + x^{127} + x^{126} + x^{125} + x^{124} + x^{122} + x^{121} + x^{118} \\ & + x^{117} + x^{115} + x^{112} + x^{99} + x^{98} + x^{97} + x^{96} + x^{95} + x^{92} + x^{87} + x^{86} \\ & + x^{85} + x^{84} + x^{83} + x^{80} + x^{79} + x^{78} + x^{77} + x^{76} + x^{74} + x^{73} + x^{70} \\ & + x^{69} + x^{66} + x^{65} + x^{63} + x^{60} + x^{55} + x^{54} + x^{53} + x^{52} + x^{50} + x^{49} \\ & + x^{46} + x^{45} + x^{42} + x^{41} + x^{39} + x^{36} + x^{35} + x^{34} + x^{33} + x^{32} + x^{30} \\ & + x^{29} + x^{26} + x^{25} + x^{23} + x^{20} + x^{15} + x^{14} + x^{13} + x^{12} + x^{10} + x^{9} \\ & + x^{6} + x^{5} + x^{3} + 1, \end{aligned}$$

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

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

$$\begin{aligned} p_0(x) = {} & x^{144} + x^{141} + x^{139} + x^{131} + x^{129} + x^{127} + x^{124} + x^{123} + x^{121} + x^{120} \\ & + x^{117} + x^{116} + x^{114} + x^{113} + x^{111} + x^{110} + x^{106} + x^{105} + x^{103} \\ & + x^{100} + x^{99} + x^{98} + x^{96} + x^{93} + x^{92} + x^{91} + x^{89} + x^{85} + x^{84} + x^{83} \\ & + x^{82} + x^{81} + x^{80} + x^{79} + x^{77} + x^{75} + x^{73} + x^{71} + x^{70} + x^{69} + x^{68} \\ & + x^{66} + x^{64} + x^{63} + x^{58} + x^{56} + x^{55} + x^{53} + x^{51} + x^{49} + x^{46} + x^{44} \\ & + x^{43} + x^{40} + x^{38} + x^{34} + x^{33} + x^{30} + x^{29} + x^{27} + x^{26} + x^{25} + x^{22} \\ & + x^{21} + x^{18}, \end{aligned}$$

$$\begin{aligned} p_3(x) = {} & x^{135} + x^{133} + x^{132} + x^{130} + x^{129} + x^{127} + x^{126} + x^{124} + x^{123} + x^{122} \\ & + x^{121} + x^{120} + x^{119} + x^{116} + x^{114} + x^{113} + x^{112} + x^{109} + x^{103} \\ & + x^{102} + x^{100} + x^{99} + x^{98} + x^{97} + x^{87} + x^{85} + x^{84} + x^{82} + x^{81} + x^{79} \\ & + x^{78} + x^{76} + x^{75} + x^{74} + x^{73} + x^{72} + x^{69} + x^{64} + x^{62} + x^{59} + x^{56} \end{aligned}$$

$$
\begin{aligned}
&+ x^{55} + x^{52} + x^{50} + x^{49} + x^{47} + x^{45} + x^{44} + x^{42} + x^{41} + x^{40} + x^{38}\\
&+ x^{35} + x^{31} + x^{29} + x^{28} + x^{26} + x^{25} + x^{24} + x^{23} + x^{22} + x^{21} + x^{20}\\
&+ x^{19} + x^{18} + x^{17} + x^{15} + x^{14} + x^{12} + x^{11} + x^{10} + x^{9},\\
p_6(x) &= x^{138} + x^{132} + x^{130} + x^{126} + x^{124} + x^{122} + x^{120} + x^{116} + x^{112} + x^{110}\\
&+ x^{108} + x^{102} + x^{100} + x^{96} + x^{86} + x^{82} + x^{78} + x^{76} + x^{74} + x^{70} + x^{62}\\
&+ x^{60} + x^{58} + x^{54} + x^{48} + x^{40} + x^{26} + x^{16} + x^{8} + x^{6},\\
p_9(x) &= x^{141} + x^{139} + x^{138} + x^{137} + x^{136} + x^{135} + x^{134} + x^{133} + x^{132} + x^{131}\\
&+ x^{130} + x^{122} + x^{121} + x^{120} + x^{116} + x^{115} + x^{93} + x^{91} + x^{90} + x^{89}\\
&+ x^{88} + x^{87} + x^{86} + x^{85} + x^{84} + x^{83} + x^{82} + x^{74} + x^{73} + x^{72} + x^{68}\\
&+ x^{67} + x^{61} + x^{59} + x^{58} + x^{57} + x^{56} + x^{55} + x^{54} + x^{53} + x^{52} + x^{51}\\
&+ x^{50} + x^{45} + x^{43} + x^{39} + x^{38} + x^{37} + x^{34} + x^{29} + x^{27} + x^{23} + x^{22}\\
&+ x^{21} + x^{18} + x^{10} + x^{9} + x^{8} + x^{4} + x^{3},\\
p_{12}(x) &= x^{144} + x^{140} + x^{132} + x^{128} + x^{124} + x^{112} + x^{96} + x^{92} + x^{84} + x^{80}\\
&+ x^{76} + x^{60} + x^{52} + x^{36} + x^{32} + x^{20} + x^{12} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{164} + x^{161} + x^{160} + x^{159} + x^{158} + x^{157} + x^{156} + x^{155} + x^{151} + x^{150}\\
&+ x^{147} + x^{144} + x^{139} + x^{138} + x^{137} + x^{135} + x^{134} + x^{132} + x^{128}\\
&+ x^{127} + x^{125} + x^{122} + x^{121} + x^{120} + x^{119} + x^{118} + x^{114} + x^{112}\\
&+ x^{111} + x^{106} + x^{103} + x^{102} + x^{99} + x^{98} + x^{97} + x^{95} + x^{94} + x^{92}\\
&+ x^{91} + x^{89} + x^{86} + x^{85} + x^{83} + x^{82} + x^{81} + x^{78} + x^{77} + x^{76} + x^{74}\\
&+ x^{73} + x^{72} + x^{71} + x^{70} + x^{69} + x^{68} + x^{67} + x^{66} + x^{65} + x^{64} + x^{62}\\
&+ x^{61} + x^{59} + x^{55} + x^{54} + x^{53} + x^{51} + x^{49} + x^{47} + x^{46} + x^{43} + x^{42}\\
&+ x^{36} + x^{33} + x^{31} + x^{30} + x^{27},\\
p_3(x) &= x^{155} + x^{153} + x^{152} + x^{151} + x^{150} + x^{148} + x^{147} + x^{145} + x^{144} + x^{141}\\
&+ x^{139} + x^{138} + x^{136} + x^{135} + x^{129} + x^{128} + x^{122} + x^{119} + x^{117}\\
&+ x^{116} + x^{115} + x^{113} + x^{108} + x^{106} + x^{104} + x^{98} + x^{96} + x^{93} + x^{90}\\
&+ x^{89} + x^{86} + x^{84} + x^{81} + x^{80} + x^{79} + x^{78} + x^{77} + x^{76} + x^{73} + x^{68}\\
&+ x^{66} + x^{63} + x^{60} + x^{57} + x^{55} + x^{53} + x^{52} + x^{46} + x^{44} + x^{43} + x^{40}\\
&+ x^{39} + x^{37} + x^{36} + x^{35} + x^{34} + x^{33} + x^{31} + x^{29} + x^{26} + x^{23} + x^{22}\\
&+ x^{15} + x^{14} + x^{12} + x^{11} + x^{10} + x^{9},\\
p_6(x) &= x^{158} + x^{154} + x^{152} + x^{150} + x^{148} + x^{144} + x^{142} + x^{138} + x^{136} + x^{130}\\
&+ x^{124} + x^{118} + x^{114} + x^{108} + x^{106} + x^{104} + x^{102} + x^{100} + x^{92} + x^{90}\\
&+ x^{82} + x^{78} + x^{76} + x^{72} + x^{70} + x^{64} + x^{58} + x^{56} + x^{54} + x^{52} + x^{46}\\
&+ x^{42} + x^{40} + x^{36} + x^{32} + x^{30} + x^{28} + x^{26} + x^{24} + x^{20} + x^{18} + x^{14}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{8} + x^{6},\\
p_9(x) &= x^{161} + x^{159} + x^{158} + x^{156} + x^{149} + x^{148} + x^{147} + x^{146} + x^{145} + x^{143}\\
&+ x^{139} + x^{137} + x^{136} + x^{135} + x^{131} + x^{129} + x^{127} + x^{124} + x^{123}\\
&+ x^{122} + x^{121} + x^{120} + x^{116} + x^{115} + x^{113} + x^{111} + x^{110} + x^{108}\\
&+ x^{101} + x^{100} + x^{99} + x^{98} + x^{97} + x^{95} + x^{91} + x^{89} + x^{88} + x^{87} + x^{83}\\
&+ x^{78} + x^{75} + x^{74} + x^{73} + x^{72} + x^{69} + x^{66} + x^{62} + x^{60} + x^{59} + x^{57}\\
&+ x^{56} + x^{55} + x^{53} + x^{52} + x^{50} + x^{49} + x^{47} + x^{46} + x^{42} + x^{39} + x^{37}\\
&+ x^{35} + x^{34} + x^{28} + x^{26} + x^{23} + x^{20} + x^{17} + x^{15} + x^{12} + x^{11} + x^{10}\\
&+ x^{9} + x^{8} + x^{4} + x^{3},\\
p_{12}(x) &= x^{164} + x^{156} + x^{152} + x^{148} + x^{144} + x^{136} + x^{128} + x^{120} + x^{116} + x^{112}\\
&+ x^{108} + x^{104} + x^{100} + x^{96} + x^{88} + x^{84} + x^{80} + x^{76} + x^{60} + x^{44} + x^{40}\\
&+ x^{36} + x^{32} + x^{8} + 1,
\end{aligned}
$$

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

$$
\begin{aligned}
p_0(x) &= x^{147} + x^{146} + x^{143} + x^{142} + x^{140} + x^{139} + x^{137} + x^{135} + x^{134} + x^{133}\\
&+ x^{131} + x^{130} + x^{128} + x^{126} + x^{125} + x^{119} + x^{115} + x^{114} + x^{113}\\
&+ x^{112} + x^{111} + x^{109} + x^{108} + x^{107} + x^{106} + x^{105} + x^{104} + x^{103}\\
&+ x^{102} + x^{100} + x^{99} + x^{97} + x^{96} + x^{95} + x^{93} + x^{91} + x^{90} + x^{89} + x^{86}\\
&+ x^{81} + x^{80} + x^{78} + x^{73} + x^{69} + x^{67} + x^{62} + x^{61} + x^{59} + x^{58} + x^{57}\\
&+ x^{56} + x^{55} + x^{53} + x^{52} + x^{51} + x^{50} + x^{49} + x^{44} + x^{41} + x^{37} + x^{36}\\
&+ x^{35} + x^{33},\\
p_3(x) &= x^{143} + x^{142} + x^{136} + x^{135} + x^{133} + x^{132} + x^{131} + x^{130} + x^{129} + x^{124}\\
&+ x^{123} + x^{121} + x^{120} + x^{116} + x^{114} + x^{113} + x^{112} + x^{110} + x^{108}\\
&+ x^{106} + x^{105} + x^{104} + x^{103} + x^{102} + x^{100} + x^{97} + x^{95} + x^{92} + x^{90}\\
&+ x^{88} + x^{87} + x^{86} + x^{85} + x^{73} + x^{72} + x^{67} + x^{62} + x^{60} + x^{59} + x^{57}\\
&+ x^{55} + x^{53} + x^{50} + x^{48} + x^{46} + x^{43} + x^{40} + x^{37} + x^{35} + x^{32} + x^{26}\\
&+ x^{24} + x^{22} + x^{21} + x^{19} + x^{12},\\
p_6(x) &= x^{145} + x^{144} + x^{143} + x^{141} + x^{140} + x^{135} + x^{134} + x^{133} + x^{131} + x^{130}\\
&+ x^{129} + x^{128} + x^{127} + x^{125} + x^{124} + x^{121} + x^{120} + x^{119} + x^{117}\\
&+ x^{116} + x^{114} + x^{110} + x^{109} + x^{108} + x^{107} + x^{106} + x^{103} + x^{101}\\
&+ x^{99} + x^{95} + x^{94} + x^{90} + x^{85} + x^{84} + x^{83} + x^{80} + x^{77} + x^{75} + x^{70}\\
&+ x^{68} + x^{63} + x^{54} + x^{53} + x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{47} + x^{44}\\
&+ x^{43} + x^{40} + x^{39} + x^{38} + x^{37} + x^{36} + x^{35} + x^{33} + x^{32} + x^{30} + x^{29}\\
&+ x^{28} + x^{26} + x^{25} + x^{23} + x^{22} + x^{19} + x^{16} + x^{12} + x^{8} + x^{7} + x^{6} + x^{5}\\
&+ x^{4} + x^{3} + 1,
\end{aligned}
$$

$$
\begin{aligned}
p_9(x) = {} & x^{143} + x^{142} + x^{141} + x^{140} + x^{138} + x^{137} + x^{135} + x^{132} + x^{131} + x^{130} \\
& + x^{129} + x^{128} + x^{126} + x^{125} + x^{122} + x^{121} + x^{119} + x^{116} + x^{95} + x^{94} \\
& + x^{93} + x^{92} + x^{90} + x^{89} + x^{87} + x^{84} + x^{83} + x^{82} + x^{81} + x^{80} + x^{78} \\
& + x^{77} + x^{74} + x^{73} + x^{71} + x^{68} + x^{63} + x^{62} + x^{61} + x^{60} + x^{58} + x^{57} \\
& + x^{55} + x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{47} + x^{44} + x^{35} + x^{34} + x^{33} \\
& + x^{32} + x^{31} + x^{28} + x^{19} + x^{18} + x^{17} + x^{16} + x^{14} + x^{13} + x^{10} + x^{9} \\
& + x^{7} + x^{4}, \\
p_{12}(x) = {} & x^{147} + x^{146} + x^{145} + x^{144} + x^{143} + x^{140} + x^{135} + x^{134} + x^{133} + x^{132} \\
& + x^{131} + x^{128} + x^{127} + x^{126} + x^{125} + x^{124} + x^{122} + x^{121} + x^{118} \\
& + x^{117} + x^{115} + x^{112} + x^{99} + x^{98} + x^{97} + x^{96} + x^{95} + x^{92} + x^{87} + x^{86} \\
& + x^{85} + x^{84} + x^{83} + x^{80} + x^{79} + x^{78} + x^{77} + x^{76} + x^{74} + x^{73} + x^{70} \\
& + x^{69} + x^{66} + x^{65} + x^{63} + x^{60} + x^{55} + x^{54} + x^{53} + x^{52} + x^{50} + x^{49} \\
& + x^{46} + x^{45} + x^{42} + x^{41} + x^{39} + x^{36} + x^{35} + x^{34} + x^{33} + x^{32} + x^{30} \\
& + x^{29} + x^{26} + x^{25} + x^{23} + x^{20} + x^{15} + x^{14} + x^{13} + x^{12} + x^{10} + x^{9} \\
& + x^{6} + x^{5} + x^{3} + 1,
\end{aligned}
$$

and the initial terms are [0, 0, 0, 0, 0, 0, 0, 1, 0, 1, 1, 0, 0, 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]	727	[1031, 785]	1454	[260, 1853]	2181	[2701, 124]
1	[3, 4]	728	[854, 949]	1455	[2050, 1960]	2182	[664, 2702]
2	[5, 6]	729	[70, 1125]	1456	[847, 781]	2183	[2703, 2704]
3	[7, 8]	730	[95, 928]	1457	[2051, 1895]	2184	[2705, 2273]
4	[9, 10]	731	[303, 1126]	1458	[2052, 103]	2185	[2706, 2707]
5	[11, 12]	732	[871, 1127]	1459	[285, 2053]	2186	[422, 2708]
6	[13, 14]	733	[1128, 1129]	1460	[825, 1160]	2187	[2709, 2153]
7	[15, 16]	734	[1130, 876]	1461	[65, 954]	2188	[2710, 1964]
8	[17, 18]	735	[1131, 1132]	1462	[271, 1948]	2189	[964, 259]
9	[19, 20]	736	[391, 355]	1463	[2054, 270]	2190	[93, 2144]
10	[21, 22]	737	[867, 1133]	1464	[2055, 2006]	2191	[2181, 2112]
11	[23, 24]	738	[1134, 1135]	1465	[2042, 387]	2192	[2711, 2712]
12	[25, 26]	739	[1044, 784]	1466	[1975, 908]	2193	[2063, 2059]
13	[27, 18]	740	[1136, 1137]	1467	[793, 1989]	2194	[2713, 2714]
14	[28, 29]	741	[1138, 1139]	1468	[1149, 1998]	2195	[2036, 1077]
15	[30, 31]	742	[1091, 1140]	1469	[2056, 2057]	2196	[2064, 797]
16	[32, 33]	743	[112, 1141]	1470	[1068, 867]	2197	[2084, 1046]
17	[34, 35]	744	[1142, 238]	1471	[943, 1989]	2198	[1927, 409]
18	[36, 37]	745	[956, 861]	1472	[2026, 1067]	2199	[281, 88]
19	[38, 39]	746	[389, 26]	1473	[1115, 84]	2200	[859, 243]

20	[40, 41]	747	[405, 114]	1474	[260, 1041]	2201	[395, 293]
21	[42, 43]	748	[803, 320]	1475	[1049, 2058]	2202	[2039, 1033]
22	[44, 45]	749	[1143, 1045]	1476	[1920, 1112]	2203	[330, 1112]
23	[46, 47]	750	[1144, 1145]	1477	[1086, 2059]	2204	[401, 269]
24	[48, 49]	751	[1146, 1147]	1478	[2060, 420]	2205	[874, 415]
25	[50, 51]	752	[1148, 1017]	1479	[2061, 255]	2206	[942, 265]
26	[52, 53]	753	[1149, 1150]	1480	[331, 1851]	2207	[1925, 1095]
27	[54, 55]	754	[1151, 899]	1481	[302, 1969]	2208	[2715, 351]
28	[56, 57]	755	[1152, 1041]	1482	[1858, 1012]	2209	[1047, 1976]
29	[58, 59]	756	[397, 1000]	1483	[346, 1948]	2210	[262, 1062]
30	[60, 61]	757	[1050, 856]	1484	[950, 1859]	2211	[2716, 1916]
31	[62, 63]	758	[1153, 898]	1485	[1005, 920]	2212	[331, 782]
32	[64, 65]	759	[1154, 926]	1486	[946, 378]	2213	[63, 803]
33	[66, 67]	760	[1155, 366]	1487	[281, 394]	2214	[2042, 870]
34	[68, 69]	761	[1071, 1081]	1488	[1028, 235]	2215	[890, 1946]
35	[70, 71]	762	[1156, 1157]	1489	[2022, 868]	2216	[789, 1116]
36	[16, 72]	763	[1110, 1024]	1490	[1911, 294]	2217	[1156, 1141]
37	[73, 74]	764	[1001, 909]	1491	[2062, 1121]	2218	[823, 2095]
38	[75, 76]	765	[1158, 1159]	1492	[1007, 1111]	2219	[2088, 1051]
39	[77, 78]	766	[1160, 1016]	1493	[835, 1919]	2220	[1161, 1024]
40	[79, 80]	767	[1161, 853]	1494	[262, 1914]	2221	[1909, 1028]
41	[81, 82]	768	[879, 1162]	1495	[2063, 2000]	2222	[854, 92]
42	[83, 84]	769	[1031, 300]	1496	[2064, 2065]	2223	[1924, 960]
43	[85, 86]	770	[1163, 1164]	1497	[2066, 2067]	2224	[1980, 2034]
44	[87, 88]	771	[1165, 835]	1498	[973, 856]	2225	[2717, 2011]
45	[89, 90]	772	[947, 305]	1499	[2029, 323]	2226	[1060, 1947]
46	[91, 92]	773	[1166, 912]	1500	[854, 393]	2227	[1165, 1949]
47	[93, 94]	774	[904, 287]	1501	[852, 1854]	2228	[904, 376]
48	[95, 96]	775	[402, 1167]	1502	[1153, 70]	2229	[926, 378]
49	[97, 98]	776	[945, 68]	1503	[1971, 316]	2230	[1909, 1984]
50	[99, 100]	777	[1168, 1169]	1504	[2068, 2069]	2231	[1884, 910]
51	[101, 102]	778	[1170, 1171]	1505	[2070, 2071]	2232	[801, 1987]
52	[103, 23]	779	[1172, 184]	1506	[356, 1981]	2233	[376, 288]
53	[104, 105]	780	[1173, 738]	1507	[2072, 2073]	2234	[779, 351]
54	[106, 107]	781	[1174, 1175]	1508	[2039, 2066]	2235	[835, 2718]
55	[108, 109]	782	[1176, 1177]	1509	[811, 2000]	2236	[1049, 2169]
56	[110, 111]	783	[1178, 1179]	1510	[2074, 2075]	2237	[327, 2144]
57	[112, 113]	784	[1180, 1181]	1511	[2076, 332]	2238	[2127, 2186]
58	[114, 115]	785	[454, 1182]	1512	[279, 929]	2239	[2716, 2719]
59	[116, 117]	786	[1183, 1184]	1513	[2077, 2078]	2240	[343, 1133]
60	[118, 119]	787	[1185, 1186]	1514	[334, 1897]	2241	[2183, 1021]
61	[120, 121]	788	[1187, 1188]	1515	[2079, 2080]	2242	[2720, 1907]
62	[122, 123]	789	[1189, 1190]	1516	[1091, 1036]	2243	[1857, 240]
63	[124, 125]	790	[1191, 1192]	1517	[2081, 332]	2244	[798, 275]

64	[126, 127]	791	[1193, 1194]	1518	[61, 1895]	2245	[2721, 1971]
65	[128, 129]	792	[1195, 1196]	1519	[66, 810]	2246	[2177, 1160]
66	[130, 131]	793	[1197, 672]	1520	[826, 270]	2247	[2042, 1023]
67	[132, 133]	794	[1198, 1199]	1521	[322, 2082]	2248	[1852, 889]
68	[134, 135]	795	[1200, 1201]	1522	[1093, 409]	2249	[809, 67]
69	[136, 137]	796	[1202, 1203]	1523	[1073, 1854]	2250	[1022, 1962]
70	[138, 139]	797	[1204, 1205]	1524	[857, 1924]	2251	[391, 1856]
71	[140, 141]	798	[798, 798]	1525	[1963, 403]	2252	[995, 18]
72	[142, 143]	799	[1206, 1207]	1526	[1965, 366]	2253	[2722, 2002]
73	[144, 145]	800	[1208, 505]	1527	[344, 1015]	2254	[952, 407]
74	[146, 147]	801	[448, 1209]	1528	[406, 2083]	2255	[866, 343]
75	[148, 136]	802	[43, 1210]	1529	[2035, 851]	2256	[269, 2135]
76	[149, 150]	803	[440, 1211]	1530	[1050, 974]	2257	[2018, 953]
77	[151, 152]	804	[1209, 1212]	1531	[2084, 1140]	2258	[866, 2137]
78	[153, 154]	805	[1213, 1214]	1532	[2084, 1030]	2259	[802, 63]
79	[155, 156]	806	[1215, 496]	1533	[1949, 1933]	2260	[256, 333]
80	[157, 158]	807	[1216, 1217]	1534	[317, 2085]	2261	[822, 288]
81	[159, 160]	808	[1218, 1219]	1535	[1940, 247]	2262	[1137, 2045]
82	[161, 162]	809	[1220, 1221]	1536	[376, 2086]	2263	[2723, 1154]
83	[163, 164]	810	[1222, 1223]	1537	[93, 1102]	2264	[1906, 2714]
84	[165, 166]	811	[1224, 1225]	1538	[16, 1876]	2265	[1089, 1102]
85	[167, 168]	812	[1226, 1227]	1539	[2087, 1894]	2266	[361, 1016]
86	[169, 122]	813	[1228, 1229]	1540	[2088, 2089]	2267	[96, 280]
87	[170, 171]	814	[1230, 1231]	1541	[901, 1953]	2268	[410, 387]
88	[172, 173]	815	[1232, 1233]	1542	[822, 2090]	2269	[1905, 284]
89	[174, 175]	816	[1234, 1235]	1543	[273, 954]	2270	[2724, 2185]
90	[176, 177]	817	[1236, 1237]	1544	[360, 349]	2271	[408, 1063]
91	[178, 179]	818	[1238, 1239]	1545	[2091, 1097]	2272	[1890, 392]
92	[180, 181]	819	[1240, 1241]	1546	[1152, 261]	2273	[1885, 1869]
93	[182, 183]	820	[1242, 1243]	1547	[2039, 1926]	2274	[358, 98]
94	[184, 185]	821	[1244, 530]	1548	[920, 2092]	2275	[1971, 405]
95	[186, 187]	822	[1245, 1246]	1549	[354, 1864]	2276	[2725, 2066]
96	[188, 189]	823	[1247, 1248]	1550	[345, 2093]	2277	[337, 1903]
97	[190, 191]	824	[1249, 1250]	1551	[5, 2094]	2278	[981, 2141]
98	[192, 193]	825	[1251, 1252]	1552	[907, 2017]	2279	[1884, 410]
99	[194, 195]	826	[739, 1253]	1553	[75, 820]	2280	[913, 1043]
100	[196, 197]	827	[1254, 1255]	1554	[1056, 1981]	2281	[2726, 2186]
101	[198, 199]	828	[1256, 1257]	1555	[16, 2095]	2282	[1142, 856]
102	[200, 201]	829	[175, 1258]	1556	[2033, 2096]	2283	[1134, 391]
103	[202, 203]	830	[1259, 1260]	1557	[2097, 1071]	2284	[2178, 2054]
104	[204, 205]	831	[1261, 680]	1558	[848, 865]	2285	[1138, 2102]
105	[206, 207]	832	[1262, 1263]	1559	[342, 867]	2286	[877, 912]
106	[208, 209]	833	[1264, 1265]	1560	[1120, 94]	2287	[2174, 2727]
107	[210, 211]	834	[1266, 1267]	1561	[779, 1988]	2288	[1145, 2728]

108	[212, 213]	835	[1233, 1268]	1562	[1968, 374]	2289	[1114, 781]
109	[214, 215]	836	[1269, 1270]	1563	[825, 349]	2290	[1029, 1140]
110	[216, 217]	837	[1271, 1272]	1564	[2026, 2045]	2291	[900, 1118]
111	[218, 219]	838	[1273, 1274]	1565	[1047, 908]	2292	[1874, 965]
112	[220, 221]	839	[1275, 1276]	1566	[1009, 412]	2293	[1872, 100]
113	[222, 223]	840	[1277, 1256]	1567	[1931, 1127]	2294	[983, 1851]
114	[224, 225]	841	[1278, 1279]	1568	[2098, 994]	2295	[1977, 264]
115	[191, 226]	842	[1280, 1281]	1569	[1122, 876]	2296	[2101, 1139]
116	[227, 228]	843	[1282, 1283]	1570	[1999, 806]	2297	[1099, 332]
117	[229, 230]	844	[1284, 1285]	1571	[1967, 781]	2298	[256, 1879]
118	[231, 232]	845	[1286, 1287]	1572	[101, 1879]	2299	[900, 1969]
119	[233, 234]	846	[1288, 1289]	1573	[1118, 2027]	2300	[2182, 885]
120	[235, 236]	847	[1290, 1291]	1574	[1949, 808]	2301	[1852, 1041]
121	[237, 238]	848	[1292, 1293]	1575	[1950, 1077]	2302	[1142, 325]
122	[239, 240]	849	[1294, 1295]	1576	[2001, 82]	2303	[2105, 868]
123	[241, 242]	850	[1296, 663]	1577	[1898, 924]	2304	[1920, 897]
124	[85, 243]	851	[1297, 1298]	1578	[1001, 784]	2305	[1993, 391]
125	[244, 245]	852	[1299, 182]	1579	[1970, 1003]	2306	[2153, 267]
126	[246, 247]	853	[1300, 1301]	1580	[921, 1043]	2307	[926, 24]
127	[248, 249]	854	[1302, 1303]	1581	[998, 967]	2308	[1085, 2066]
128	[250, 251]	855	[1304, 1305]	1582	[909, 2099]	2309	[862, 255]
129	[252, 253]	856	[1306, 1307]	1583	[1852, 261]	2310	[61, 113]
130	[254, 255]	857	[1308, 1309]	1584	[975, 89]	2311	[1017, 2146]
131	[256, 102]	858	[434, 1310]	1585	[386, 1023]	2312	[1995, 2080]
132	[257, 23]	859	[424, 1178]	1586	[2100, 267]	2313	[1082, 102]
133	[258, 259]	860	[1311, 1312]	1587	[1155, 78]	2314	[980, 1880]
134	[260, 261]	861	[1313, 1314]	1588	[1912, 370]	2315	[1158, 88]
135	[262, 263]	862	[1315, 1316]	1589	[2101, 2102]	2316	[2035, 790]
136	[264, 265]	863	[1317, 674]	1590	[834, 1949]	2317	[896, 927]
137	[266, 267]	864	[1318, 1319]	1591	[2103, 414]	2318	[934, 820]
138	[268, 26]	865	[1320, 1321]	1592	[389, 1144]	2319	[2729, 1863]
139	[269, 270]	866	[1322, 1323]	1593	[832, 2104]	2320	[807, 2718]
140	[271, 272]	867	[1324, 1325]	1594	[2105, 785]	2321	[310, 2085]
141	[273, 274]	868	[1326, 1327]	1595	[2063, 2106]	2322	[2730, 1961]
142	[275, 276]	869	[552, 1328]	1596	[2107, 2049]	2323	[263, 1963]
143	[277, 278]	870	[1329, 1330]	1597	[1940, 1153]	2324	[68, 288]
144	[279, 280]	871	[1331, 1332]	1598	[2108, 2109]	2325	[1039, 1097]
145	[281, 282]	872	[1333, 1334]	1599	[878, 2082]	2326	[2052, 1154]
146	[283, 284]	873	[1335, 765]	1600	[2110, 1000]	2327	[2731, 2121]
147	[285, 286]	874	[1336, 1337]	1601	[99, 1071]	2328	[1056, 357]
148	[287, 288]	875	[1338, 1339]	1602	[277, 2111]	2329	[1931, 872]
149	[289, 103]	876	[1340, 1341]	1603	[925, 23]	2330	[821, 287]
150	[290, 291]	877	[1342, 746]	1604	[1145, 1010]	2331	[1875, 2095]
151	[292, 293]	878	[1343, 1344]	1605	[1920, 315]	2332	[1956, 2022]

152	[262, 294]	879	[1345, 1346]	1606	[950, 234]	2333	[784, 2166]
153	[295, 296]	880	[1347, 1348]	1607	[372, 2112]	2334	[2113, 910]
154	[297, 298]	881	[1211, 1349]	1608	[2113, 386]	2335	[2725, 1926]
155	[299, 300]	882	[1179, 1213]	1609	[2114, 880]	2336	[859, 2162]
156	[301, 92]	883	[1169, 1350]	1610	[1887, 332]	2337	[2115, 1030]
157	[302, 303]	884	[1351, 1352]	1611	[2115, 1140]	2338	[1997, 2732]
158	[304, 305]	885	[1353, 1354]	1612	[1154, 23]	2339	[2716, 969]
159	[306, 307]	886	[1355, 1356]	1613	[2116, 833]	2340	[2725, 1033]
160	[308, 309]	887	[1357, 1358]	1614	[2055, 1944]	2341	[781, 984]
161	[310, 115]	888	[1359, 1340]	1615	[1058, 371]	2342	[2091, 1917]
162	[311, 312]	889	[1360, 1361]	1616	[1120, 1102]	2343	[1115, 1994]
163	[235, 313]	890	[1362, 2]	1617	[1962, 2083]	2344	[410, 870]
164	[314, 315]	891	[1363, 1364]	1618	[791, 293]	2345	[2115, 1036]
165	[316, 317]	892	[1365, 1366]	1619	[17, 977]	2346	[255, 2733]
166	[318, 319]	893	[1367, 1368]	1620	[297, 2117]	2347	[2124, 1150]
167	[62, 241]	894	[1369, 1370]	1621	[2038, 1048]	2348	[2180, 299]
168	[244, 320]	895	[1371, 1372]	1622	[397, 2118]	2349	[1042, 922]
169	[321, 241]	896	[1373, 1374]	1623	[2119, 418]	2350	[327, 94]
170	[322, 323]	897	[1375, 1376]	1624	[2120, 2121]	2351	[874, 2157]
171	[324, 272]	898	[1377, 1378]	1625	[839, 1052]	2352	[2077, 933]
172	[237, 325]	899	[1379, 655]	1626	[2122, 2016]	2353	[2019, 1932]
173	[326, 327]	900	[1380, 1381]	1627	[1896, 2123]	2354	[340, 912]
174	[328, 329]	901	[1382, 1383]	1628	[1980, 1057]	2355	[2103, 874]
175	[330, 315]	902	[1384, 1385]	1629	[2124, 1998]	2356	[250, 1024]
176	[331, 309]	903	[1386, 1387]	1630	[1131, 2125]	2357	[379, 1989]
177	[332, 333]	904	[1388, 1389]	1631	[2126, 781]	2358	[2062, 1066]
178	[334, 335]	905	[1390, 1391]	1632	[983, 309]	2359	[268, 1144]
179	[336, 337]	906	[1392, 1393]	1633	[2116, 2104]	2360	[802, 1979]
180	[338, 339]	907	[1394, 31]	1634	[806, 826]	2361	[1100, 278]
181	[340, 341]	908	[1395, 1396]	1635	[2127, 966]	2362	[1130, 2133]
182	[342, 343]	909	[1397, 1398]	1636	[2128, 1990]	2363	[2734, 2735]
183	[344, 345]	910	[1399, 1400]	1637	[803, 805]	2364	[1859, 2093]
184	[346, 272]	911	[1401, 507]	1638	[381, 2129]	2365	[2736, 2737]
185	[347, 88]	912	[1402, 573]	1639	[2130, 1992]	2366	[1874, 2738]
186	[348, 349]	913	[1403, 1404]	1640	[311, 1147]	2367	[1937, 1955]
187	[350, 351]	914	[1405, 1406]	1641	[993, 2131]	2368	[2088, 1961]
188	[322, 352]	915	[1407, 1408]	1642	[1898, 1084]	2369	[2018, 998]
189	[25, 89]	916	[1409, 1410]	1643	[25, 390]	2370	[100, 1081]
190	[353, 92]	917	[1411, 1412]	1644	[1977, 942]	2371	[1091, 1046]
191	[354, 355]	918	[1413, 1414]	1645	[2132, 895]	2372	[2739, 2011]
192	[356, 357]	919	[1415, 1416]	1646	[1891, 2133]	2373	[377, 24]
193	[358, 359]	920	[1417, 1251]	1647	[2134, 74]	2374	[2715, 1988]
194	[360, 361]	921	[1418, 1419]	1648	[1124, 2071]	2375	[1065, 2740]
195	[362, 363]	922	[1420, 1421]	1649	[1885, 1863]	2376	[2741, 1947]

196	[364, 365]	923	[1422, 1423]	1650	[1963, 1167]	2377	[868, 2158]
197	[77, 366]	924	[1424, 433]	1651	[1980, 357]	2378	[328, 1949]
198	[367, 236]	925	[1425, 48]	1652	[279, 1903]	2379	[913, 922]
199	[368, 369]	926	[1426, 1427]	1653	[416, 1019]	2380	[1890, 355]
200	[370, 371]	927	[1428, 1429]	1654	[951, 1095]	2381	[362, 1880]
201	[372, 373]	928	[1430, 1431]	1655	[1066, 2045]	2382	[2173, 1121]
202	[302, 374]	929	[187, 1432]	1656	[322, 955]	2383	[999, 2118]
203	[375, 376]	930	[1260, 1433]	1657	[1001, 67]	2384	[1143, 265]
204	[377, 378]	931	[1434, 1435]	1658	[943, 380]	2385	[1095, 407]
205	[379, 380]	932	[1436, 1437]	1659	[826, 2135]	2386	[1124, 2089]
206	[381, 296]	933	[1438, 1439]	1660	[2032, 1983]	2387	[95, 279]
207	[382, 383]	934	[1440, 1441]	1661	[2136, 2057]	2388	[1946, 918]
208	[384, 352]	935	[1442, 1443]	1662	[1068, 2137]	2389	[2098, 948]
209	[385, 263]	936	[1444, 1445]	1663	[910, 870]	2390	[2742, 843]
210	[386, 387]	937	[1446, 744]	1664	[839, 2129]	2391	[17, 817]
211	[388, 373]	938	[1447, 1448]	1665	[2138, 286]	2392	[2743, 2714]
212	[389, 390]	939	[1449, 1450]	1666	[1165, 807]	2393	[1037, 2744]
213	[391, 392]	940	[1451, 1452]	1667	[104, 369]	2394	[109, 2745]
214	[91, 393]	941	[1453, 1311]	1668	[1954, 1983]	2395	[2746, 2022]
215	[347, 394]	942	[1454, 1455]	1669	[2139, 2125]	2396	[2055, 2009]
216	[395, 396]	943	[1456, 1457]	1670	[2012, 2140]	2397	[1026, 891]
217	[397, 398]	944	[1458, 1459]	1671	[1096, 2141]	2398	[2038, 908]
218	[345, 399]	945	[1460, 1461]	1672	[284, 851]	2399	[1921, 1028]
219	[400, 401]	946	[1462, 1463]	1673	[2108, 105]	2400	[1959, 65]
220	[402, 403]	947	[1464, 1465]	1674	[1152, 1853]	2401	[2023, 957]
221	[404, 6]	948	[1466, 1467]	1675	[1934, 880]	2402	[1857, 62]
222	[405, 317]	949	[1468, 1469]	1676	[852, 2104]	2403	[1069, 1986]
223	[406, 407]	950	[1470, 736]	1677	[1051, 950]	2404	[850, 790]
224	[408, 409]	951	[1471, 1472]	1678	[2061, 863]	2405	[869, 2747]
225	[410, 411]	952	[1473, 1206]	1679	[1080, 1070]	2406	[2748, 74]
226	[412, 413]	953	[1474, 1475]	1680	[2142, 1964]	2407	[1944, 1866]
227	[414, 415]	954	[1476, 628]	1681	[237, 974]	2408	[314, 897]
228	[416, 351]	955	[1477, 1478]	1682	[1890, 1856]	2409	[2749, 858]
229	[417, 418]	956	[1479, 1480]	1683	[2143, 319]	2410	[1117, 1969]
230	[419, 420]	957	[1481, 1482]	1684	[367, 313]	2411	[869, 2750]
231	[421, 422]	958	[1483, 1484]	1685	[404, 1012]	2412	[2751, 963]
232	[423, 424]	959	[1485, 1486]	1686	[1120, 2144]	2413	[1166, 1912]
233	[425, 426]	960	[641, 1487]	1687	[1947, 2145]	2414	[947, 994]
234	[427, 428]	961	[1194, 1488]	1688	[23, 378]	2415	[367, 1942]
235	[429, 430]	962	[1489, 1490]	1689	[921, 914]	2416	[993, 305]
236	[431, 432]	963	[1491, 1492]	1690	[930, 2135]	2417	[2041, 410]
237	[433, 434]	964	[1493, 1494]	1691	[2020, 928]	2418	[2132, 2058]
238	[435, 436]	965	[1495, 1496]	1692	[1006, 2146]	2419	[2164, 2154]
239	[437, 438]	966	[225, 1497]	1693	[2054, 931]	2420	[1083, 959]

240	[439, 440]	967	[1498, 1342]	1694	[1937, 2147]	2421	[2110, 398]
241	[441, 442]	968	[1499, 1500]	1695	[2030, 312]	2422	[1015, 399]
242	[443, 444]	969	[1501, 1502]	1696	[2148, 307]	2423	[1161, 1061]
243	[445, 446]	970	[1503, 1504]	1697	[2149, 2150]	2424	[1085, 2040]
244	[447, 448]	971	[1505, 1506]	1698	[1146, 2151]	2425	[275, 800]
245	[449, 450]	972	[1507, 1424]	1699	[90, 829]	2426	[101, 333]
246	[451, 138]	973	[1258, 1508]	1700	[2152, 965]	2427	[299, 868]
247	[452, 140]	974	[1509, 1510]	1701	[950, 1015]	2428	[1982, 1938]
248	[453, 454]	975	[1511, 176]	1702	[2153, 2154]	2429	[871, 1932]
249	[455, 456]	976	[1512, 119]	1703	[2142, 403]	2430	[2128, 1929]
250	[457, 458]	977	[1513, 1514]	1704	[314, 927]	2431	[937, 865]
251	[459, 460]	978	[1515, 1516]	1705	[300, 869]	2432	[363, 2150]
252	[461, 462]	979	[1517, 1518]	1706	[336, 928]	2433	[2752, 2735]
253	[463, 464]	980	[1519, 1520]	1707	[2155, 2156]	2434	[1108, 255]
254	[465, 466]	981	[1521, 1522]	1708	[2126, 308]	2435	[400, 806]
255	[467, 468]	982	[1523, 1524]	1709	[1069, 1081]	2436	[1152, 889]
256	[469, 470]	983	[1525, 1526]	1710	[2005, 2157]	2437	[1921, 1910]
257	[471, 472]	984	[1527, 1528]	1711	[898, 71]	2438	[1071, 1986]
258	[473, 474]	985	[1529, 1530]	1712	[306, 936]	2439	[320, 85]
259	[475, 476]	986	[1531, 1532]	1713	[2158, 1104]	2440	[2076, 1082]
260	[477, 478]	987	[1533, 559]	1714	[819, 2159]	2441	[858, 960]
261	[479, 480]	988	[1534, 1535]	1715	[268, 390]	2442	[1148, 920]
262	[481, 482]	989	[1536, 1537]	1716	[868, 786]	2443	[2753, 1075]
263	[483, 484]	990	[1538, 1539]	1717	[252, 1043]	2444	[65, 274]
264	[485, 486]	991	[1540, 1541]	1718	[968, 1916]	2445	[1161, 251]
265	[487, 488]	992	[1542, 1543]	1719	[1946, 831]	2446	[2110, 2118]
266	[430, 489]	993	[1544, 1545]	1720	[830, 105]	2447	[345, 2165]
267	[490, 491]	994	[1546, 1547]	1721	[789, 788]	2448	[2070, 1961]
268	[492, 493]	995	[1548, 1549]	1722	[937, 2160]	2449	[2730, 2071]
269	[494, 495]	996	[1550, 38]	1723	[2161, 2123]	2450	[375, 822]
270	[496, 497]	997	[1283, 1551]	1724	[906, 874]	2451	[2142, 2754]
271	[498, 499]	998	[1552, 685]	1725	[979, 2137]	2452	[336, 96]
272	[500, 501]	999	[1553, 1554]	1726	[2013, 1916]	2453	[1086, 2106]
273	[502, 503]	1000	[1555, 1556]	1727	[331, 984]	2454	[2755, 846]
274	[127, 504]	1001	[1557, 1558]	1728	[2162, 804]	2455	[920, 2732]
275	[505, 506]	1002	[1559, 1560]	1729	[893, 853]	2456	[2025, 2006]
276	[507, 508]	1003	[1400, 1561]	1730	[2163, 1139]	2457	[65, 2756]
277	[509, 510]	1004	[1562, 1218]	1731	[248, 78]	2458	[912, 1058]
278	[511, 512]	1005	[1563, 1564]	1732	[1961, 950]	2459	[1959, 998]
279	[513, 514]	1006	[1565, 1566]	1733	[360, 1160]	2460	[2024, 2058]
280	[515, 516]	1007	[1567, 1568]	1734	[1915, 2028]	2461	[1035, 1071]
281	[517, 518]	1008	[1569, 1570]	1735	[2012, 886]	2462	[1115, 788]
282	[519, 520]	1009	[1571, 1572]	1736	[1970, 1945]	2463	[334, 2123]
283	[521, 190]	1010	[721, 1573]	1737	[1855, 365]	2464	[1862, 2727]

284	[522, 523]	1011	[1574, 635]	1738	[354, 1856]	2465	[268, 89]
285	[524, 525]	1012	[1575, 1576]	1739	[2164, 267]	2466	[953, 274]
286	[526, 527]	1013	[1577, 1578]	1740	[408, 1111]	2467	[1110, 853]
287	[528, 529]	1014	[12, 1579]	1741	[942, 1045]	2468	[303, 2027]
288	[530, 531]	1015	[1580, 1581]	1742	[1015, 2165]	2469	[330, 897]
289	[532, 533]	1016	[643, 1582]	1743	[810, 2166]	2470	[2079, 1996]
290	[534, 535]	1017	[1583, 1584]	1744	[874, 1972]	2471	[85, 1987]
291	[536, 537]	1018	[1585, 1586]	1745	[410, 1023]	2472	[1006, 1018]
292	[538, 539]	1019	[1587, 1384]	1746	[2167, 103]	2473	[1137, 1904]
293	[537, 540]	1020	[1588, 1589]	1747	[1973, 846]	2474	[2741, 2140]
294	[541, 542]	1021	[1590, 1591]	1748	[946, 2168]	2475	[1066, 1904]
295	[543, 544]	1022	[1592, 749]	1749	[894, 2169]	2476	[941, 1026]
296	[545, 546]	1023	[1593, 1594]	1750	[2008, 1865]	2477	[2003, 1989]
297	[547, 548]	1024	[1595, 1596]	1751	[1089, 2144]	2478	[903, 269]
298	[549, 550]	1025	[1597, 1598]	1752	[402, 1964]	2479	[888, 261]
299	[551, 552]	1026	[1599, 1600]	1753	[368, 105]	2480	[342, 2137]
300	[553, 554]	1027	[1601, 1602]	1754	[2148, 1978]	2481	[850, 358]
301	[555, 556]	1028	[1603, 579]	1755	[804, 321]	2482	[337, 1889]
302	[557, 558]	1029	[1604, 1605]	1756	[338, 2095]	2483	[858, 2149]
303	[559, 560]	1030	[1606, 1607]	1757	[915, 1153]	2484	[2711, 2757]
304	[561, 562]	1031	[1608, 1609]	1758	[2170, 795]	2485	[2758, 2712]
305	[563, 564]	1032	[1610, 1611]	1759	[28, 1079]	2486	[2162, 1857]
306	[565, 566]	1033	[1612, 1613]	1760	[2004, 942]	2487	[254, 863]
307	[567, 568]	1034	[1406, 757]	1761	[1925, 406]	2488	[1100, 2111]
308	[569, 570]	1035	[1614, 1615]	1762	[2072, 829]	2489	[834, 329]
309	[571, 572]	1036	[1616, 1617]	1763	[832, 1119]	2490	[1037, 885]
310	[573, 574]	1037	[1618, 1559]	1764	[344, 234]	2491	[1858, 2094]
311	[575, 576]	1038	[1619, 1620]	1765	[886, 2145]	2492	[384, 323]
312	[577, 578]	1039	[1621, 1622]	1766	[1117, 303]	2493	[2163, 1960]
313	[579, 11]	1040	[1623, 1624]	1767	[2171, 1006]	2494	[2081, 1082]
314	[580, 581]	1041	[1625, 1626]	1768	[271, 1868]	2495	[864, 849]
315	[582, 583]	1042	[1627, 1628]	1769	[300, 786]	2496	[1862, 1886]
316	[584, 585]	1043	[1629, 1630]	1770	[2170, 296]	2497	[2717, 2156]
317	[129, 586]	1044	[1631, 1632]	1771	[2172, 1958]	2498	[1965, 249]
318	[587, 169]	1045	[1633, 1634]	1772	[2003, 794]	2499	[2749, 1924]
319	[215, 588]	1046	[1225, 1635]	1773	[1135, 355]	2500	[2096, 1890]
320	[589, 590]	1047	[1636, 1637]	1774	[1975, 1048]	2501	[2132, 2759]
321	[591, 443]	1048	[1638, 1639]	1775	[2173, 2026]	2502	[850, 97]
322	[592, 593]	1049	[1640, 1641]	1776	[2007, 1028]	2503	[2171, 920]
323	[594, 595]	1050	[1642, 1643]	1777	[859, 1987]	2504	[2730, 2089]
324	[596, 597]	1051	[1644, 1645]	1778	[1109, 84]	2505	[304, 2131]
325	[598, 599]	1052	[1646, 1647]	1779	[981, 1917]	2506	[235, 905]
326	[600, 601]	1053	[1648, 1649]	1780	[2174, 1886]	2507	[2030, 944]
327	[602, 603]	1054	[1650, 1651]	1781	[2175, 2047]	2508	[906, 106]

328	[604, 605]	1055	[1652, 1653]	1782	[2176, 291]	2509	[1867, 831]
329	[606, 607]	1056	[1654, 1655]	1783	[2177, 349]	2510	[2152, 259]
330	[608, 609]	1057	[1656, 1657]	1784	[1026, 265]	2511	[806, 2054]
331	[610, 611]	1058	[1658, 1659]	1785	[260, 889]	2512	[1855, 2760]
332	[612, 613]	1059	[1660, 1661]	1786	[1009, 957]	2513	[2729, 1869]
333	[614, 615]	1060	[1662, 1663]	1787	[1034, 2042]	2514	[1002, 1125]
334	[616, 617]	1061	[1664, 1665]	1788	[1044, 67]	2515	[2003, 890]
335	[618, 619]	1062	[1666, 1667]	1789	[2178, 826]	2516	[1027, 778]
336	[620, 621]	1063	[1668, 1669]	1790	[2023, 985]	2517	[2113, 410]
337	[622, 623]	1064	[1670, 1671]	1791	[2179, 1137]	2518	[2068, 1000]
338	[624, 625]	1065	[1672, 1673]	1792	[301, 855]	2519	[1875, 339]
339	[626, 627]	1066	[1674, 1675]	1793	[863, 278]	2520	[2139, 1132]
340	[628, 629]	1067	[1676, 1677]	1794	[2179, 1121]	2521	[932, 2078]
341	[630, 224]	1068	[1678, 1679]	1795	[362, 960]	2522	[1861, 312]
342	[631, 632]	1069	[1680, 1681]	1796	[1166, 341]	2523	[1999, 2178]
343	[633, 634]	1070	[1682, 1683]	1797	[104, 2109]	2524	[1064, 279]
344	[635, 636]	1071	[1684, 1685]	1798	[384, 2082]	2525	[1908, 886]
345	[486, 637]	1072	[1686, 1687]	1799	[894, 2058]	2526	[822, 2086]
346	[638, 639]	1073	[1688, 602]	1800	[1896, 335]	2527	[300, 109]
347	[640, 641]	1074	[1689, 1690]	1801	[1148, 1997]	2528	[987, 111]
348	[642, 643]	1075	[1691, 151]	1802	[1130, 1123]	2529	[781, 1851]
349	[644, 439]	1076	[1692, 1693]	1803	[2180, 2022]	2530	[371, 1930]
350	[645, 646]	1077	[1694, 1695]	1804	[1058, 317]	2531	[2761, 2762]
351	[647, 648]	1078	[1696, 742]	1805	[2181, 373]	2532	[302, 1118]
352	[649, 650]	1079	[1697, 1698]	1806	[956, 985]	2533	[2108, 369]
353	[651, 652]	1080	[1699, 1700]	1807	[907, 1048]	2534	[992, 2123]
354	[653, 654]	1081	[1701, 1702]	1808	[1927, 1111]	2535	[945, 287]
355	[655, 656]	1082	[1703, 1704]	1809	[1873, 790]	2536	[1937, 1983]
356	[657, 658]	1083	[156, 1705]	1810	[2182, 1038]	2537	[824, 401]
357	[659, 660]	1084	[1706, 1707]	1811	[376, 2090]	2538	[899, 391]
358	[661, 662]	1085	[1708, 1709]	1812	[347, 1159]	2539	[2173, 1137]
359	[663, 664]	1086	[1710, 1711]	1813	[2183, 2184]	2540	[1163, 1162]
360	[665, 666]	1087	[1712, 761]	1814	[2048, 2185]	2541	[2084, 1036]
361	[667, 668]	1088	[1713, 1714]	1815	[2008, 2006]	2542	[842, 2763]
362	[669, 670]	1089	[1715, 1716]	1816	[1158, 282]	2543	[255, 1101]
363	[671, 490]	1090	[1717, 1718]	1817	[2004, 1143]	2544	[960, 1881]
364	[672, 673]	1091	[1719, 1720]	1818	[801, 2162]	2545	[2764, 1894]
365	[674, 675]	1092	[1721, 1722]	1819	[2096, 391]	2546	[348, 21]
366	[676, 677]	1093	[1723, 1724]	1820	[1913, 294]	2547	[997, 953]
367	[678, 679]	1094	[1725, 1726]	1821	[935, 2014]	2548	[1032, 1926]
368	[680, 681]	1095	[1727, 1728]	1822	[320, 881]	2549	[783, 62]
369	[682, 683]	1096	[1729, 1730]	1823	[1025, 264]	2550	[377, 2044]
370	[474, 684]	1097	[1731, 1732]	1824	[2114, 1162]	2551	[363, 2765]
371	[685, 422]	1098	[1733, 1734]	1825	[1154, 377]	2552	[2766, 2022]

372	[686, 687]	1099	[1735, 1736]	1826	[1083, 924]	2553	[2025, 1865]
373	[688, 689]	1100	[1737, 1261]	1827	[1909, 778]	2554	[785, 2158]
374	[690, 691]	1101	[1738, 1739]	1828	[2072, 1010]	2555	[17, 844]
375	[692, 693]	1102	[1740, 1741]	1829	[77, 1888]	2556	[2767, 2049]
376	[694, 695]	1103	[1742, 126]	1830	[232, 2186]	2557	[67, 2166]
377	[533, 696]	1104	[1182, 1743]	1831	[2038, 2017]	2558	[1941, 236]
378	[697, 204]	1105	[1744, 1745]	1832	[1934, 1162]	2559	[26, 1145]
379	[698, 699]	1106	[1746, 1747]	1833	[2116, 1854]	2560	[2768, 2769]
380	[700, 701]	1107	[1748, 1749]	1834	[341, 1058]	2561	[96, 1903]
381	[702, 703]	1108	[1750, 1751]	1835	[1080, 1072]	2562	[942, 891]
382	[704, 705]	1109	[1752, 1753]	1836	[1979, 803]	2563	[1027, 1984]
383	[706, 707]	1110	[1754, 1755]	1837	[110, 988]	2564	[1034, 386]
384	[708, 709]	1111	[1756, 1757]	1838	[242, 805]	2565	[2009, 1966]
385	[710, 711]	1112	[1758, 1759]	1839	[1891, 876]	2566	[888, 1853]
386	[712, 713]	1113	[1760, 1740]	1840	[2056, 963]	2567	[2006, 1966]
387	[714, 715]	1114	[1761, 1527]	1841	[934, 1040]	2568	[370, 114]
388	[716, 717]	1115	[1762, 1763]	1842	[2020, 279]	2569	[1910, 235]
389	[718, 719]	1116	[1764, 1765]	1843	[932, 1150]	2570	[2063, 812]
390	[720, 721]	1117	[1766, 1767]	1844	[257, 377]	2571	[2037, 2117]
391	[581, 722]	1118	[1768, 1769]	1845	[2103, 2005]	2572	[61, 1157]
392	[723, 724]	1119	[1770, 1771]	1846	[2096, 1135]	2573	[997, 273]
393	[725, 726]	1120	[1772, 1773]	1847	[2043, 861]	2574	[1163, 880]
394	[39, 727]	1121	[1774, 1434]	1848	[851, 359]	2575	[951, 406]
395	[728, 729]	1122	[1775, 1776]	1849	[2187, 1276]	2576	[269, 827]
396	[730, 731]	1123	[1777, 1778]	1850	[2188, 2189]	2577	[1060, 2140]
397	[732, 733]	1124	[1594, 425]	1851	[2190, 2191]	2578	[2715, 1019]
398	[734, 735]	1125	[713, 1779]	1852	[2192, 1777]	2579	[819, 1040]
399	[736, 737]	1126	[1780, 1299]	1853	[2193, 2194]	2580	[2098, 2131]
400	[738, 739]	1127	[1781, 1782]	1854	[2195, 2196]	2581	[16, 339]
401	[740, 741]	1128	[1783, 1784]	1855	[705, 2197]	2582	[2136, 963]
402	[742, 743]	1129	[1785, 1786]	1856	[2198, 2199]	2583	[1022, 1095]
403	[744, 580]	1130	[1787, 1788]	1857	[2200, 441]	2584	[976, 18]
404	[540, 745]	1131	[1789, 1790]	1858	[2201, 2202]	2585	[840, 2075]
405	[746, 747]	1132	[1791, 1792]	1859	[1808, 688]	2586	[2062, 1137]
406	[673, 748]	1133	[1679, 1793]	1860	[2203, 2204]	2587	[1875, 72]
407	[749, 750]	1134	[1794, 723]	1861	[2205, 2206]	2588	[2770, 2735]
408	[751, 752]	1135	[1374, 1795]	1862	[2207, 2208]	2589	[2021, 916]
409	[753, 754]	1136	[1796, 1797]	1863	[2209, 2210]	2590	[1885, 2727]
410	[755, 756]	1137	[1798, 1799]	1864	[1500, 2211]	2591	[292, 792]
411	[757, 758]	1138	[1800, 1801]	1865	[2212, 2213]	2592	[1009, 861]
412	[759, 760]	1139	[1802, 1803]	1866	[2214, 2215]	2593	[796, 2065]
413	[761, 762]	1140	[1804, 10]	1867	[2216, 2217]	2594	[1861, 1147]
414	[763, 764]	1141	[1549, 1805]	1868	[2218, 2219]	2595	[336, 279]
415	[765, 766]	1142	[1486, 1806]	1869	[2220, 2221]	2596	[233, 1015]

416	[767, 768]	1143	[1807, 1808]	1870	[2222, 2223]	2597	[318, 2769]
417	[769, 770]	1144	[1809, 1810]	1871	[2224, 2225]	2598	[1984, 235]
418	[771, 772]	1145	[719, 667]	1872	[2226, 1686]	2599	[258, 2738]
419	[773, 774]	1146	[1811, 1812]	1873	[2227, 2228]	2600	[2161, 335]
420	[775, 776]	1147	[1813, 1814]	1874	[2229, 2230]	2601	[2031, 1129]
421	[777, 778]	1148	[1815, 1816]	1875	[2231, 1662]	2602	[2710, 403]
422	[779, 780]	1149	[1817, 1592]	1876	[2232, 1355]	2603	[884, 1038]
423	[781, 782]	1150	[1818, 1727]	1877	[2233, 2234]	2604	[923, 1084]
424	[783, 240]	1151	[1819, 1820]	1878	[2235, 2236]	2605	[385, 294]
425	[66, 784]	1152	[1821, 1822]	1879	[2237, 2238]	2606	[786, 2747]
426	[785, 786]	1153	[1823, 1824]	1880	[171, 2239]	2607	[992, 2771]
427	[787, 272]	1154	[1825, 697]	1881	[670, 2240]	2608	[2077, 1150]
428	[386, 411]	1155	[1826, 1827]	1882	[2241, 2242]	2609	[2021, 247]
429	[83, 788]	1156	[1828, 1829]	1883	[2243, 2244]	2610	[903, 930]
430	[789, 84]	1157	[119, 1830]	1884	[2245, 1329]	2611	[2021, 1902]
431	[248, 366]	1158	[1831, 1832]	1885	[2246, 2247]	2612	[95, 337]
432	[790, 359]	1159	[1833, 1834]	1886	[2248, 2249]	2613	[90, 2728]
433	[791, 792]	1160	[1835, 1836]	1887	[2250, 2251]	2614	[1128, 837]
434	[793, 794]	1161	[1837, 1838]	1888	[2252, 2253]	2615	[2721, 912]
435	[295, 795]	1162	[1839, 1840]	1889	[621, 2254]	2616	[1098, 1057]
436	[796, 797]	1163	[1841, 1842]	1890	[2255, 2256]	2617	[289, 1154]
437	[276, 798]	1164	[1843, 1453]	1891	[2257, 2258]	2618	[2772, 2773]
438	[799, 320]	1165	[1844, 1845]	1892	[2259, 2260]	2619	[2179, 2026]
439	[800, 275]	1166	[1846, 1847]	1893	[2261, 2262]	2620	[2041, 386]
440	[801, 243]	1167	[484, 1848]	1894	[2263, 2264]	2621	[2101, 1960]
441	[239, 802]	1168	[1849, 1850]	1895	[2265, 2266]	2622	[2177, 361]
442	[243, 783]	1169	[308, 1851]	1896	[2267, 2268]	2623	[789, 1994]
443	[275, 798]	1170	[1165, 329]	1897	[2269, 2270]	2624	[803, 245]
444	[241, 803]	1171	[5, 1012]	1898	[2271, 2272]	2625	[292, 2774]
445	[804, 240]	1172	[1852, 1853]	1899	[2273, 2274]	2626	[2050, 2775]
446	[799, 245]	1173	[832, 1854]	1900	[2275, 2276]	2627	[1982, 2147]
447	[783, 802]	1174	[1855, 831]	1901	[2277, 2278]	2628	[2161, 1897]
448	[801, 86]	1175	[1142, 974]	1902	[2279, 2280]	2629	[2070, 2089]
449	[276, 275]	1176	[1135, 1856]	1903	[145, 2281]	2630	[2171, 1017]
450	[805, 85]	1177	[361, 22]	1904	[2282, 2283]	2631	[1110, 1061]
451	[806, 269]	1178	[1857, 802]	1905	[2284, 2285]	2632	[25, 1144]
452	[64, 273]	1179	[240, 882]	1906	[2286, 2287]	2633	[1939, 820]
453	[807, 808]	1180	[284, 790]	1907	[2288, 1691]	2634	[873, 106]
454	[809, 810]	1181	[1858, 6]	1908	[1467, 1357]	2635	[1857, 321]
455	[811, 812]	1182	[1014, 1859]	1909	[2289, 2290]	2636	[68, 2090]
456	[813, 814]	1183	[271, 1059]	1910	[2291, 2292]	2637	[2716, 2028]
457	[815, 816]	1184	[1137, 1860]	1911	[2293, 2294]	2638	[998, 274]
458	[321, 63]	1185	[1861, 944]	1912	[2295, 2296]	2639	[1004, 807]
459	[27, 817]	1186	[1862, 1863]	1913	[2297, 2298]	2640	[2116, 1119]

460	[818, 420]	1187	[1135, 1864]	1914	[2299, 2300]	2641	[877, 1912]
461	[819, 820]	1188	[1865, 1866]	1915	[2301, 2198]	2642	[1064, 337]
462	[821, 822]	1189	[1867, 365]	1916	[2302, 2303]	2643	[899, 1135]
463	[823, 339]	1190	[1013, 1038]	1917	[2304, 2305]	2644	[308, 782]
464	[824, 806]	1191	[1042, 914]	1918	[1276, 2306]	2645	[242, 320]
465	[825, 21]	1192	[233, 345]	1919	[605, 608]	2646	[973, 325]
466	[826, 827]	1193	[787, 1868]	1920	[2307, 2308]	2647	[100, 1072]
467	[828, 829]	1194	[354, 392]	1921	[2309, 2310]	2648	[1987, 783]
468	[830, 369]	1195	[1862, 1869]	1922	[2311, 1606]	2649	[1137, 1067]
469	[364, 831]	1196	[1870, 1871]	1923	[2312, 2313]	2650	[2137, 1133]
470	[832, 833]	1197	[1872, 1071]	1924	[1643, 2314]	2651	[1143, 891]
471	[834, 835]	1198	[1873, 851]	1925	[2249, 2315]	2652	[2140, 887]
472	[836, 837]	1199	[1874, 259]	1926	[2316, 2317]	2653	[276, 800]
473	[838, 792]	1200	[1875, 1876]	1927	[2318, 2319]	2654	[2051, 1157]
474	[809, 784]	1201	[1877, 1106]	1928	[2320, 1273]	2655	[838, 2774]
475	[839, 795]	1202	[1878, 307]	1929	[2321, 2322]	2656	[346, 1868]
476	[840, 841]	1203	[1082, 1879]	1930	[1192, 2323]	2657	[1121, 1860]
477	[842, 843]	1204	[1880, 1881]	1931	[2324, 2325]	2658	[794, 364]
478	[63, 244]	1205	[1055, 1882]	1932	[2326, 2327]	2659	[2175, 418]
479	[27, 844]	1206	[62, 882]	1933	[2328, 1373]	2660	[2776, 2773]
480	[845, 846]	1207	[1883, 85]	1934	[2329, 2330]	2661	[958, 1084]
481	[847, 308]	1208	[321, 882]	1935	[2331, 2332]	2662	[2115, 1046]
482	[848, 849]	1209	[802, 882]	1936	[684, 2333]	2663	[63, 242]
483	[850, 851]	1210	[1883, 859]	1937	[2334, 2335]	2664	[1914, 1963]
484	[852, 833]	1211	[275, 275]	1938	[2336, 2337]	2665	[408, 1008]
485	[250, 853]	1212	[86, 804]	1939	[2338, 2339]	2666	[316, 114]
486	[854, 855]	1213	[802, 241]	1940	[2305, 2340]	2667	[2777, 2186]
487	[237, 856]	1214	[882, 803]	1941	[2290, 2341]	2668	[968, 2719]
488	[857, 858]	1215	[1884, 386]	1942	[1605, 2201]	2669	[1020, 2184]
489	[320, 859]	1216	[353, 949]	1943	[764, 2342]	2670	[2778, 1974]
490	[264, 860]	1217	[370, 310]	1944	[2343, 449]	2671	[2143, 2769]
491	[861, 413]	1218	[1885, 1886]	1945	[2280, 2344]	2672	[2005, 415]
492	[862, 863]	1219	[374, 1126]	1946	[2345, 2346]	2673	[981, 1097]
493	[864, 865]	1220	[1887, 1082]	1947	[627, 1208]	2674	[86, 783]
494	[866, 867]	1221	[1109, 1116]	1948	[2347, 2348]	2675	[2019, 872]
495	[868, 869]	1222	[1004, 329]	1949	[2349, 2350]	2676	[2729, 2727]
496	[353, 393]	1223	[1155, 1888]	1950	[2351, 165]	2677	[1069, 1072]
497	[386, 870]	1224	[96, 1889]	1951	[2352, 2353]	2678	[380, 364]
498	[871, 872]	1225	[1890, 1864]	1952	[2354, 2355]	2679	[1082, 2779]
499	[873, 874]	1226	[1891, 1892]	1953	[2356, 2357]	2680	[2022, 108]
500	[875, 876]	1227	[1893, 1894]	1954	[2358, 2359]	2681	[2024, 2759]
501	[877, 341]	1228	[1107, 1103]	1955	[2360, 2361]	2682	[919, 1006]
502	[878, 323]	1229	[112, 1895]	1956	[2283, 212]	2683	[1982, 1955]
503	[879, 880]	1230	[1015, 938]	1957	[2362, 2363]	2684	[915, 247]

504	[247, 70]	1231	[1896, 1897]	1958	[2364, 2365]	2685	[1997, 2092]
505	[881, 243]	1232	[1898, 1899]	1959	[2219, 2366]	2686	[1924, 2149]
506	[882, 242]	1233	[324, 1868]	1960	[2367, 2368]	2687	[1908, 2140]
507	[804, 802]	1234	[363, 961]	1961	[2369, 1580]	2688	[2758, 2757]
508	[805, 859]	1235	[1900, 1132]	1962	[2197, 447]	2689	[255, 2111]
509	[883, 313]	1236	[1130, 1892]	1963	[2370, 2371]	2690	[2182, 2744]
510	[884, 885]	1237	[1901, 1106]	1964	[1319, 2372]	2691	[2741, 911]
511	[405, 371]	1238	[915, 1902]	1965	[2373, 1326]	2692	[953, 2756]
512	[886, 887]	1239	[901, 1129]	1966	[2374, 2375]	2693	[341, 370]
513	[888, 889]	1240	[928, 1903]	1967	[2376, 2377]	2694	[787, 1948]
514	[793, 890]	1241	[1121, 1904]	1968	[2378, 1780]	2695	[1999, 903]
515	[264, 891]	1242	[1905, 850]	1969	[2379, 2380]	2696	[2174, 1863]
516	[892, 373]	1243	[1906, 1907]	1970	[1578, 2381]	2697	[1025, 942]
517	[893, 251]	1244	[1908, 911]	1971	[2382, 2383]	2698	[2068, 2118]
518	[894, 895]	1245	[878, 955]	1972	[2384, 2385]	2699	[2070, 1051]
519	[896, 897]	1246	[1909, 1910]	1973	[2386, 2387]	2700	[1032, 2066]
520	[247, 898]	1247	[1136, 1066]	1974	[2388, 2389]	2701	[100, 1986]
521	[899, 354]	1248	[1911, 1062]	1975	[2390, 626]	2702	[385, 1914]
522	[900, 303]	1249	[1912, 405]	1976	[2391, 2392]	2703	[401, 930]
523	[901, 837]	1250	[1913, 1914]	1977	[1348, 2393]	2704	[999, 2069]
524	[902, 903]	1251	[379, 890]	1978	[2394, 2395]	2705	[2035, 358]
525	[904, 822]	1252	[1915, 1916]	1979	[717, 2243]	2706	[1867, 2760]
526	[883, 905]	1253	[1135, 392]	1980	[2396, 2397]	2707	[873, 2005]
527	[906, 414]	1254	[324, 1059]	1981	[2398, 2399]	2708	[778, 883]
528	[907, 908]	1255	[1039, 1917]	1982	[2400, 2401]	2709	[2780, 490]
529	[809, 909]	1256	[1071, 1070]	1983	[2402, 2403]	2710	[711, 2781]
530	[910, 387]	1257	[937, 1918]	1984	[2404, 431]	2711	[2782, 690]
531	[911, 887]	1258	[329, 1919]	1985	[2405, 2406]	2712	[2783, 2784]
532	[912, 316]	1259	[807, 1919]	1986	[1615, 2407]	2713	[2785, 2786]
533	[913, 914]	1260	[975, 26]	1987	[2244, 591]	2714	[2787, 2788]
534	[915, 916]	1261	[1920, 927]	1988	[2408, 2409]	2715	[2789, 1717]
535	[917, 874]	1262	[395, 792]	1989	[2410, 1413]	2716	[2790, 2791]
536	[364, 918]	1263	[1921, 778]	1990	[2411, 2412]	2717	[2792, 2793]
537	[919, 920]	1264	[1922, 812]	1991	[2413, 2414]	2718	[2452, 2794]
538	[921, 922]	1265	[1923, 996]	1992	[2415, 2416]	2719	[2795, 2796]
539	[108, 869]	1266	[284, 97]	1993	[2417, 2418]	2720	[2797, 2798]
540	[923, 924]	1267	[304, 948]	1994	[1537, 2419]	2721	[2799, 1658]
541	[925, 926]	1268	[1924, 1880]	1995	[2420, 2421]	2722	[2800, 2801]
542	[330, 927]	1269	[1925, 952]	1996	[2422, 2245]	2723	[2802, 2803]
543	[928, 929]	1270	[87, 1159]	1997	[2423, 2424]	2724	[2804, 2805]
544	[930, 931]	1271	[878, 352]	1998	[2425, 2426]	2725	[2806, 2807]
545	[932, 933]	1272	[1085, 1926]	1999	[2427, 494]	2726	[2337, 2808]
546	[934, 76]	1273	[1927, 1008]	2000	[2428, 2429]	2727	[2809, 1725]
547	[935, 936]	1274	[233, 1859]	2001	[2430, 2431]	2728	[1526, 2810]

548	[937, 849]	1275	[287, 69]	2002	[2432, 2433]	2729	[2811, 2812]
549	[234, 938]	1276	[370, 317]	2003	[2434, 2345]	2730	[2813, 2814]
550	[939, 940]	1277	[1928, 1929]	2004	[2435, 1633]	2731	[2815, 2816]
551	[941, 942]	1278	[317, 1930]	2005	[2436, 2437]	2732	[228, 2817]
552	[913, 253]	1279	[1931, 1932]	2006	[2438, 2439]	2733	[1751, 2818]
553	[943, 794]	1280	[329, 1933]	2007	[2440, 678]	2734	[2819, 2820]
554	[785, 869]	1281	[1934, 1935]	2008	[1337, 2374]	2735	[2821, 2822]
555	[311, 944]	1282	[310, 1936]	2009	[1532, 589]	2736	[2823, 2824]
556	[945, 822]	1283	[902, 401]	2010	[566, 2441]	2737	[2825, 2826]
557	[103, 946]	1284	[1937, 1938]	2011	[2442, 2443]	2738	[2827, 2828]
558	[947, 948]	1285	[1939, 76]	2012	[33, 2444]	2739	[2656, 2829]
559	[91, 949]	1286	[1940, 916]	2013	[2445, 2446]	2740	[632, 2701]
560	[950, 345]	1287	[375, 287]	2014	[2447, 2448]	2741	[2632, 2830]
561	[951, 952]	1288	[1941, 1942]	2015	[2449, 2450]	2742	[2831, 2349]
562	[953, 954]	1289	[1148, 1006]	2016	[2451, 2452]	2743	[2832, 2833]
563	[384, 955]	1290	[1943, 1944]	2017	[2453, 2454]	2744	[2834, 2835]
564	[956, 957]	1291	[1002, 1945]	2018	[501, 1498]	2745	[1217, 2836]
565	[958, 959]	1292	[1946, 365]	2019	[2455, 210]	2746	[2837, 553]
566	[252, 922]	1293	[1011, 6]	2020	[2456, 2457]	2747	[213, 2838]
567	[960, 961]	1294	[391, 1864]	2021	[2458, 1377]	2748	[2839, 515]
568	[962, 963]	1295	[1947, 887]	2022	[2459, 2460]	2749	[2840, 671]
569	[883, 236]	1296	[925, 946]	2023	[2461, 2462]	2750	[2350, 2841]
570	[964, 965]	1297	[324, 1948]	2024	[2463, 2464]	2751	[2842, 669]
571	[316, 371]	1298	[70, 1003]	2025	[2465, 2466]	2752	[2843, 2844]
572	[232, 966]	1299	[1949, 1919]	2026	[2467, 1254]	2753	[2845, 1447]
573	[301, 393]	1300	[1950, 1951]	2027	[1767, 2468]	2754	[542, 2307]
574	[273, 967]	1301	[1952, 1054]	2028	[2469, 2275]	2755	[2846, 2847]
575	[337, 280]	1302	[1939, 1040]	2029	[2470, 2471]	2756	[2848, 2849]
576	[968, 969]	1303	[1128, 1953]	2030	[2472, 2473]	2757	[2850, 2851]
577	[970, 850]	1304	[1954, 1955]	2031	[2474, 2475]	2758	[2852, 2853]
578	[971, 972]	1305	[1956, 299]	2032	[2476, 2477]	2759	[2854, 2855]
579	[973, 974]	1306	[1076, 1957]	2033	[2478, 2255]	2760	[701, 1259]
580	[838, 293]	1307	[1087, 1958]	2034	[2479, 2480]	2761	[2856, 2857]
581	[975, 390]	1308	[1959, 273]	2035	[2481, 192]	2762	[2858, 2859]
582	[976, 977]	1309	[1138, 1960]	2036	[2482, 2483]	2763	[2860, 2861]
583	[978, 814]	1310	[1089, 94]	2037	[2484, 429]	2764	[2862, 2863]
584	[979, 867]	1311	[896, 1112]	2038	[2485, 2486]	2765	[1274, 2864]
585	[980, 960]	1312	[1961, 233]	2039	[2487, 2488]	2766	[2865, 2866]
586	[981, 982]	1313	[834, 807]	2040	[2489, 2490]	2767	[2867, 2868]
587	[983, 984]	1314	[258, 965]	2041	[2322, 2491]	2768	[2371, 2869]
588	[985, 986]	1315	[1094, 1962]	2042	[2492, 2493]	2769	[1328, 2870]
589	[859, 86]	1316	[980, 363]	2043	[2494, 2495]	2770	[2871, 1585]
590	[881, 86]	1317	[1963, 1964]	2044	[2496, 2497]	2771	[2872, 2873]
591	[240, 241]	1318	[1941, 313]	2045	[2498, 2499]	2772	[2874, 2875]

592	[987, 988]	1319	[1965, 1888]	2046	[2500, 2501]	2773	[2876, 2877]
593	[800, 276]	1320	[1014, 234]	2047	[2502, 2503]	2774	[2878, 1574]
594	[989, 990]	1321	[1944, 1966]	2048	[2504, 2505]	2775	[2879, 2880]
595	[991, 286]	1322	[1967, 308]	2049	[2506, 2496]	2776	[2881, 2882]
596	[992, 335]	1323	[277, 1101]	2050	[2507, 2508]	2777	[2403, 167]
597	[993, 994]	1324	[1968, 1969]	2051	[2509, 2510]	2778	[2883, 2884]
598	[995, 977]	1325	[896, 315]	2052	[2511, 1462]	2779	[2251, 2885]
599	[382, 996]	1326	[979, 343]	2053	[2512, 2513]	2780	[2886, 861]
600	[997, 998]	1327	[1970, 1125]	2054	[205, 2514]	2781	[863, 2733]
601	[999, 1000]	1328	[942, 860]	2055	[2515, 2214]	2782	[23, 2168]
602	[1001, 810]	1329	[1155, 249]	2056	[1364, 2516]	2783	[960, 2765]
603	[1002, 1003]	1330	[1971, 1058]	2057	[2517, 2518]	2784	[2887, 2096]
604	[1004, 835]	1331	[106, 1972]	2058	[2519, 2520]	2785	[246, 1902]
605	[1005, 1006]	1332	[998, 954]	2059	[2521, 2522]	2786	[2171, 1997]
606	[1007, 1008]	1333	[970, 284]	2060	[2523, 2524]	2787	[2710, 2754]
607	[930, 270]	1334	[1973, 1974]	2061	[2525, 511]	2788	[2031, 2888]
608	[835, 808]	1335	[348, 1160]	2062	[1372, 2203]	2789	[2029, 2082]
609	[1009, 985]	1336	[1975, 1976]	2063	[2526, 2527]	2790	[1047, 2017]
610	[828, 1010]	1337	[342, 1065]	2064	[2528, 2529]	2791	[2050, 1139]
611	[1011, 1012]	1338	[1977, 1143]	2065	[2530, 2531]	2792	[301, 949]
612	[90, 1010]	1339	[1913, 1062]	2066	[2532, 2533]	2793	[2054, 2135]
613	[1013, 885]	1340	[276, 276]	2067	[2529, 1401]	2794	[2753, 1871]
614	[1014, 1015]	1341	[848, 1918]	2068	[2534, 2535]	2795	[1965, 78]
615	[21, 1016]	1342	[341, 405]	2069	[2536, 2537]	2796	[1113, 93]
616	[1017, 1018]	1343	[1878, 1978]	2070	[2538, 1470]	2797	[2088, 2071]
617	[779, 1019]	1344	[1979, 244]	2071	[2539, 2540]	2798	[917, 106]
618	[1020, 1021]	1345	[1146, 944]	2072	[2541, 42]	2799	[903, 826]
619	[419, 972]	1346	[1980, 1981]	2073	[1175, 1642]	2800	[2742, 2763]
620	[1022, 952]	1347	[1982, 1983]	2074	[2542, 2543]	2801	[83, 1116]
621	[910, 1023]	1348	[340, 1971]	2075	[2544, 2545]	2802	[1993, 354]
622	[893, 1024]	1349	[243, 804]	2076	[2546, 614]	2803	[2114, 1164]
623	[956, 412]	1350	[1850, 1918]	2077	[2547, 2548]	2804	[2721, 1912]
624	[1025, 1026]	1351	[329, 808]	2078	[2549, 1473]	2805	[1005, 1997]
625	[1027, 1028]	1352	[1921, 1984]	2079	[2550, 728]	2806	[2097, 100]
626	[783, 321]	1353	[989, 1957]	2080	[2551, 2552]	2807	[2051, 113]
627	[1029, 1030]	1354	[813, 1985]	2081	[2553, 2554]	2808	[2162, 783]
628	[1031, 868]	1355	[1080, 1986]	2082	[2555, 2556]	2809	[2029, 352]
629	[1032, 1033]	1356	[1987, 804]	2083	[2315, 2557]	2810	[2889, 1075]
630	[1034, 410]	1357	[350, 1988]	2084	[2558, 1390]	2811	[1943, 2009]
631	[1035, 100]	1358	[1989, 364]	2085	[747, 2559]	2812	[2091, 2141]
632	[1029, 1036]	1359	[1928, 1990]	2086	[1441, 2560]	2813	[2178, 269]
633	[257, 926]	1360	[1950, 990]	2087	[2561, 2562]	2814	[1911, 1914]
634	[1037, 1038]	1361	[1991, 1992]	2088	[1330, 2563]	2815	[824, 2178]
635	[793, 380]	1362	[103, 926]	2089	[2564, 427]	2816	[836, 1953]

636	[1014, 345]	1363	[77, 249]	2090	[1389, 2565]	2817	[2890, 2769]
637	[1039, 982]	1364	[1993, 1135]	2091	[2566, 214]	2818	[1865, 1966]
638	[75, 1040]	1365	[1109, 1994]	2092	[1816, 2567]	2819	[928, 280]
639	[919, 1017]	1366	[1979, 242]	2093	[2568, 2569]	2820	[998, 2756]
640	[888, 1041]	1367	[1995, 1996]	2094	[2570, 2571]	2821	[2891, 850]
641	[1042, 1043]	1368	[1987, 1857]	2095	[31, 2572]	2822	[2772, 1054]
642	[1044, 909]	1369	[1055, 1127]	2096	[2573, 2574]	2823	[1006, 2732]
643	[1026, 1045]	1370	[919, 1997]	2097	[2575, 2576]	2824	[273, 2756]
644	[1029, 1046]	1371	[932, 1998]	2098	[2577, 2578]	2825	[79, 2184]
645	[1047, 1048]	1372	[1999, 401]	2099	[1632, 423]	2826	[2176, 1992]
646	[1049, 895]	1373	[958, 924]	2100	[2341, 2200]	2827	[1950, 1957]
647	[1050, 325]	1374	[379, 794]	2101	[2579, 2580]	2828	[1923, 383]
648	[1051, 233]	1375	[1922, 2000]	2102	[2581, 2582]	2829	[93, 1090]
649	[381, 1052]	1376	[2001, 2002]	2103	[2583, 2384]	2830	[1096, 1917]
650	[1053, 1054]	1377	[2003, 380]	2104	[2584, 2585]	2831	[791, 396]
651	[1055, 872]	1378	[1058, 310]	2105	[2586, 1183]	2832	[902, 2178]
652	[1056, 1057]	1379	[2004, 264]	2106	[2587, 2588]	2833	[947, 2131]
653	[1044, 810]	1380	[1873, 358]	2107	[2589, 2590]	2834	[381, 795]
654	[1058, 114]	1381	[917, 2005]	2108	[2591, 2592]	2835	[2722, 82]
655	[787, 1059]	1382	[1943, 2006]	2109	[8, 2593]	2836	[957, 413]
656	[264, 1045]	1383	[1915, 969]	2110	[2594, 2595]	2837	[299, 785]
657	[1060, 911]	1384	[401, 826]	2111	[2596, 2597]	2838	[390, 1145]
658	[87, 282]	1385	[2007, 1984]	2112	[428, 2598]	2839	[920, 1018]
659	[893, 1061]	1386	[64, 998]	2113	[464, 2599]	2840	[941, 264]
660	[385, 1062]	1387	[1007, 409]	2114	[2600, 2601]	2841	[1062, 1963]
661	[1007, 1063]	1388	[2008, 2009]	2115	[2602, 2603]	2842	[912, 405]
662	[108, 786]	1389	[350, 1019]	2116	[2604, 2605]	2843	[1997, 1018]
663	[1064, 96]	1390	[1073, 1119]	2117	[2606, 2607]	2844	[1039, 2141]
664	[946, 24]	1391	[2010, 2011]	2118	[2608, 2609]	2845	[1927, 1063]
665	[866, 1065]	1392	[2012, 911]	2119	[2610, 1689]	2846	[400, 903]
666	[1066, 1067]	1393	[2013, 969]	2120	[2611, 2612]	2847	[1098, 1981]
667	[308, 984]	1394	[306, 2014]	2121	[2613, 2614]	2848	[1073, 2104]
668	[245, 85]	1395	[989, 1951]	2122	[2615, 2616]	2849	[326, 93]
669	[1068, 343]	1396	[2015, 2016]	2123	[2617, 2618]	2850	[109, 2750]
670	[405, 310]	1397	[1968, 1118]	2124	[2619, 1471]	2851	[2892, 1132]
671	[353, 855]	1398	[1050, 238]	2125	[2620, 2621]	2852	[923, 1899]
672	[1069, 1070]	1399	[1975, 2017]	2126	[2622, 1176]	2853	[2163, 2775]
673	[1071, 1072]	1400	[91, 855]	2127	[2623, 2624]	2854	[1891, 1123]
674	[1073, 833]	1401	[83, 1994]	2128	[2625, 2626]	2855	[1151, 2096]
675	[1074, 1075]	1402	[2018, 273]	2129	[2627, 2628]	2856	[1017, 2732]
676	[1076, 1077]	1403	[2019, 1127]	2130	[2629, 2630]	2857	[347, 282]
677	[1078, 1079]	1404	[2020, 337]	2131	[2631, 2632]	2858	[2893, 1021]
678	[1080, 1081]	1405	[875, 1123]	2132	[2633, 2634]	2859	[2120, 2016]
679	[1082, 333]	1406	[2021, 1153]	2133	[2635, 587]	2860	[869, 2745]

680	[1083, 1084]	1407	[2022, 785]	2134	[2636, 2637]	2861	[2894, 2096]
681	[1085, 1033]	1408	[2023, 861]	2135	[1387, 2638]	2862	[2005, 1972]
682	[1086, 812]	1409	[1136, 1121]	2136	[1634, 1519]	2863	[968, 2028]
683	[1087, 1088]	1410	[2024, 895]	2137	[2639, 2640]	2864	[1926, 1092]
684	[1089, 1090]	1411	[2025, 2009]	2138	[2641, 2642]	2865	[1912, 1058]
685	[346, 1059]	1412	[2026, 1904]	2139	[2643, 1772]	2866	[2043, 985]
686	[1091, 1030]	1413	[248, 1888]	2140	[2644, 2645]	2867	[824, 903]
687	[245, 859]	1414	[1969, 2027]	2141	[2646, 451]	2868	[2103, 106]
688	[416, 780]	1415	[1094, 952]	2142	[2294, 2647]	2869	[242, 245]
689	[1033, 1092]	1416	[2013, 2028]	2143	[1778, 2648]	2870	[294, 402]
690	[1093, 1008]	1417	[2029, 955]	2144	[1792, 2649]	2871	[287, 2090]
691	[898, 1003]	1418	[2030, 1147]	2145	[1663, 2650]	2872	[2119, 2047]
692	[1094, 1095]	1419	[2031, 1953]	2146	[2651, 2652]	2873	[2895, 2053]
693	[1096, 1097]	1420	[2032, 1955]	2147	[2653, 2654]	2874	[1940, 1902]
694	[250, 1061]	1421	[2033, 899]	2148	[2655, 2656]	2875	[304, 994]
695	[979, 1065]	1422	[252, 914]	2149	[1492, 2657]	2876	[828, 2073]
696	[316, 310]	1423	[898, 1125]	2150	[1310, 2658]	2877	[821, 376]
697	[1098, 357]	1424	[1056, 2034]	2151	[2659, 2660]	2878	[1098, 2034]
698	[1099, 1082]	1425	[2035, 97]	2152	[2661, 584]	2879	[2077, 1998]
699	[1100, 1101]	1426	[1093, 1063]	2153	[2662, 2663]	2880	[877, 1971]
700	[328, 807]	1427	[858, 1880]	2154	[1487, 2664]	2881	[400, 2178]
701	[973, 238]	1428	[2036, 1957]	2155	[2665, 2666]	2882	[1005, 1017]
702	[414, 107]	1429	[2037, 298]	2156	[2513, 2661]	2883	[340, 1912]
703	[327, 1102]	1430	[2038, 1976]	2157	[1653, 2667]	2884	[836, 1129]
704	[815, 1103]	1431	[2039, 2040]	2158	[1522, 2668]	2885	[1962, 407]
705	[781, 309]	1432	[349, 1016]	2159	[2669, 2670]	2886	[2896, 761]
706	[109, 1104]	1433	[344, 1859]	2160	[703, 2671]	2887	[727, 2897]
707	[1105, 1106]	1434	[1042, 253]	2161	[2672, 2673]	2888	[2898, 2899]
708	[1107, 816]	1435	[416, 1988]	2162	[590, 2674]	2889	[2694, 2568]
709	[245, 881]	1436	[2041, 2042]	2163	[2675, 2676]	2890	[2647, 445]
710	[1108, 863]	1437	[2043, 957]	2164	[2677, 437]	2891	[2900, 661]
711	[1109, 788]	1438	[62, 1979]	2165	[636, 2678]	2892	[2303, 1715]
712	[1110, 251]	1439	[864, 1918]	2166	[1221, 2679]	2893	[2901, 2271]
713	[1093, 1111]	1440	[414, 1972]	2167	[2680, 2681]	2894	[1834, 653]
714	[314, 1112]	1441	[281, 1159]	2168	[2682, 2591]	2895	[2902, 2903]
715	[1113, 327]	1442	[926, 2044]	2169	[2683, 2684]	2896	[60, 1156]
716	[983, 782]	1443	[879, 1935]	2170	[2685, 2686]	2897	[2007, 778]
717	[800, 798]	1444	[317, 1936]	2171	[2687, 2651]	2898	[907, 1976]
718	[1114, 308]	1445	[1166, 1971]	2172	[2688, 2689]	2899	[975, 1144]
719	[1115, 1116]	1446	[1145, 829]	2173	[2684, 2690]	2900	[2105, 108]
720	[1117, 1118]	1447	[327, 1090]	2174	[2691, 2692]	2901	[1134, 1890]
721	[852, 1119]	1448	[2040, 1092]	2175	[2693, 2694]	2902	[246, 916]
722	[1120, 1090]	1449	[106, 415]	2176	[2695, 2696]	2903	[356, 1057]
723	[921, 253]	1450	[1121, 2045]	2177	[1584, 44]		

724	[1121, 1067]	1451	[2046, 2047]	2178	[2697, 2698]	
725	[1122, 1123]	1452	[2048, 2049]	2179	[2699, 1676]	
726	[1124, 1051]	1453	[1124, 1961]	2180	[2204, 2700]	

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	485	1	970	1	1455	0	1940	1	2425	1
1	0	486	0	971	0	1456	1	1941	1	2426	0
2	1	487	1	972	1	1457	0	1942	0	2427	0
3	0	488	1	973	0	1458	0	1943	1	2428	1
4	1	489	0	974	1	1459	1	1944	1	2429	0
5	1	490	1	975	0	1460	1	1945	1	2430	0
6	0	491	1	976	1	1461	1	1946	0	2431	1
7	0	492	1	977	1	1462	0	1947	1	2432	1
8	0	493	1	978	1	1463	1	1948	0	2433	0
9	1	494	1	979	1	1464	0	1949	1	2434	0
10	1	495	1	980	1	1465	0	1950	1	2435	0
11	1	496	1	981	1	1466	1	1951	1	2436	0
12	1	497	1	982	1	1467	0	1952	1	2437	1
13	0	498	0	983	1	1468	0	1953	1	2438	0
14	0	499	0	984	0	1469	1	1954	0	2439	0
15	0	500	1	985	0	1470	0	1955	1	2440	0
16	0	501	0	986	1	1471	1	1956	0	2441	0
17	0	502	0	987	1	1472	1	1957	0	2442	0
18	0	503	1	988	0	1473	1	1958	1	2443	1
19	1	504	0	989	1	1474	0	1959	1	2444	1
20	0	505	1	990	0	1475	0	1960	1	2445	0
21	1	506	0	991	1	1476	0	1961	0	2446	1
22	1	507	1	992	0	1477	0	1962	1	2447	0
23	1	508	1	993	1	1478	0	1963	1	2448	0
24	0	509	0	994	0	1479	0	1964	1	2449	1
25	1	510	0	995	1	1480	0	1965	1	2450	1
26	1	511	0	996	0	1481	1	1966	1	2451	1
27	0	512	0	997	1	1482	0	1967	1	2452	0
28	0	513	1	998	1	1483	1	1968	0	2453	0
29	1	514	0	999	1	1484	0	1969	1	2454	0
30	0	515	1	1000	0	1485	1	1970	1	2455	1
31	1	516	0	1001	1	1486	0	1971	1	2456	1
32	0	517	0	1002	0	1487	0	1972	1	2457	1
33	1	518	1	1003	1	1488	0	1973	0	2458	0
34	0	519	1	1004	0	1489	1	1974	0	2459	1
35	1	520	0	1005	1	1490	0	1975	1	2460	1
36	0	521	0	1006	0	1491	0	1976	0	2461	0
37	1	522	1	1007	0	1492	0	1977	1	2462	1

38	1	523	1	1008	1	1493	0	1978	1	2463	1
39	0	524	1	1009	1	1494	1	1979	0	2464	0
40	0	525	0	1010	1	1495	0	1980	0	2465	1
41	1	526	0	1011	1	1496	1	1981	0	2466	0
42	1	527	1	1012	1	1497	1	1982	1	2467	1
43	1	528	1	1013	1	1498	0	1983	0	2468	1
44	1	529	0	1014	1	1499	1	1984	0	2469	0
45	0	530	1	1015	0	1500	0	1985	1	2470	1
46	1	531	1	1016	0	1501	1	1986	1	2471	1
47	0	532	0	1017	1	1502	1	1987	0	2472	0
48	0	533	1	1018	1	1503	1	1988	1	2473	0
49	1	534	1	1019	0	1504	0	1989	0	2474	1
50	1	535	1	1020	1	1505	0	1990	1	2475	0
51	0	536	1	1021	1	1506	0	1991	1	2476	0
52	1	537	1	1022	0	1507	1	1992	0	2477	0
53	1	538	0	1023	0	1508	1	1993	1	2478	0
54	0	539	0	1024	0	1509	1	1994	0	2479	1
55	0	540	0	1025	1	1510	0	1995	0	2480	0
56	0	541	0	1026	0	1511	0	1996	0	2481	0
57	0	542	0	1027	1	1512	1	1997	0	2482	0
58	1	543	0	1028	0	1513	1	1998	1	2483	0
59	1	544	0	1029	1	1514	1	1999	0	2484	1
60	0	545	1	1030	0	1515	1	2000	1	2485	0
61	1	546	1	1031	1	1516	0	2001	0	2486	1
62	1	547	0	1032	0	1517	1	2002	1	2487	1
63	1	548	1	1033	0	1518	1	2003	0	2488	1
64	0	549	1	1034	0	1519	1	2004	0	2489	1
65	1	550	0	1035	0	1520	0	2005	0	2490	1
66	1	551	0	1036	0	1521	1	2006	0	2491	0
67	1	552	1	1037	1	1522	0	2007	0	2492	0
68	0	553	1	1038	0	1523	1	2008	0	2493	1
69	1	554	0	1039	0	1524	1	2009	1	2494	1
70	1	555	0	1040	0	1525	1	2010	0	2495	1
71	0	556	1	1041	1	1526	1	2011	0	2496	0
72	1	557	1	1042	1	1527	0	2012	1	2497	0
73	1	558	0	1043	0	1528	0	2013	0	2498	1
74	0	559	1	1044	0	1529	0	2014	0	2499	0
75	1	560	0	1045	0	1530	1	2015	1	2500	1
76	0	561	1	1046	1	1531	1	2016	1	2501	0
77	0	562	0	1047	0	1532	1	2017	0	2502	0
78	0	563	0	1048	1	1533	1	2018	0	2503	0
79	0	564	0	1049	0	1534	0	2019	1	2504	1
80	1	565	1	1050	1	1535	1	2020	1	2505	1
81	1	566	0	1051	1	1536	1	2021	0	2506	1

82	0	567	1	1052	0	1537	0	2022	1	2507	0
83	1	568	1	1053	0	1538	0	2023	0	2508	1
84	1	569	0	1054	1	1539	1	2024	1	2509	0
85	1	570	0	1055	1	1540	1	2025	1	2510	1
86	0	571	1	1056	1	1541	1	2026	1	2511	0
87	1	572	1	1057	1	1542	0	2027	0	2512	1
88	1	573	0	1058	1	1543	0	2028	0	2513	1
89	0	574	0	1059	0	1544	1	2029	1	2514	0
90	0	575	0	1060	0	1545	1	2030	0	2515	0
91	1	576	1	1061	1	1546	0	2031	1	2516	1
92	1	577	1	1062	1	1547	1	2032	0	2517	1
93	0	578	0	1063	0	1548	1	2033	0	2518	0
94	1	579	0	1064	1	1549	0	2034	1	2519	0
95	0	580	1	1065	1	1550	0	2035	0	2520	0
96	1	581	0	1066	0	1551	1	2036	0	2521	1
97	1	582	1	1067	1	1552	1	2037	1	2522	1
98	0	583	1	1068	0	1553	1	2038	0	2523	0
99	1	584	1	1069	1	1554	1	2039	1	2524	1
100	1	585	1	1070	1	1555	0	2040	1	2525	0
101	0	586	1	1071	0	1556	0	2041	1	2526	0
102	0	587	1	1072	0	1557	1	2042	0	2527	1
103	1	588	0	1073	1	1558	0	2043	1	2528	1
104	1	589	0	1074	0	1559	0	2044	0	2529	1
105	1	590	1	1075	1	1560	0	2045	1	2530	1
106	0	591	0	1076	0	1561	1	2046	1	2531	1
107	1	592	1	1077	1	1562	0	2047	0	2532	1
108	0	593	0	1078	1	1563	1	2048	1	2533	0
109	1	594	1	1079	0	1564	1	2049	1	2534	0
110	0	595	1	1080	0	1565	0	2050	0	2535	1
111	0	596	0	1081	0	1566	1	2051	0	2536	1
112	0	597	1	1082	1	1567	0	2052	0	2537	1
113	0	598	1	1083	0	1568	0	2053	1	2538	0
114	1	599	1	1084	0	1569	1	2054	1	2539	1
115	0	600	1	1085	0	1570	0	2055	0	2540	1
116	1	601	1	1086	0	1571	1	2056	1	2541	1
117	1	602	1	1087	1	1572	0	2057	1	2542	0
118	0	603	0	1088	0	1573	0	2058	0	2543	0
119	1	604	0	1089	1	1574	1	2059	1	2544	1
120	1	605	1	1090	0	1575	1	2060	0	2545	0
121	1	606	0	1091	0	1576	0	2061	0	2546	0
122	1	607	0	1092	0	1577	1	2062	0	2547	1
123	1	608	0	1093	0	1578	1	2063	0	2548	0
124	1	609	1	1094	1	1579	1	2064	1	2549	0
125	0	610	0	1095	0	1580	0	2065	1	2550	1

126	0	611	1	1096	0	1581	1	2066	1	2551	1
127	1	612	0	1097	1	1582	0	2067	1	2552	1
128	1	613	1	1098	1	1583	1	2068	0	2553	1
129	0	614	1	1099	1	1584	0	2069	1	2554	0
130	1	615	1	1100	1	1585	1	2070	0	2555	0
131	1	616	1	1101	0	1586	1	2071	1	2556	1
132	1	617	1	1102	1	1587	0	2072	1	2557	1
133	1	618	1	1103	0	1588	1	2073	0	2558	1
134	0	619	1	1104	1	1589	0	2074	0	2559	1
135	1	620	0	1105	1	1590	1	2075	1	2560	0
136	1	621	1	1106	1	1591	0	2076	0	2561	1
137	0	622	0	1107	0	1592	0	2077	1	2562	0
138	1	623	0	1108	0	1593	0	2078	0	2563	1
139	1	624	1	1109	0	1594	0	2079	1	2564	0
140	0	625	1	1110	1	1595	0	2080	1	2565	1
141	0	626	0	1111	1	1596	0	2081	1	2566	1
142	1	627	1	1112	0	1597	1	2082	0	2567	0
143	0	628	1	1113	0	1598	0	2083	0	2568	0
144	1	629	0	1114	0	1599	0	2084	1	2569	1
145	0	630	0	1115	1	1600	1	2085	0	2570	0
146	0	631	0	1116	0	1601	1	2086	0	2571	1
147	1	632	1	1117	0	1602	0	2087	1	2572	1
148	1	633	1	1118	0	1603	0	2088	1	2573	1
149	0	634	1	1119	0	1604	1	2089	0	2574	1
150	1	635	0	1120	0	1605	0	2090	0	2575	1
151	0	636	1	1121	1	1606	0	2091	1	2576	1
152	1	637	0	1122	1	1607	0	2092	0	2577	0
153	0	638	1	1123	0	1608	1	2093	0	2578	1
154	0	639	1	1124	0	1609	0	2094	0	2579	0
155	0	640	1	1125	0	1610	0	2095	1	2580	0
156	0	641	1	1126	1	1611	0	2096	1	2581	0
157	1	642	0	1127	0	1612	0	2097	1	2582	0
158	1	643	0	1128	0	1613	0	2098	0	2583	0
159	1	644	1	1129	0	1614	0	2099	1	2584	1
160	0	645	0	1130	0	1615	1	2100	1	2585	1
161	0	646	0	1131	1	1616	0	2101	0	2586	0
162	0	647	1	1132	0	1617	1	2102	0	2587	0
163	1	648	1	1133	0	1618	1	2103	0	2588	1
164	1	649	1	1134	0	1619	0	2104	1	2589	0
165	1	650	0	1135	1	1620	0	2105	0	2590	0
166	1	651	1	1136	1	1621	0	2106	0	2591	0
167	1	652	1	1137	0	1622	0	2107	0	2592	1
168	0	653	0	1138	1	1623	0	2108	0	2593	0
169	0	654	1	1139	0	1624	0	2109	0	2594	1

170	1	655	1	1140	1	1625	1	2110	1	2595	0
171	0	656	1	1141	0	1626	0	2111	1	2596	1
172	1	657	0	1142	0	1627	1	2112	1	2597	1
173	1	658	1	1143	1	1628	0	2113	1	2598	0
174	0	659	0	1144	1	1629	0	2114	0	2599	1
175	0	660	0	1145	1	1630	1	2115	0	2600	0
176	0	661	0	1146	1	1631	0	2116	0	2601	1
177	0	662	0	1147	1	1632	1	2117	0	2602	0
178	1	663	1	1148	0	1633	0	2118	1	2603	0
179	0	664	0	1149	0	1634	0	2119	0	2604	0
180	1	665	1	1150	0	1635	0	2120	0	2605	0
181	1	666	0	1151	1	1636	0	2121	0	2606	0
182	0	667	0	1152	0	1637	0	2122	0	2607	0
183	0	668	1	1153	1	1638	1	2123	0	2608	1
184	1	669	0	1154	0	1639	0	2124	0	2609	0
185	1	670	0	1155	0	1640	0	2125	1	2610	0
186	0	671	1	1156	1	1641	1	2126	0	2611	0
187	0	672	1	1157	1	1642	1	2127	0	2612	0
188	1	673	0	1158	0	1643	1	2128	0	2613	0
189	1	674	1	1159	0	1644	1	2129	1	2614	0
190	1	675	0	1160	0	1645	0	2130	0	2615	0
191	0	676	0	1161	0	1646	0	2131	1	2616	1
192	0	677	1	1162	0	1647	0	2132	0	2617	0
193	0	678	0	1163	1	1648	0	2133	0	2618	1
194	1	679	1	1164	1	1649	0	2134	0	2619	0
195	0	680	0	1165	1	1650	1	2135	0	2620	1
196	1	681	0	1166	1	1651	0	2136	0	2621	0
197	0	682	0	1167	1	1652	1	2137	0	2622	0
198	0	683	1	1168	0	1653	0	2138	0	2623	0
199	0	684	1	1169	0	1654	1	2139	0	2624	0
200	0	685	1	1170	1	1655	0	2140	0	2625	0
201	0	686	0	1171	1	1656	1	2141	0	2626	0
202	1	687	1	1172	1	1657	1	2142	1	2627	1
203	1	688	0	1173	0	1658	1	2143	0	2628	0
204	1	689	0	1174	1	1659	0	2144	0	2629	0
205	1	690	0	1175	0	1660	0	2145	1	2630	0
206	1	691	0	1176	1	1661	0	2146	1	2631	1
207	1	692	1	1177	0	1662	0	2147	1	2632	1
208	0	693	0	1178	0	1663	1	2148	1	2633	0
209	0	694	1	1179	0	1664	1	2149	0	2634	0
210	1	695	1	1180	1	1665	0	2150	1	2635	0
211	1	696	1	1181	0	1666	1	2151	0	2636	0
212	0	697	1	1182	1	1667	1	2152	1	2637	0
213	0	698	1	1183	0	1668	0	2153	0	2638	1

214	1	699	1	1184	0	1669	0	2154	0	2639	0
215	1	700	0	1185	1	1670	1	2155	1	2640	0
216	0	701	0	1186	0	1671	0	2156	1	2641	0
217	0	702	1	1187	1	1672	1	2157	0	2642	1
218	0	703	1	1188	0	1673	0	2158	0	2643	0
219	0	704	1	1189	0	1674	0	2159	1	2644	0
220	0	705	1	1190	1	1675	0	2160	1	2645	1
221	0	706	1	1191	1	1676	1	2161	0	2646	0
222	0	707	1	1192	1	1677	1	2162	1	2647	1
223	0	708	0	1193	1	1678	0	2163	1	2648	0
224	1	709	1	1194	0	1679	0	2164	1	2649	0
225	0	710	0	1195	0	1680	1	2165	1	2650	0
226	0	711	0	1196	0	1681	1	2166	0	2651	1
227	1	712	1	1197	0	1682	1	2167	1	2652	0
228	0	713	0	1198	1	1683	0	2168	1	2653	1
229	1	714	1	1199	0	1684	0	2169	1	2654	0
230	1	715	0	1200	0	1685	0	2170	0	2655	1
231	0	716	1	1201	1	1686	0	2171	0	2656	1
232	1	717	0	1202	0	1687	1	2172	0	2657	1
233	1	718	0	1203	1	1688	1	2173	1	2658	1
234	1	719	1	1204	0	1689	0	2174	1	2659	0
235	1	720	0	1205	1	1690	0	2175	0	2660	0
236	1	721	1	1206	1	1691	1	2176	0	2661	1
237	1	722	0	1207	0	1692	0	2177	0	2662	0
238	0	723	0	1208	0	1693	1	2178	1	2663	1
239	1	724	1	1209	1	1694	1	2179	0	2664	1
240	0	725	1	1210	0	1695	0	2180	1	2665	1
241	1	726	0	1211	1	1696	1	2181	1	2666	1
242	1	727	1	1212	0	1697	0	2182	0	2667	1
243	1	728	0	1213	1	1698	1	2183	1	2668	1
244	0	729	1	1214	0	1699	0	2184	0	2669	1
245	1	730	0	1215	0	1700	1	2185	0	2670	1
246	0	731	1	1216	1	1701	0	2186	1	2671	0
247	0	732	0	1217	0	1702	0	2187	0	2672	0
248	1	733	0	1218	0	1703	1	2188	0	2673	1
249	1	734	0	1219	0	1704	1	2189	0	2674	0
250	1	735	1	1220	0	1705	1	2190	0	2675	1
251	0	736	0	1221	0	1706	0	2191	1	2676	1
252	0	737	0	1222	0	1707	1	2192	1	2677	1
253	1	738	0	1223	0	1708	0	2193	0	2678	0
254	1	739	0	1224	1	1709	1	2194	0	2679	1
255	0	740	1	1225	1	1710	0	2195	0	2680	1
256	1	741	1	1226	0	1711	0	2196	1	2681	1
257	1	742	0	1227	0	1712	1	2197	1	2682	1

258	1	743	0	1228	0	1713	0	2198	1	2683	1
259	1	744	0	1229	0	1714	0	2199	0	2684	1
260	0	745	0	1230	0	1715	1	2200	0	2685	0
261	0	746	0	1231	1	1716	1	2201	0	2686	1
262	1	747	0	1232	1	1717	0	2202	1	2687	0
263	0	748	0	1233	0	1718	1	2203	0	2688	0
264	1	749	1	1234	1	1719	0	2204	1	2689	0
265	1	750	1	1235	1	1720	1	2205	1	2690	0
266	0	751	1	1236	0	1721	0	2206	0	2691	1
267	1	752	0	1237	0	1722	1	2207	0	2692	0
268	1	753	0	1238	1	1723	0	2208	1	2693	0
269	1	754	1	1239	1	1724	1	2209	0	2694	1
270	1	755	0	1240	0	1725	1	2210	1	2695	0
271	0	756	0	1241	1	1726	0	2211	0	2696	1
272	1	757	1	1242	1	1727	0	2212	0	2697	1
273	0	758	1	1243	0	1728	1	2213	1	2698	0
274	1	759	0	1244	0	1729	0	2214	0	2699	0
275	1	760	0	1245	0	1730	1	2215	1	2700	0
276	1	761	0	1246	0	1731	1	2216	0	2701	1
277	0	762	1	1247	1	1732	0	2217	1	2702	0
278	0	763	1	1248	0	1733	1	2218	1	2703	1
279	1	764	1	1249	1	1734	1	2219	1	2704	1
280	1	765	0	1250	1	1735	1	2220	0	2705	0
281	0	766	0	1251	1	1736	1	2221	0	2706	0
282	1	767	0	1252	1	1737	1	2222	0	2707	0
283	0	768	1	1253	1	1738	0	2223	1	2708	1
284	1	769	1	1254	0	1739	1	2224	0	2709	0
285	1	770	1	1255	0	1740	1	2225	0	2710	0
286	0	771	1	1256	0	1741	0	2226	0	2711	1
287	1	772	0	1257	1	1742	0	2227	1	2712	1
288	1	773	1	1258	0	1743	0	2228	0	2713	0
289	0	774	0	1259	1	1744	1	2229	0	2714	0
290	1	775	0	1260	0	1745	0	2230	0	2715	1
291	1	776	1	1261	0	1746	1	2231	0	2716	0
292	0	777	0	1262	0	1747	0	2232	0	2717	0
293	1	778	1	1263	1	1748	0	2233	1	2718	0
294	0	779	1	1264	1	1749	1	2234	1	2719	1
295	0	780	0	1265	0	1750	0	2235	0	2720	1
296	1	781	1	1266	1	1751	1	2236	0	2721	0
297	0	782	1	1267	1	1752	0	2237	1	2722	1
298	1	783	0	1268	1	1753	0	2238	0	2723	1
299	0	784	1	1269	0	1754	1	2239	0	2724	0
300	1	785	0	1270	1	1755	1	2240	1	2725	1
301	0	786	0	1271	0	1756	1	2241	1	2726	0

302	1	787	1	1272	0	1757	1	2242	1	2727	1
303	1	788	1	1273	1	1758	0	2243	0	2728	1
304	1	789	0	1274	1	1759	0	2244	0	2729	1
305	0	790	1	1275	1	1760	0	2245	0	2730	1
306	1	791	1	1276	0	1761	0	2246	0	2731	1
307	1	792	0	1277	1	1762	1	2247	0	2732	0
308	0	793	0	1278	0	1763	0	2248	1	2733	1
309	1	794	1	1279	0	1764	0	2249	0	2734	0
310	0	795	0	1280	0	1765	0	2250	0	2735	0
311	0	796	0	1281	0	1766	0	2251	0	2736	0
312	1	797	0	1282	0	1767	0	2252	1	2737	0
313	0	798	0	1283	1	1768	0	2253	1	2738	1
314	1	799	1	1284	1	1769	1	2254	1	2739	1
315	1	800	0	1285	0	1770	0	2255	1	2740	1
316	1	801	0	1286	1	1771	0	2256	1	2741	1
317	0	802	1	1287	1	1772	0	2257	0	2742	1
318	1	803	0	1288	1	1773	1	2258	1	2743	1
319	1	804	1	1289	0	1774	1	2259	1	2744	1
320	0	805	1	1290	1	1775	1	2260	1	2745	0
321	0	806	0	1291	0	1776	0	2261	0	2746	0
322	1	807	1	1292	0	1777	0	2262	0	2747	0
323	1	808	0	1293	1	1778	0	2263	1	2748	1
324	0	809	0	1294	0	1779	1	2264	0	2749	0
325	1	810	0	1295	1	1780	1	2265	1	2750	1
326	1	811	1	1296	0	1781	0	2266	0	2751	0
327	1	812	0	1297	0	1782	0	2267	1	2752	0
328	0	813	0	1298	1	1783	0	2268	0	2753	1
329	0	814	0	1299	1	1784	0	2269	1	2754	0
330	0	815	1	1300	1	1785	0	2270	0	2755	0
331	0	816	1	1301	1	1786	1	2271	1	2756	1
332	0	817	0	1302	0	1787	0	2272	1	2757	1
333	1	818	1	1303	0	1788	0	2273	0	2758	0
334	1	819	0	1304	0	1789	1	2274	0	2759	0
335	1	820	1	1305	0	1790	0	2275	1	2760	0
336	0	821	0	1306	0	1791	0	2276	1	2761	1
337	0	822	0	1307	1	1792	0	2277	0	2762	0
338	1	823	1	1308	1	1793	1	2278	1	2763	1
339	0	824	1	1309	1	1794	0	2279	0	2764	0
340	1	825	1	1310	1	1795	0	2280	1	2765	1
341	0	826	0	1311	1	1796	1	2281	0	2766	1
342	0	827	0	1312	0	1797	1	2282	0	2767	1
343	1	828	0	1313	1	1798	0	2283	0	2768	0
344	0	829	0	1314	1	1799	1	2284	1	2769	0
345	0	830	1	1315	1	1800	1	2285	1	2770	1

346	1	831	0	1316	1	1801	0	2286	0	2771	0
347	1	832	0	1317	1	1802	0	2287	1	2772	1
348	0	833	1	1318	1	1803	1	2288	1	2773	0
349	1	834	1	1319	1	1804	1	2289	0	2774	1
350	0	835	0	1320	1	1805	1	2290	1	2775	1
351	1	836	0	1321	1	1806	0	2291	1	2776	0
352	1	837	0	1322	1	1807	1	2292	0	2777	1
353	1	838	1	1323	0	1808	1	2293	0	2778	1
354	0	839	1	1324	0	1809	1	2294	1	2779	0
355	1	840	1	1325	1	1810	0	2295	1	2780	0
356	0	841	0	1326	1	1811	1	2296	0	2781	1
357	0	842	0	1327	1	1812	1	2297	1	2782	1
358	0	843	0	1328	0	1813	1	2298	1	2783	1
359	1	844	1	1329	0	1814	1	2299	1	2784	1
360	1	845	1	1330	1	1815	0	2300	0	2785	0
361	0	846	1	1331	0	1816	0	2301	1	2786	0
362	0	847	1	1332	1	1817	0	2302	0	2787	0
363	1	848	0	1333	1	1818	0	2303	0	2788	1
364	1	849	0	1334	0	1819	1	2304	0	2789	1
365	1	850	0	1335	0	1820	1	2305	1	2790	0
366	0	851	0	1336	1	1821	0	2306	0	2791	0
367	0	852	1	1337	0	1822	0	2307	0	2792	0
368	0	853	1	1338	1	1823	1	2308	0	2793	1
369	0	854	0	1339	1	1824	0	2309	1	2794	1
370	0	855	0	1340	1	1825	0	2310	1	2795	1
371	1	856	0	1341	0	1826	0	2311	1	2796	0
372	0	857	1	1342	0	1827	0	2312	0	2797	1
373	0	858	0	1343	0	1828	1	2313	1	2798	1
374	0	859	0	1344	0	1829	0	2314	1	2799	0
375	1	860	1	1345	1	1830	1	2315	0	2800	1
376	1	861	1	1346	0	1831	0	2316	0	2801	1
377	1	862	1	1347	1	1832	0	2317	1	2802	1
378	1	863	1	1348	1	1833	0	2318	1	2803	0
379	1	864	1	1349	1	1834	0	2319	1	2804	0
380	0	865	1	1350	0	1835	0	2320	1	2805	1
381	1	866	1	1351	0	1836	0	2321	0	2806	1
382	1	867	0	1352	1	1837	0	2322	1	2807	0
383	1	868	1	1353	1	1838	1	2323	0	2808	1
384	0	869	1	1354	0	1839	0	2324	0	2809	1
385	0	870	0	1355	0	1840	1	2325	0	2810	1
386	1	871	0	1356	0	1841	1	2326	0	2811	1
387	1	872	1	1357	0	1842	1	2327	1	2812	1
388	1	873	0	1358	0	1843	1	2328	1	2813	1
389	0	874	1	1359	1	1844	1	2329	0	2814	0

390	0	875	1	1360	1	1845	0	2330	0	2815	1
391	0	876	1	1361	1	1846	1	2331	0	2816	0
392	0	877	0	1362	1	1847	1	2332	0	2817	1
393	1	878	0	1363	0	1848	0	2333	1	2818	0
394	0	879	1	1364	1	1849	0	2334	1	2819	0
395	0	880	1	1365	0	1850	0	2335	1	2820	1
396	0	881	1	1366	0	1851	0	2336	0	2821	0
397	0	882	0	1367	0	1852	1	2337	0	2822	1
398	0	883	0	1368	0	1853	0	2338	0	2823	0
399	0	884	0	1369	1	1854	0	2339	0	2824	0
400	0	885	1	1370	1	1855	1	2340	1	2825	0
401	1	886	0	1371	1	1856	1	2341	1	2826	0
402	0	887	0	1372	0	1857	0	2342	1	2827	1
403	0	888	1	1373	1	1858	0	2343	1	2828	0
404	0	889	1	1374	1	1859	1	2344	0	2829	0
405	0	890	1	1375	1	1860	0	2345	0	2830	0
406	0	891	0	1376	0	1861	1	2346	0	2831	1
407	1	892	0	1377	0	1862	0	2347	0	2832	1
408	1	893	0	1378	1	1863	0	2348	1	2833	0
409	0	894	1	1379	0	1864	0	2349	1	2834	1
410	0	895	1	1380	1	1865	0	2350	1	2835	1
411	1	896	1	1381	1	1866	0	2351	1	2836	1
412	0	897	1	1382	1	1867	0	2352	1	2837	0
413	0	898	0	1383	1	1868	1	2353	1	2838	0
414	1	899	0	1384	1	1869	0	2354	1	2839	1
415	0	900	1	1385	0	1870	0	2355	0	2840	0
416	0	901	1	1386	0	1871	0	2356	1	2841	1
417	1	902	1	1387	0	1872	0	2357	1	2842	0
418	1	903	0	1388	0	1873	1	2358	0	2843	0
419	1	904	0	1389	0	1874	0	2359	1	2844	0
420	0	905	1	1390	1	1875	0	2360	1	2845	1
421	0	906	1	1391	0	1876	0	2361	1	2846	0
422	1	907	1	1392	1	1877	1	2362	0	2847	1
423	1	908	1	1393	0	1878	0	2363	0	2848	1
424	0	909	0	1394	1	1879	1	2364	1	2849	1
425	1	910	1	1395	1	1880	0	2365	0	2850	1
426	0	911	1	1396	1	1881	0	2366	0	2851	0
427	1	912	0	1397	0	1882	1	2367	1	2852	0
428	1	913	1	1398	1	1883	0	2368	1	2853	1
429	1	914	1	1399	1	1884	0	2369	0	2854	0
430	0	915	1	1400	1	1885	0	2370	1	2855	1
431	1	916	1	1401	1	1886	1	2371	0	2856	1
432	1	917	1	1402	0	1887	0	2372	1	2857	1
433	1	918	1	1403	1	1888	1	2373	1	2858	0

434	0	919	1	1404	1	1889	1	2374	1	2859	0
435	0	920	1	1405	1	1890	1	2375	1	2860	1
436	0	921	0	1406	0	1891	0	2376	1	2861	0
437	1	922	0	1407	1	1892	1	2377	1	2862	0
438	1	923	0	1408	0	1893	0	2378	0	2863	1
439	0	924	1	1409	1	1894	1	2379	1	2864	0
440	0	925	0	1410	1	1895	1	2380	1	2865	1
441	1	926	0	1411	1	1896	1	2381	0	2866	1
442	1	927	0	1412	1	1897	1	2382	1	2867	1
443	1	928	0	1413	1	1898	1	2383	1	2868	0
444	1	929	0	1414	1	1899	0	2384	1	2869	1
445	1	930	0	1415	1	1900	1	2385	0	2870	0
446	1	931	1	1416	0	1901	0	2386	0	2871	1
447	0	932	1	1417	1	1902	0	2387	0	2872	0
448	0	933	1	1418	0	1903	0	2388	0	2873	0
449	1	934	1	1419	1	1904	0	2389	0	2874	1
450	1	935	0	1420	0	1905	1	2390	1	2875	1
451	0	936	0	1421	0	1906	0	2391	0	2876	0
452	0	937	1	1422	0	1907	1	2392	1	2877	0
453	1	938	1	1423	0	1908	0	2393	1	2878	1
454	0	939	0	1424	1	1909	0	2394	1	2879	1
455	1	940	1	1425	0	1910	1	2395	0	2880	0
456	0	941	0	1426	0	1911	0	2396	0	2881	0
457	1	942	0	1427	0	1912	1	2397	0	2882	1
458	0	943	1	1428	0	1913	1	2398	0	2883	1
459	0	944	0	1429	1	1914	1	2399	1	2884	0
460	1	945	1	1430	0	1915	1	2400	1	2885	1
461	0	946	0	1431	1	1916	0	2401	0	2886	0
462	0	947	0	1432	1	1917	0	2402	0	2887	1
463	1	948	1	1433	0	1918	0	2403	1	2888	1
464	1	949	0	1434	1	1919	1	2404	0	2889	1
465	1	950	0	1435	0	1920	0	2405	1	2890	1
466	0	951	1	1436	1	1921	1	2406	1	2891	0
467	0	952	1	1437	1	1922	1	2407	1	2892	0
468	1	953	0	1438	1	1923	0	2408	1	2893	0
469	1	954	0	1439	1	1924	1	2409	0	2894	0
470	0	955	0	1440	1	1925	0	2410	0	2895	0
471	1	956	0	1441	0	1926	0	2411	1	2896	0
472	0	957	1	1442	0	1927	1	2412	0	2897	0
473	1	958	1	1443	1	1928	1	2413	1	2898	1
474	0	959	1	1444	0	1929	0	2414	0	2899	0
475	1	960	1	1445	1	1930	1	2415	0	2900	0
476	1	961	0	1446	1	1931	0	2416	1	2901	0
477	0	962	1	1447	1	1932	0	2417	1	2902	0

478	1	963	0	1448	1	1933	1	2418	0	2903	0
479	0	964	0	1449	0	1934	0	2419	1		
480	1	965	0	1450	1	1935	0	2420	0		
481	1	966	0	1451	1	1936	1	2421	1		
482	0	967	0	1452	1	1937	1	2422	0		
483	0	968	1	1453	0	1938	0	2423	0		
484	1	969	1	1454	0	1939	0	2424	0		

Université de Strasbourg, CNRS, IRMA UMR 7501, F-67000 Strasbourg, France
Email address: guoniu.han@unistra.fr

School of Mathematics and Statistics, Huazhong University of Science and Technology, Wuhan, PR China
Email address: huyining@hust.edu.cn