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

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 $(a,b) = (z^6+z, z+1)$.

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: 9/04/2020 20:29:37 .
2010 *Mathematics Subject Classification.* 11B85, 11J70, 11B50, 11Y65, 05A15.
Key words and phrases. automatic sequence, continued fraction, Thue-Morse sequence.

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

Theorem 1.1. *When $(a,b)=(z^6+z,z+1)$, 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 $\mathrm{CF}(a,b)$,

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

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

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

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 $a_0, a_1, \dots, a_{n-1} \in \mathbb{F}_2$ $P(x, \sum_{j=0}^{n-1} a_j x^j) = O(x^n)$ and $Q(x,y) := P(x, \sum_{j=0}^{n-1} a_j x^j + x^n y)$ can be written as $x^m \sum_{j=0}^{\infty} q_j(x) y^j$ where $q_j(x)$ are polynomials for $j \ge 0$, $q_1(0) = 1$, and $q_j(0) = 0$ for $j > 1$, then there exists a unique solution $f(x) \in \mathbb{F}_2[[x]]$ of $P(x, f(x)) = 0$ that satisfies the initial condition $f_n(x) = \sum_{j=0}^{n-1} a_j x^j$.

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

Lemma 2.1. *We have*

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

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

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

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

Proof. We give the proof of the identity

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

the proofs of the others being similar.

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

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

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

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

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

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

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

Define

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

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

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

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

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

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

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

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

$$+ x^{12u}T[:2u] + x^{13u}T[:u].$$

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

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

which can be rewritten as

$$\begin{aligned}
&0 = T[[w]_2] + T[[1w]_2] + T[[10w]_2] + T[[100w]_2] + T[[101w]_2] \\
&\quad + T[[110w]_2] + T[[111w]_2], \qquad (2.7) \\
&0 = T[[w]_2] + T[[11w]_2] + T[[100w]_2] + T[[1000w]_2], \qquad (2.8) \\
&0 = T[[w]_2] + T[[1w]_2] + T[[100w]_2] + T[[101w]_2] + T[[1001w]_2], \qquad (2.9) \\
&0 = T[[1w]_2] + T[[10w]_2] + T[[101w]_2] + T[[110w]_2] + T[[1010w]_2], \qquad (2.10) \\
&0 = T[[w]_2] + T[[1w]_2] + T[[11w]_2] + T[[100w]_2] + T[[101w]_2] \\
&\quad + T[[1011w]_2], \qquad (2.11) \\
&0 = T[[1w]_2] + T[[10w]_2] + T[[100w]_2] + T[[101w]_2] + T[[110w]_2] \\
&\quad + T[[1100w]_2], \qquad (2.12) \\
&0 = T[[w]_2] + T[[1w]_2] + T[[11w]_2] + T[[100w]_2] + T[[1101w]_2], \qquad (2.13)
\end{aligned}$$

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

$$\begin{aligned}
&0 = T[[w]_2] + T[[1w]_2] + T[[10w]_2] + T[[100w]_2] + T[[101w]_2] \\
&\quad + T[[110w]_2] + T[[111w]_2], \qquad (2.14) \\
&0 = T[[w]_2] + T[[11w]_2] + T[[100w]_2] + T[[1000w]_2], \qquad (2.15) \\
&0 = T[[w]_2] + T[[1w]_2] + T[[100w]_2] + T[[101w]_2] + T[[1001w]_2], \qquad (2.16) \\
&0 = T[[1w]_2] + T[[10w]_2] + T[[101w]_2] + T[[110w]_2] + T[[1010w]_2], \qquad (2.17) \\
&0 = T[[w]_2] + T[[1w]_2] + T[[11w]_2] + T[[100w]_2] + T[[101w]_2] \\
&\quad + T[[1011w]_2], \qquad (2.18) \\
&0 = T[[1w]_2] + T[[10w]_2] + T[[100w]_2] + T[[101w]_2] + T[[110w]_2] \\
&\quad + T[[1100w]_2], \qquad (2.19) \\
&0 = T[[w]_2] + T[[1w]_2] + T[[11w]_2] + T[[100w]_2] + T[[1101w]_2], \qquad (2.20)
\end{aligned}$$

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

First we calculate an 2-automaton that generates T from its minimal polynomial and its first terms. This automaton has 3241 states; its transition function and output function can be found in the annex. Let $A(s, w)$ denote the state reached after reading w from right to left starting from the state s, and τ the output function. Define

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

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

$$\begin{aligned} 0 &= \tau(A(s,\epsilon)) + \tau(A(s,1)) + \tau(A(s,10)) + \tau(A(s,100)) \\ &\quad + \tau(A(s,101)) + \tau(A(s,110)) + \tau(A(s,111)), \end{aligned} \tag{2.21}$$

$$0 = \tau(A(s,\epsilon)) + \tau(A(s,11)) + \tau(A(s,100)) + \tau(A(s,1000)), \tag{2.22}$$

$$\begin{aligned} 0 &= \tau(A(s,\epsilon)) + \tau(A(s,1)) + \tau(A(s,100)) + \tau(A(s,101)) \\ &\quad + \tau(A(s,1001)), \end{aligned} \tag{2.23}$$

$$\begin{aligned} 0 &= \tau(A(s,1)) + \tau(A(s,10)) + \tau(A(s,101)) + \tau(A(s,110)) \\ &\quad + \tau(A(s,1010)), \end{aligned} \tag{2.24}$$

$$\begin{aligned} 0 &= \tau(A(s,\epsilon)) + \tau(A(s,1)) + \tau(A(s,11)) + \tau(A(s,100)) \\ &\quad + \tau(A(s,101)) + \tau(A(s,1011)), \end{aligned} \tag{2.25}$$

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

$$\begin{aligned} 0 &= \tau(A(s,\epsilon)) + \tau(A(s,1)) + \tau(A(s,11)) + \tau(A(s,100)) \\ &\quad + \tau(A(s,1101)), \end{aligned} \tag{2.27}$$

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

$$\begin{aligned} 0 &= \tau(A(s,\epsilon)) + \tau(A(s,1)) + \tau(A(s,10)) + \tau(A(s,100)) \\ &\quad + \tau(A(s,101)) + \tau(A(s,110)) + \tau(A(s,111)), \end{aligned} \tag{2.28}$$

$$0 = \tau(A(s,\epsilon)) + \tau(A(s,11)) + \tau(A(s,100)) + \tau(A(s,1000)), \tag{2.29}$$

$$\begin{aligned} 0 &= \tau(A(s,\epsilon)) + \tau(A(s,1)) + \tau(A(s,100)) + \tau(A(s,101)) \\ &\quad + \tau(A(s,1001)), \end{aligned} \tag{2.30}$$

$$\begin{aligned} 0 &= \tau(A(s,1)) + \tau(A(s,10)) + \tau(A(s,101)) + \tau(A(s,110)) \\ &\quad + \tau(A(s,1010)), \end{aligned} \tag{2.31}$$

$$\begin{aligned} 0 &= \tau(A(s,\epsilon)) + \tau(A(s,1)) + \tau(A(s,11)) + \tau(A(s,100)) \\ &\quad + \tau(A(s,101)) + \tau(A(s,1011)), \end{aligned} \tag{2.32}$$

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

$$\begin{aligned} 0 &= \tau(A(s,\epsilon)) + \tau(A(s,1)) + \tau(A(s,11)) + \tau(A(s,100)) \\ &\quad + \tau(A(s,1101)), \end{aligned} \tag{2.34}$$

for $s = A(i, 0^{2k})$. We find that $(A(i, 0^{32}), E_{32}) = (A(i, 0^{20}), E_{20})$, so that we only have to verify that identities (2.21) through (2.34) hold for $2 \leq k \leq 16$, which turns out to be true. $\square$

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

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

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

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

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

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

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

We give the proof of

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

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

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

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

$$\begin{aligned} & W^e[:14v] M^e[:14v] + x^{2v} W^e[:12v] M^e[:12v] + x^{4v} W^e[:10v] M^e[:10v] \\ &\quad + x^{6v} W^e[:8v] M^e[:8v] + x^{10v} W^e[:4v] M^e[:4v] + x^{12v} W^e[:2v] M^e[:2v]. \end{aligned}$$

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

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

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

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

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

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

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

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

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

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

Define

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

where

$$\begin{aligned}
q_0(x) &= x^{22} + x^{21} + x^{20} + x^{18} + x^{16} + x^{13} + x^{12} + x^{10} + x^9 + x^8 + x^7, \\
q_1(x) &= x^{21} + x^{20} + x^{16} + x^{15} + x^{13} + x^{12} + x^9 + x^6 + x^4 + x^3 + x^2 + x, \\
q_2(x) &= x^{20} + x^{18} + x^{14} + x^8 + x^4 + 1, \\
q_3(x) &= x^{21} + x^{20} + x^{16} + x^{15} + x^{13} + x^{12} + x^9 + x^6 + x^4 + x^3 + x^2 + x, \\
q_4(x) &= x^{21} + x^{20} + x^{18} + x^{14} + x^{13} + x^{12} + x^9 + x^8 + x^7 + x^4 + x^2.
\end{aligned}$$

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

3. Annexe

All 16 polynomials are of the form

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

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

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

$$\begin{aligned}
p_0(x) &= x^{102} + x^{98} + x^{96} + x^{92} + x^{88} + x^{84} + x^{82} + x^{74} + x^{72} + x^{70} + x^{66} \\
&\quad + x^{58} + x^{56} + x^{54} + x^{50} + x^{44} + x^{42} + x^{26} + x^{24} + x^{14} + x^{12}, \\
p_3(x) &= x^{98} + x^{96} + x^{94} + x^{92} + x^{90} + x^{88} + x^{86} + x^{78} + x^{76} + x^{74} + x^{72} \\
&\quad + x^{70} + x^{66} + x^{60} + x^{56} + x^{54} + x^{48} + x^{46} + x^{42} + x^{40} + x^{36} + x^{30} \\
&\quad + x^{28} + x^{26} + x^{24} + x^{22} + x^{20} + x^{8}, \\
p_6(x) &= x^{96} + x^{92} + x^{90} + x^{88} + x^{86} + x^{84} + x^{76} + x^{72} + x^{68} + x^{66} + x^{60} \\
&\quad + x^{58} + x^{54} + x^{46} + x^{42} + x^{30} + x^{28} + x^{24} + x^{22} + x^{20} + x^{18} + x^{10} \\
&\quad + x^{8} + x^{6} + x^{4} + 1, \\
p_9(x) &= x^{100} + x^{96} + x^{94} + x^{92} + x^{88} + x^{86} + x^{84} + x^{82} + x^{80} + x^{78} + x^{72} \\
&\quad + x^{68} + x^{66} + x^{64} + x^{58} + x^{56} + x^{42} + x^{40} + x^{38} + x^{26} + x^{18} + x^{16} \\
&\quad + x^{12} + x^{10} + x^{4} + x^{2}, \\
p_{12}(x) &= x^{100} + x^{98} + x^{92} + x^{88} + x^{84} + x^{80} + x^{76} + x^{72} + x^{66} + x^{64} + x^{52} \\
&\quad + x^{50} + x^{44} + x^{40} + x^{34} + x^{32} + x^{20} + x^{18} + x^{12} + x^{8} + x^{2} + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{117} + x^{116} + x^{115} + x^{114} + x^{112} + x^{110} + x^{109} + x^{108} + x^{106} + x^{105} \\
&\quad + x^{104} + x^{103} + x^{102} + x^{101} + x^{99} + x^{96} + x^{95} + x^{92} + x^{90} + x^{88} \\
&\quad + x^{87} + x^{86} + x^{84} + x^{83} + x^{82} + x^{81} + x^{79} + x^{78} + x^{77} + x^{76} + x^{72} \\
&\quad + x^{70} + x^{68} + x^{66} + x^{65} + x^{64} + x^{63} + x^{62} + x^{61} + x^{59} + x^{58} + x^{56} \\
&\quad + x^{55} + x^{53} + x^{52} + x^{51} + x^{49} + x^{48} + x^{47} + x^{44} + x^{43} + x^{39} + x^{38} \\
&\quad + x^{37} + x^{36} + x^{33} + x^{32} + x^{29} + x^{27}, \\
p_3(x) &= x^{115} + x^{113} + x^{107} + x^{99} + x^{97} + x^{95} + x^{93} + x^{91} + x^{81} + x^{73} + x^{71} \\
&\quad + x^{69} + x^{65} + x^{63} + x^{61} + x^{59} + x^{57} + x^{51} + x^{49} + x^{47} + x^{45} + x^{43} \\
&\quad + x^{33} + x^{25} + x^{23} + x^{21} + x^{19} + x^{15} + x^{13} + x^{9}, \\
p_6(x) &= x^{114} + x^{113} + x^{109} + x^{108} + x^{106} + x^{105} + x^{104} + x^{103} + x^{101} + x^{100} \\
&\quad + x^{99} + x^{97} + x^{96} + x^{95} + x^{93} + x^{92} + x^{91} + x^{90} + x^{88} + x^{87} + x^{86} \\
&\quad + x^{85} + x^{83} + x^{82} + x^{81} + x^{80} + x^{78} + x^{77} + x^{76} + x^{75} + x^{74} + x^{72} \\
&\quad + x^{71} + x^{70} + x^{69} + x^{67} + x^{64} + x^{62} + x^{59} + x^{58} + x^{54} + x^{53} + x^{50} \\
&\quad + x^{48} + x^{46} + x^{43} + x^{42} + x^{30} + x^{29} + x^{25} + x^{24} + x^{20} + x^{19} + x^{18} \\
&\quad + x^{17} + x^{15} + x^{12} + x^{10} + x^{7} + x^{6}, \\
p_9(x) &= x^{113} + x^{105} + x^{101} + x^{99} + x^{93} + x^{81} + x^{79} + x^{77} + x^{71} + x^{69} + x^{65} \\
&\quad + x^{61} + x^{59} + x^{57} + x^{55} + x^{53} + x^{47} + x^{41} + x^{35} + x^{33} + x^{29} + x^{25} \\
&\quad + x^{23} + x^{19} + x^{11} + x^{7} + x^{5} + x^{3},
\end{aligned}$$

$$\begin{aligned}
p_{12}(x) = {} & x^{112} + x^{111} + x^{110} + x^{109} + x^{108} + x^{104} + x^{103} + x^{102} + x^{101} + x^{100} \\
& + x^{96} + x^{95} + x^{94} + x^{93} + x^{91} + x^{90} + x^{89} + x^{87} + x^{86} + x^{85} + x^{83} \\
& + x^{82} + x^{81} + x^{80} + x^{76} + x^{75} + x^{74} + x^{73} + x^{72} + x^{68} + x^{67} + x^{66} \\
& + x^{65} + x^{63} + x^{62} + x^{61} + x^{60} + x^{56} + x^{55} + x^{54} + x^{53} + x^{52} + x^{44} \\
& + x^{43} + x^{42} + x^{41} + x^{40} + x^{36} + x^{35} + x^{34} + x^{33} + x^{31} + x^{30} + x^{29} \\
& + x^{28} + x^{24} + x^{23} + x^{22} + x^{21} + x^{20} + x^{12} + x^{11} + x^{10} + x^{9} + x^{8} + x^{4} \\
& + x^{3} + x^{2} + x + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_{0}(x) = {} & x^{117} + x^{116} + x^{115} + x^{114} + x^{112} + x^{110} + x^{109} + x^{108} + x^{106} + x^{105} \\
& + x^{104} + x^{103} + x^{102} + x^{101} + x^{99} + x^{96} + x^{95} + x^{92} + x^{90} + x^{88} \\
& + x^{87} + x^{86} + x^{84} + x^{83} + x^{82} + x^{81} + x^{79} + x^{78} + x^{77} + x^{76} + x^{72} \\
& + x^{70} + x^{68} + x^{66} + x^{65} + x^{64} + x^{63} + x^{62} + x^{61} + x^{59} + x^{58} + x^{56} \\
& + x^{55} + x^{53} + x^{52} + x^{51} + x^{49} + x^{48} + x^{47} + x^{44} + x^{43} + x^{39} + x^{38} \\
& + x^{37} + x^{36} + x^{33} + x^{32} + x^{29} + x^{27}, \\
p_{3}(x) = {} & x^{115} + x^{113} + x^{107} + x^{99} + x^{97} + x^{95} + x^{93} + x^{91} + x^{81} + x^{73} + x^{71} \\
& + x^{69} + x^{65} + x^{63} + x^{61} + x^{59} + x^{57} + x^{51} + x^{49} + x^{47} + x^{45} + x^{43} \\
& + x^{33} + x^{25} + x^{23} + x^{21} + x^{19} + x^{15} + x^{13} + x^{9}, \\
p_{6}(x) = {} & x^{114} + x^{113} + x^{109} + x^{108} + x^{106} + x^{105} + x^{104} + x^{103} + x^{101} + x^{100} \\
& + x^{99} + x^{97} + x^{96} + x^{95} + x^{93} + x^{92} + x^{91} + x^{90} + x^{88} + x^{87} + x^{86} \\
& + x^{85} + x^{83} + x^{82} + x^{81} + x^{80} + x^{78} + x^{77} + x^{76} + x^{75} + x^{74} + x^{72} \\
& + x^{71} + x^{70} + x^{69} + x^{67} + x^{64} + x^{62} + x^{59} + x^{58} + x^{54} + x^{53} + x^{50} \\
& + x^{48} + x^{46} + x^{43} + x^{42} + x^{30} + x^{29} + x^{25} + x^{24} + x^{20} + x^{19} + x^{18} \\
& + x^{17} + x^{15} + x^{12} + x^{10} + x^{7} + x^{6}, \\
p_{9}(x) = {} & x^{113} + x^{105} + x^{101} + x^{99} + x^{93} + x^{81} + x^{79} + x^{77} + x^{71} + x^{69} + x^{65} \\
& + x^{61} + x^{59} + x^{57} + x^{55} + x^{53} + x^{47} + x^{41} + x^{35} + x^{33} + x^{29} + x^{25} \\
& + x^{23} + x^{19} + x^{11} + x^{7} + x^{5} + x^{3}, \\
p_{12}(x) = {} & x^{112} + x^{111} + x^{110} + x^{109} + x^{108} + x^{104} + x^{103} + x^{102} + x^{101} + x^{100} \\
& + x^{96} + x^{95} + x^{94} + x^{93} + x^{91} + x^{90} + x^{89} + x^{87} + x^{86} + x^{85} + x^{83} \\
& + x^{82} + x^{81} + x^{80} + x^{76} + x^{75} + x^{74} + x^{73} + x^{72} + x^{68} + x^{67} + x^{66} \\
& + x^{65} + x^{63} + x^{62} + x^{61} + x^{60} + x^{56} + x^{55} + x^{54} + x^{53} + x^{52} + x^{44} \\
& + x^{43} + x^{42} + x^{41} + x^{40} + x^{36} + x^{35} + x^{34} + x^{33} + x^{31} + x^{30} + x^{29} \\
& + x^{28} + x^{24} + x^{23} + x^{22} + x^{21} + x^{20} + x^{12} + x^{11} + x^{10} + x^{9} + x^{8} + x^{4} \\
& + x^{3} + x^{2} + x + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{132} + x^{130} + x^{126} + x^{124} + x^{122} + x^{120} + x^{116} + x^{112} + x^{110} + x^{106} \\
&\quad + x^{104} + x^{100} + x^{98} + x^{92} + x^{90} + x^{86} + x^{78} + x^{68} + x^{66} + x^{60} + x^{56} \\
&\quad + x^{54} + x^{52} + x^{44} + x^{42}, \\
p_3(x) &= x^{126} + x^{124} + x^{120} + x^{116} + x^{106} + x^{104} + x^{98} + x^{96} + x^{90} + x^{88} \\
&\quad + x^{86} + x^{82} + x^{76} + x^{68} + x^{64} + x^{54} + x^{50} + x^{42} + x^{38} + x^{36} + x^{34} \\
&\quad + x^{30} + x^{24} + x^{20} + x^{10} + x^{6}, \\
p_6(x) &= x^{126} + x^{122} + x^{118} + x^{116} + x^{114} + x^{112} + x^{98} + x^{94} + x^{88} + x^{86} \\
&\quad + x^{80} + x^{78} + x^{72} + x^{68} + x^{66} + x^{62} + x^{58} + x^{56} + x^{54} + x^{52} + x^{50} \\
&\quad + x^{48} + x^{44} + x^{40} + x^{38} + x^{30} + x^{24} + x^{22} + x^{20} + x^{18} + x^{14} + x^{12} \\
&\quad + x^{8} + x^{6} + x^{2} + 1, \\
p_9(x) &= x^{124} + x^{122} + x^{120} + x^{116} + x^{114} + x^{112} + x^{110} + x^{108} + x^{106} + x^{104} \\
&\quad + x^{102} + x^{100} + x^{98} + x^{90} + x^{80} + x^{78} + x^{74} + x^{72} + x^{68} + x^{58} + x^{52} \\
&\quad + x^{50} + x^{46} + x^{44} + x^{38} + x^{36} + x^{30} + x^{26} + x^{24} + x^{22} + x^{20} + x^{12} \\
&\quad + x^{6} + x^{2}, \\
p_{12}(x) &= x^{124} + x^{120} + x^{108} + x^{104} + x^{84} + x^{80} + x^{76} + x^{72} + x^{68} + x^{64} + x^{44} \\
&\quad + x^{40} + x^{36} + x^{32} + x^{4} + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{132} + x^{130} + x^{128} + x^{126} + x^{124} + x^{120} + x^{116} + x^{110} + x^{108} + x^{106} \\
&\quad + x^{104} + x^{94} + x^{92} + x^{90} + x^{88} + x^{86} + x^{84} + x^{80} + x^{74} + x^{68} + x^{62} \\
&\quad + x^{60} + x^{58} + x^{56} + x^{44} + x^{40} + x^{38} + x^{34} + x^{32} + x^{28} + x^{26} + x^{24} \\
&\quad + x^{22} + x^{20} + x^{12}, \\
p_3(x) &= x^{126} + x^{124} + x^{122} + x^{118} + x^{114} + x^{110} + x^{108} + x^{102} + x^{98} + x^{96} \\
&\quad + x^{84} + x^{82} + x^{80} + x^{76} + x^{74} + x^{70} + x^{68} + x^{66} + x^{64} + x^{62} + x^{56} \\
&\quad + x^{54} + x^{52} + x^{50} + x^{44} + x^{34} + x^{30} + x^{28} + x^{20} + x^{16} + x^{12} + x^{8}, \\
p_6(x) &= x^{126} + x^{112} + x^{110} + x^{108} + x^{106} + x^{104} + x^{102} + x^{100} + x^{98} + x^{94} \\
&\quad + x^{90} + x^{88} + x^{84} + x^{80} + x^{78} + x^{74} + x^{70} + x^{64} + x^{60} + x^{58} + x^{54} \\
&\quad + x^{52} + x^{50} + x^{44} + x^{42} + x^{40} + x^{36} + x^{32} + x^{30} + x^{24} + x^{22} + x^{20} \\
&\quad + x^{18} + x^{16} + x^{14} + x^{12} + x^{10} + x^{4} + x^{2} + 1, \\
p_9(x) &= x^{124} + x^{122} + x^{120} + x^{116} + x^{114} + x^{112} + x^{110} + x^{108} + x^{106} + x^{104} \\
&\quad + x^{102} + x^{100} + x^{98} + x^{90} + x^{80} + x^{78} + x^{74} + x^{72} + x^{68} + x^{58} + x^{52} \\
&\quad + x^{50} + x^{46} + x^{44} + x^{38} + x^{36} + x^{30} + x^{26} + x^{24} + x^{22} + x^{20} + x^{12} \\
&\quad + x^{6} + x^{2}, \\
p_{12}(x) &= x^{124} + x^{120} + x^{108} + x^{104} + x^{84} + x^{80} + x^{76} + x^{72} + x^{68} + x^{64} + x^{44}
\end{aligned}$$

$$+ x^{40} + x^{36} + x^{32} + x^{4} + 1,$$

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

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

$$\begin{aligned}
p_0(x) &= x^{117} + x^{115} + x^{114} + x^{110} + x^{108} + x^{107} + x^{106} + x^{103} + x^{102} + x^{100} \\
&\quad + x^{99} + x^{92} + x^{91} + x^{90} + x^{89} + x^{87} + x^{80} + x^{79} + x^{78} + x^{76} + x^{75} \\
&\quad + x^{72} + x^{71} + x^{69} + x^{68} + x^{59} + x^{55} + x^{54} + x^{53} + x^{48} + x^{45} + x^{44} \\
&\quad + x^{41} + x^{39} + x^{38} + x^{36} + x^{35} + x^{32} + x^{31} + x^{30} + x^{28} + x^{22} + x^{21} \\
&\quad + x^{19} + x^{18}, \\
p_3(x) &= x^{115} + x^{113} + x^{107} + x^{99} + x^{97} + x^{95} + x^{93} + x^{91} + x^{81} + x^{73} + x^{71} \\
&\quad + x^{69} + x^{65} + x^{63} + x^{61} + x^{59} + x^{57} + x^{51} + x^{49} + x^{47} + x^{45} + x^{43} \\
&\quad + x^{33} + x^{25} + x^{23} + x^{21} + x^{19} + x^{15} + x^{13} + x^{9}, \\
p_6(x) &= x^{114} + x^{113} + x^{109} + x^{108} + x^{106} + x^{105} + x^{104} + x^{103} + x^{101} + x^{100} \\
&\quad + x^{99} + x^{97} + x^{96} + x^{95} + x^{93} + x^{92} + x^{91} + x^{90} + x^{88} + x^{87} + x^{86} \\
&\quad + x^{85} + x^{83} + x^{82} + x^{81} + x^{80} + x^{78} + x^{77} + x^{76} + x^{75} + x^{74} + x^{72} \\
&\quad + x^{71} + x^{70} + x^{69} + x^{67} + x^{64} + x^{62} + x^{59} + x^{58} + x^{54} + x^{53} + x^{50} \\
&\quad + x^{48} + x^{46} + x^{43} + x^{42} + x^{30} + x^{29} + x^{25} + x^{24} + x^{20} + x^{19} + x^{18} \\
&\quad + x^{17} + x^{15} + x^{12} + x^{10} + x^{7} + x^{6}, \\
p_9(x) &= x^{113} + x^{105} + x^{101} + x^{99} + x^{93} + x^{81} + x^{79} + x^{77} + x^{71} + x^{69} + x^{65} \\
&\quad + x^{61} + x^{59} + x^{57} + x^{55} + x^{53} + x^{47} + x^{41} + x^{35} + x^{33} + x^{29} + x^{25} \\
&\quad + x^{23} + x^{19} + x^{11} + x^{7} + x^{5} + x^{3}, \\
p_{12}(x) &= x^{112} + x^{111} + x^{110} + x^{109} + x^{108} + x^{104} + x^{103} + x^{102} + x^{101} + x^{100} \\
&\quad + x^{96} + x^{95} + x^{94} + x^{93} + x^{91} + x^{90} + x^{89} + x^{87} + x^{86} + x^{85} + x^{83} \\
&\quad + x^{82} + x^{81} + x^{80} + x^{76} + x^{75} + x^{74} + x^{73} + x^{72} + x^{68} + x^{67} + x^{66} \\
&\quad + x^{65} + x^{63} + x^{62} + x^{61} + x^{60} + x^{56} + x^{55} + x^{54} + x^{53} + x^{52} + x^{44} \\
&\quad + x^{43} + x^{42} + x^{41} + x^{40} + x^{36} + x^{35} + x^{34} + x^{33} + x^{31} + x^{30} + x^{29} \\
&\quad + x^{28} + x^{24} + x^{23} + x^{22} + x^{21} + x^{20} + x^{12} + x^{11} + x^{10} + x^{9} + x^{8} + x^{4} \\
&\quad + x^{3} + x^{2} + x + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{117} + x^{115} + x^{114} + x^{110} + x^{108} + x^{107} + x^{106} + x^{103} + x^{102} + x^{100} \\
&\quad + x^{99} + x^{92} + x^{91} + x^{90} + x^{89} + x^{87} + x^{80} + x^{79} + x^{78} + x^{76} + x^{75} \\
&\quad + x^{72} + x^{71} + x^{69} + x^{68} + x^{59} + x^{55} + x^{54} + x^{53} + x^{48} + x^{45} + x^{44} \\
&\quad + x^{41} + x^{39} + x^{38} + x^{36} + x^{35} + x^{32} + x^{31} + x^{30} + x^{28} + x^{22} + x^{21} \\
&\quad + x^{19} + x^{18}, \\
p_3(x) &= x^{115} + x^{113} + x^{107} + x^{99} + x^{97} + x^{95} + x^{93} + x^{91} + x^{81} + x^{73} + x^{71}
\end{aligned}$$

$$+ x^{69} + x^{65} + x^{63} + x^{61} + x^{59} + x^{57} + x^{51} + x^{49} + x^{47} + x^{45} + x^{43} + x^{33} + x^{25} + x^{23} + x^{21} + x^{19} + x^{15} + x^{13} + x^{9},$$

$$\begin{aligned}
p_6(x) = {} & x^{114} + x^{113} + x^{109} + x^{108} + x^{106} + x^{105} + x^{104} + x^{103} + x^{101} + x^{100} \\
& + x^{99} + x^{97} + x^{96} + x^{95} + x^{93} + x^{92} + x^{91} + x^{90} + x^{88} + x^{87} + x^{86} \\
& + x^{85} + x^{83} + x^{82} + x^{81} + x^{80} + x^{78} + x^{77} + x^{76} + x^{75} + x^{74} + x^{72} \\
& + x^{71} + x^{70} + x^{69} + x^{67} + x^{64} + x^{62} + x^{59} + x^{58} + x^{54} + x^{53} + x^{50} \\
& + x^{48} + x^{46} + x^{43} + x^{42} + x^{30} + x^{29} + x^{25} + x^{24} + x^{20} + x^{19} + x^{18} \\
& + x^{17} + x^{15} + x^{12} + x^{10} + x^{7} + x^{6},
\end{aligned}$$

$$\begin{aligned}
p_9(x) = {} & x^{113} + x^{105} + x^{101} + x^{99} + x^{93} + x^{81} + x^{79} + x^{77} + x^{71} + x^{69} + x^{65} \\
& + x^{61} + x^{59} + x^{57} + x^{55} + x^{53} + x^{47} + x^{41} + x^{35} + x^{33} + x^{29} + x^{25} \\
& + x^{23} + x^{19} + x^{11} + x^{7} + x^{5} + x^{3},
\end{aligned}$$

$$\begin{aligned}
p_{12}(x) = {} & x^{112} + x^{111} + x^{110} + x^{109} + x^{108} + x^{104} + x^{103} + x^{102} + x^{101} + x^{100} \\
& + x^{96} + x^{95} + x^{94} + x^{93} + x^{91} + x^{90} + x^{89} + x^{87} + x^{86} + x^{85} + x^{83} \\
& + x^{82} + x^{81} + x^{80} + x^{76} + x^{75} + x^{74} + x^{73} + x^{72} + x^{68} + x^{67} + x^{66} \\
& + x^{65} + x^{63} + x^{62} + x^{61} + x^{60} + x^{56} + x^{55} + x^{54} + x^{53} + x^{52} + x^{44} \\
& + x^{43} + x^{42} + x^{41} + x^{40} + x^{36} + x^{35} + x^{34} + x^{33} + x^{31} + x^{30} + x^{29} \\
& + x^{28} + x^{24} + x^{23} + x^{22} + x^{21} + x^{20} + x^{12} + x^{11} + x^{10} + x^{9} + x^{8} + x^{4} \\
& + x^{3} + x^{2} + x + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) = {} & x^{102} + x^{100} + x^{98} + x^{94} + x^{92} + x^{84} + x^{76} + x^{74} + x^{72} + x^{68} + x^{64} \\
& + x^{52} + x^{50} + x^{44} + x^{40} + x^{38} + x^{30} + x^{26} + x^{24}, \\
p_3(x) = {} & x^{96} + x^{92} + x^{90} + x^{88} + x^{82} + x^{76} + x^{72} + x^{70} + x^{66} + x^{60} + x^{56} \\
& + x^{48} + x^{46} + x^{42} + x^{40} + x^{36} + x^{28} + x^{26} + x^{24} + x^{20} + x^{14} + x^{10} \\
& + x^{8} + x^{6}, \\
p_6(x) = {} & x^{98} + x^{88} + x^{86} + x^{80} + x^{78} + x^{70} + x^{68} + x^{60} + x^{54} + x^{52} + x^{50} \\
& + x^{42} + x^{38} + x^{34} + x^{24} + x^{22} + x^{18} + x^{14} + x^{12} + x^{10} + x^{6} + 1, \\
p_9(x) = {} & x^{100} + x^{96} + x^{94} + x^{92} + x^{88} + x^{86} + x^{84} + x^{82} + x^{80} + x^{78} + x^{72} \\
& + x^{68} + x^{66} + x^{64} + x^{58} + x^{56} + x^{42} + x^{40} + x^{38} + x^{26} + x^{18} + x^{16} \\
& + x^{12} + x^{10} + x^{4} + x^{2}, \\
p_{12}(x) = {} & x^{100} + x^{98} + x^{92} + x^{88} + x^{84} + x^{80} + x^{76} + x^{72} + x^{66} + x^{64} + x^{52} \\
& + x^{50} + x^{44} + x^{40} + x^{34} + x^{32} + x^{20} + x^{18} + x^{12} + x^{8} + x^{2} + 1,
\end{aligned}$$

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

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

$$p_0(x) = x^{117} + x^{116} + x^{114} + x^{113} + x^{112} + x^{110} + x^{105} + x^{103} + x^{101} + x^{99}$$

$$
\begin{aligned}
&+ x^{96} + x^{95} + x^{92} + x^{90} + x^{86} + x^{85} + x^{84} + x^{83} + x^{80} + x^{75} + x^{74} \\
&+ x^{73} + x^{72} + x^{69} + x^{68} + x^{63} + x^{61} + x^{60} + x^{59} + x^{58} + x^{57} + x^{56} \\
&+ x^{54} + x^{52} + x^{48} + x^{46} + x^{45} + x^{44} + x^{42} + x^{37} + x^{35} + x^{34} + x^{31} \\
&+ x^{30} + x^{29} + x^{28} + x^{27} + x^{25} + x^{24} + x^{21} + x^{19} + x^{18} + x^{16} + x^{13} \\
&+ x^{12}, \\
p_3(x) = {}& x^{116} + x^{113} + x^{112} + x^{107} + x^{104} + x^{103} + x^{102} + x^{100} + x^{99} + x^{97} \\
&+ x^{96} + x^{95} + x^{94} + x^{93} + x^{92} + x^{90} + x^{89} + x^{86} + x^{83} + x^{78} + x^{74} \\
&+ x^{73} + x^{71} + x^{70} + x^{69} + x^{67} + x^{65} + x^{64} + x^{63} + x^{62} + x^{61} + x^{59} \\
&+ x^{58} + x^{55} + x^{51} + x^{48} + x^{46} + x^{45} + x^{41} + x^{39} + x^{35} + x^{34} + x^{33} \\
&+ x^{28} + x^{26} + x^{22} + x^{21} + x^{19} + x^{18} + x^{13} + x^{9} + x^{8}, \\
p_6(x) = {}& x^{116} + x^{113} + x^{112} + x^{111} + x^{110} + x^{108} + x^{107} + x^{105} + x^{104} + x^{103} \\
&+ x^{101} + x^{100} + x^{99} + x^{98} + x^{97} + x^{94} + x^{93} + x^{91} + x^{90} + x^{89} + x^{88} \\
&+ x^{85} + x^{83} + x^{82} + x^{81} + x^{80} + x^{78} + x^{74} + x^{73} + x^{72} + x^{71} + x^{70} \\
&+ x^{69} + x^{65} + x^{64} + x^{63} + x^{62} + x^{61} + x^{59} + x^{58} + x^{55} + x^{48} + x^{47} \\
&+ x^{46} + x^{45} + x^{44} + x^{40} + x^{38} + x^{37} + x^{36} + x^{35} + x^{32} + x^{29} + x^{28} \\
&+ x^{25} + x^{24} + x^{23} + x^{21} + x^{20} + x^{18} + x^{17} + x^{15} + x^{14} + x^{12} + x^{11} \\
&+ x^{10} + x^{8} + x^{5} + x^{3} + x^{2} + x + 1, \\
p_9(x) = {}& x^{116} + x^{115} + x^{114} + x^{113} + x^{111} + x^{110} + x^{109} + x^{108} + x^{100} + x^{99} \\
&+ x^{98} + x^{97} + x^{95} + x^{94} + x^{93} + x^{91} + x^{90} + x^{89} + x^{87} + x^{86} + x^{85} \\
&+ x^{84} + x^{76} + x^{75} + x^{74} + x^{73} + x^{71} + x^{70} + x^{69} + x^{67} + x^{66} + x^{65} \\
&+ x^{63} + x^{62} + x^{61} + x^{60} + x^{44} + x^{43} + x^{42} + x^{41} + x^{39} + x^{38} + x^{37} \\
&+ x^{35} + x^{34} + x^{33} + x^{31} + x^{30} + x^{29} + x^{28} + x^{12} + x^{11} + x^{10} + x^{9} \\
&+ x^{7} + x^{6} + x^{5} + x^{4}, \\
p_{12}(x) = {}& x^{116} + x^{115} + x^{114} + x^{113} + x^{112} + x^{104} + x^{103} + x^{102} + x^{101} + x^{99} \\
&+ x^{98} + x^{97} + x^{96} + x^{84} + x^{83} + x^{82} + x^{81} + x^{80} + x^{72} + x^{71} + x^{70} \\
&+ x^{69} + x^{68} + x^{56} + x^{55} + x^{54} + x^{53} + x^{52} + x^{40} + x^{39} + x^{38} + x^{37} \\
&+ x^{36} + x^{24} + x^{23} + x^{22} + x^{21} + x^{20} + x^{8} + x^{7} + x^{6} + x^{5} + x^{3} + x^{2} + x \\
&+ 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) = {}& x^{132} + x^{129} + x^{126} + x^{125} + x^{124} + x^{123} + x^{120} + x^{118} + x^{115} + x^{114} \\
&+ x^{107} + x^{106} + x^{104} + x^{103} + x^{102} + x^{99} + x^{98} + x^{94} + x^{93} + x^{90} \\
&+ x^{86} + x^{85} + x^{84} + x^{83} + x^{82} + x^{78} + x^{75} + x^{73} + x^{72} + x^{70} + x^{68} \\
&+ x^{66} + x^{65} + x^{64} + x^{62} + x^{61} + x^{59} + x^{54} + x^{53} + x^{51} + x^{50} + x^{48} \\
&+ x^{47} + x^{46} + x^{45} + x^{43} + x^{41} + x^{39} + x^{38} + x^{37} + x^{36} + x^{34} + x^{33}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{32} + x^{31} + x^{28} + x^{27},\\
p_3(x) &= x^{125} + x^{124} + x^{123} + x^{122} + x^{120} + x^{117} + x^{114} + x^{112} + x^{111} + x^{110}\\
&+ x^{109} + x^{105} + x^{104} + x^{103} + x^{102} + x^{101} + x^{99} + x^{98} + x^{97} + x^{96}\\
&+ x^{94} + x^{90} + x^{89} + x^{87} + x^{86} + x^{82} + x^{81} + x^{75} + x^{74} + x^{71} + x^{69}\\
&+ x^{67} + x^{64} + x^{63} + x^{61} + x^{60} + x^{59} + x^{58} + x^{56} + x^{55} + x^{54} + x^{53}\\
&+ x^{51} + x^{50} + x^{49} + x^{48} + x^{46} + x^{42} + x^{41} + x^{39} + x^{38} + x^{34} + x^{33}\\
&+ x^{29} + x^{28} + x^{24} + x^{23} + x^{19} + x^{18} + x^{14} + x^{12} + x^{11} + x^{10} + x^{9},\\
p_6(x) &= x^{126} + x^{124} + x^{122} + x^{120} + x^{116} + x^{114} + x^{112} + x^{108} + x^{100} + x^{98}\\
&+ x^{86} + x^{84} + x^{82} + x^{80} + x^{76} + x^{74} + x^{72} + x^{68} + x^{66} + x^{64} + x^{60}\\
&+ x^{54} + x^{50} + x^{44} + x^{40} + x^{38} + x^{36} + x^{34} + x^{30} + x^{28} + x^{20} + x^{16}\\
&+ x^{8} + x^{6},\\
p_9(x) &= x^{127} + x^{126} + x^{122} + x^{120} + x^{116} + x^{114} + x^{111} + x^{108} + x^{107} + x^{103}\\
&+ x^{102} + x^{98} + x^{96} + x^{92} + x^{91} + x^{87} + x^{86} + x^{83} + x^{80} + x^{79} + x^{67}\\
&+ x^{66} + x^{62} + x^{60} + x^{59} + x^{58} + x^{56} + x^{55} + x^{54} + x^{52} + x^{48} + x^{47}\\
&+ x^{35} + x^{34} + x^{30} + x^{28} + x^{27} + x^{26} + x^{24} + x^{23} + x^{22} + x^{20} + x^{16}\\
&+ x^{14} + x^{10} + x^{8} + x^{4} + x^{3},\\
p_{12}(x) &= x^{128} + x^{124} + x^{120} + x^{112} + x^{92} + x^{88} + x^{76} + x^{72} + x^{64} + x^{60} + x^{56}\\
&+ x^{48} + x^{44} + x^{40} + x^{32} + x^{28} + x^{24} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{110} + x^{109} + x^{108} + x^{107} + x^{99} + x^{98} + x^{97} + x^{96} + x^{95} + x^{94} + x^{92}\\
&+ x^{91} + x^{88} + x^{81} + x^{78} + x^{77} + x^{71} + x^{68} + x^{67} + x^{66} + x^{65} + x^{59}\\
&+ x^{56} + x^{55} + x^{53} + x^{49} + x^{48} + x^{47} + x^{46} + x^{45} + x^{43} + x^{42} + x^{40}\\
&+ x^{39} + x^{37} + x^{33} + x^{30} + x^{29} + x^{26} + x^{23} + x^{22} + x^{21} + x^{18},\\
p_3(x) &= x^{109} + x^{108} + x^{107} + x^{106} + x^{105} + x^{103} + x^{102} + x^{101} + x^{100} + x^{98}\\
&+ x^{97} + x^{96} + x^{95} + x^{93} + x^{92} + x^{91} + x^{90} + x^{89} + x^{85} + x^{84} + x^{83}\\
&+ x^{82} + x^{81} + x^{79} + x^{78} + x^{75} + x^{72} + x^{70} + x^{67} + x^{64} + x^{63} + x^{55}\\
&+ x^{54} + x^{53} + x^{52} + x^{50} + x^{49} + x^{48} + x^{47} + x^{45} + x^{44} + x^{43} + x^{42}\\
&+ x^{41} + x^{37} + x^{36} + x^{35} + x^{34} + x^{33} + x^{31} + x^{30} + x^{27} + x^{24} + x^{22}\\
&+ x^{19} + x^{16} + x^{15} + x^{13} + x^{12} + x^{11} + x^{10} + x^{9},\\
p_6(x) &= x^{110} + x^{108} + x^{102} + x^{98} + x^{94} + x^{90} + x^{84} + x^{80} + x^{74} + x^{68} + x^{64}\\
&+ x^{62} + x^{60} + x^{58} + x^{50} + x^{48} + x^{46} + x^{44} + x^{42} + x^{26} + x^{24} + x^{16}\\
&+ x^{12} + x^{10} + x^{8} + x^{6},\\
p_9(x) &= x^{111} + x^{110} + x^{107} + x^{104} + x^{102} + x^{98} + x^{96} + x^{95} + x^{94} + x^{92} + x^{91}\\
&+ x^{90} + x^{88} + x^{87} + x^{86} + x^{84} + x^{83} + x^{82} + x^{80} + x^{76} + x^{74} + x^{71}
\end{aligned}
$$

$$+x^{68}+x^{67}+x^{63}+x^{62}+x^{59}+x^{56}+x^{54}+x^{50}+x^{48}+x^{44}+x^{42}$$
$$+x^{39}+x^{36}+x^{35}+x^{31}+x^{30}+x^{27}+x^{24}+x^{22}+x^{18}+x^{16}+x^{12}$$
$$+x^{10}+x^{7}+x^{4}+x^{3},$$
$$p_{12}(x)=x^{112}+x^{100}+x^{96}+x^{80}+x^{68}+x^{52}+x^{36}+x^{20}+x^{4}+1,$$

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

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

$$\begin{aligned}
p_0(x)={}&x^{117}+x^{113}+x^{112}+x^{110}+x^{107}+x^{106}+x^{104}+x^{102}+x^{101}+x^{100}\\
&+x^{98}+x^{97}+x^{96}+x^{95}+x^{94}+x^{93}+x^{92}+x^{90}+x^{86}+x^{85}+x^{81}\\
&+x^{76}+x^{75}+x^{74}+x^{71}+x^{69}+x^{68}+x^{66}+x^{64}+x^{63}+x^{60}+x^{59}\\
&+x^{53}+x^{52}+x^{49}+x^{47}+x^{46}+x^{45}+x^{44}+x^{43}+x^{42}+x^{40}+x^{38}\\
&+x^{37}+x^{36}+x^{35}+x^{33},\\
p_3(x)={}&x^{116}+x^{114}+x^{111}+x^{109}+x^{107}+x^{106}+x^{104}+x^{102}+x^{101}+x^{100}\\
&+x^{99}+x^{98}+x^{97}+x^{95}+x^{93}+x^{89}+x^{87}+x^{86}+x^{85}+x^{83}+x^{81}\\
&+x^{80}+x^{78}+x^{74}+x^{73}+x^{72}+x^{68}+x^{67}+x^{65}+x^{60}+x^{59}+x^{57}\\
&+x^{56}+x^{53}+x^{51}+x^{50}+x^{45}+x^{44}+x^{42}+x^{41}+x^{37}+x^{35}+x^{34}\\
&+x^{32}+x^{28}+x^{26}+x^{24}+x^{23}+x^{20}+x^{19}+x^{17}+x^{14}+x^{13}+x^{12},\\
p_6(x)={}&x^{116}+x^{114}+x^{105}+x^{103}+x^{102}+x^{101}+x^{100}+x^{98}+x^{96}+x^{95}\\
&+x^{94}+x^{91}+x^{90}+x^{85}+x^{84}+x^{80}+x^{79}+x^{78}+x^{76}+x^{74}+x^{71}\\
&+x^{70}+x^{69}+x^{68}+x^{67}+x^{65}+x^{63}+x^{61}+x^{56}+x^{51}+x^{49}+x^{46}\\
&+x^{44}+x^{41}+x^{40}+x^{39}+x^{36}+x^{34}+x^{33}+x^{30}+x^{28}+x^{23}+x^{21}\\
&+x^{19}+x^{16}+x^{15}+x^{13}+x^{12}+x^{11}+x^{4}+x^{3}+x^{2}+x+1,\\
p_9(x)={}&x^{116}+x^{115}+x^{114}+x^{113}+x^{111}+x^{110}+x^{109}+x^{108}+x^{100}+x^{99}\\
&+x^{98}+x^{97}+x^{95}+x^{94}+x^{93}+x^{91}+x^{90}+x^{89}+x^{87}+x^{86}+x^{85}\\
&+x^{84}+x^{76}+x^{75}+x^{74}+x^{73}+x^{71}+x^{70}+x^{69}+x^{67}+x^{66}+x^{65}\\
&+x^{63}+x^{62}+x^{61}+x^{60}+x^{44}+x^{43}+x^{42}+x^{41}+x^{39}+x^{38}+x^{37}\\
&+x^{35}+x^{34}+x^{33}+x^{31}+x^{30}+x^{29}+x^{28}+x^{12}+x^{11}+x^{10}+x^{9}\\
&+x^{7}+x^{6}+x^{5}+x^{4},\\
p_{12}(x)={}&x^{116}+x^{115}+x^{114}+x^{113}+x^{112}+x^{104}+x^{103}+x^{102}+x^{101}+x^{99}\\
&+x^{98}+x^{97}+x^{96}+x^{84}+x^{83}+x^{82}+x^{81}+x^{80}+x^{72}+x^{71}+x^{70}\\
&+x^{69}+x^{68}+x^{56}+x^{55}+x^{54}+x^{53}+x^{52}+x^{40}+x^{39}+x^{38}+x^{37}\\
&+x^{36}+x^{24}+x^{23}+x^{22}+x^{21}+x^{20}+x^{8}+x^{7}+x^{6}+x^{5}+x^{3}+x^{2}+x\\
&+1,
\end{aligned}$$

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

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

$$p_0(x)=x^{117}+x^{116}+x^{114}+x^{113}+x^{112}+x^{110}+x^{105}+x^{103}+x^{101}+x^{99}$$

$$
\begin{aligned}
&+x^{96}+x^{95}+x^{92}+x^{90}+x^{86}+x^{85}+x^{84}+x^{83}+x^{80}+x^{75}+x^{74}\\
&+x^{73}+x^{72}+x^{69}+x^{68}+x^{63}+x^{61}+x^{60}+x^{59}+x^{58}+x^{57}+x^{56}\\
&+x^{54}+x^{52}+x^{48}+x^{46}+x^{45}+x^{44}+x^{42}+x^{37}+x^{35}+x^{34}+x^{31}\\
&+x^{30}+x^{29}+x^{28}+x^{27}+x^{25}+x^{24}+x^{21}+x^{19}+x^{18}+x^{16}+x^{13}\\
&+x^{12},\\
p_3(x)=&\,x^{116}+x^{113}+x^{112}+x^{107}+x^{104}+x^{103}+x^{102}+x^{100}+x^{99}+x^{97}\\
&+x^{96}+x^{95}+x^{94}+x^{93}+x^{92}+x^{90}+x^{89}+x^{86}+x^{83}+x^{78}+x^{74}\\
&+x^{73}+x^{71}+x^{70}+x^{69}+x^{67}+x^{65}+x^{64}+x^{63}+x^{62}+x^{61}+x^{59}\\
&+x^{58}+x^{55}+x^{51}+x^{48}+x^{46}+x^{45}+x^{41}+x^{39}+x^{35}+x^{34}+x^{33}\\
&+x^{28}+x^{26}+x^{22}+x^{21}+x^{19}+x^{18}+x^{13}+x^{9}+x^{8},\\
p_6(x)=&\,x^{116}+x^{113}+x^{112}+x^{111}+x^{110}+x^{108}+x^{107}+x^{105}+x^{104}+x^{103}\\
&+x^{101}+x^{100}+x^{99}+x^{98}+x^{97}+x^{94}+x^{93}+x^{91}+x^{90}+x^{89}+x^{88}\\
&+x^{85}+x^{83}+x^{82}+x^{81}+x^{80}+x^{78}+x^{74}+x^{73}+x^{72}+x^{71}+x^{70}\\
&+x^{69}+x^{65}+x^{64}+x^{63}+x^{62}+x^{61}+x^{59}+x^{58}+x^{55}+x^{48}+x^{47}\\
&+x^{46}+x^{45}+x^{44}+x^{40}+x^{38}+x^{37}+x^{36}+x^{35}+x^{32}+x^{29}+x^{28}\\
&+x^{25}+x^{24}+x^{23}+x^{21}+x^{20}+x^{18}+x^{17}+x^{15}+x^{14}+x^{12}+x^{11}\\
&+x^{10}+x^{8}+x^{5}+x^{3}+x^{2}+x+1,\\
p_9(x)=&\,x^{116}+x^{115}+x^{114}+x^{113}+x^{111}+x^{110}+x^{109}+x^{108}+x^{100}+x^{99}\\
&+x^{98}+x^{97}+x^{95}+x^{94}+x^{93}+x^{91}+x^{90}+x^{89}+x^{87}+x^{86}+x^{85}\\
&+x^{84}+x^{76}+x^{75}+x^{74}+x^{73}+x^{71}+x^{70}+x^{69}+x^{67}+x^{66}+x^{65}\\
&+x^{63}+x^{62}+x^{61}+x^{60}+x^{44}+x^{43}+x^{42}+x^{41}+x^{39}+x^{38}+x^{37}\\
&+x^{35}+x^{34}+x^{33}+x^{31}+x^{30}+x^{29}+x^{28}+x^{12}+x^{11}+x^{10}+x^{9}\\
&+x^{7}+x^{6}+x^{5}+x^{4},\\
p_{12}(x)=&\,x^{116}+x^{115}+x^{114}+x^{113}+x^{112}+x^{104}+x^{103}+x^{102}+x^{101}+x^{99}\\
&+x^{98}+x^{97}+x^{96}+x^{84}+x^{83}+x^{82}+x^{81}+x^{80}+x^{72}+x^{71}+x^{70}\\
&+x^{69}+x^{68}+x^{56}+x^{55}+x^{54}+x^{53}+x^{52}+x^{40}+x^{39}+x^{38}+x^{37}\\
&+x^{36}+x^{24}+x^{23}+x^{22}+x^{21}+x^{20}+x^{8}+x^{7}+x^{6}+x^{5}+x^{3}+x^{2}+x\\
&+1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x)=&\,x^{110}+x^{109}+x^{108}+x^{107}+x^{99}+x^{98}+x^{97}+x^{96}+x^{95}+x^{94}+x^{92}\\
&+x^{91}+x^{88}+x^{81}+x^{78}+x^{77}+x^{71}+x^{68}+x^{67}+x^{66}+x^{65}+x^{59}\\
&+x^{56}+x^{55}+x^{53}+x^{49}+x^{48}+x^{47}+x^{46}+x^{45}+x^{43}+x^{42}+x^{40}\\
&+x^{39}+x^{37}+x^{33}+x^{30}+x^{29}+x^{26}+x^{23}+x^{22}+x^{21}+x^{18},\\
p_3(x)=&\,x^{109}+x^{108}+x^{107}+x^{106}+x^{105}+x^{103}+x^{102}+x^{101}+x^{100}+x^{98}
\end{aligned}
$$

$$+ x^{97} + x^{96} + x^{95} + x^{93} + x^{92} + x^{91} + x^{90} + x^{89} + x^{85} + x^{84} + x^{83} + x^{82} + x^{81} + x^{79} + x^{78} + x^{75} + x^{72} + x^{70} + x^{67} + x^{64} + x^{63} + x^{55} + x^{54} + x^{53} + x^{52} + x^{50} + x^{49} + x^{48} + x^{47} + x^{45} + x^{44} + x^{43} + x^{42} + x^{41} + x^{37} + x^{36} + x^{35} + x^{34} + x^{33} + x^{31} + x^{30} + x^{27} + x^{24} + x^{22} + x^{19} + x^{16} + x^{15} + x^{13} + x^{12} + x^{11} + x^{10} + x^{9},$$

$$p_6(x) = x^{110} + x^{108} + x^{102} + x^{98} + x^{94} + x^{90} + x^{84} + x^{80} + x^{74} + x^{68} + x^{64} + x^{62} + x^{60} + x^{58} + x^{50} + x^{48} + x^{46} + x^{44} + x^{42} + x^{26} + x^{24} + x^{16} + x^{12} + x^{10} + x^{8} + x^{6},$$

$$p_9(x) = x^{111} + x^{110} + x^{107} + x^{104} + x^{102} + x^{98} + x^{96} + x^{95} + x^{94} + x^{92} + x^{91} + x^{90} + x^{88} + x^{87} + x^{86} + x^{84} + x^{83} + x^{82} + x^{80} + x^{76} + x^{74} + x^{71} + x^{68} + x^{67} + x^{63} + x^{62} + x^{59} + x^{56} + x^{54} + x^{50} + x^{48} + x^{44} + x^{42} + x^{39} + x^{36} + x^{35} + x^{31} + x^{30} + x^{27} + x^{24} + x^{22} + x^{18} + x^{16} + x^{12} + x^{10} + x^{7} + x^{4} + x^{3},$$

$$p_{12}(x) = x^{112} + x^{100} + x^{96} + x^{80} + x^{68} + x^{52} + x^{36} + x^{20} + x^{4} + 1,$$

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

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

$$p_0(x) = x^{132} + x^{129} + x^{126} + x^{125} + x^{124} + x^{123} + x^{120} + x^{118} + x^{115} + x^{114} + x^{107} + x^{106} + x^{104} + x^{103} + x^{102} + x^{99} + x^{98} + x^{94} + x^{93} + x^{90} + x^{86} + x^{85} + x^{84} + x^{83} + x^{82} + x^{78} + x^{75} + x^{73} + x^{72} + x^{70} + x^{68} + x^{66} + x^{65} + x^{64} + x^{62} + x^{61} + x^{59} + x^{54} + x^{53} + x^{51} + x^{50} + x^{48} + x^{47} + x^{46} + x^{45} + x^{43} + x^{41} + x^{39} + x^{38} + x^{37} + x^{36} + x^{34} + x^{33} + x^{32} + x^{31} + x^{28} + x^{27},$$

$$p_3(x) = x^{125} + x^{124} + x^{123} + x^{122} + x^{120} + x^{117} + x^{114} + x^{112} + x^{111} + x^{110} + x^{109} + x^{105} + x^{104} + x^{103} + x^{102} + x^{101} + x^{99} + x^{98} + x^{97} + x^{96} + x^{94} + x^{90} + x^{89} + x^{87} + x^{86} + x^{82} + x^{81} + x^{75} + x^{74} + x^{71} + x^{69} + x^{67} + x^{64} + x^{63} + x^{61} + x^{60} + x^{59} + x^{58} + x^{56} + x^{55} + x^{54} + x^{53} + x^{51} + x^{50} + x^{49} + x^{48} + x^{46} + x^{42} + x^{41} + x^{39} + x^{38} + x^{34} + x^{33} + x^{29} + x^{28} + x^{24} + x^{23} + x^{19} + x^{18} + x^{14} + x^{12} + x^{11} + x^{10} + x^{9},$$

$$p_6(x) = x^{126} + x^{124} + x^{122} + x^{120} + x^{116} + x^{114} + x^{112} + x^{108} + x^{100} + x^{98} + x^{86} + x^{84} + x^{82} + x^{80} + x^{76} + x^{74} + x^{72} + x^{68} + x^{66} + x^{64} + x^{60} + x^{54} + x^{50} + x^{44} + x^{40} + x^{38} + x^{36} + x^{34} + x^{30} + x^{28} + x^{20} + x^{16} + x^{8} + x^{6},$$

$$p_9(x) = x^{127} + x^{126} + x^{122} + x^{120} + x^{116} + x^{114} + x^{111} + x^{108} + x^{107} + x^{103} + x^{102} + x^{98} + x^{96} + x^{92} + x^{91} + x^{87} + x^{86} + x^{83} + x^{80} + x^{79} + x^{67} + x^{66} + x^{62} + x^{60} + x^{59} + x^{58} + x^{56} + x^{55} + x^{54} + x^{52} + x^{48} + x^{47}$$

$$
\begin{aligned}
&+ x^{35} + x^{34} + x^{30} + x^{28} + x^{27} + x^{26} + x^{24} + x^{23} + x^{22} + x^{20} + x^{16}\\
&+ x^{14} + x^{10} + x^{8} + x^{4} + x^{3},\\
p_{12}(x) &= x^{128} + x^{124} + x^{120} + x^{112} + x^{92} + x^{88} + x^{76} + x^{72} + x^{64} + x^{60} + x^{56}\\
&+ x^{48} + x^{44} + x^{40} + x^{32} + x^{28} + x^{24} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{117} + x^{113} + x^{112} + x^{110} + x^{107} + x^{106} + x^{104} + x^{102} + x^{101} + x^{100}\\
&+ x^{98} + x^{97} + x^{96} + x^{95} + x^{94} + x^{93} + x^{92} + x^{90} + x^{86} + x^{85} + x^{81}\\
&+ x^{76} + x^{75} + x^{74} + x^{71} + x^{69} + x^{68} + x^{66} + x^{64} + x^{63} + x^{60} + x^{59}\\
&+ x^{53} + x^{52} + x^{49} + x^{47} + x^{46} + x^{45} + x^{44} + x^{43} + x^{42} + x^{40} + x^{38}\\
&+ x^{37} + x^{36} + x^{35} + x^{33},\\
p_3(x) &= x^{116} + x^{114} + x^{111} + x^{109} + x^{107} + x^{106} + x^{104} + x^{102} + x^{101} + x^{100}\\
&+ x^{99} + x^{98} + x^{97} + x^{95} + x^{93} + x^{89} + x^{87} + x^{86} + x^{85} + x^{83} + x^{81}\\
&+ x^{80} + x^{78} + x^{74} + x^{73} + x^{72} + x^{68} + x^{67} + x^{65} + x^{60} + x^{59} + x^{57}\\
&+ x^{56} + x^{53} + x^{51} + x^{50} + x^{45} + x^{44} + x^{42} + x^{41} + x^{37} + x^{35} + x^{34}\\
&+ x^{32} + x^{28} + x^{26} + x^{24} + x^{23} + x^{20} + x^{19} + x^{17} + x^{14} + x^{13} + x^{12},\\
p_6(x) &= x^{116} + x^{114} + x^{105} + x^{103} + x^{102} + x^{101} + x^{100} + x^{98} + x^{96} + x^{95}\\
&+ x^{94} + x^{91} + x^{90} + x^{85} + x^{84} + x^{80} + x^{79} + x^{78} + x^{76} + x^{74} + x^{71}\\
&+ x^{70} + x^{69} + x^{68} + x^{67} + x^{65} + x^{63} + x^{61} + x^{56} + x^{51} + x^{49} + x^{46}\\
&+ x^{44} + x^{41} + x^{40} + x^{39} + x^{36} + x^{34} + x^{33} + x^{30} + x^{28} + x^{23} + x^{21}\\
&+ x^{19} + x^{16} + x^{15} + x^{13} + x^{12} + x^{11} + x^{4} + x^{3} + x^{2} + x + 1,\\
p_9(x) &= x^{116} + x^{115} + x^{114} + x^{113} + x^{111} + x^{110} + x^{109} + x^{108} + x^{100} + x^{99}\\
&+ x^{98} + x^{97} + x^{95} + x^{94} + x^{93} + x^{91} + x^{90} + x^{89} + x^{87} + x^{86} + x^{85}\\
&+ x^{84} + x^{76} + x^{75} + x^{74} + x^{73} + x^{71} + x^{70} + x^{69} + x^{67} + x^{66} + x^{65}\\
&+ x^{63} + x^{62} + x^{61} + x^{60} + x^{44} + x^{43} + x^{42} + x^{41} + x^{39} + x^{38} + x^{37}\\
&+ x^{35} + x^{34} + x^{33} + x^{31} + x^{30} + x^{29} + x^{28} + x^{12} + x^{11} + x^{10} + x^{9}\\
&+ x^{7} + x^{6} + x^{5} + x^{4},\\
p_{12}(x) &= x^{116} + x^{115} + x^{114} + x^{113} + x^{112} + x^{104} + x^{103} + x^{102} + x^{101} + x^{99}\\
&+ x^{98} + x^{97} + x^{96} + x^{84} + x^{83} + x^{82} + x^{81} + x^{80} + x^{72} + x^{71} + x^{70}\\
&+ x^{69} + x^{68} + x^{56} + x^{55} + x^{54} + x^{53} + x^{52} + x^{40} + x^{39} + x^{38} + x^{37}\\
&+ x^{36} + x^{24} + x^{23} + x^{22} + x^{21} + x^{20} + x^{8} + x^{7} + x^{6} + x^{5} + x^{3} + x^{2} + x\\
&+ 1,
\end{aligned}
$$

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

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

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

n	$\Lambda(n)$	n	$\Lambda(n)$	n	$\Lambda(n)$	n	$\Lambda(n)$
0	[1, 2]	811	[1256, 266]	1622	[1109, 1023]	2433	[25, 1303]
1	[3, 4]	812	[1307, 1308]	1623	[2191, 1098]	2434	[2806, 92]
2	[5, 6]	813	[1309, 972]	1624	[2050, 2192]	2435	[348, 2167]
3	[7, 8]	814	[1310, 1311]	1625	[2193, 1287]	2436	[2807, 2808]
4	[9, 10]	815	[1066, 379]	1626	[2194, 315]	2437	[2372, 2809]
5	[11, 12]	816	[1312, 1313]	1627	[2195, 2196]	2438	[2036, 2245]
6	[13, 14]	817	[1009, 1005]	1628	[2197, 2198]	2439	[948, 2355]
7	[15, 16]	818	[1314, 1315]	1629	[1047, 1049]	2440	[858, 2810]
8	[17, 18]	819	[1106, 1316]	1630	[2190, 1285]	2441	[2811, 2050]
9	[19, 20]	820	[429, 1317]	1631	[2199, 2200]	2442	[2290, 857]
10	[21, 22]	821	[1318, 1231]	1632	[2201, 993]	2443	[2349, 2213]
11	[23, 24]	822	[1319, 1320]	1633	[2202, 79]	2444	[1935, 2812]
12	[25, 26]	823	[1081, 283]	1634	[919, 1074]	2445	[976, 2289]
13	[27, 28]	824	[1321, 1322]	1635	[2203, 435]	2446	[1234, 1151]
14	[29, 30]	825	[1323, 1324]	1636	[2204, 2205]	2447	[907, 1259]
15	[31, 32]	826	[1325, 100]	1637	[2206, 2164]	2448	[391, 2028]
16	[33, 34]	827	[1112, 30]	1638	[1209, 2207]	2449	[2813, 1296]
17	[35, 36]	828	[1326, 1327]	1639	[1007, 2208]	2450	[2074, 2362]
18	[37, 38]	829	[1328, 1329]	1640	[909, 1970]	2451	[2170, 1946]
19	[39, 40]	830	[1330, 1331]	1641	[379, 2209]	2452	[1199, 870]
20	[41, 42]	831	[1332, 1333]	1642	[448, 2210]	2453	[2140, 871]
21	[43, 44]	832	[1334, 1335]	1643	[2211, 1126]	2454	[1968, 260]
22	[45, 46]	833	[523, 1336]	1644	[1306, 2014]	2455	[1209, 262]
23	[47, 48]	834	[166, 1337]	1645	[936, 1969]	2456	[2237, 457]
24	[49, 50]	835	[1338, 1339]	1646	[17, 2212]	2457	[1195, 1076]
25	[51, 52]	836	[1340, 632]	1647	[270, 2025]	2458	[102, 889]
26	[53, 54]	837	[1341, 1342]	1648	[934, 1185]	2459	[2814, 2815]
27	[55, 56]	838	[1343, 217]	1649	[1950, 2213]	2460	[103, 406]
28	[57, 58]	839	[1344, 622]	1650	[2154, 957]	2461	[1226, 2816]
29	[59, 60]	840	[1345, 1346]	1651	[2214, 274]	2462	[1250, 2323]
30	[61, 62]	841	[1347, 1348]	1652	[262, 2215]	2463	[459, 2264]
31	[63, 64]	842	[1349, 1350]	1653	[2216, 2217]	2464	[839, 2130]
32	[65, 66]	843	[1351, 1352]	1654	[293, 1086]	2465	[2817, 1019]
33	[67, 68]	844	[1353, 1354]	1655	[2218, 2219]	2466	[2818, 1202]
34	[69, 70]	845	[1355, 503]	1656	[2145, 869]	2467	[835, 2142]
35	[71, 72]	846	[1339, 154]	1657	[251, 357]	2468	[1296, 2819]
36	[73, 74]	847	[1356, 1357]	1658	[1236, 2134]	2469	[2820, 1028]
37	[75, 76]	848	[634, 1358]	1659	[2220, 937]	2470	[303, 2821]
38	[77, 78]	849	[1359, 1360]	1660	[2221, 2222]	2471	[2001, 2003]
39	[79, 80]	850	[1361, 741]	1661	[1203, 2223]	2472	[2822, 1220]
40	[81, 82]	851	[1362, 140]	1662	[2174, 2224]	2473	[2356, 1210]
41	[83, 84]	852	[1363, 1364]	1663	[876, 930]	2474	[425, 1268]
42	[85, 86]	853	[558, 567]	1664	[2225, 1262]	2475	[1997, 882]

43	[87, 88]	854	[1365, 1366]	1665	[1280, 2136]	2476	[1160, 2823]
44	[89, 90]	855	[1367, 689]	1666	[2226, 2082]	2477	[2824, 348]
45	[91, 92]	856	[1368, 1369]	1667	[431, 1251]	2478	[339, 2825]
46	[93, 94]	857	[1370, 746]	1668	[2227, 1218]	2479	[886, 2826]
47	[95, 96]	858	[1371, 1372]	1669	[2228, 379]	2480	[322, 1198]
48	[97, 98]	859	[1373, 1374]	1670	[2229, 2230]	2481	[2827, 2828]
49	[99, 100]	860	[1375, 1376]	1671	[2231, 1193]	2482	[977, 855]
50	[101, 102]	861	[1377, 1378]	1672	[2039, 1251]	2483	[434, 304]
51	[103, 104]	862	[654, 138]	1673	[2232, 1256]	2484	[382, 961]
52	[105, 106]	863	[656, 819]	1674	[2233, 2234]	2485	[2829, 1056]
53	[107, 108]	864	[1379, 1380]	1675	[2235, 2236]	2486	[2830, 830]
54	[109, 110]	865	[1381, 1382]	1676	[2237, 2001]	2487	[1160, 2831]
55	[111, 112]	866	[1383, 517]	1677	[2238, 1150]	2488	[2135, 1281]
56	[113, 114]	867	[1384, 654]	1678	[2144, 2144]	2489	[2832, 2833]
57	[115, 116]	868	[1385, 469]	1679	[2119, 2239]	2490	[338, 2238]
58	[117, 118]	869	[1386, 1387]	1680	[867, 276]	2491	[2834, 258]
59	[119, 120]	870	[1388, 1376]	1681	[2077, 2240]	2492	[862, 2835]
60	[121, 122]	871	[179, 543]	1682	[2241, 2242]	2493	[2836, 2092]
61	[123, 124]	872	[1389, 1390]	1683	[952, 2032]	2494	[873, 1958]
62	[125, 126]	873	[750, 1391]	1684	[2243, 955]	2495	[2254, 907]
63	[127, 128]	874	[1392, 208]	1685	[2244, 398]	2496	[2380, 1002]
64	[129, 130]	875	[1393, 1360]	1686	[2089, 999]	2497	[2355, 2207]
65	[131, 132]	876	[1394, 1395]	1687	[916, 1067]	2498	[434, 2821]
66	[133, 134]	877	[1396, 1397]	1688	[1993, 2245]	2499	[1026, 1957]
67	[135, 136]	878	[1398, 1399]	1689	[2188, 1324]	2500	[2354, 2375]
68	[137, 138]	879	[1400, 778]	1690	[382, 289]	2501	[2387, 2837]
69	[139, 140]	880	[1342, 1401]	1691	[444, 2057]	2502	[2838, 2013]
70	[141, 142]	881	[1402, 527]	1692	[1285, 84]	2503	[2037, 1004]
71	[143, 144]	882	[506, 1403]	1693	[2152, 2246]	2504	[2839, 1184]
72	[145, 146]	883	[1404, 1405]	1694	[2247, 2026]	2505	[2840, 2841]
73	[147, 148]	884	[1406, 754]	1695	[2248, 1208]	2506	[1127, 2379]
74	[149, 150]	885	[1407, 1408]	1696	[2249, 2170]	2507	[609, 2144]
75	[151, 152]	886	[1409, 1410]	1697	[2250, 365]	2508	[84, 329]
76	[153, 154]	887	[1411, 1412]	1698	[2251, 2174]	2509	[2842, 2212]
77	[155, 156]	888	[1413, 1414]	1699	[2075, 1020]	2510	[984, 2243]
78	[157, 158]	889	[1415, 1416]	1700	[2252, 2253]	2511	[2325, 2074]
79	[159, 160]	890	[545, 1417]	1701	[2254, 374]	2512	[831, 2283]
80	[161, 162]	891	[1418, 1419]	1702	[1315, 2089]	2513	[1245, 2843]
81	[163, 164]	892	[1420, 247]	1703	[2255, 2119]	2514	[2844, 2845]
82	[165, 166]	893	[1421, 1342]	1704	[2256, 984]	2515	[330, 1023]
83	[167, 168]	894	[1422, 1423]	1705	[2257, 2071]	2516	[2120, 994]
84	[169, 170]	895	[1424, 1425]	1706	[2258, 401]	2517	[2038, 828]
85	[170, 171]	896	[1408, 1426]	1707	[2259, 1147]	2518	[2846, 2809]
86	[172, 173]	897	[1427, 1364]	1708	[2260, 2025]	2519	[2847, 1191]

87	[174, 175]	898	[736, 1408]	1709	[2261, 2262]	2520	[2301, 2362]
88	[176, 177]	899	[1428, 573]	1710	[2263, 2264]	2521	[837, 2091]
89	[178, 179]	900	[1429, 1389]	1711	[2265, 346]	2522	[2848, 2201]
90	[180, 181]	901	[1430, 1431]	1712	[1165, 1239]	2523	[2849, 366]
91	[182, 183]	902	[1432, 682]	1713	[1966, 300]	2524	[2850, 2051]
92	[184, 185]	903	[54, 1433]	1714	[2147, 2266]	2525	[78, 414]
93	[186, 187]	904	[755, 1327]	1715	[2195, 1060]	2526	[1169, 303]
94	[188, 189]	905	[1434, 1365]	1716	[2267, 2268]	2527	[2384, 2851]
95	[190, 191]	906	[1435, 1345]	1717	[2269, 2270]	2528	[1132, 2852]
96	[192, 193]	907	[1436, 1437]	1718	[2271, 2272]	2529	[1136, 268]
97	[194, 195]	908	[1438, 1394]	1719	[1232, 258]	2530	[110, 1997]
98	[196, 197]	909	[772, 1439]	1720	[2273, 1963]	2531	[2040, 2214]
99	[56, 198]	910	[1440, 516]	1721	[866, 2015]	2532	[2330, 2853]
100	[199, 200]	911	[1441, 1442]	1722	[1248, 2274]	2533	[980, 2156]
101	[201, 60]	912	[1443, 755]	1723	[1278, 2275]	2534	[1120, 2096]
102	[202, 203]	913	[1444, 1445]	1724	[1061, 2276]	2535	[1249, 942]
103	[204, 205]	914	[1446, 1447]	1725	[2264, 875]	2536	[1264, 2854]
104	[206, 207]	915	[1337, 1425]	1726	[369, 2277]	2537	[2207, 263]
105	[208, 209]	916	[1437, 816]	1727	[996, 2278]	2538	[2106, 1169]
106	[210, 211]	917	[1448, 1449]	1728	[2125, 1291]	2539	[2822, 2246]
107	[212, 213]	918	[1450, 1331]	1729	[2244, 2279]	2540	[2029, 2087]
108	[214, 215]	919	[1423, 1451]	1730	[1113, 1238]	2541	[1159, 116]
109	[216, 217]	920	[1452, 1453]	1731	[1032, 2280]	2542	[2785, 2123]
110	[218, 219]	921	[1454, 1455]	1732	[120, 410]	2543	[291, 2141]
111	[220, 221]	922	[1456, 47]	1733	[1213, 995]	2544	[2842, 18]
112	[222, 223]	923	[1457, 1458]	1734	[2281, 1976]	2545	[2302, 299]
113	[215, 224]	924	[1459, 1460]	1735	[1316, 338]	2546	[2138, 2291]
114	[225, 226]	925	[1461, 1462]	1736	[989, 2282]	2547	[912, 265]
115	[221, 227]	926	[1463, 740]	1737	[2171, 2283]	2548	[2123, 2855]
116	[228, 229]	927	[1464, 817]	1738	[2284, 877]	2549	[442, 1179]
117	[32, 230]	928	[1465, 1466]	1739	[2008, 2285]	2550	[1316, 1001]
118	[34, 231]	929	[1467, 1468]	1740	[2286, 2287]	2551	[2856, 1181]
119	[232, 233]	930	[1360, 1469]	1741	[402, 2288]	2552	[960, 899]
120	[234, 235]	931	[1470, 1471]	1742	[276, 2289]	2553	[885, 1958]
121	[236, 237]	932	[1472, 1473]	1743	[2290, 118]	2554	[2105, 65]
122	[238, 239]	933	[1474, 1358]	1744	[1248, 2291]	2555	[2857, 956]
123	[240, 241]	934	[1327, 483]	1745	[1211, 1947]	2556	[2142, 2805]
124	[242, 243]	935	[1475, 772]	1746	[952, 1937]	2557	[1989, 905]
125	[244, 245]	936	[1476, 820]	1747	[2107, 904]	2558	[975, 1994]
126	[246, 247]	937	[1477, 1478]	1748	[2292, 392]	2559	[2075, 1103]
127	[248, 249]	938	[510, 544]	1749	[2293, 2142]	2560	[2807, 2149]
128	[250, 251]	939	[1479, 733]	1750	[2294, 441]	2561	[2858, 2859]
129	[252, 253]	940	[1480, 1481]	1751	[1982, 1264]	2562	[63, 2203]
130	[254, 255]	941	[1482, 181]	1752	[1257, 2092]	2563	[2860, 310]

131	[256, 257]	942	[150, 1442]	1753	[1155, 902]	2564	[922, 1090]
132	[258, 259]	943	[1483, 1484]	1754	[2295, 308]	2565	[2325, 2301]
133	[260, 261]	944	[1352, 826]	1755	[2296, 1242]	2566	[326, 1097]
134	[262, 263]	945	[666, 55]	1756	[2297, 872]	2567	[2804, 461]
135	[264, 265]	946	[1485, 1486]	1757	[2298, 1992]	2568	[1277, 1297]
136	[107, 266]	947	[1487, 1488]	1758	[2294, 2033]	2569	[2861, 2862]
137	[267, 268]	948	[1390, 493]	1759	[1224, 1298]	2570	[116, 2831]
138	[269, 270]	949	[1489, 1460]	1760	[2099, 967]	2571	[2863, 844]
139	[271, 272]	950	[1490, 1491]	1761	[275, 2030]	2572	[909, 2330]
140	[273, 274]	951	[1492, 1345]	1762	[1957, 2088]	2573	[2140, 2297]
141	[275, 271]	952	[52, 1493]	1763	[1214, 1215]	2574	[1286, 2864]
142	[276, 277]	953	[1494, 501]	1764	[2225, 2299]	2575	[1953, 1108]
143	[278, 259]	954	[1495, 1346]	1765	[2204, 2300]	2576	[2788, 1254]
144	[279, 280]	955	[556, 479]	1766	[429, 954]	2577	[2865, 970]
145	[281, 282]	956	[1496, 1497]	1767	[2301, 996]	2578	[1014, 2282]
146	[283, 284]	957	[1498, 1499]	1768	[2076, 403]	2579	[427, 1239]
147	[285, 286]	958	[1500, 512]	1769	[438, 2110]	2580	[2866, 893]
148	[287, 288]	959	[1501, 1438]	1770	[2302, 1966]	2581	[1233, 409]
149	[289, 290]	960	[1502, 1391]	1771	[119, 926]	2582	[2018, 2344]
150	[291, 292]	961	[1503, 582]	1772	[1295, 1981]	2583	[2850, 1244]
151	[293, 294]	962	[703, 1504]	1773	[2232, 107]	2584	[1052, 2190]
152	[295, 296]	963	[1505, 1506]	1774	[427, 1949]	2585	[2191, 359]
153	[297, 298]	964	[1507, 1508]	1775	[2110, 2067]	2586	[864, 2222]
154	[299, 300]	965	[1509, 1510]	1776	[898, 860]	2587	[2246, 1221]
155	[301, 302]	966	[1511, 1512]	1777	[2303, 1168]	2588	[2867, 21]
156	[303, 304]	967	[1513, 732]	1778	[1121, 120]	2589	[1962, 2868]
157	[289, 305]	968	[825, 1514]	1779	[2304, 280]	2590	[1292, 2869]
158	[306, 307]	969	[241, 1515]	1780	[1192, 2305]	2591	[90, 2297]
159	[308, 309]	970	[1516, 577]	1781	[1213, 2108]	2592	[2391, 403]
160	[310, 311]	971	[1517, 1518]	1782	[422, 373]	2593	[1085, 294]
161	[312, 313]	972	[1519, 235]	1783	[1959, 2253]	2594	[2870, 28]
162	[314, 315]	973	[1520, 1521]	1784	[2162, 2234]	2595	[2871, 2872]
163	[316, 317]	974	[1522, 1483]	1785	[2306, 2307]	2596	[2066, 422]
164	[318, 319]	975	[1523, 1524]	1786	[1276, 1296]	2597	[2873, 946]
165	[320, 321]	976	[1525, 1439]	1787	[2005, 1194]	2598	[2334, 64]
166	[288, 322]	977	[805, 1373]	1788	[1027, 2308]	2599	[2347, 1933]
167	[323, 324]	978	[1526, 565]	1789	[1217, 2309]	2600	[250, 356]
168	[325, 326]	979	[1527, 1528]	1790	[916, 255]	2601	[2165, 1097]
169	[84, 327]	980	[1529, 1417]	1791	[1018, 1038]	2602	[2382, 20]
170	[328, 329]	981	[1530, 679]	1792	[71, 2310]	2603	[2862, 1246]
171	[327, 85]	982	[1531, 1532]	1793	[1270, 2311]	2604	[2874, 1155]
172	[324, 330]	983	[1533, 515]	1794	[2312, 2277]	2605	[945, 2875]
173	[326, 331]	984	[1534, 634]	1795	[2313, 2314]	2606	[2045, 894]
174	[332, 333]	985	[1535, 238]	1796	[1163, 900]	2607	[2876, 2877]

175	[334, 335]	986	[1536, 1537]	1797	[1177, 1008]	2608	[1323, 2878]
176	[336, 337]	987	[1538, 1488]	1798	[1303, 75]	2609	[2189, 2879]
177	[338, 339]	988	[1539, 703]	1799	[992, 2315]	2610	[2880, 1033]
178	[340, 341]	989	[1540, 1541]	1800	[1067, 2112]	2611	[1188, 2881]
179	[342, 343]	990	[1542, 1543]	1801	[978, 856]	2612	[2393, 893]
180	[344, 345]	991	[1544, 1545]	1802	[2289, 2316]	2613	[412, 2024]
181	[346, 347]	992	[1546, 1547]	1803	[2241, 2317]	2614	[1071, 858]
182	[348, 349]	993	[1548, 1549]	1804	[1237, 891]	2615	[1149, 66]
183	[350, 351]	994	[1550, 1551]	1805	[2180, 1087]	2616	[2797, 2053]
184	[352, 324]	995	[1552, 1378]	1806	[883, 1181]	2617	[2882, 2883]
185	[331, 353]	996	[1553, 466]	1807	[2318, 972]	2618	[2132, 1025]
186	[354, 355]	997	[1554, 702]	1808	[2221, 865]	2619	[2228, 979]
187	[356, 357]	998	[1555, 727]	1809	[1302, 2085]	2620	[2231, 2305]
188	[358, 359]	999	[1556, 476]	1810	[2319, 440]	2621	[1016, 2260]
189	[360, 22]	1000	[1557, 1558]	1811	[2256, 340]	2622	[2840, 2884]
190	[5, 361]	1001	[1445, 777]	1812	[2293, 845]	2623	[2368, 2885]
191	[362, 363]	1002	[1354, 676]	1813	[1312, 2320]	2624	[318, 951]
192	[364, 365]	1003	[1559, 1499]	1814	[2321, 2322]	2625	[331, 1054]
193	[366, 367]	1004	[1560, 1395]	1815	[953, 1317]	2626	[2194, 2886]
194	[368, 369]	1005	[739, 1506]	1816	[942, 2323]	2627	[1184, 447]
195	[370, 371]	1006	[1561, 1562]	1817	[2078, 2324]	2628	[21, 2887]
196	[372, 373]	1007	[1563, 1564]	1818	[848, 1962]	2629	[2888, 2889]
197	[374, 375]	1008	[701, 136]	1819	[2186, 1122]	2630	[949, 2890]
198	[376, 377]	1009	[1565, 1468]	1820	[1932, 1072]	2631	[332, 2266]
199	[301, 378]	1010	[1566, 583]	1821	[1975, 2325]	2632	[1129, 2833]
200	[379, 380]	1011	[1567, 1568]	1822	[1146, 2326]	2633	[2891, 1077]
201	[381, 382]	1012	[1569, 1570]	1823	[964, 2327]	2634	[1953, 2892]
202	[383, 384]	1013	[1571, 642]	1824	[2328, 2329]	2635	[325, 2165]
203	[385, 322]	1014	[1572, 1573]	1825	[902, 1967]	2636	[2227, 2309]
204	[386, 387]	1015	[768, 802]	1826	[1239, 1015]	2637	[2893, 2370]
205	[354, 388]	1016	[1574, 219]	1827	[353, 1048]	2638	[2894, 1227]
206	[389, 390]	1017	[1547, 1575]	1828	[2165, 331]	2639	[2286, 2895]
207	[391, 392]	1018	[1576, 1577]	1829	[1969, 2330]	2640	[2896, 1224]
208	[393, 394]	1019	[1578, 1579]	1830	[1274, 2208]	2641	[915, 1987]
209	[395, 396]	1020	[1580, 1581]	1831	[2331, 87]	2642	[2375, 2086]
210	[397, 398]	1021	[1582, 1583]	1832	[387, 941]	2643	[2897, 2381]
211	[399, 400]	1022	[1584, 1585]	1833	[2154, 2058]	2644	[1020, 2336]
212	[401, 402]	1023	[1586, 611]	1834	[2332, 2294]	2645	[428, 953]
213	[403, 77]	1024	[173, 603]	1835	[2115, 2311]	2646	[1068, 2898]
214	[404, 405]	1025	[1587, 1588]	1836	[929, 2333]	2647	[2899, 1099]
215	[406, 407]	1026	[1589, 740]	1837	[2334, 2203]	2648	[65, 2900]
216	[408, 409]	1027	[1590, 1591]	1838	[1211, 1972]	2649	[1961, 2349]
217	[410, 411]	1028	[1592, 1593]	1839	[1201, 2335]	2650	[2216, 2901]
218	[412, 413]	1029	[1594, 1595]	1840	[1103, 2336]	2651	[2093, 1169]

219	[414, 415]	1030	[40, 191]	1841	[2085, 2105]	2652	[1137, 371]
220	[416, 417]	1031	[1596, 1597]	1842	[446, 2337]	2653	[2879, 289]
221	[418, 419]	1032	[597, 1598]	1843	[2338, 2339]	2654	[64, 2902]
222	[420, 421]	1033	[1599, 709]	1844	[2102, 2122]	2655	[2233, 2163]
223	[422, 423]	1034	[1600, 735]	1845	[2340, 2341]	2656	[2903, 396]
224	[424, 425]	1035	[1601, 748]	1846	[2259, 2326]	2657	[973, 1152]
225	[426, 427]	1036	[1602, 1603]	1847	[899, 861]	2658	[2904, 1943]
226	[428, 429]	1037	[1604, 1447]	1848	[2342, 109]	2659	[1123, 390]
227	[430, 431]	1038	[1575, 1558]	1849	[1019, 1103]	2660	[2905, 2841]
228	[432, 337]	1039	[1605, 1606]	1850	[305, 2343]	2661	[1131, 888]
229	[433, 434]	1040	[1607, 1492]	1851	[2034, 2344]	2662	[2906, 2907]
230	[64, 435]	1041	[1608, 1609]	1852	[367, 2158]	2663	[2795, 2201]
231	[68, 436]	1042	[1610, 1604]	1853	[2345, 1188]	2664	[1113, 2908]
232	[437, 26]	1043	[1611, 1612]	1854	[1992, 2346]	2665	[2342, 1180]
233	[438, 439]	1044	[1613, 779]	1855	[1258, 2093]	2666	[2238, 2825]
234	[440, 441]	1045	[1614, 1615]	1856	[1318, 2347]	2667	[1977, 2210]
235	[442, 443]	1046	[1616, 825]	1857	[1212, 994]	2668	[1050, 1053]
236	[444, 445]	1047	[1617, 607]	1858	[2348, 2349]	2669	[329, 85]
237	[446, 447]	1048	[611, 1618]	1859	[2346, 878]	2670	[302, 2113]
238	[448, 449]	1049	[1619, 610]	1860	[2350, 314]	2671	[1043, 378]
239	[450, 451]	1050	[1620, 646]	1861	[2025, 2351]	2672	[2087, 852]
240	[452, 453]	1051	[1618, 646]	1862	[2352, 838]	2673	[2909, 2268]
241	[454, 455]	1052	[648, 170]	1863	[306, 2353]	2674	[2247, 2351]
242	[456, 457]	1053	[1621, 648]	1864	[2354, 69]	2675	[2910, 363]
243	[255, 458]	1054	[1622, 173]	1865	[2355, 262]	2676	[2911, 428]
244	[459, 460]	1055	[1623, 1624]	1866	[2043, 2275]	2677	[2912, 867]
245	[87, 461]	1056	[1625, 1626]	1867	[2356, 2170]	2678	[2214, 2913]
246	[462, 463]	1057	[1627, 1628]	1868	[2357, 1128]	2679	[1075, 1196]
247	[464, 465]	1058	[1629, 1630]	1869	[78, 934]	2680	[2080, 1073]
248	[466, 467]	1059	[1549, 1455]	1870	[935, 908]	2681	[2914, 399]
249	[468, 469]	1060	[1631, 791]	1871	[68, 2358]	2682	[2915, 2310]
250	[470, 471]	1061	[1632, 1633]	1872	[2061, 2359]	2683	[1008, 1004]
251	[472, 473]	1062	[1634, 1635]	1873	[1253, 2360]	2684	[2866, 2045]
252	[474, 475]	1063	[1636, 1637]	1874	[2361, 2224]	2685	[2916, 1943]
253	[476, 477]	1064	[1638, 1639]	1875	[860, 1971]	2686	[109, 1996]
254	[478, 479]	1065	[632, 690]	1876	[2362, 997]	2687	[2917, 126]
255	[480, 481]	1066	[1640, 527]	1877	[2363, 121]	2688	[2918, 2217]
256	[482, 483]	1067	[1641, 1403]	1878	[2267, 2364]	2689	[347, 2059]
257	[484, 485]	1068	[1642, 1340]	1879	[955, 1278]	2690	[2361, 2919]
258	[486, 130]	1069	[1643, 1644]	1880	[277, 2316]	2691	[2920, 868]
259	[487, 488]	1070	[1645, 1363]	1881	[901, 2365]	2692	[264, 913]
260	[489, 490]	1071	[224, 1368]	1882	[2321, 842]	2693	[836, 1944]
261	[491, 492]	1072	[1646, 1647]	1883	[105, 2084]	2694	[1149, 2900]
262	[493, 494]	1073	[1648, 1649]	1884	[1298, 1078]	2695	[2921, 908]

263	[495, 234]	1074	[1650, 1651]	1885	[1144, 2072]	2696	[1958, 2389]
264	[496, 497]	1075	[1652, 1653]	1886	[387, 900]	2697	[1231, 2922]
265	[498, 499]	1076	[1654, 211]	1887	[2366, 2367]	2698	[1145, 1236]
266	[500, 501]	1077	[1655, 1414]	1888	[2218, 2021]	2699	[370, 1138]
267	[502, 503]	1078	[1656, 1657]	1889	[86, 323]	2700	[2137, 1248]
268	[504, 505]	1079	[759, 1658]	1890	[2368, 2369]	2701	[1989, 450]
269	[497, 506]	1080	[1577, 1650]	1891	[2370, 1013]	2702	[877, 2923]
270	[499, 507]	1081	[1659, 531]	1892	[1082, 2371]	2703	[839, 1080]
271	[508, 490]	1082	[1660, 815]	1893	[2131, 257]	2704	[914, 342]
272	[509, 510]	1083	[1488, 1501]	1894	[2372, 2373]	2705	[2924, 1986]
273	[511, 512]	1084	[1661, 1662]	1895	[2374, 103]	2706	[410, 68]
274	[513, 514]	1085	[1663, 1664]	1896	[357, 850]	2707	[340, 2243]
275	[515, 516]	1086	[1665, 1666]	1897	[2375, 70]	2708	[266, 2065]
276	[517, 518]	1087	[540, 1667]	1898	[1018, 839]	2709	[2273, 2868]
277	[473, 519]	1088	[1668, 1669]	1899	[1084, 2288]	2710	[2925, 988]
278	[520, 521]	1089	[642, 1670]	1900	[2376, 2079]	2711	[2926, 69]
279	[522, 523]	1090	[585, 1630]	1901	[947, 1208]	2712	[2927, 2317]
280	[524, 525]	1091	[1671, 1672]	1902	[2377, 2378]	2713	[2346, 2923]
281	[526, 481]	1092	[1591, 1673]	1903	[2357, 2379]	2714	[464, 2000]
282	[527, 528]	1093	[1674, 193]	1904	[2070, 1083]	2715	[1251, 2214]
283	[529, 530]	1094	[1585, 500]	1905	[441, 1230]	2716	[2928, 297]
284	[531, 532]	1095	[707, 1675]	1906	[432, 2111]	2717	[2929, 2276]
285	[533, 534]	1096	[1676, 1677]	1907	[16, 2290]	2718	[1183, 446]
286	[535, 536]	1097	[1678, 606]	1908	[2380, 911]	2719	[2830, 2129]
287	[537, 538]	1098	[1335, 42]	1909	[2381, 915]	2720	[2332, 440]
288	[539, 540]	1099	[1679, 1680]	1910	[249, 1088]	2721	[1024, 330]
289	[471, 541]	1100	[1681, 657]	1911	[252, 1311]	2722	[998, 2930]
290	[542, 543]	1101	[1682, 1573]	1912	[2382, 2383]	2723	[1266, 927]
291	[544, 545]	1102	[1683, 1684]	1913	[2384, 2192]	2724	[2083, 106]
292	[546, 547]	1103	[1685, 638]	1914	[2085, 1148]	2725	[2873, 2875]
293	[548, 549]	1104	[197, 1686]	1915	[1089, 923]	2726	[2931, 2932]
294	[550, 551]	1105	[1687, 784]	1916	[2385, 319]	2727	[2023, 413]
295	[552, 62]	1106	[1688, 499]	1917	[395, 2386]	2728	[2925, 2070]
296	[553, 554]	1107	[1689, 1690]	1918	[2387, 2388]	2729	[2110, 15]
297	[555, 556]	1108	[1691, 162]	1919	[1966, 2139]	2730	[979, 2209]
298	[557, 558]	1109	[1692, 1618]	1920	[1016, 270]	2731	[2874, 1114]
299	[559, 560]	1110	[1693, 1694]	1921	[874, 2389]	2732	[1948, 1274]
300	[561, 505]	1111	[1695, 735]	1922	[2153, 956]	2733	[2793, 2030]
301	[562, 563]	1112	[1696, 1415]	1923	[1046, 2312]	2734	[1985, 2933]
302	[564, 565]	1113	[1697, 1698]	1924	[835, 845]	2735	[1946, 1972]
303	[566, 567]	1114	[1699, 54]	1925	[2226, 2390]	2736	[2089, 2930]
304	[568, 569]	1115	[1700, 761]	1926	[2391, 2038]	2737	[1259, 254]
305	[570, 571]	1116	[503, 1611]	1927	[2392, 906]	2738	[1997, 281]
306	[572, 573]	1117	[1701, 1702]	1928	[2393, 2045]	2739	[1155, 1115]

307	[574, 575]	1118	[682, 1703]	1929	[403, 828]	2740	[2107, 1989]
308	[576, 577]	1119	[1704, 680]	1930	[312, 2240]	2741	[2121, 2103]
309	[578, 579]	1120	[1705, 227]	1931	[2394, 2395]	2742	[2934, 2935]
310	[580, 511]	1121	[1706, 180]	1932	[1, 1373]	2743	[2880, 2280]
311	[581, 582]	1122	[1707, 1708]	1933	[1830, 2396]	2744	[894, 2080]
312	[189, 583]	1123	[1709, 1675]	1934	[2397, 2398]	2745	[2936, 2369]
313	[584, 585]	1124	[1710, 205]	1935	[2399, 2400]	2746	[1315, 998]
314	[586, 587]	1125	[1711, 180]	1936	[2401, 1397]	2747	[404, 1999]
315	[588, 589]	1126	[1712, 1713]	1937	[2402, 630]	2748	[2211, 89]
316	[590, 12]	1127	[1714, 1715]	1938	[2403, 791]	2749	[2937, 2826]
317	[591, 592]	1128	[1716, 1669]	1939	[2404, 2405]	2750	[2347, 2922]
318	[593, 52]	1129	[1717, 1718]	1940	[2406, 1853]	2751	[2938, 2145]
319	[594, 595]	1130	[1719, 1720]	1941	[1453, 1624]	2752	[1101, 2104]
320	[596, 597]	1131	[1721, 1415]	1942	[2407, 209]	2753	[2861, 1245]
321	[598, 599]	1132	[1722, 1508]	1943	[2408, 561]	2754	[2087, 2041]
322	[600, 601]	1133	[1723, 1507]	1944	[2409, 1640]	2755	[1991, 2273]
323	[602, 603]	1134	[1524, 1724]	1945	[2410, 491]	2756	[2857, 2154]
324	[604, 605]	1135	[205, 1725]	1946	[2411, 1501]	2757	[460, 1235]
325	[605, 606]	1136	[195, 1726]	1947	[1713, 2412]	2758	[2939, 1302]
326	[607, 168]	1137	[1727, 1728]	1948	[1904, 1864]	2759	[2791, 2293]
327	[608, 609]	1138	[1729, 1730]	1949	[2413, 558]	2760	[2940, 2200]
328	[171, 610]	1139	[1731, 1532]	1950	[2414, 1372]	2761	[2381, 342]
329	[168, 172]	1140	[1732, 1562]	1951	[2415, 2416]	2762	[882, 991]
330	[603, 607]	1141	[1733, 1497]	1952	[2417, 1691]	2763	[2252, 1960]
331	[606, 611]	1142	[1734, 1368]	1953	[2418, 795]	2764	[2941, 1096]
332	[612, 590]	1143	[1735, 1736]	1954	[1771, 615]	2765	[423, 1294]
333	[613, 614]	1144	[1737, 1478]	1955	[2419, 2420]	2766	[98, 267]
334	[615, 525]	1145	[1738, 1339]	1956	[148, 246]	2767	[2942, 2943]
335	[616, 617]	1146	[1739, 1740]	1957	[2421, 495]	2768	[1314, 1252]
336	[618, 619]	1147	[1741, 1684]	1958	[2422, 1663]	2769	[123, 2314]
337	[154, 620]	1148	[1742, 507]	1959	[573, 1872]	2770	[327, 1050]
338	[621, 568]	1149	[1743, 1744]	1960	[2423, 551]	2771	[2860, 1194]
339	[622, 623]	1150	[777, 1545]	1961	[2424, 563]	2772	[2944, 2388]
340	[624, 556]	1151	[738, 1745]	1962	[1357, 1649]	2773	[2945, 1206]
341	[625, 626]	1152	[1746, 519]	1963	[1358, 2425]	2774	[2946, 2359]
342	[627, 628]	1153	[1521, 1747]	1964	[516, 2426]	2775	[2834, 278]
343	[629, 630]	1154	[1748, 726]	1965	[2427, 497]	2776	[2376, 2324]
344	[631, 632]	1155	[1749, 1750]	1966	[2428, 152]	2777	[125, 2180]
345	[633, 634]	1156	[1751, 1445]	1967	[2429, 1450]	2778	[843, 2947]
346	[635, 636]	1157	[152, 805]	1968	[1725, 491]	2779	[2155, 1295]
347	[637, 638]	1158	[1752, 1753]	1969	[2430, 518]	2780	[2926, 2375]
348	[639, 640]	1159	[1754, 1643]	1970	[820, 1535]	2781	[4, 2239]
349	[641, 642]	1160	[1755, 783]	1971	[1391, 2431]	2782	[385, 1197]
350	[643, 644]	1161	[1401, 1756]	1972	[2432, 466]	2783	[2802, 1106]

351	[645, 50]	1162	[1757, 1429]	1973	[1812, 178]	2784	[2948, 1644]
352	[646, 605]	1163	[1758, 1430]	1974	[790, 38]	2785	[2949, 1681]
353	[647, 648]	1164	[1759, 1760]	1975	[2433, 517]	2786	[2950, 2951]
354	[649, 650]	1165	[1761, 1762]	1976	[2434, 2435]	2787	[2952, 674]
355	[651, 652]	1166	[1579, 1763]	1977	[2436, 2437]	2788	[1564, 1653]
356	[653, 654]	1167	[1764, 1765]	1978	[8, 652]	2789	[1670, 2953]
357	[655, 656]	1168	[1766, 1543]	1979	[2438, 492]	2790	[2954, 1585]
358	[657, 47]	1169	[1767, 568]	1980	[774, 713]	2791	[2955, 1355]
359	[658, 659]	1170	[560, 1609]	1981	[582, 1791]	2792	[2956, 1747]
360	[532, 660]	1171	[1768, 212]	1982	[2439, 1864]	2793	[2957, 1465]
361	[661, 662]	1172	[1425, 221]	1983	[2440, 2441]	2794	[2958, 1356]
362	[663, 195]	1173	[1769, 1770]	1984	[2442, 2443]	2795	[2959, 1548]
363	[664, 213]	1174	[1606, 1771]	1985	[2444, 1352]	2796	[1686, 2703]
364	[665, 666]	1175	[802, 1772]	1986	[2445, 2446]	2797	[2960, 1429]
365	[667, 145]	1176	[1773, 701]	1987	[2447, 1815]	2798	[2961, 588]
366	[668, 669]	1177	[1774, 1565]	1988	[2448, 1337]	2799	[2962, 239]
367	[670, 671]	1178	[751, 1588]	1989	[2449, 156]	2800	[2963, 2964]
368	[672, 673]	1179	[1775, 1399]	1990	[1828, 1458]	2801	[2965, 674]
369	[674, 675]	1180	[1776, 1577]	1991	[2450, 158]	2802	[815, 31]
370	[676, 677]	1181	[1777, 1340]	1992	[811, 1398]	2803	[1431, 763]
371	[678, 679]	1182	[1778, 1689]	1993	[2451, 1498]	2804	[2966, 10]
372	[680, 561]	1183	[1779, 1631]	1994	[2452, 2453]	2805	[2967, 1542]
373	[681, 682]	1184	[1780, 1690]	1995	[2454, 2455]	2806	[589, 2629]
374	[683, 157]	1185	[1781, 231]	1996	[2456, 506]	2807	[2968, 1633]
375	[684, 480]	1186	[1782, 1438]	1997	[217, 692]	2808	[2615, 143]
376	[501, 685]	1187	[1783, 721]	1998	[490, 1882]	2809	[2969, 544]
377	[686, 687]	1188	[1784, 1698]	1999	[2457, 2458]	2810	[2970, 794]
378	[688, 689]	1189	[1785, 696]	2000	[2459, 2460]	2811	[2971, 2602]
379	[690, 691]	1190	[1786, 599]	2001	[2461, 530]	2812	[547, 1875]
380	[692, 693]	1191	[1787, 724]	2002	[2462, 1551]	2813	[2972, 1901]
381	[694, 655]	1192	[1788, 1537]	2003	[2463, 1885]	2814	[2973, 2974]
382	[695, 570]	1193	[1789, 1790]	2004	[2464, 1911]	2815	[2975, 1486]
383	[696, 666]	1194	[1791, 774]	2005	[2465, 581]	2816	[1433, 2530]
384	[697, 698]	1195	[1376, 1792]	2006	[2466, 1541]	2817	[2976, 1580]
385	[699, 245]	1196	[1793, 1794]	2007	[2467, 1774]	2818	[2471, 2977]
386	[700, 701]	1197	[1795, 1603]	2008	[2468, 2469]	2819	[2978, 1885]
387	[702, 703]	1198	[245, 1796]	2009	[2470, 2471]	2820	[2979, 45]
388	[704, 705]	1199	[1797, 574]	2010	[711, 1797]	2821	[2980, 693]
389	[706, 707]	1200	[1798, 1589]	2011	[1598, 706]	2822	[2981, 2463]
390	[708, 709]	1201	[1799, 144]	2012	[2472, 1615]	2823	[2982, 1374]
391	[710, 711]	1202	[1800, 1801]	2013	[2473, 2474]	2824	[2983, 2602]
392	[538, 207]	1203	[1802, 1803]	2014	[1911, 2475]	2825	[2984, 528]
393	[712, 713]	1204	[1804, 1805]	2015	[514, 473]	2826	[2985, 1884]
394	[181, 714]	1205	[1806, 1677]	2016	[2476, 2477]	2827	[2986, 1404]

395	[715, 716]	1206	[1807, 553]	2017	[2478, 1632]	2828	[2987, 687]
396	[717, 718]	1207	[1808, 1462]	2018	[1497, 549]	2829	[2412, 1517]
397	[719, 677]	1208	[1809, 1565]	2019	[2479, 2480]	2830	[2988, 1380]
398	[720, 721]	1209	[1810, 495]	2020	[2481, 1515]	2831	[227, 794]
399	[722, 723]	1210	[1469, 1713]	2021	[2482, 2483]	2832	[2974, 2974]
400	[724, 725]	1211	[1811, 1812]	2022	[2484, 546]	2833	[2989, 200]
401	[687, 595]	1212	[725, 1552]	2023	[2485, 1771]	2834	[2691, 487]
402	[726, 727]	1213	[1813, 545]	2024	[2486, 1818]	2835	[2990, 702]
403	[728, 157]	1214	[782, 560]	2025	[219, 2487]	2836	[1647, 2541]
404	[729, 730]	1215	[1750, 1542]	2026	[507, 485]	2837	[2453, 489]
405	[731, 732]	1216	[571, 1707]	2027	[2488, 2458]	2838	[2991, 670]
406	[733, 734]	1217	[1814, 1449]	2028	[2489, 734]	2839	[2992, 796]
407	[735, 736]	1218	[1815, 1382]	2029	[1657, 546]	2840	[2993, 1887]
408	[737, 738]	1219	[1816, 134]	2030	[1897, 1524]	2841	[2994, 585]
409	[536, 208]	1220	[1817, 1818]	2031	[2490, 1575]	2842	[2995, 619]
410	[233, 739]	1221	[813, 1819]	2032	[595, 1815]	2843	[2996, 2627]
411	[740, 741]	1222	[541, 1589]	2033	[2491, 626]	2844	[2997, 2604]
412	[742, 531]	1223	[1820, 1720]	2034	[2492, 1664]	2845	[2998, 592]
413	[743, 496]	1224	[1821, 553]	2035	[807, 1579]	2846	[2999, 2951]
414	[744, 745]	1225	[1822, 821]	2036	[1796, 1922]	2847	[2519, 722]
415	[158, 746]	1226	[1823, 1824]	2037	[2493, 739]	2848	[3000, 487]
416	[747, 748]	1227	[1825, 1826]	2038	[2494, 1437]	2849	[534, 1784]
417	[749, 750]	1228	[1827, 1828]	2039	[1747, 511]	2850	[797, 590]
418	[713, 751]	1229	[1374, 1570]	2040	[2495, 513]	2851	[3001, 1590]
419	[752, 753]	1230	[1829, 1830]	2041	[2496, 1745]	2852	[2483, 1632]
420	[754, 755]	1231	[626, 132]	2042	[2497, 816]	2853	[3002, 1791]
421	[756, 757]	1232	[1831, 1548]	2043	[2498, 691]	2854	[3003, 1484]
422	[758, 759]	1233	[1832, 574]	2044	[2499, 738]	2855	[3004, 1595]
423	[760, 761]	1234	[1833, 1663]	2045	[2500, 1640]	2856	[3005, 1867]
424	[762, 763]	1235	[1834, 656]	2046	[718, 2398]	2857	[3006, 1922]
425	[764, 765]	1236	[1835, 1581]	2047	[2501, 2502]	2858	[3007, 1703]
426	[130, 766]	1237	[1836, 1724]	2048	[2503, 1428]	2859	[3008, 1699]
427	[767, 768]	1238	[60, 1732]	2049	[2504, 2505]	2860	[3009, 1393]
428	[769, 629]	1239	[1837, 1357]	2050	[2506, 1886]	2861	[3010, 1571]
429	[770, 215]	1240	[1838, 1365]	2051	[2507, 2508]	2862	[3011, 660]
430	[771, 772]	1241	[1839, 799]	2052	[2509, 1518]	2863	[3012, 3013]
431	[773, 774]	1242	[1840, 1841]	2053	[2510, 493]	2864	[2721, 793]
432	[775, 36]	1243	[1842, 1843]	2054	[1819, 2511]	2865	[3014, 751]
433	[776, 777]	1244	[614, 1827]	2055	[2512, 617]	2866	[3015, 1400]
434	[778, 779]	1245	[780, 44]	2056	[2513, 2514]	2867	[3016, 45]
435	[128, 780]	1246	[1844, 1590]	2057	[2515, 793]	2868	[3017, 2396]
436	[136, 653]	1247	[1845, 1405]	2058	[2516, 2426]	2869	[575, 1639]
437	[781, 782]	1248	[1846, 783]	2059	[2517, 1433]	2870	[3018, 1598]
438	[783, 784]	1249	[1514, 1483]	2060	[766, 1743]	2871	[583, 3019]

439	[785, 757]	1250	[1847, 676]	2061	[1510, 2477]	2872	[3020, 1853]
440	[786, 768]	1251	[1848, 1554]	2062	[709, 1510]	2873	[3021, 198]
441	[787, 788]	1252	[1849, 1398]	2063	[2518, 2519]	2874	[3022, 1432]
442	[789, 628]	1253	[1850, 1792]	2064	[2520, 1875]	2875	[3023, 1634]
443	[213, 790]	1254	[1851, 1852]	2065	[2521, 476]	2876	[2607, 164]
444	[791, 792]	1255	[1853, 1580]	2066	[14, 760]	2877	[3024, 2687]
445	[793, 584]	1256	[1854, 1855]	2067	[2522, 480]	2878	[3025, 1708]
446	[794, 795]	1257	[1856, 787]	2068	[1595, 40]	2879	[714, 1553]
447	[796, 797]	1258	[1857, 1767]	2069	[2523, 722]	2880	[3026, 56]
448	[798, 799]	1259	[1858, 32]	2070	[1506, 1430]	2881	[3027, 725]
449	[800, 620]	1260	[1855, 1859]	2071	[2524, 650]	2882	[3028, 240]
450	[801, 802]	1261	[1350, 1860]	2072	[1736, 177]	2883	[3029, 243]
451	[156, 803]	1262	[1861, 143]	2073	[2525, 218]	2884	[1568, 2669]
452	[804, 805]	1263	[1862, 1812]	2074	[1928, 513]	2885	[2508, 1568]
453	[806, 807]	1264	[1863, 1802]	2075	[1702, 197]	2886	[3030, 797]
454	[808, 809]	1265	[1864, 1865]	2076	[2526, 155]	2887	[3031, 657]
455	[810, 811]	1266	[1866, 623]	2077	[2527, 1591]	2888	[2629, 2768]
456	[812, 813]	1267	[1867, 1868]	2078	[2528, 475]	2889	[3032, 593]
457	[814, 815]	1268	[467, 1869]	2079	[2529, 2530]	2890	[3033, 1790]
458	[816, 817]	1269	[1870, 1533]	2080	[2531, 1650]	2891	[3034, 1656]
459	[818, 581]	1270	[1871, 1872]	2081	[1770, 1855]	2892	[3035, 1891]
460	[819, 820]	1271	[1873, 1874]	2082	[1481, 1904]	2893	[3036, 1571]
461	[763, 821]	1272	[757, 1830]	2083	[2532, 1803]	2894	[3037, 3038]
462	[822, 241]	1273	[809, 1643]	2084	[2533, 1794]	2895	[492, 2422]
463	[823, 145]	1274	[1875, 1876]	2085	[2534, 690]	2896	[2502, 1655]
464	[824, 825]	1275	[1667, 1363]	2086	[2535, 1426]	2897	[592, 1355]
465	[826, 827]	1276	[1877, 128]	2087	[2536, 2537]	2898	[3039, 1369]
466	[828, 78]	1277	[1878, 1879]	2088	[235, 2538]	2899	[3040, 1681]
467	[829, 830]	1278	[788, 1528]	2089	[1760, 1662]	2900	[3041, 1651]
468	[831, 832]	1279	[479, 1880]	2090	[530, 1400]	2901	[1720, 718]
469	[280, 833]	1280	[1881, 1882]	2091	[2539, 1743]	2902	[3042, 1819]
470	[834, 835]	1281	[1883, 1884]	2092	[2540, 2455]	2903	[1801, 2441]
471	[836, 837]	1282	[1885, 1886]	2093	[2541, 1423]	2904	[50, 1396]
472	[838, 839]	1283	[1887, 1583]	2094	[2542, 1691]	2905	[2603, 3043]
473	[402, 840]	1284	[1888, 194]	2095	[2543, 1880]	2906	[638, 1404]
474	[841, 842]	1285	[610, 647]	2096	[2544, 754]	2907	[3044, 1924]
475	[843, 844]	1286	[1624, 183]	2097	[2545, 1390]	2908	[3045, 1667]
476	[845, 846]	1287	[1889, 584]	2098	[2546, 716]	2909	[3046, 3038]
477	[847, 848]	1288	[1369, 587]	2099	[1442, 1410]	2910	[2633, 789]
478	[849, 850]	1289	[1890, 1891]	2100	[761, 809]	2911	[3047, 637]
479	[851, 852]	1290	[1892, 1860]	2101	[2547, 1492]	2912	[3048, 1928]
480	[853, 854]	1291	[1893, 1635]	2102	[2548, 792]	2913	[3049, 1469]
481	[855, 856]	1292	[1894, 1895]	2103	[1458, 185]	2914	[3050, 1481]
482	[117, 857]	1293	[1896, 1897]	2104	[2549, 2550]	2915	[3051, 2977]

483	[858, 859]	1294	[1898, 1686]	2105	[2455, 133]	2916	[3052, 2428]
484	[860, 861]	1295	[1899, 1431]	2106	[2551, 778]	2917	[3053, 540]
485	[862, 863]	1296	[1900, 1547]	2107	[2552, 1434]	2918	[2670, 1348]
486	[864, 865]	1297	[1901, 1671]	2108	[2553, 2431]	2919	[3054, 736]
487	[866, 867]	1298	[1902, 203]	2109	[2554, 31]	2920	[3055, 1386]
488	[868, 869]	1299	[1903, 1904]	2110	[2555, 1434]	2921	[3056, 1848]
489	[870, 307]	1300	[1905, 1906]	2111	[2556, 2557]	2922	[3057, 2425]
490	[871, 872]	1301	[1907, 766]	2112	[2558, 1772]	2923	[3058, 790]
491	[873, 874]	1302	[1908, 1767]	2113	[1612, 1689]	2924	[3059, 3013]
492	[875, 876]	1303	[1909, 1750]	2114	[2559, 653]	2925	[3060, 1810]
493	[877, 878]	1304	[1910, 1796]	2115	[1876, 2560]	2926	[1416, 141]
494	[879, 880]	1305	[1395, 1911]	2116	[2561, 1718]	2927	[3061, 3062]
495	[363, 442]	1306	[1912, 1913]	2117	[2562, 1634]	2928	[1818, 1356]
496	[881, 882]	1307	[1914, 704]	2118	[2563, 711]	2929	[3063, 2588]
497	[883, 884]	1308	[1915, 1715]	2119	[2564, 175]	2930	[3064, 1859]
498	[885, 874]	1309	[1916, 1811]	2120	[2565, 141]	2931	[3065, 2959]
499	[357, 862]	1310	[1917, 1918]	2121	[1891, 2514]	2932	[3066, 1753]
500	[886, 887]	1311	[1919, 1920]	2122	[2566, 1828]	2933	[1865, 1428]
501	[888, 889]	1312	[1921, 1876]	2123	[2567, 640]	2934	[3067, 2953]
502	[890, 891]	1313	[1922, 510]	2124	[1597, 1760]	2935	[3068, 194]
503	[892, 400]	1314	[1923, 760]	2125	[2568, 2569]	2936	[3069, 3043]
504	[893, 894]	1315	[1924, 1556]	2126	[58, 2570]	2937	[2537, 1512]
505	[895, 443]	1316	[784, 622]	2127	[2571, 1637]	2938	[512, 8]
506	[882, 282]	1317	[1447, 1683]	2128	[2572, 2422]	2939	[689, 2413]
507	[874, 896]	1318	[1762, 34]	2129	[505, 1473]	2940	[162, 1333]
508	[409, 897]	1319	[1925, 1611]	2130	[2573, 1401]	2941	[3070, 707]
509	[898, 899]	1320	[1926, 1738]	2131	[1558, 745]	2942	[792, 2596]
510	[900, 901]	1321	[1927, 1928]	2132	[2574, 2575]	2943	[3071, 1748]
511	[902, 903]	1322	[1929, 1553]	2133	[518, 1774]	2944	[3072, 534]
512	[904, 905]	1323	[1930, 237]	2134	[636, 1450]	2945	[3073, 1784]
513	[906, 402]	1324	[1906, 579]	2135	[1551, 730]	2946	[3074, 3075]
514	[907, 375]	1325	[1931, 55]	2136	[2576, 1412]	2947	[1364, 1550]
515	[908, 909]	1326	[1932, 858]	2137	[2577, 1867]	2948	[3076, 356]
516	[910, 911]	1327	[1231, 1933]	2138	[2578, 229]	2949	[3077, 1012]
517	[912, 913]	1328	[1934, 965]	2139	[2579, 1763]	2950	[3078, 1064]
518	[914, 915]	1329	[1935, 286]	2140	[2580, 1389]	2951	[3079, 125]
519	[375, 916]	1330	[1936, 1937]	2141	[2581, 575]	2952	[3080, 2292]
520	[917, 918]	1331	[15, 1272]	2142	[2582, 1726]	2953	[2897, 914]
521	[880, 919]	1332	[280, 1938]	2143	[2583, 189]	2954	[2250, 1045]
522	[920, 921]	1333	[1939, 1940]	2144	[2584, 172]	2955	[1191, 892]
523	[922, 923]	1334	[1051, 83]	2145	[2585, 765]	2956	[401, 1084]
524	[924, 925]	1335	[1053, 352]	2146	[2586, 2475]	2957	[356, 849]
525	[926, 410]	1336	[921, 1941]	2147	[617, 1843]	2958	[1015, 1044]
526	[451, 927]	1337	[1942, 1204]	2148	[2587, 2588]	2959	[3081, 2132]

527	[271, 928]	1338	[1943, 299]	2149	[2589, 2546]	2960	[3082, 98]
528	[929, 930]	1339	[1944, 1065]	2150	[2590, 148]	2961	[3083, 1028]
529	[931, 932]	1340	[1001, 339]	2151	[2591, 1733]	2962	[2303, 2796]
530	[933, 934]	1341	[1945, 942]	2152	[1609, 813]	2963	[3084, 2128]
531	[935, 936]	1342	[1946, 1947]	2153	[554, 1498]	2964	[3085, 2345]
532	[937, 388]	1343	[1948, 1007]	2154	[2446, 1802]	2965	[3086, 1131]
533	[73, 938]	1344	[1174, 283]	2155	[2592, 541]	2966	[2199, 3087]
534	[939, 940]	1345	[1165, 1949]	2156	[2593, 1730]	2967	[2092, 2106]
535	[941, 393]	1346	[267, 1166]	2157	[2594, 675]	2968	[258, 3088]
536	[942, 943]	1347	[1950, 1951]	2158	[2474, 737]	2969	[1083, 958]
537	[944, 101]	1348	[1952, 1953]	2159	[2595, 2596]	2970	[2248, 948]
538	[945, 946]	1349	[1073, 1219]	2160	[2597, 781]	2971	[2094, 2054]
539	[947, 948]	1350	[413, 1954]	2161	[662, 770]	2972	[3089, 2231]
540	[949, 950]	1351	[1955, 1293]	2162	[198, 696]	2973	[3090, 3091]
541	[951, 952]	1352	[1956, 1269]	2163	[2598, 2599]	2974	[3092, 3093]
542	[953, 954]	1353	[1957, 1152]	2164	[2600, 673]	2975	[2848, 992]
543	[341, 955]	1354	[1958, 896]	2165	[2601, 647]	2976	[2013, 2157]
544	[956, 957]	1355	[1959, 1960]	2166	[1644, 187]	2977	[2893, 1012]
545	[958, 959]	1356	[1961, 1950]	2167	[2602, 2603]	2978	[1162, 387]
546	[960, 860]	1357	[1962, 1963]	2168	[183, 2604]	2979	[2350, 2194]
547	[961, 305]	1358	[1002, 1964]	2169	[2605, 662]	2980	[870, 2353]
548	[962, 963]	1359	[1965, 421]	2170	[2606, 179]	2981	[3094, 924]
549	[964, 965]	1360	[1943, 1966]	2171	[1336, 2607]	2982	[2263, 460]
550	[966, 967]	1361	[1115, 1967]	2172	[2608, 1672]	2983	[3095, 2862]
551	[465, 968]	1362	[911, 1964]	2173	[2609, 669]	2984	[911, 1003]
552	[969, 321]	1363	[1968, 975]	2174	[2610, 2460]	2985	[2937, 887]
553	[970, 971]	1364	[1969, 1970]	2175	[2611, 1877]	2986	[322, 3096]
554	[972, 973]	1365	[899, 1971]	2176	[2612, 1702]	2987	[2090, 340]
555	[974, 975]	1366	[1972, 1973]	2177	[2613, 58]	2988	[2016, 3097]
556	[976, 277]	1367	[1241, 1974]	2178	[2614, 2615]	2989	[2813, 1277]
557	[977, 978]	1368	[1975, 1322]	2179	[2616, 724]	2990	[2081, 895]
558	[979, 380]	1369	[1976, 122]	2180	[2617, 723]	2991	[3098, 1124]
559	[980, 981]	1370	[1234, 897]	2181	[2618, 1732]	2992	[2202, 1288]
560	[982, 983]	1371	[1977, 449]	2182	[138, 1736]	2993	[1099, 3099]
561	[984, 341]	1372	[1240, 853]	2183	[2619, 2413]	2994	[1049, 2190]
562	[985, 986]	1373	[386, 1163]	2184	[2620, 1514]	2995	[3100, 2009]
563	[987, 988]	1374	[4, 1978]	2185	[2621, 1707]	2996	[2193, 2864]
564	[989, 990]	1375	[1274, 1979]	2186	[2622, 1626]	2997	[3101, 3102]
565	[905, 451]	1376	[1980, 1981]	2187	[1468, 1906]	2998	[2116, 2815]
566	[281, 991]	1377	[1982, 1141]	2188	[2623, 2435]	2999	[2063, 3103]
567	[992, 993]	1378	[311, 1980]	2189	[2624, 471]	3000	[3104, 1323]
568	[994, 995]	1379	[1983, 1984]	2190	[2625, 171]	3001	[1010, 2308]
569	[996, 997]	1380	[1985, 1986]	2191	[2626, 1670]	3002	[1256, 108]
570	[998, 999]	1381	[342, 1987]	2192	[2505, 2627]	3003	[2022, 291]

571	[1000, 1001]	1382	[1259, 916]	2193	[2628, 2629]	3004	[2068, 1990]
572	[1002, 1003]	1383	[1988, 914]	2194	[2416, 160]	3005	[3105, 2357]
573	[1004, 1005]	1384	[421, 1989]	2195	[2630, 2511]	3006	[2053, 2037]
574	[1006, 1007]	1385	[1057, 1990]	2196	[2631, 1336]	3007	[104, 3106]
575	[1008, 1009]	1386	[917, 932]	2197	[1628, 2405]	3008	[344, 297]
576	[1010, 1011]	1387	[1991, 1962]	2198	[2632, 2633]	3009	[362, 2081]
577	[1012, 1013]	1388	[1141, 1265]	2199	[2634, 2607]	3010	[3107, 1099]
578	[1014, 990]	1389	[1992, 877]	2200	[2635, 1827]	3011	[1308, 3108]
579	[1015, 853]	1390	[893, 879]	2201	[2636, 1879]	3012	[2127, 3109]
580	[913, 1016]	1391	[1993, 1312]	2202	[2637, 1890]	3013	[3110, 2173]
581	[1017, 1018]	1392	[260, 1994]	2203	[2638, 521]	3014	[110, 881]
582	[1019, 1020]	1393	[1301, 1995]	2204	[2639, 2640]	3015	[450, 1266]
583	[1021, 1022]	1394	[373, 1079]	2205	[1745, 1733]	3016	[3111, 93]
584	[1023, 326]	1395	[1996, 1997]	2206	[1637, 202]	3017	[1141, 2854]
585	[323, 1024]	1396	[1998, 1999]	2207	[2641, 1535]	3018	[3112, 3113]
586	[986, 1025]	1397	[2000, 968]	2208	[1562, 2453]	3019	[3114, 346]
587	[1026, 973]	1398	[1156, 1316]	2209	[2642, 569]	3020	[2941, 2177]
588	[1027, 1011]	1399	[266, 1260]	2210	[1658, 2557]	3021	[3115, 3116]
589	[1028, 1029]	1400	[456, 2001]	2211	[2643, 233]	3022	[1124, 1139]
590	[1030, 1031]	1401	[2002, 292]	2212	[1346, 1841]	3023	[2348, 1950]
591	[1032, 1033]	1402	[875, 929]	2213	[563, 2567]	3024	[1189, 2378]
592	[1034, 1035]	1403	[457, 2003]	2214	[2644, 1504]	3025	[2296, 1974]
593	[940, 1036]	1404	[2004, 354]	2215	[2645, 714]	3026	[3117, 3118]
594	[1037, 953]	1405	[2005, 310]	2216	[2646, 2647]	3027	[2188, 2878]
595	[838, 1038]	1406	[2006, 1102]	2217	[2648, 2587]	3028	[3119, 3120]
596	[1039, 1040]	1407	[988, 1263]	2218	[1675, 597]	3029	[2856, 884]
597	[1041, 1042]	1408	[1275, 2002]	2219	[2649, 2599]	3030	[2905, 2884]
598	[1043, 302]	1409	[1295, 2007]	2220	[2538, 704]	3031	[2056, 445]
599	[1044, 854]	1410	[2008, 2009]	2221	[2650, 1329]	3032	[383, 2883]
600	[364, 1045]	1411	[1998, 405]	2222	[1859, 2651]	3033	[2909, 2364]
601	[1046, 369]	1412	[392, 2010]	2223	[2652, 1852]	3034	[3076, 251]
602	[353, 1047]	1413	[2011, 2012]	2224	[669, 2653]	3035	[2806, 1228]
603	[330, 325]	1414	[2013, 367]	2225	[2654, 2569]	3036	[279, 1091]
604	[1048, 1049]	1415	[1308, 2014]	2226	[2655, 601]	3037	[3121, 2017]
605	[1050, 86]	1416	[2015, 276]	2227	[2656, 1471]	3038	[3122, 3123]
606	[1049, 1051]	1417	[2016, 2017]	2228	[2657, 692]	3039	[2318, 1026]
607	[1047, 1052]	1418	[2018, 2019]	2229	[1333, 2658]	3040	[1952, 1107]
608	[85, 1053]	1419	[416, 983]	2230	[2659, 781]	3041	[2245, 2320]
609	[609, 609]	1420	[2020, 2021]	2231	[2660, 2575]	3042	[1321, 2325]
610	[1054, 1048]	1421	[2022, 2002]	2232	[2661, 500]	3043	[3124, 6]
611	[86, 352]	1422	[2023, 2024]	2233	[2662, 2561]	3044	[2928, 345]
612	[334, 1055]	1423	[2025, 2026]	2234	[2663, 2483]	3045	[2186, 309]
613	[328, 327]	1424	[966, 2027]	2235	[2664, 685]	3046	[2098, 3125]
614	[1052, 1051]	1425	[2028, 2010]	2236	[2665, 1924]	3047	[2118, 416]

615	[1056, 971]	1426	[1263, 962]	2237	[685, 2463]	3048	[3114, 1145]
616	[1057, 1058]	1427	[2029, 851]	2238	[2666, 803]	3049	[2284, 2346]
617	[1059, 1060]	1428	[2030, 928]	2239	[2667, 705]	3050	[2921, 936]
618	[1061, 1062]	1429	[2031, 374]	2240	[2668, 2669]	3051	[1220, 3126]
619	[1063, 1064]	1430	[1936, 2032]	2241	[1635, 2469]	3052	[1206, 295]
620	[1065, 1066]	1431	[2033, 1318]	2242	[599, 2670]	3053	[3127, 431]
621	[961, 290]	1432	[2034, 2019]	2243	[2671, 788]	3054	[1976, 2052]
622	[1067, 458]	1433	[1020, 1104]	2244	[140, 1728]	3055	[847, 1991]
623	[1068, 1069]	1434	[90, 871]	2245	[2672, 1564]	3056	[3128, 2284]
624	[1070, 851]	1435	[2035, 267]	2246	[2673, 496]	3057	[2030, 272]
625	[1071, 1072]	1436	[2036, 1312]	2247	[2674, 230]	3058	[1180, 1996]
626	[1073, 1074]	1437	[2037, 1009]	2248	[2675, 1810]	3059	[3129, 2329]
627	[1075, 1076]	1438	[2038, 77]	2249	[2676, 1520]	3060	[2904, 2302]
628	[1077, 1078]	1439	[372, 423]	2250	[1718, 240]	3061	[2024, 3130]
629	[421, 904]	1440	[2039, 2040]	2251	[2677, 2474]	3062	[3131, 2172]
630	[423, 1079]	1441	[851, 2041]	2252	[2678, 2560]	3063	[457, 3132]
631	[1080, 256]	1442	[290, 1222]	2253	[2679, 1666]	3064	[440, 2033]
632	[1081, 1082]	1443	[2042, 2043]	2254	[1372, 684]	3065	[399, 3133]
633	[910, 1002]	1444	[2044, 870]	2255	[543, 1386]	3066	[2109, 439]
634	[1083, 962]	1445	[941, 901]	2256	[2680, 625]	3067	[3134, 3135]
635	[906, 1084]	1446	[26, 75]	2257	[494, 1716]	3068	[2011, 463]
636	[439, 15]	1447	[2045, 879]	2258	[2681, 1432]	3069	[1012, 3136]
637	[1085, 1086]	1448	[2046, 1133]	2259	[2682, 1765]	3070	[3137, 3138]
638	[126, 1087]	1449	[2047, 2048]	2260	[2683, 133]	3071	[2814, 2117]
639	[425, 1088]	1450	[1084, 840]	2261	[1397, 2577]	3072	[3139, 2048]
640	[988, 1083]	1451	[2024, 1954]	2262	[2684, 1604]	3073	[3140, 2251]
641	[1089, 1090]	1452	[2049, 2050]	2263	[2685, 1393]	3074	[378, 3141]
642	[1091, 833]	1453	[1243, 2051]	2264	[2686, 1394]	3075	[3142, 2195]
643	[1092, 1093]	1454	[121, 2052]	2265	[2687, 637]	3076	[3143, 655]
644	[1094, 1019]	1455	[2053, 1008]	2266	[2669, 1335]	3077	[3144, 1844]
645	[1095, 1096]	1456	[2054, 2055]	2267	[2688, 1824]	3078	[3145, 1479]
646	[352, 1024]	1457	[1054, 1047]	2268	[2689, 477]	3079	[3146, 246]
647	[83, 328]	1458	[1048, 1052]	2269	[2690, 2691]	3080	[3147, 600]
648	[1097, 353]	1459	[2056, 2057]	2270	[2692, 226]	3081	[3148, 1808]
649	[358, 1098]	1460	[79, 1289]	2271	[628, 1877]	3082	[3149, 789]
650	[1099, 1100]	1461	[1310, 253]	2272	[2693, 1738]	3083	[3150, 1594]
651	[1101, 1102]	1462	[2042, 1278]	2273	[2694, 1451]	3084	[3151, 1479]
652	[16, 117]	1463	[345, 298]	2274	[2695, 2567]	3085	[2964, 670]
653	[265, 269]	1464	[956, 2058]	2275	[2696, 1366]	3086	[3152, 202]
654	[1103, 1104]	1465	[408, 1234]	2276	[2697, 2570]	3087	[42, 2508]
655	[1105, 1106]	1466	[849, 862]	2277	[673, 750]	3088	[3153, 615]
656	[1037, 429]	1467	[1236, 2059]	2278	[2698, 819]	3089	[519, 1789]
657	[1107, 1108]	1468	[1949, 1015]	2279	[2699, 1419]	3090	[3154, 2424]
658	[324, 1109]	1469	[1995, 2060]	2280	[2700, 1694]	3091	[3155, 680]

659	[1109, 325]	1470	[2061, 2062]	2281	[2701, 238]	3092	[3156, 224]
660	[936, 909]	1471	[2063, 2064]	2282	[2702, 2703]	3093	[3157, 1909]
661	[389, 1110]	1472	[108, 2065]	2283	[185, 614]	3094	[3158, 1517]
662	[1111, 406]	1473	[894, 880]	2284	[2704, 1556]	3095	[3159, 1844]
663	[1112, 1113]	1474	[900, 393]	2285	[1486, 1801]	3096	[3160, 1416]
664	[1114, 1115]	1475	[2066, 372]	2286	[2705, 1895]	3097	[243, 1507]
665	[1116, 1117]	1476	[439, 2067]	2287	[2706, 2672]	3098	[2640, 1601]
666	[1118, 1119]	1477	[2068, 1058]	2288	[2707, 1683]	3099	[3161, 46]
667	[1120, 1068]	1478	[2054, 1941]	2289	[2708, 2538]	3100	[146, 3062]
668	[1121, 926]	1479	[2069, 1034]	2290	[2709, 2487]	3101	[3162, 1673]
669	[308, 1122]	1480	[987, 2070]	2291	[1405, 2416]	3102	[3163, 1597]
670	[1123, 1110]	1481	[2071, 2072]	2292	[2710, 1533]	3103	[1426, 536]
671	[1124, 1035]	1482	[2073, 1180]	2293	[1753, 636]	3104	[3164, 1789]
672	[1125, 1126]	1483	[1945, 1250]	2294	[2711, 1762]	3105	[3165, 1716]
673	[1127, 1128]	1484	[2074, 996]	2295	[1504, 1490]	3106	[3166, 2653]
674	[1129, 1130]	1485	[1142, 978]	2296	[2712, 2437]	3107	[3167, 188]
675	[1131, 102]	1486	[2043, 1279]	2297	[2713, 571]	3108	[3168, 1387]
676	[411, 436]	1487	[1094, 2075]	2298	[2714, 1396]	3109	[1499, 2672]
677	[1132, 1133]	1488	[2076, 2038]	2299	[1615, 2546]	3110	[3169, 1655]
678	[1134, 981]	1489	[2077, 313]	2300	[2715, 1388]	3111	[3170, 188]
679	[1035, 1135]	1490	[2078, 2079]	2301	[2716, 1554]	3112	[3171, 742]
680	[98, 1136]	1491	[2080, 919]	2302	[226, 759]	3113	[3172, 1770]
681	[1137, 1138]	1492	[2081, 442]	2303	[2717, 1740]	3114	[3173, 770]
682	[1139, 1135]	1493	[1036, 2082]	2304	[2718, 588]	3115	[1662, 2424]
683	[1140, 1141]	1494	[2083, 2084]	2305	[2719, 1491]	3116	[3174, 1699]
684	[1142, 855]	1495	[1995, 2085]	2306	[727, 1606]	3117	[3175, 2577]
685	[1143, 1144]	1496	[69, 2086]	2307	[2720, 811]	3118	[3176, 212]
686	[1017, 838]	1497	[1947, 1973]	2308	[1630, 2721]	3119	[1493, 2959]
687	[1145, 347]	1498	[1070, 2087]	2309	[2722, 2651]	3120	[3177, 807]
688	[1146, 1147]	1499	[973, 2088]	2310	[2723, 2670]	3121	[2443, 3075]
689	[1148, 1149]	1500	[1214, 76]	2311	[2724, 2480]	3122	[3178, 2502]
690	[339, 1150]	1501	[1252, 2089]	2312	[2725, 671]	3123	[3179, 1550]
691	[1082, 284]	1502	[926, 67]	2313	[2726, 706]	3124	[3043, 644]
692	[409, 1151]	1503	[2090, 984]	2314	[2727, 698]	3125	[698, 1350]
693	[1152, 1153]	1504	[2091, 1066]	2315	[2728, 532]	3126	[3180, 780]
694	[1154, 1155]	1505	[319, 1936]	2316	[1439, 2729]	3127	[3181, 1848]
695	[1156, 1000]	1506	[2092, 2093]	2317	[2730, 146]	3128	[193, 2428]
696	[1157, 1158]	1507	[884, 1267]	2318	[2731, 1520]	3129	[3182, 2965]
697	[1159, 1160]	1508	[2094, 921]	2319	[1879, 787]	3130	[3183, 488]
698	[256, 1161]	1509	[853, 2095]	2320	[2732, 1466]	3131	[3184, 1890]
699	[1162, 1163]	1510	[2096, 1069]	2321	[2570, 2647]	3132	[3185, 1671]
700	[1164, 422]	1511	[1152, 2097]	2322	[2599, 2443]	3133	[3186, 554]
701	[426, 1165]	1512	[2098, 1984]	2323	[2733, 1865]	3134	[1843, 3187]
702	[297, 847]	1513	[2099, 2027]	2324	[1763, 1826]	3135	[3188, 2681]

703	[1136, 1166]	1514	[1322, 2074]	2325	[2729, 570]	3136	[3189, 2603]
704	[1167, 1168]	1515	[2100, 2101]	2326	[1399, 2550]	3137	[1726, 742]
705	[1169, 434]	1516	[2102, 2103]	2327	[200, 2568]	3138	[3190, 223]
706	[1170, 1171]	1517	[2006, 2104]	2328	[2734, 2519]	3139	[3191, 3192]
707	[1172, 1173]	1518	[2105, 1149]	2329	[2735, 489]	3140	[1895, 2610]
708	[1174, 1082]	1519	[1258, 2106]	2330	[2736, 494]	3141	[3193, 1868]
709	[451, 1175]	1520	[420, 2107]	2331	[2737, 467]	3142	[3194, 1631]
710	[1176, 1177]	1521	[1114, 902]	2332	[2738, 2541]	3143	[2161, 1037]
711	[924, 1178]	1522	[867, 976]	2333	[2739, 514]	3144	[3195, 79]
712	[895, 1179]	1523	[994, 2108]	2334	[1703, 1901]	3145	[3196, 74]
713	[1038, 1080]	1524	[850, 863]	2335	[1677, 2471]	3146	[3197, 464]
714	[1180, 110]	1525	[2109, 2110]	2336	[2740, 1658]	3147	[3198, 2917]
715	[1181, 1182]	1526	[336, 2111]	2337	[2741, 589]	3148	[2243, 2042]
716	[1183, 1184]	1527	[255, 2112]	2338	[2742, 2658]	3149	[2251, 2361]
717	[414, 1185]	1528	[378, 2113]	2339	[2743, 1748]	3150	[3199, 2172]
718	[1072, 859]	1529	[1972, 2114]	2340	[2744, 1490]	3151	[2047, 3200]
719	[1009, 1186]	1530	[2115, 1271]	2341	[2745, 753]	3152	[3201, 385]
720	[890, 1187]	1531	[2116, 2117]	2342	[521, 155]	3153	[381, 2879]
721	[1188, 296]	1532	[2118, 982]	2343	[2746, 2729]	3154	[367, 3202]
722	[1189, 1190]	1533	[2119, 1978]	2344	[2747, 1874]	3155	[2352, 1018]
723	[1191, 399]	1534	[2120, 1213]	2345	[2748, 1656]	3156	[1035, 3203]
724	[1192, 1193]	1535	[2067, 1272]	2346	[2749, 1493]	3157	[2319, 2294]
725	[1194, 311]	1536	[2121, 2122]	2347	[2750, 1744]	3158	[2093, 433]
726	[1195, 1196]	1537	[2123, 94]	2348	[2751, 1612]	3159	[2824, 2166]
727	[1197, 1198]	1538	[2124, 1252]	2349	[2752, 1647]	3160	[937, 355]
728	[1199, 306]	1539	[1944, 2091]	2350	[2753, 523]	3161	[2936, 2885]
729	[277, 1200]	1540	[2125, 2126]	2351	[2754, 1756]	3162	[3204, 3205]
730	[1201, 1202]	1541	[2127, 2128]	2352	[2755, 684]	3163	[2020, 2219]
731	[1203, 1204]	1542	[915, 343]	2353	[2756, 547]	3164	[77, 933]
732	[104, 407]	1543	[441, 1318]	2354	[2757, 1552]	3165	[1065, 2228]
733	[27, 1205]	1544	[1007, 1979]	2355	[2758, 1521]	3166	[2341, 2890]
734	[1206, 1188]	1545	[901, 394]	2356	[2759, 1811]	3167	[3206, 2195]
735	[986, 1207]	1546	[829, 2129]	2357	[2760, 1913]	3168	[2894, 2816]
736	[1208, 1209]	1547	[2130, 2131]	2358	[2761, 178]	3169	[3207, 2914]
737	[1210, 1211]	1548	[1176, 2053]	2359	[2762, 2568]	3170	[2867, 360]
738	[1212, 1213]	1549	[2132, 1207]	2360	[2763, 1805]	3171	[465, 3208]
739	[26, 1214]	1550	[975, 261]	2361	[2764, 827]	3172	[2836, 1258]
740	[75, 1215]	1551	[1970, 2133]	2362	[2765, 2412]	3173	[2179, 2226]
741	[298, 848]	1552	[2044, 306]	2363	[741, 1808]	3174	[2073, 109]
742	[1216, 949]	1553	[347, 2134]	2364	[630, 1920]	3175	[2312, 3209]
743	[1217, 1218]	1554	[2035, 1136]	2365	[2766, 234]	3176	[2794, 837]
744	[919, 1219]	1555	[2135, 2136]	2366	[2767, 2768]	3177	[1965, 2107]
745	[1220, 1221]	1556	[345, 847]	2367	[2769, 2681]	3178	[3210, 2287]
746	[305, 1222]	1557	[2137, 2138]	2368	[46, 1887]	3179	[1235, 929]

747	[99, 1223]	1558	[2131, 1161]	2369	[2770, 2721]	3180	[1125, 89]
748	[1224, 1077]	1559	[974, 260]	2370	[1868, 1593]	3181	[97, 2035]
749	[1144, 1225]	1560	[299, 2139]	2371	[2771, 1549]	3182	[3211, 3123]
750	[1126, 90]	1561	[89, 2140]	2372	[2772, 2640]	3183	[2249, 1210]
751	[1226, 1227]	1562	[1140, 1264]	2373	[1484, 150]	3184	[3212, 1953]
752	[91, 1228]	1563	[2002, 2141]	2374	[2773, 733]	3185	[3127, 2039]
753	[1229, 1029]	1564	[2088, 1153]	2375	[1639, 2537]	3186	[419, 925]
754	[1230, 1231]	1565	[2142, 846]	2376	[2774, 1918]	3187	[2298, 2284]
755	[1232, 278]	1566	[1229, 2143]	2377	[1515, 2561]	3188	[969, 2178]
756	[1233, 1234]	1567	[1097, 1054]	2378	[2775, 2615]	3189	[2940, 3087]
757	[1235, 876]	1568	[2144, 609]	2379	[2776, 1869]	3190	[2939, 1995]
758	[346, 1236]	1569	[2145, 2146]	2380	[2653, 1465]	3191	[3213, 2064]
759	[913, 269]	1570	[460, 875]	2381	[223, 629]	3192	[3214, 391]
760	[1237, 1187]	1571	[2147, 333]	2382	[2627, 1628]	3193	[2912, 2015]
761	[30, 1238]	1572	[2148, 2149]	2383	[659, 659]	3194	[2899, 1282]
762	[1239, 1240]	1573	[2150, 2151]	2384	[488, 1680]	3195	[3215, 616]
763	[1241, 1242]	1574	[115, 1160]	2385	[2777, 782]	3196	[3216, 2964]
764	[1243, 1244]	1575	[2152, 1220]	2386	[1694, 2587]	3197	[3217, 826]
765	[1245, 1246]	1576	[2153, 2154]	2387	[2778, 2400]	3198	[2400, 1531]
766	[1247, 1248]	1577	[2155, 1980]	2388	[2779, 1362]	3199	[3218, 616]
767	[1249, 1250]	1578	[951, 1936]	2389	[2780, 142]	3200	[1466, 2446]
768	[1251, 273]	1579	[1302, 2060]	2390	[2781, 1657]	3201	[2420, 600]
769	[1252, 998]	1580	[1134, 2156]	2391	[565, 218]	3202	[3219, 1725]
770	[1253, 1254]	1581	[2157, 2158]	2392	[2782, 726]	3203	[3220, 737]
771	[1255, 1256]	1582	[2159, 2160]	2393	[229, 625]	3204	[2514, 3221]
772	[1257, 1258]	1583	[2161, 428]	2394	[1581, 2691]	3205	[3222, 166]
773	[374, 1259]	1584	[2162, 2163]	2395	[2783, 1909]	3206	[3223, 796]
774	[108, 1260]	1585	[2164, 465]	2396	[2330, 2133]	3207	[3224, 1601]
775	[1261, 1262]	1586	[1023, 2165]	2397	[855, 2784]	3208	[3225, 1797]
776	[1263, 958]	1587	[931, 918]	2398	[2785, 93]	3209	[3226, 515]
777	[1264, 1265]	1588	[1080, 2131]	2399	[2786, 2300]	3210	[3227, 2420]
778	[1266, 1175]	1589	[837, 1065]	2400	[2787, 29]	3211	[3228, 3192]
779	[1181, 1267]	1590	[2166, 2167]	2401	[2788, 2360]	3212	[3229, 1453]
780	[249, 1268]	1591	[2168, 2169]	2402	[265, 1016]	3213	[3230, 2965]
781	[1269, 982]	1592	[2071, 1225]	2403	[19, 2383]	3214	[3192, 538]
782	[1270, 1271]	1593	[2170, 1211]	2404	[2789, 2790]	3215	[3231, 21]
783	[1272, 117]	1594	[2171, 832]	2405	[2791, 835]	3216	[2328, 3232]
784	[1273, 1068]	1595	[2172, 335]	2406	[1325, 1223]	3217	[3233, 1112]
785	[1006, 1274]	1596	[462, 2012]	2407	[2297, 2792]	3218	[3142, 1059]
786	[1275, 291]	1597	[2173, 2174]	2408	[363, 895]	3219	[1306, 3108]
787	[1276, 1277]	1598	[2175, 2176]	2409	[2793, 271]	3220	[2804, 88]
788	[1278, 1279]	1599	[1273, 2096]	2410	[310, 2155]	3221	[2258, 906]
789	[1280, 1281]	1600	[430, 2039]	2411	[2794, 1944]	3222	[2313, 124]
790	[1115, 903]	1601	[1095, 2177]	2412	[2060, 2105]	3223	[3234, 348]

791	[1282, 1100]	1602	[320, 2178]	2413	[2795, 992]	3224	[3235, 1111]
792	[1283, 1284]	1603	[2179, 1036]	2414	[1167, 2796]	3225	[1056, 2799]
793	[1285, 328]	1604	[319, 952]	2415	[2797, 1177]	3226	[868, 2146]
794	[419, 1178]	1605	[2180, 2181]	2416	[2341, 950]	3227	[3122, 3236]
795	[948, 1209]	1606	[2182, 1127]	2417	[2798, 314]	3228	[1063, 3237]
796	[1286, 1287]	1607	[2183, 1165]	2418	[970, 2799]	3229	[3131, 334]
797	[1288, 1289]	1608	[392, 2184]	2419	[2800, 2151]	3230	[2150, 3238]
798	[1290, 1291]	1609	[2185, 2186]	2420	[2801, 1046]	3231	[3239, 1594]
799	[1292, 1293]	1610	[2031, 907]	2421	[2802, 1156]	3232	[2426, 1362]
800	[373, 1294]	1611	[2187, 2188]	2422	[2245, 1313]	3233	[2951, 61]
801	[311, 1295]	1612	[2189, 382]	2423	[1942, 2223]	3234	[3240, 2505]
802	[1250, 943]	1613	[1044, 2095]	2424	[2803, 2804]	3235	[3013, 1602]
803	[1296, 1297]	1614	[1247, 2138]	2425	[962, 959]	3236	[2431, 1354]
804	[1298, 1299]	1615	[934, 415]	2426	[2040, 273]	3237	[142, 1897]
805	[1300, 1192]	1616	[1309, 1026]	2427	[2260, 2247]	3238	[1378, 1388]
806	[1301, 1302]	1617	[1024, 1109]	2428	[397, 2279]	3239	[2811, 2384]
807	[1303, 1214]	1618	[1051, 1285]	2429	[1106, 1000]	3240	[2820, 1229]
808	[102, 1304]	1619	[2190, 83]	2430	[2183, 427]		
809	[1305, 1306]	1620	[329, 1050]	2431	[67, 411]		
810	[1105, 1156]	1621	[1053, 323]	2432	[845, 2805]		

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	541	1	1082	0	1623	0	2164	1	2705	1
1	0	542	0	1083	0	1624	0	2165	0	2706	1
2	1	543	1	1084	1	1625	1	2166	0	2707	0
3	0	544	0	1085	1	1626	0	2167	0	2708	1
4	1	545	1	1086	0	1627	1	2168	1	2709	1
5	1	546	0	1087	1	1628	0	2169	0	2710	1
6	0	547	1	1088	0	1629	1	2170	1	2711	0
7	0	548	0	1089	1	1630	0	2171	1	2712	0
8	0	549	0	1090	0	1631	0	2172	0	2713	0
9	1	550	1	1091	1	1632	0	2173	0	2714	0
10	1	551	1	1092	1	1633	0	2174	1	2715	1
11	1	552	1	1093	1	1634	0	2175	0	2716	0
12	1	553	0	1094	1	1635	1	2176	1	2717	1
13	0	554	0	1095	1	1636	1	2177	1	2718	1
14	0	555	1	1096	0	1637	1	2178	1	2719	0
15	0	556	0	1097	1	1638	0	2179	1	2720	1
16	0	557	1	1098	1	1639	1	2180	0	2721	1
17	0	558	0	1099	0	1640	1	2181	0	2722	1
18	0	559	0	1100	1	1641	1	2182	1	2723	0
19	1	560	1	1101	1	1642	0	2183	0	2724	0
20	0	561	1	1102	1	1643	1	2184	1	2725	1

21	1	562	1	1103	0	1644	0	2185	0	2726	1
22	1	563	0	1104	1	1645	0	2186	0	2727	0
23	1	564	1	1105	0	1646	0	2187	0	2728	1
24	0	565	1	1106	1	1647	0	2188	1	2729	1
25	1	566	1	1107	1	1648	1	2189	0	2730	0
26	1	567	1	1108	1	1649	0	2190	0	2731	0
27	0	568	0	1109	1	1650	1	2191	0	2732	1
28	0	569	1	1110	0	1651	1	2192	0	2733	0
29	0	570	1	1111	0	1652	1	2193	1	2734	0
30	0	571	1	1112	1	1653	0	2194	0	2735	1
31	0	572	0	1113	1	1654	0	2195	1	2736	0
32	0	573	0	1114	0	1655	1	2196	1	2737	1
33	0	574	0	1115	1	1656	0	2197	0	2738	1
34	0	575	1	1116	0	1657	1	2198	0	2739	1
35	0	576	1	1117	0	1658	0	2199	0	2740	0
36	1	577	0	1118	0	1659	0	2200	0	2741	1
37	0	578	0	1119	0	1660	0	2201	0	2742	0
38	1	579	1	1120	1	1661	1	2202	0	2743	1
39	1	580	1	1121	1	1662	1	2203	1	2744	0
40	0	581	0	1122	1	1663	1	2204	1	2745	0
41	0	582	1	1123	0	1664	0	2205	0	2746	0
42	1	583	1	1124	0	1665	0	2206	1	2747	0
43	1	584	1	1125	0	1666	1	2207	0	2748	1
44	0	585	0	1126	1	1667	1	2208	1	2749	0
45	1	586	1	1127	0	1668	0	2209	1	2750	0
46	1	587	1	1128	1	1669	0	2210	0	2751	1
47	1	588	0	1129	0	1670	1	2211	1	2752	1
48	0	589	0	1130	1	1671	1	2212	1	2753	1
49	0	590	0	1131	0	1672	0	2213	0	2754	0
50	1	591	0	1132	1	1673	0	2214	1	2755	1
51	1	592	1	1133	1	1674	1	2215	1	2756	1
52	1	593	0	1134	1	1675	1	2216	0	2757	1
53	1	594	0	1135	1	1676	0	2217	0	2758	1
54	0	595	1	1136	0	1677	0	2218	1	2759	0
55	0	596	0	1137	1	1678	1	2219	0	2760	1
56	0	597	0	1138	0	1679	0	2220	0	2761	0
57	0	598	0	1139	0	1680	1	2221	0	2762	0
58	0	599	1	1140	1	1681	1	2222	0	2763	1
59	0	600	0	1141	1	1682	1	2223	1	2764	0
60	1	601	1	1142	0	1683	1	2224	1	2765	0
61	0	602	0	1143	0	1684	0	2225	0	2766	1
62	1	603	0	1144	1	1685	0	2226	1	2767	0
63	0	604	0	1145	1	1686	0	2227	0	2768	1
64	0	605	0	1146	0	1687	0	2228	0	2769	0

65	0	606	0	1147	0	1688	1	2229	1	2770	1
66	1	607	1	1148	1	1689	1	2230	0	2771	1
67	0	608	1	1149	1	1690	0	2231	1	2772	0
68	1	609	0	1150	0	1691	1	2232	0	2773	0
69	0	610	1	1151	0	1692	1	2233	1	2774	0
70	1	611	0	1152	1	1693	0	2234	0	2775	0
71	0	612	1	1153	0	1694	1	2235	1	2776	0
72	1	613	1	1154	1	1695	0	2236	1	2777	1
73	1	614	1	1155	1	1696	1	2237	0	2778	1
74	0	615	1	1156	0	1697	1	2238	0	2779	1
75	0	616	1	1157	1	1698	1	2239	1	2780	0
76	1	617	0	1158	1	1699	0	2240	0	2781	1
77	1	618	0	1159	1	1700	1	2241	1	2782	0
78	0	619	1	1160	0	1701	0	2242	1	2783	1
79	1	620	0	1161	1	1702	0	2243	0	2784	0
80	0	621	1	1162	0	1703	1	2244	0	2785	1
81	0	622	1	1163	0	1704	0	2245	0	2786	0
82	0	623	0	1164	1	1705	1	2246	0	2787	1
83	0	624	0	1165	1	1706	1	2247	1	2788	0
84	0	625	1	1166	1	1707	1	2248	0	2789	1
85	1	626	1	1167	0	1708	1	2249	1	2790	1
86	0	627	1	1168	1	1709	0	2250	1	2791	0
87	1	628	1	1169	0	1710	0	2251	1	2792	1
88	0	629	1	1170	1	1711	0	2252	1	2793	0
89	0	630	0	1171	0	1712	1	2253	1	2794	1
90	1	631	1	1172	1	1713	1	2254	0	2795	0
91	1	632	0	1173	1	1714	0	2255	1	2796	0
92	1	633	0	1174	1	1715	1	2256	0	2797	1
93	1	634	0	1175	1	1716	1	2257	1	2798	0
94	1	635	0	1176	0	1717	0	2258	1	2799	1
95	1	636	0	1177	0	1718	1	2259	1	2800	1
96	0	637	1	1178	0	1719	1	2260	1	2801	0
97	0	638	1	1179	1	1720	1	2261	0	2802	1
98	1	639	1	1180	1	1721	0	2262	0	2803	0
99	0	640	0	1181	1	1722	1	2263	0	2804	0
100	1	641	1	1182	1	1723	1	2264	0	2805	1
101	1	642	1	1183	1	1724	0	2265	0	2806	0
102	1	643	1	1184	0	1725	0	2266	0	2807	1
103	1	644	1	1185	1	1726	0	2267	1	2808	1
104	1	645	1	1186	0	1727	1	2268	1	2809	0
105	1	646	1	1187	0	1728	1	2269	0	2810	0
106	1	647	0	1188	0	1729	0	2270	0	2811	1
107	1	648	1	1189	1	1730	1	2271	1	2812	1
108	0	649	1	1190	1	1731	0	2272	0	2813	0

109	0	650	0	1191	0	1732	1	2273	1	2814	0
110	1	651	1	1192	0	1733	1	2274	1	2815	1
111	0	652	0	1193	1	1734	0	2275	0	2816	1
112	0	653	0	1194	0	1735	0	2276	1	2817	0
113	0	654	0	1195	0	1736	1	2277	0	2818	0
114	1	655	0	1196	1	1737	1	2278	1	2819	0
115	0	656	0	1197	1	1738	1	2279	0	2820	1
116	1	657	1	1198	1	1739	0	2280	1	2821	1
117	0	658	0	1199	0	1740	1	2281	0	2822	1
118	0	659	1	1200	0	1741	0	2282	1	2823	0
119	0	660	0	1201	1	1742	1	2283	0	2824	0
120	1	661	1	1202	1	1743	1	2284	1	2825	1
121	1	662	0	1203	1	1744	1	2285	0	2826	0
122	0	663	1	1204	0	1745	0	2286	1	2827	0
123	0	664	0	1205	1	1746	1	2287	1	2828	1
124	1	665	0	1206	0	1747	0	2288	0	2829	0
125	1	666	0	1207	0	1748	1	2289	1	2830	0
126	1	667	1	1208	1	1749	1	2290	1	2831	1
127	0	668	1	1209	0	1750	0	2291	0	2832	1
128	1	669	1	1210	0	1751	0	2292	1	2833	0
129	0	670	0	1211	0	1752	1	2293	1	2834	0
130	1	671	0	1212	0	1753	1	2294	0	2835	1
131	0	672	0	1213	1	1754	1	2295	1	2836	0
132	1	673	0	1214	1	1755	0	2296	0	2837	0
133	1	674	0	1215	0	1756	0	2297	0	2838	0
134	1	675	0	1216	1	1757	0	2298	0	2839	0
135	0	676	0	1217	1	1758	0	2299	1	2840	0
136	1	677	1	1218	0	1759	1	2300	1	2841	0
137	1	678	1	1219	0	1760	0	2301	0	2842	1
138	1	679	1	1220	1	1761	1	2302	1	2843	1
139	0	680	1	1221	1	1762	1	2303	1	2844	0
140	0	681	1	1222	1	1763	1	2304	1	2845	1
141	1	682	0	1223	0	1764	0	2305	0	2846	1
142	1	683	1	1224	1	1765	1	2306	1	2847	0
143	0	684	0	1225	0	1766	1	2307	1	2848	1
144	0	685	0	1226	0	1767	0	2308	0	2849	1
145	1	686	0	1227	0	1768	0	2309	1	2850	0
146	1	687	1	1228	0	1769	1	2310	0	2851	1
147	1	688	0	1229	1	1770	1	2311	0	2852	0
148	1	689	1	1230	0	1771	0	2312	1	2853	0
149	0	690	1	1231	1	1772	1	2313	1	2854	0
150	0	691	0	1232	1	1773	0	2314	0	2855	0
151	0	692	0	1233	1	1774	0	2315	1	2856	0
152	1	693	1	1234	1	1775	1	2316	1	2857	1

153	1	694	1	1235	1	1776	1	2317	0	2858	1
154	0	695	0	1236	0	1777	1	2318	0	2859	1
155	1	696	1	1237	0	1778	1	2319	0	2860	1
156	1	697	1	1238	1	1779	1	2320	1	2861	1
157	0	698	0	1239	1	1780	0	2321	1	2862	1
158	0	699	0	1240	0	1781	1	2322	0	2863	0
159	1	700	1	1241	1	1782	0	2323	0	2864	1
160	1	701	1	1242	0	1783	0	2324	1	2865	1
161	0	702	1	1243	1	1784	0	2325	1	2866	0
162	1	703	0	1244	1	1785	1	2326	1	2867	0
163	0	704	0	1245	0	1786	1	2327	1	2868	1
164	0	705	0	1246	0	1787	0	2328	0	2869	1
165	0	706	1	1247	0	1788	0	2329	1	2870	1
166	1	707	1	1248	1	1789	1	2330	0	2871	1
167	0	708	1	1249	0	1790	0	2331	1	2872	0
168	0	709	1	1250	1	1791	0	2332	1	2873	1
169	0	710	0	1251	1	1792	0	2333	1	2874	0
170	1	711	0	1252	1	1793	1	2334	1	2875	1
171	1	712	1	1253	1	1794	1	2335	0	2876	1
172	0	713	0	1254	0	1795	1	2336	0	2877	1
173	1	714	1	1255	1	1796	0	2337	1	2878	0
174	1	715	1	1256	0	1797	0	2338	0	2879	1
175	1	716	1	1257	1	1798	0	2339	1	2880	1
176	0	717	0	1258	0	1799	1	2340	0	2881	1
177	1	718	0	1259	1	1800	1	2341	0	2882	0
178	0	719	1	1260	0	1801	0	2342	1	2883	0
179	1	720	1	1261	1	1802	1	2343	0	2884	1
180	1	721	0	1262	0	1803	1	2344	0	2885	0
181	0	722	1	1263	1	1804	0	2345	1	2886	1
182	1	723	0	1264	0	1805	0	2346	0	2887	0
183	1	724	0	1265	1	1806	1	2347	0	2888	1
184	1	725	0	1266	0	1807	0	2348	1	2889	1
185	0	726	0	1267	0	1808	0	2349	1	2890	0
186	1	727	1	1268	1	1809	1	2350	1	2891	0
187	0	728	0	1269	0	1810	0	2351	0	2892	0
188	1	729	0	1270	1	1811	0	2352	1	2893	0
189	0	730	1	1271	1	1812	1	2353	1	2894	1
190	1	731	1	1272	1	1813	1	2354	1	2895	0
191	1	732	1	1273	0	1814	1	2355	1	2896	0
192	0	733	0	1274	0	1815	0	2356	0	2897	1
193	1	734	0	1275	1	1816	0	2357	1	2898	0
194	0	735	1	1276	1	1817	1	2358	0	2899	0
195	0	736	1	1277	1	1818	0	2359	0	2900	0
196	1	737	0	1278	1	1819	0	2360	1	2901	1

197	1	738	0	1279	1	1820	0	2361	0	2902	0
198	0	739	1	1280	0	1821	1	2362	0	2903	0
199	1	740	0	1281	1	1822	0	2363	1	2904	1
200	1	741	1	1282	1	1823	0	2364	0	2905	1
201	1	742	1	1283	0	1824	0	2365	1	2906	1
202	1	743	1	1284	1	1825	0	2366	0	2907	0
203	0	744	0	1285	1	1826	1	2367	0	2908	0
204	1	745	1	1286	0	1827	0	2368	1	2909	0
205	1	746	1	1287	0	1828	0	2369	1	2910	0
206	1	747	0	1288	0	1829	0	2370	1	2911	1
207	0	748	1	1289	1	1830	0	2371	1	2912	1
208	1	749	1	1290	0	1831	1	2372	0	2913	1
209	1	750	1	1291	1	1832	1	2373	1	2914	1
210	1	751	0	1292	0	1833	1	2374	0	2915	1
211	1	752	1	1293	0	1834	1	2375	1	2916	0
212	1	753	1	1294	0	1835	0	2376	0	2917	0
213	0	754	0	1295	1	1836	0	2377	0	2918	1
214	0	755	1	1296	0	1837	1	2378	0	2919	0
215	0	756	1	1297	1	1838	0	2379	0	2920	0
216	0	757	1	1298	0	1839	1	2380	1	2921	1
217	1	758	0	1299	1	1840	0	2381	0	2922	1
218	1	759	1	1300	1	1841	1	2382	0	2923	1
219	0	760	0	1301	0	1842	1	2383	1	2924	1
220	0	761	0	1302	1	1843	0	2384	1	2925	1
221	0	762	1	1303	0	1844	0	2385	1	2926	0
222	0	763	1	1304	0	1845	0	2386	1	2927	0
223	0	764	1	1305	0	1846	1	2387	1	2928	0
224	1	765	0	1306	0	1847	1	2388	1	2929	1
225	1	766	0	1307	1	1848	1	2389	0	2930	1
226	1	767	0	1308	1	1849	1	2390	1	2931	1
227	1	768	1	1309	1	1850	1	2391	1	2932	0
228	1	769	1	1310	1	1851	0	2392	0	2933	1
229	1	770	1	1311	1	1852	0	2393	1	2934	0
230	0	771	1	1312	1	1853	1	2394	1	2935	0
231	1	772	1	1313	0	1854	0	2395	1	2936	0
232	0	773	1	1314	1	1855	0	2396	0	2937	0
233	1	774	0	1315	0	1856	1	2397	1	2938	1
234	1	775	1	1316	0	1857	0	2398	1	2939	1
235	0	776	1	1317	1	1858	1	2399	0	2940	1
236	1	777	0	1318	1	1859	0	2400	1	2941	0
237	1	778	0	1319	1	1860	1	2401	0	2942	0
238	0	779	1	1320	1	1861	0	2402	0	2943	0
239	0	780	0	1321	0	1862	1	2403	1	2944	0
240	0	781	0	1322	0	1863	0	2404	1	2945	0

241	1	782	1	1323	0	1864	1	2405	0	2946	0
242	1	783	1	1324	1	1865	1	2406	1	2947	0
243	0	784	0	1325	1	1866	0	2407	0	2948	0
244	1	785	0	1326	0	1867	0	2408	0	2949	1
245	1	786	1	1327	1	1868	1	2409	0	2950	0
246	1	787	1	1328	1	1869	0	2410	1	2951	0
247	0	788	1	1329	0	1870	0	2411	1	2952	1
248	0	789	0	1330	0	1871	1	2412	0	2953	1
249	0	790	1	1331	0	1872	1	2413	0	2954	1
250	1	791	1	1332	0	1873	1	2414	0	2955	0
251	1	792	0	1333	1	1874	0	2415	1	2956	1
252	0	793	1	1334	1	1875	0	2416	0	2957	0
253	0	794	1	1335	1	1876	0	2417	0	2958	1
254	1	795	0	1336	1	1877	1	2418	0	2959	0
255	0	796	0	1337	0	1878	1	2419	1	2960	1
256	0	797	0	1338	0	1879	0	2420	0	2961	0
257	0	798	0	1339	0	1880	0	2421	1	2962	1
258	1	799	0	1340	0	1881	0	2422	0	2963	1
259	0	800	1	1341	1	1882	1	2423	0	2964	1
260	1	801	0	1342	1	1883	1	2424	0	2965	0
261	1	802	1	1343	1	1884	0	2425	0	2966	0
262	1	803	0	1344	1	1885	1	2426	0	2967	1
263	0	804	0	1345	1	1886	1	2427	1	2968	1
264	0	805	1	1346	1	1887	0	2428	1	2969	0
265	0	806	0	1347	0	1888	1	2429	1	2970	0
266	1	807	0	1348	0	1889	0	2430	0	2971	1
267	1	808	1	1349	1	1890	1	2431	0	2972	0
268	0	809	0	1350	1	1891	1	2432	0	2973	0
269	1	810	0	1351	1	1892	0	2433	1	2974	1
270	0	811	0	1352	1	1893	1	2434	0	2975	1
271	0	812	1	1353	1	1894	0	2435	1	2976	0
272	1	813	1	1354	0	1895	0	2436	1	2977	0
273	0	814	1	1355	0	1896	0	2437	0	2978	0
274	0	815	1	1356	0	1897	1	2438	0	2979	1
275	1	816	1	1357	0	1898	0	2439	0	2980	1
276	1	817	1	1358	0	1899	1	2440	1	2981	1
277	0	818	1	1359	1	1900	0	2441	1	2982	0
278	0	819	1	1360	0	1901	1	2442	1	2983	0
279	0	820	1	1361	1	1902	0	2443	1	2984	1
280	0	821	1	1362	1	1903	1	2444	0	2985	0
281	1	822	1	1363	0	1904	1	2445	0	2986	0
282	0	823	0	1364	0	1905	1	2446	1	2987	1
283	1	824	0	1365	1	1906	1	2447	0	2988	0
284	0	825	0	1366	0	1907	0	2448	0	2989	0

285	1	826	1	1367	1	1908	1	2449	0	2990	1
286	0	827	1	1368	1	1909	0	2450	1	2991	0
287	1	828	0	1369	0	1910	0	2451	1	2992	0
288	1	829	1	1370	1	1911	0	2452	0	2993	0
289	0	830	0	1371	1	1912	0	2453	0	2994	0
290	0	831	0	1372	0	1913	1	2454	0	2995	1
291	0	832	1	1373	1	1914	1	2455	0	2996	1
292	0	833	0	1374	1	1915	1	2456	0	2997	0
293	0	834	1	1375	0	1916	1	2457	0	2998	1
294	1	835	0	1376	0	1917	1	2458	1	2999	1
295	1	836	0	1377	0	1918	1	2459	0	3000	1
296	0	837	1	1378	0	1919	1	2460	1	3001	1
297	1	838	1	1379	1	1920	0	2461	0	3002	0
298	1	839	1	1380	0	1921	1	2462	1	3003	0
299	0	840	1	1381	1	1922	0	2463	1	3004	0
300	1	841	0	1382	1	1923	1	2464	1	3005	0
301	1	842	1	1383	0	1924	0	2465	0	3006	1
302	1	843	1	1384	1	1925	1	2466	0	3007	1
303	1	844	1	1385	1	1926	1	2467	0	3008	1
304	0	845	0	1386	0	1927	0	2468	0	3009	1
305	1	846	0	1387	1	1928	1	2469	1	3010	1
306	0	847	0	1388	1	1929	0	2470	1	3011	1
307	0	848	0	1389	0	1930	0	2471	0	3012	0
308	1	849	1	1390	0	1931	1	2472	1	3013	1
309	0	850	1	1391	1	1932	0	2473	0	3014	1
310	1	851	1	1392	1	1933	0	2474	1	3015	0
311	0	852	0	1393	0	1934	1	2475	1	3016	0
312	0	853	0	1394	1	1935	0	2476	0	3017	1
313	1	854	1	1395	0	1936	0	2477	0	3018	1
314	1	855	1	1396	1	1937	0	2478	1	3019	1
315	0	856	1	1397	0	1938	1	2479	1	3020	0
316	0	857	1	1398	0	1939	1	2480	0	3021	1
317	0	858	1	1399	1	1940	1	2481	0	3022	0
318	0	859	1	1400	1	1941	1	2482	1	3023	1
319	0	860	0	1401	1	1942	0	2483	0	3024	1
320	0	861	0	1402	0	1943	0	2484	0	3025	0
321	0	862	0	1403	1	1944	0	2485	0	3026	1
322	0	863	0	1404	1	1945	1	2486	0	3027	1
323	0	864	1	1405	0	1946	1	2487	0	3028	0
324	0	865	1	1406	0	1947	1	2488	1	3029	0
325	0	866	0	1407	0	1948	1	2489	1	3030	1
326	1	867	1	1408	1	1949	0	2490	1	3031	0
327	1	868	1	1409	1	1950	0	2491	0	3032	1
328	1	869	0	1410	0	1951	1	2492	0	3033	0

329	0	870	1	1411	1	1952	0	2493	0	3034	0
330	0	871	1	1412	0	1953	0	2494	1	3035	0
331	0	872	0	1413	0	1954	0	2495	0	3036	0
332	1	873	1	1414	0	1955	1	2496	1	3037	1
333	1	874	1	1415	1	1956	1	2497	1	3038	0
334	1	875	0	1416	0	1957	1	2498	0	3039	0
335	1	876	1	1417	0	1958	0	2499	1	3040	0
336	0	877	1	1418	1	1959	0	2500	1	3041	0
337	0	878	0	1419	0	1960	0	2501	1	3042	0
338	1	879	1	1420	0	1961	0	2502	0	3043	0
339	1	880	1	1421	0	1962	0	2503	0	3044	0
340	0	881	0	1422	0	1963	0	2504	0	3045	0
341	1	882	0	1423	0	1964	0	2505	0	3046	0
342	1	883	1	1424	1	1965	1	2506	0	3047	1
343	1	884	0	1425	1	1966	1	2507	0	3048	1
344	1	885	0	1426	1	1967	1	2508	0	3049	1
345	0	886	1	1427	1	1968	0	2509	1	3050	1
346	0	887	1	1428	1	1969	0	2510	1	3051	1
347	1	888	0	1429	1	1970	1	2511	1	3052	0
348	1	889	1	1430	0	1971	1	2512	0	3053	0
349	1	890	1	1431	0	1972	0	2513	0	3054	0
350	1	891	1	1432	0	1973	1	2514	0	3055	0
351	1	892	0	1433	1	1974	1	2515	0	3056	1
352	1	893	0	1434	1	1975	1	2516	1	3057	1
353	0	894	0	1435	0	1976	0	2517	1	3058	1
354	1	895	1	1436	0	1977	1	2518	1	3059	1
355	1	896	1	1437	0	1978	0	2519	0	3060	1
356	0	897	1	1438	1	1979	0	2520	0	3061	0
357	0	898	1	1439	1	1980	0	2521	1	3062	1
358	1	899	1	1440	0	1981	1	2522	1	3063	1
359	0	900	1	1441	1	1982	0	2523	1	3064	1
360	0	901	0	1442	0	1983	1	2524	0	3065	1
361	1	902	0	1443	1	1984	1	2525	0	3066	0
362	1	903	0	1444	1	1985	0	2526	0	3067	0
363	0	904	1	1445	0	1986	0	2527	1	3068	0
364	0	905	1	1446	1	1987	0	2528	1	3069	0
365	1	906	0	1447	1	1988	0	2529	0	3070	0
366	1	907	0	1448	0	1989	0	2530	1	3071	0
367	0	908	1	1449	1	1990	0	2531	0	3072	0
368	0	909	1	1450	1	1991	1	2532	0	3073	0
369	0	910	0	1451	0	1992	0	2533	0	3074	0
370	0	911	1	1452	0	1993	1	2534	1	3075	0
371	1	912	1	1453	1	1994	0	2535	0	3076	0
372	1	913	1	1454	1	1995	0	2536	0	3077	1

373	1	914	1	1455	1	1996	0	2537	0	3078	0
374	1	915	0	1456	0	1997	1	2538	0	3079	0
375	0	916	0	1457	1	1998	1	2539	1	3080	1
376	0	917	0	1458	0	1999	0	2540	1	3081	0
377	0	918	1	1459	0	2000	0	2541	1	3082	1
378	0	919	0	1460	1	2001	0	2542	1	3083	0
379	1	920	0	1461	1	2002	1	2543	0	3084	1
380	0	921	1	1462	1	2003	1	2544	1	3085	1
381	1	922	0	1463	0	2004	1	2545	1	3086	0
382	0	923	1	1464	0	2005	0	2546	0	3087	1
383	1	924	0	1465	0	2006	0	2547	1	3088	1
384	1	925	1	1466	1	2007	0	2548	0	3089	0
385	0	926	0	1467	0	2008	0	2549	0	3090	0
386	1	927	0	1468	0	2009	1	2550	0	3091	1
387	1	928	0	1469	0	2010	0	2551	0	3092	1
388	0	929	0	1470	1	2011	0	2552	0	3093	0
389	1	930	0	1471	1	2012	1	2553	0	3094	1
390	1	931	1	1472	0	2013	0	2554	0	3095	0
391	0	932	0	1473	0	2014	0	2555	1	3096	0
392	0	933	1	1474	1	2015	0	2556	1	3097	0
393	1	934	1	1475	0	2016	0	2557	0	3098	0
394	0	935	0	1476	0	2017	1	2558	0	3099	0
395	1	936	0	1477	0	2018	1	2559	0	3100	1
396	0	937	0	1478	0	2019	1	2560	1	3101	0
397	1	938	1	1479	1	2020	0	2561	1	3102	0
398	1	939	1	1480	0	2021	1	2562	0	3103	1
399	1	940	0	1481	0	2022	0	2563	1	3104	1
400	0	941	0	1482	0	2023	0	2564	0	3105	0
401	1	942	0	1483	1	2024	0	2565	1	3106	0
402	0	943	1	1484	1	2025	0	2566	1	3107	1
403	0	944	1	1485	0	2026	1	2567	0	3108	1
404	0	945	0	1486	0	2027	1	2568	1	3109	0
405	1	946	0	1487	1	2028	1	2569	1	3110	1
406	0	947	1	1488	0	2029	1	2570	1	3111	0
407	1	948	0	1489	1	2030	1	2571	0	3112	1
408	0	949	1	1490	1	2031	1	2572	1	3113	0
409	0	950	1	1491	0	2032	1	2573	0	3114	1
410	1	951	1	1492	1	2033	0	2574	0	3115	1
411	0	952	1	1493	0	2034	0	2575	0	3116	0
412	1	953	0	1494	0	2035	0	2576	0	3117	1
413	1	954	0	1495	0	2036	0	2577	1	3118	1
414	0	955	0	1496	0	2037	0	2578	0	3119	0
415	0	956	0	1497	1	2038	1	2579	0	3120	1
416	0	957	0	1498	0	2039	0	2580	0	3121	1

417	1	958	1	1499	0	2040	0	2581	1	3122	0
418	0	959	1	1500	1	2041	1	2582	1	3123	1
419	1	960	0	1501	1	2042	1	2583	0	3124	0
420	0	961	1	1502	0	2043	0	2584	1	3125	0
421	1	962	0	1503	1	2044	1	2585	0	3126	0
422	0	963	0	1504	1	2045	1	2586	1	3127	0
423	0	964	0	1505	0	2046	0	2587	0	3128	1
424	1	965	0	1506	1	2047	1	2588	0	3129	1
425	1	966	1	1507	0	2048	0	2589	0	3130	1
426	1	967	0	1508	1	2049	0	2590	0	3131	1
427	0	968	0	1509	0	2050	0	2591	1	3132	0
428	1	969	1	1510	1	2051	0	2592	1	3133	1
429	1	970	0	1511	1	2052	1	2593	1	3134	0
430	1	971	0	1512	0	2053	1	2594	1	3135	1
431	1	972	0	1513	0	2054	0	2595	1	3136	1
432	1	973	0	1514	0	2055	0	2596	0	3137	0
433	1	974	1	1515	0	2056	0	2597	1	3138	1
434	0	975	0	1516	0	2057	0	2598	1	3139	0
435	1	976	0	1517	0	2058	1	2599	0	3140	0
436	1	977	1	1518	0	2059	1	2600	1	3141	1
437	0	978	0	1519	0	2060	0	2601	0	3142	0
438	1	979	0	1520	0	2061	1	2602	0	3143	0
439	0	980	0	1521	0	2062	1	2603	1	3144	1
440	1	981	0	1522	1	2063	1	2604	0	3145	0
441	1	982	1	1523	0	2064	0	2605	0	3146	0
442	0	983	0	1524	1	2065	1	2606	1	3147	1
443	0	984	1	1525	0	2066	0	2607	1	3148	0
444	1	985	1	1526	0	2067	1	2608	0	3149	1
445	1	986	1	1527	0	2068	0	2609	0	3150	0
446	1	987	0	1528	0	2069	1	2610	1	3151	1
447	0	988	0	1529	0	2070	1	2611	0	3152	0
448	0	989	1	1530	0	2071	0	2612	1	3153	1
449	1	990	0	1531	1	2072	1	2613	1	3154	0
450	0	991	1	1532	1	2073	0	2614	1	3155	1
451	1	992	1	1533	0	2074	1	2615	1	3156	1
452	0	993	0	1534	1	2075	0	2616	1	3157	0
453	0	994	0	1535	1	2076	0	2617	0	3158	1
454	1	995	1	1536	1	2077	1	2618	0	3159	0
455	0	996	1	1537	0	2078	1	2619	0	3160	0
456	1	997	0	1538	0	2079	0	2620	1	3161	0
457	1	998	1	1539	0	2080	0	2621	0	3162	0
458	1	999	0	1540	1	2081	1	2622	0	3163	0
459	1	1000	1	1541	0	2082	0	2623	1	3164	1
460	1	1001	0	1542	0	2083	0	2624	0	3165	0

461	1	1002	0	1543	1	2084	0	2625	0	3166	0
462	1	1003	1	1544	1	2085	1	2626	0	3167	1
463	0	1004	0	1545	0	2086	0	2627	0	3168	1
464	0	1005	1	1546	1	2087	0	2628	1	3169	1
465	1	1006	0	1547	0	2088	0	2629	1	3170	0
466	0	1007	1	1548	0	2089	0	2630	1	3171	1
467	1	1008	1	1549	0	2090	1	2631	1	3172	0
468	0	1009	1	1550	0	2091	1	2632	0	3173	1
469	0	1010	1	1551	1	2092	1	2633	0	3174	0
470	1	1011	1	1552	1	2093	1	2634	0	3175	1
471	0	1012	0	1553	1	2094	1	2635	0	3176	1
472	1	1013	0	1554	0	2095	0	2636	0	3177	1
473	0	1014	0	1555	1	2096	1	2637	0	3178	0
474	0	1015	1	1556	0	2097	1	2638	1	3179	1
475	1	1016	0	1557	1	2098	0	2639	1	3180	0
476	0	1017	0	1558	1	2099	0	2640	0	3181	0
477	0	1018	0	1559	1	2100	0	2641	0	3182	1
478	1	1019	1	1560	0	2101	1	2642	1	3183	1
479	1	1020	1	1561	0	2102	0	2643	1	3184	1
480	0	1021	1	1562	1	2103	0	2644	1	3185	0
481	1	1022	0	1563	1	2104	0	2645	1	3186	1
482	0	1023	1	1564	0	2105	0	2646	0	3187	0
483	1	1024	1	1565	1	2106	0	2647	0	3188	1
484	0	1025	1	1566	1	2107	0	2648	0	3189	1
485	0	1026	1	1567	1	2108	0	2649	0	3190	1
486	1	1027	0	1568	1	2109	0	2650	0	3191	0
487	0	1028	0	1569	0	2110	1	2651	1	3192	0
488	1	1029	1	1570	1	2111	1	2652	1	3193	1
489	1	1030	0	1571	0	2112	0	2653	1	3194	0
490	1	1031	1	1572	0	2113	0	2654	0	3195	1
491	1	1032	0	1573	0	2114	0	2655	1	3196	0
492	0	1033	0	1574	0	2115	0	2656	0	3197	0
493	1	1034	1	1575	0	2116	1	2657	0	3198	1
494	1	1035	1	1576	0	2117	0	2658	1	3199	0
495	0	1036	0	1577	1	2118	1	2659	0	3200	1
496	0	1037	0	1578	1	2119	0	2660	1	3201	0
497	1	1038	0	1579	1	2120	1	2661	0	3202	0
498	0	1039	0	1580	1	2121	1	2662	1	3203	0
499	0	1040	0	1581	1	2122	1	2663	0	3204	0
500	1	1041	0	1582	1	2123	0	2664	1	3205	1
501	0	1042	1	1583	0	2124	0	2665	1	3206	1
502	1	1043	0	1584	0	2125	1	2666	0	3207	1
503	0	1044	1	1585	1	2126	0	2667	1	3208	1
504	0	1045	0	1586	1	2127	0	2668	0	3209	1

505	1	1046	1	1587	1	2128	1	2669	0	3210	0
506	0	1047	1	1588	1	2129	1	2670	1	3211	1
507	1	1048	0	1589	1	2130	0	2671	0	3212	1
508	0	1049	0	1590	0	2131	1	2672	0	3213	0
509	1	1050	0	1591	1	2132	0	2673	0	3214	0
510	1	1051	1	1592	0	2133	1	2674	1	3215	1
511	0	1052	1	1593	1	2134	0	2675	0	3216	0
512	1	1053	1	1594	1	2135	1	2676	1	3217	0
513	0	1054	1	1595	0	2136	0	2677	1	3218	0
514	0	1055	0	1596	1	2137	1	2678	1	3219	0
515	1	1056	1	1597	0	2138	0	2679	1	3220	0
516	0	1057	1	1598	0	2139	0	2680	0	3221	1
517	1	1058	1	1599	0	2140	0	2681	1	3222	1
518	1	1059	0	1600	1	2141	1	2682	1	3223	1
519	0	1060	0	1601	1	2142	1	2683	1	3224	1
520	0	1061	0	1602	0	2143	0	2684	0	3225	1
521	1	1062	0	1603	1	2144	1	2685	0	3226	1
522	0	1063	1	1604	0	2145	0	2686	0	3227	0
523	0	1064	0	1605	0	2146	1	2687	0	3228	1
524	0	1065	0	1606	1	2147	0	2688	1	3229	1
525	0	1066	1	1607	0	2148	0	2689	1	3230	0
526	1	1067	1	1608	0	2149	0	2690	0	3231	1
527	0	1068	0	1609	0	2150	0	2691	0	3232	0
528	0	1069	1	1610	1	2151	1	2692	0	3233	0
529	1	1070	0	1611	0	2152	0	2693	0	3234	1
530	1	1071	1	1612	0	2153	0	2694	1	3235	1
531	0	1072	0	1613	1	2154	1	2695	1	3236	0
532	0	1073	1	1614	0	2155	1	2696	0	3237	1
533	1	1074	1	1615	1	2156	1	2697	1	3238	0
534	1	1075	1	1616	1	2157	1	2698	1	3239	1
535	0	1076	0	1617	1	2158	1	2699	0	3240	1
536	0	1077	1	1618	1	2159	1	2700	1		
537	1	1078	0	1619	0	2160	1	2701	0		
538	0	1079	1	1620	0	2161	0	2702	1		
539	1	1080	1	1621	1	2162	0	2703	1		
540	1	1081	0	1622	1	2163	1	2704	1		

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

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