PROOF OF THE CONTINUED FRACTION CONJECTURE FOR $(a,b) = (z^2+z, z^5+z^3+z+1)$

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Abstract. The continued fraction conjecture claims that the continued fraction defined by the (a,b)-Thue-Morse sequence is algebraic over $\mathbb{F}_2(x)$ for all pairs of distinct elements (a,b) in $\mathbb{F}_2[x] \setminus \mathbb{F}_2$. In this paper we prove the conjecture for $(a,b) = (z^2+z, z^5+z^3+z+1)$.

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

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

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Theorem 1.1. *When* $(a,b)=(z^2+z, z^5+z^3+z+1)$, *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 $\mathrm{CF}(a,b)$,

$$\begin{aligned}
p_0(z)&=z^{15}+z^{13}+z^{10}+z^9+z^8+z^6+z^5+z^4+z^3+z+1,\\
p_1(z)&=z^{20}+z^{19}+z^{17}+z^{14}+z^{12}+z^9+z^8+z,\\
p_2(z)&=z^{22}+z^{20}+z^{16}+z^{14}+z^{12}+z^{10}+z^6+z^2,\\
p_3(z)&=z^{20}+z^{19}+z^{17}+z^{14}+z^{12}+z^9+z^8+z,\\
p_4(z)&=z^{18}+z^{15}+z^{13}+z^9+z^8+z^6+z^5+z^3+z,
\end{aligned}$$

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

$$\begin{aligned}
p_0(z)&=z^{15}+z^{14}+z^{13}+z^{12}+z^{10}+z^9+z^8+z^6+z^5+z^4+z^3+z^2+z,\\
p_1(z)&=z^{20}+z^{19}+z^{17}+z^{14}+z^{12}+z^9+z^8+z,\\
p_2(z)&=z^{22}+z^{20}+z^{16}+z^{14}+z^{12}+z^{10}+z^6+z^2,\\
p_3(z)&=z^{20}+z^{19}+z^{17}+z^{14}+z^{12}+z^9+z^8+z,\\
p_4(z)&=z^{18}+z^{15}+z^{14}+z^{13}+z^{12}+z^9+z^8+z^6+z^5+z^3+z^2+z+1.
\end{aligned}$$

2. Proof

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

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

By the basic properties of continued fractions, we have

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

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

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

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

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

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

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

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

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

for some positive integer d_n. Hence,

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

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

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

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

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

of the vector

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

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

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

Lemma 2.1. *We have*

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

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

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

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

Proof. We give the proof of the identity

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

the proofs of the others being similar.

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

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

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

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

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

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

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

Define

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

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

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

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

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

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

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 $u = 2^{2k}$,

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

$$+ x^{9u}T[:5u] + x^{11u}T[:3u] + x^{12u}T[:2u].$$

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

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

which can be rewritten as

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

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

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

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

First we calculate an 2-automaton that generates T from its minimal polynomial and its first terms. This automaton has 4096 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

$$\begin{aligned}
0 &= \tau(A(s,1)) + \tau(A(s,10)) + \tau(A(s,100)) + \tau(A(s,101)) \\
&\quad + \tau(A(s,110)) + \tau(A(s,111)), \quad (2.21)\\
0 &= \tau(A(s,1)) + \tau(A(s,11)) + \tau(A(s,100)) + \tau(A(s,1000)), \quad (2.22)\\
0 &= \tau(A(s,\epsilon)) + \tau(A(s,10)) + \tau(A(s,100)) + \tau(A(s,101)) \\
&\quad + \tau(A(s,1001)), \quad (2.23)\\
0 &= \tau(A(s,\epsilon)) + \tau(A(s,1)) + \tau(A(s,11)) + \tau(A(s,101)) \\
&\quad + \tau(A(s,110)) + \tau(A(s,1010)), \quad (2.24)\\
0 &= \tau(A(s,101)) + \tau(A(s,1011)), \quad (2.25)\\
0 &= \tau(A(s,110)) + \tau(A(s,1100)), \quad (2.26)\\
0 &= \tau(A(s,1)) + \tau(A(s,10)) + \tau(A(s,100)) + \tau(A(s,101)) \\
&\quad + \tau(A(s,110)) + \tau(A(s,1101)), \quad (2.27)
\end{aligned}$$

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

$$\begin{aligned}
0 &= \tau(A(s,1)) + \tau(A(s,10)) + \tau(A(s,100)) + \tau(A(s,101)) \\
&\quad + \tau(A(s,110)) + \tau(A(s,111)), \quad (2.28)\\
0 &= \tau(A(s,1)) + \tau(A(s,11)) + \tau(A(s,100)) + \tau(A(s,1000)), \quad (2.29)\\
0 &= \tau(A(s,\epsilon)) + \tau(A(s,10)) + \tau(A(s,100)) + \tau(A(s,101)) \\
&\quad + \tau(A(s,1001)), \quad (2.30)\\
0 &= \tau(A(s,\epsilon)) + \tau(A(s,1)) + \tau(A(s,11)) + \tau(A(s,101)) \\
&\quad + \tau(A(s,110)) + \tau(A(s,1010)), \quad (2.31)\\
0 &= \tau(A(s,101)) + \tau(A(s,1011)), \quad (2.32)\\
0 &= \tau(A(s,110)) + \tau(A(s,1100)), \quad (2.33)\\
0 &= \tau(A(s,1)) + \tau(A(s,10)) + \tau(A(s,100)) + \tau(A(s,101)) \\
&\quad + \tau(A(s,110)) + \tau(A(s,1101)), \quad (2.34)
\end{aligned}$$

for $s = A(i, 0^{2k})$. We find that $(A(i, 0^{82}), E_{82}) = (A(i, 0^{22}), E_{22})$, so that we only have to verify that identities (2.21) through (2.34) hold for $2 \le k \le 41$, which turns out to be true. $\square$

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

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

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

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

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

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

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

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

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

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

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

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

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

Define

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

where

$$\begin{aligned}
q_0(x) &= x^{22} + x^{21} + x^{19} + x^{18} + x^{17} + x^{16} + x^{14} + x^{13} + x^{12} + x^9 + x^7,\\
q_1(x) &= x^{21} + x^{14} + x^{13} + x^{10} + x^8 + x^5 + x^3 + x^2,\\
q_2(x) &= x^{20} + x^{16} + x^{12} + x^{10} + x^8 + x^6 + x^2 + 1,\\
q_3(x) &= x^{21} + x^{14} + x^{13} + x^{10} + x^8 + x^5 + x^3 + x^2,\\
q_4(x) &= x^{21} + x^{19} + x^{17} + x^{16} + x^{14} + x^{13} + x^9 + x^7 + x^4.
\end{aligned}$$

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

3. Annexe

All 16 polynomials are of the form

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

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

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

$$\begin{aligned}
p_0(x) = x^{126} &+ x^{122} + x^{116} + x^{114} + x^{112} + x^{110} + x^{108} + x^{104} + x^{100} + x^{98}\\
&+ x^{88} + x^{84} + x^{82} + x^{80} + x^{78} + x^{76} + x^{72} + x^{68} + x^{58} + x^{56} + x^{54}\\
&+ x^{48} + x^{46} + x^{36} + x^{34} + x^{30} + x^{24},
\end{aligned}$$

$$\begin{aligned}
p_3(x) &= x^{122} + x^{118} + x^{112} + x^{110} + x^{106} + x^{104} + x^{100} + x^{94} + x^{92} + x^{88} \\
&\quad + x^{86} + x^{84} + x^{80} + x^{78} + x^{62} + x^{58} + x^{54} + x^{42} + x^{38} + x^{34} + x^{32} \\
&\quad + x^{30} + x^{22} + x^{20} + x^{18} + x^{16}, \\
p_6(x) &= x^{118} + x^{116} + x^{112} + x^{108} + x^{102} + x^{100} + x^{98} + x^{86} + x^{84} + x^{72} \\
&\quad + x^{70} + x^{68} + x^{62} + x^{60} + x^{58} + x^{56} + x^{50} + x^{40} + x^{38} + x^{32} + x^{26} \\
&\quad + x^{18} + x^{16} + x^{14} + x^{10} + x^{8} + x^{6} + 1, \\
p_9(x) &= x^{124} + x^{122} + x^{116} + x^{104} + x^{96} + x^{90} + x^{86} + x^{82} + x^{80} + x^{76} + x^{74} \\
&\quad + x^{70} + x^{68} + x^{60} + x^{56} + x^{54} + x^{50} + x^{48} + x^{46} + x^{38} + x^{36} + x^{30} \\
&\quad + x^{28} + x^{26} + x^{20} + x^{18} + x^{14} + x^{12} + x^{10} + x^{8} + x^{6} + x^{4}, \\
p_{12}(x) &= x^{124} + x^{120} + x^{116} + x^{112} + x^{108} + x^{104} + x^{76} + x^{72} + x^{60} + x^{56} \\
&\quad + x^{44} + x^{40} + x^{36} + x^{32} + x^{4} + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{117} + x^{116} + x^{111} + x^{107} + x^{106} + x^{104} + x^{103} + x^{102} + x^{100} + x^{99} \\
&\quad + x^{97} + x^{95} + x^{91} + x^{89} + x^{88} + x^{86} + x^{85} + x^{84} + x^{82} + x^{78} + x^{77} \\
&\quad + x^{76} + x^{72} + x^{70} + x^{69} + x^{65} + x^{63} + x^{62} + x^{60} + x^{59} + x^{56} + x^{55} \\
&\quad + x^{54} + x^{51} + x^{47} + x^{46} + x^{45} + x^{42} + x^{40} + x^{38} + x^{35} + x^{34} + x^{33}, \\
p_3(x) &= x^{115} + x^{113} + x^{112} + x^{111} + x^{110} + x^{109} + x^{108} + x^{107} + x^{106} + x^{104} \\
&\quad + x^{95} + x^{92} + x^{91} + x^{88} + x^{83} + x^{81} + x^{80} + x^{78} + x^{77} + x^{75} + x^{74} \\
&\quad + x^{73} + x^{72} + x^{71} + x^{70} + x^{69} + x^{68} + x^{67} + x^{66} + x^{64} + x^{59} + x^{57} \\
&\quad + x^{56} + x^{54} + x^{53} + x^{50} + x^{43} + x^{41} + x^{40} + x^{39} + x^{38} + x^{37} + x^{36} \\
&\quad + x^{35} + x^{34} + x^{32} + x^{27} + x^{25} + x^{24} + x^{22} + x^{21} + x^{18}, \\
p_6(x) &= x^{114} + x^{111} + x^{110} + x^{102} + x^{100} + x^{99} + x^{98} + x^{97} + x^{96} + x^{92} + x^{90} \\
&\quad + x^{89} + x^{88} + x^{87} + x^{86} + x^{84} + x^{81} + x^{77} + x^{76} + x^{74} + x^{71} + x^{70} \\
&\quad + x^{68} + x^{66} + x^{65} + x^{64} + x^{63} + x^{62} + x^{58} + x^{56} + x^{55} + x^{53} + x^{51} \\
&\quad + x^{50} + x^{49} + x^{46} + x^{45} + x^{43} + x^{41} + x^{39} + x^{37} + x^{36} + x^{35} + x^{32} \\
&\quad + x^{31} + x^{29} + x^{28} + x^{27} + x^{26} + x^{22} + x^{19} + x^{16} + x^{15} + x^{14} + x^{13} \\
&\quad + x^{12}, \\
p_9(x) &= x^{113} + x^{111} + x^{110} + x^{108} + x^{105} + x^{102} + x^{101} + x^{99} + x^{98} + x^{97} \\
&\quad + x^{96} + x^{95} + x^{94} + x^{92} + x^{87} + x^{85} + x^{84} + x^{82} + x^{81} + x^{78} + x^{73} \\
&\quad + x^{70} + x^{69} + x^{66} + x^{63} + x^{61} + x^{60} + x^{59} + x^{58} + x^{57} + x^{56} + x^{54} \\
&\quad + x^{53} + x^{51} + x^{50} + x^{48} + x^{45} + x^{42} + x^{33} + x^{30} + x^{29} + x^{27} + x^{26} \\
&\quad + x^{25} + x^{24} + x^{22} + x^{21} + x^{19} + x^{18} + x^{17} + x^{16} + x^{14} + x^{11} + x^{9} \\
&\quad + x^{8} + x^{6}, \\
p_{12}(x) &= x^{112} + x^{109} + x^{105} + x^{101} + x^{100} + x^{96} + x^{93} + x^{89} + x^{85} + x^{81} + x^{80}
\end{aligned}$$

$$+ x^{68} + x^{65} + x^{61} + x^{57} + x^{53} + x^{52} + x^{48} + x^{45} + x^{41} + x^{37} + x^{33} + x^{29} + x^{25} + x^{21} + x^{17} + x^{16} + x^{4} + x + 1,$$

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

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

$$\begin{aligned}
p_0(x) &= x^{117} + x^{116} + x^{111} + x^{107} + x^{106} + x^{104} + x^{103} + x^{102} + x^{100} + x^{99} \\
&\quad + x^{97} + x^{95} + x^{91} + x^{89} + x^{88} + x^{86} + x^{85} + x^{84} + x^{82} + x^{78} + x^{77} \\
&\quad + x^{76} + x^{72} + x^{70} + x^{69} + x^{65} + x^{63} + x^{62} + x^{60} + x^{59} + x^{56} + x^{55} \\
&\quad + x^{54} + x^{51} + x^{47} + x^{46} + x^{45} + x^{42} + x^{40} + x^{38} + x^{35} + x^{34} + x^{33}, \\
p_3(x) &= x^{115} + x^{113} + x^{112} + x^{111} + x^{110} + x^{109} + x^{108} + x^{107} + x^{106} + x^{104} \\
&\quad + x^{95} + x^{92} + x^{91} + x^{88} + x^{83} + x^{81} + x^{80} + x^{78} + x^{77} + x^{75} + x^{74} \\
&\quad + x^{73} + x^{72} + x^{71} + x^{70} + x^{69} + x^{68} + x^{67} + x^{66} + x^{64} + x^{59} + x^{57} \\
&\quad + x^{56} + x^{54} + x^{53} + x^{50} + x^{43} + x^{41} + x^{40} + x^{39} + x^{38} + x^{37} + x^{36} \\
&\quad + x^{35} + x^{34} + x^{32} + x^{27} + x^{25} + x^{24} + x^{22} + x^{21} + x^{18}, \\
p_6(x) &= x^{114} + x^{111} + x^{110} + x^{102} + x^{100} + x^{99} + x^{98} + x^{97} + x^{96} + x^{92} + x^{90} \\
&\quad + x^{89} + x^{88} + x^{87} + x^{86} + x^{84} + x^{81} + x^{77} + x^{76} + x^{74} + x^{71} + x^{70} \\
&\quad + x^{68} + x^{66} + x^{65} + x^{64} + x^{63} + x^{62} + x^{58} + x^{56} + x^{55} + x^{53} + x^{51} \\
&\quad + x^{50} + x^{49} + x^{46} + x^{45} + x^{43} + x^{41} + x^{39} + x^{37} + x^{36} + x^{35} + x^{32} \\
&\quad + x^{31} + x^{29} + x^{28} + x^{27} + x^{26} + x^{22} + x^{19} + x^{16} + x^{15} + x^{14} + x^{13} \\
&\quad + x^{12}, \\
p_9(x) &= x^{113} + x^{111} + x^{110} + x^{108} + x^{105} + x^{102} + x^{101} + x^{99} + x^{98} + x^{97} \\
&\quad + x^{96} + x^{95} + x^{94} + x^{92} + x^{87} + x^{85} + x^{84} + x^{82} + x^{81} + x^{78} + x^{73} \\
&\quad + x^{70} + x^{69} + x^{66} + x^{63} + x^{61} + x^{60} + x^{59} + x^{58} + x^{57} + x^{56} + x^{54} \\
&\quad + x^{53} + x^{51} + x^{50} + x^{48} + x^{45} + x^{42} + x^{33} + x^{30} + x^{29} + x^{27} + x^{26} \\
&\quad + x^{25} + x^{24} + x^{22} + x^{21} + x^{19} + x^{18} + x^{17} + x^{16} + x^{14} + x^{11} + x^{9} \\
&\quad + x^{8} + x^{6}, \\
p_{12}(x) &= x^{112} + x^{109} + x^{105} + x^{101} + x^{100} + x^{96} + x^{93} + x^{89} + x^{85} + x^{81} + x^{80} \\
&\quad + x^{68} + x^{65} + x^{61} + x^{57} + x^{53} + x^{52} + x^{48} + x^{45} + x^{41} + x^{37} + x^{33} \\
&\quad + x^{29} + x^{25} + x^{21} + x^{17} + x^{16} + x^{4} + x + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{108} + x^{106} + x^{104} + x^{102} + x^{100} + x^{94} + x^{88} + x^{86} + x^{84} + x^{76} + x^{72} \\
&\quad + x^{58} + x^{54} + x^{52} + x^{50} + x^{48} + x^{46} + x^{44} + x^{42}, \\
p_3(x) &= x^{102} + x^{98} + x^{96} + x^{92} + x^{90} + x^{88} + x^{86} + x^{82} + x^{78} + x^{76} + x^{74} \\
&\quad + x^{72} + x^{68} + x^{64} + x^{60} + x^{58} + x^{54} + x^{50} + x^{48} + x^{36} + x^{32} + x^{26} \\
&\quad + x^{24} + x^{18} + x^{16} + x^{12},
\end{aligned}$$

$$\begin{aligned}
p_6(x) &= x^{102} + x^{100} + x^{96} + x^{94} + x^{92} + x^{88} + x^{80} + x^{78} + x^{66} + x^{64} + x^{62} \\
&\quad + x^{60} + x^{56} + x^{54} + x^{52} + x^{44} + x^{42} + x^{38} + x^{36} + x^{34} + x^{26} + x^{24} \\
&\quad + x^{18} + x^{14} + x^{8} + x^{6} + x^{2} + 1, \\
p_9(x) &= x^{100} + x^{98} + x^{94} + x^{92} + x^{90} + x^{86} + x^{84} + x^{80} + x^{76} + x^{70} + x^{64} \\
&\quad + x^{62} + x^{60} + x^{58} + x^{56} + x^{50} + x^{46} + x^{42} + x^{36} + x^{34} + x^{32} + x^{30} \\
&\quad + x^{22} + x^{20} + x^{14} + x^{4}, \\
p_{12}(x) &= x^{100} + x^{96} + x^{94} + x^{90} + x^{86} + x^{82} + x^{78} + x^{74} + x^{70} + x^{68} + x^{66} \\
&\quad + x^{64} + x^{52} + x^{48} + x^{46} + x^{42} + x^{38} + x^{34} + x^{30} + x^{26} + x^{22} + x^{18} \\
&\quad + x^{14} + x^{10} + x^{6} + x^{4} + x^{2} + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{108} + x^{106} + x^{102} + x^{96} + x^{94} + x^{90} + x^{88} + x^{86} + x^{82} + x^{74} + x^{72} \\
&\quad + x^{64} + x^{62} + x^{58} + x^{54} + x^{48} + x^{46} + x^{42} + x^{36} + x^{34} + x^{30} + x^{26} \\
&\quad + x^{24}, \\
p_3(x) &= x^{102} + x^{96} + x^{94} + x^{90} + x^{86} + x^{82} + x^{78} + x^{76} + x^{74} + x^{72} + x^{70} \\
&\quad + x^{68} + x^{62} + x^{60} + x^{58} + x^{56} + x^{46} + x^{44} + x^{42} + x^{40} + x^{34} + x^{32} \\
&\quad + x^{30} + x^{28} + x^{20} + x^{16}, \\
p_6(x) &= x^{102} + x^{100} + x^{98} + x^{92} + x^{90} + x^{88} + x^{86} + x^{84} + x^{80} + x^{78} + x^{70} \\
&\quad + x^{68} + x^{66} + x^{62} + x^{60} + x^{54} + x^{52} + x^{50} + x^{42} + x^{40} + x^{36} + x^{34} \\
&\quad + x^{30} + x^{26} + x^{22} + x^{18} + x^{14} + x^{12} + x^{10} + x^{6} + x^{2} + 1, \\
p_9(x) &= x^{100} + x^{98} + x^{94} + x^{92} + x^{90} + x^{86} + x^{84} + x^{80} + x^{76} + x^{70} + x^{64} \\
&\quad + x^{62} + x^{60} + x^{58} + x^{56} + x^{50} + x^{46} + x^{42} + x^{36} + x^{34} + x^{32} + x^{30} \\
&\quad + x^{22} + x^{20} + x^{14} + x^{4}, \\
p_{12}(x) &= x^{100} + x^{96} + x^{94} + x^{90} + x^{86} + x^{82} + x^{78} + x^{74} + x^{70} + x^{68} + x^{66} \\
&\quad + x^{64} + x^{52} + x^{48} + x^{46} + x^{42} + x^{38} + x^{34} + x^{30} + x^{26} + x^{22} + x^{18} \\
&\quad + x^{14} + x^{10} + x^{6} + x^{4} + x^{2} + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{117} + x^{115} + x^{114} + x^{111} + x^{108} + x^{104} + x^{102} + x^{100} + x^{96} + x^{95} \\
&\quad + x^{93} + x^{92} + x^{91} + x^{89} + x^{88} + x^{87} + x^{85} + x^{83} + x^{82} + x^{80} + x^{79} \\
&\quad + x^{76} + x^{75} + x^{71} + x^{69} + x^{68} + x^{66} + x^{65} + x^{63} + x^{62} + x^{61} + x^{60} \\
&\quad + x^{58} + x^{57} + x^{55} + x^{54} + x^{52} + x^{49} + x^{48} + x^{47} + x^{46} + x^{45} + x^{44} \\
&\quad + x^{43} + x^{41} + x^{37} + x^{36} + x^{35} + x^{33}, \\
p_3(x) &= x^{115} + x^{113} + x^{112} + x^{111} + x^{110} + x^{109} + x^{108} + x^{107} + x^{106} + x^{104} \\
&\quad + x^{95} + x^{92} + x^{91} + x^{88} + x^{83} + x^{81} + x^{80} + x^{78} + x^{77} + x^{75} + x^{74}
\end{aligned}$$

$$
\begin{aligned}
&+ x^{73} + x^{72} + x^{71} + x^{70} + x^{69} + x^{68} + x^{67} + x^{66} + x^{64} + x^{59} + x^{57} \\
&+ x^{56} + x^{54} + x^{53} + x^{50} + x^{43} + x^{41} + x^{40} + x^{39} + x^{38} + x^{37} + x^{36} \\
&+ x^{35} + x^{34} + x^{32} + x^{27} + x^{25} + x^{24} + x^{22} + x^{21} + x^{18}, \\
p_6(x) &= x^{114} + x^{111} + x^{110} + x^{102} + x^{100} + x^{99} + x^{98} + x^{97} + x^{96} + x^{92} + x^{90} \\
&+ x^{89} + x^{88} + x^{87} + x^{86} + x^{84} + x^{81} + x^{77} + x^{76} + x^{74} + x^{71} + x^{70} \\
&+ x^{68} + x^{66} + x^{65} + x^{64} + x^{63} + x^{62} + x^{58} + x^{56} + x^{55} + x^{53} + x^{51} \\
&+ x^{50} + x^{49} + x^{46} + x^{45} + x^{43} + x^{41} + x^{39} + x^{37} + x^{36} + x^{35} + x^{32} \\
&+ x^{31} + x^{29} + x^{28} + x^{27} + x^{26} + x^{22} + x^{19} + x^{16} + x^{15} + x^{14} + x^{13} \\
&+ x^{12}, \\
p_9(x) &= x^{113} + x^{111} + x^{110} + x^{108} + x^{105} + x^{102} + x^{101} + x^{99} + x^{98} + x^{97} \\
&+ x^{96} + x^{95} + x^{94} + x^{92} + x^{87} + x^{85} + x^{84} + x^{82} + x^{81} + x^{78} + x^{73} \\
&+ x^{70} + x^{69} + x^{66} + x^{63} + x^{61} + x^{60} + x^{59} + x^{58} + x^{57} + x^{56} + x^{54} \\
&+ x^{53} + x^{51} + x^{50} + x^{48} + x^{45} + x^{42} + x^{33} + x^{30} + x^{29} + x^{27} + x^{26} \\
&+ x^{25} + x^{24} + x^{22} + x^{21} + x^{19} + x^{18} + x^{17} + x^{16} + x^{14} + x^{11} + x^{9} \\
&+ x^{8} + x^{6}, \\
p_{12}(x) &= x^{112} + x^{109} + x^{105} + x^{101} + x^{100} + x^{96} + x^{93} + x^{89} + x^{85} + x^{81} + x^{80} \\
&+ x^{68} + x^{65} + x^{61} + x^{57} + x^{53} + x^{52} + x^{48} + x^{45} + x^{41} + x^{37} + x^{33} \\
&+ x^{29} + x^{25} + x^{21} + x^{17} + x^{16} + x^{4} + x + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{117} + x^{115} + x^{114} + x^{111} + x^{108} + x^{104} + x^{102} + x^{100} + x^{96} + x^{95} \\
&+ x^{93} + x^{92} + x^{91} + x^{89} + x^{88} + x^{87} + x^{85} + x^{83} + x^{82} + x^{80} + x^{79} \\
&+ x^{76} + x^{75} + x^{71} + x^{69} + x^{68} + x^{66} + x^{65} + x^{63} + x^{62} + x^{61} + x^{60} \\
&+ x^{58} + x^{57} + x^{55} + x^{54} + x^{52} + x^{49} + x^{48} + x^{47} + x^{46} + x^{45} + x^{44} \\
&+ x^{43} + x^{41} + x^{37} + x^{36} + x^{35} + x^{33}, \\
p_3(x) &= x^{115} + x^{113} + x^{112} + x^{111} + x^{110} + x^{109} + x^{108} + x^{107} + x^{106} + x^{104} \\
&+ x^{95} + x^{92} + x^{91} + x^{88} + x^{83} + x^{81} + x^{80} + x^{78} + x^{77} + x^{75} + x^{74} \\
&+ x^{73} + x^{72} + x^{71} + x^{70} + x^{69} + x^{68} + x^{67} + x^{66} + x^{64} + x^{59} + x^{57} \\
&+ x^{56} + x^{54} + x^{53} + x^{50} + x^{43} + x^{41} + x^{40} + x^{39} + x^{38} + x^{37} + x^{36} \\
&+ x^{35} + x^{34} + x^{32} + x^{27} + x^{25} + x^{24} + x^{22} + x^{21} + x^{18}, \\
p_6(x) &= x^{114} + x^{111} + x^{110} + x^{102} + x^{100} + x^{99} + x^{98} + x^{97} + x^{96} + x^{92} + x^{90} \\
&+ x^{89} + x^{88} + x^{87} + x^{86} + x^{84} + x^{81} + x^{77} + x^{76} + x^{74} + x^{71} + x^{70} \\
&+ x^{68} + x^{66} + x^{65} + x^{64} + x^{63} + x^{62} + x^{58} + x^{56} + x^{55} + x^{53} + x^{51} \\
&+ x^{50} + x^{49} + x^{46} + x^{45} + x^{43} + x^{41} + x^{39} + x^{37} + x^{36} + x^{35} + x^{32} \\
&+ x^{31} + x^{29} + x^{28} + x^{27} + x^{26} + x^{22} + x^{19} + x^{16} + x^{15} + x^{14} + x^{13}
\end{aligned}
$$

$$+ x^{12},$$
$$p_9(x) = x^{113} + x^{111} + x^{110} + x^{108} + x^{105} + x^{102} + x^{101} + x^{99} + x^{98} + x^{97} + x^{96} + x^{95} + x^{94} + x^{92} + x^{87} + x^{85} + x^{84} + x^{82} + x^{81} + x^{78} + x^{73} + x^{70} + x^{69} + x^{66} + x^{63} + x^{61} + x^{60} + x^{59} + x^{58} + x^{57} + x^{56} + x^{54} + x^{53} + x^{51} + x^{50} + x^{48} + x^{45} + x^{42} + x^{33} + x^{30} + x^{29} + x^{27} + x^{26} + x^{25} + x^{24} + x^{22} + x^{21} + x^{19} + x^{18} + x^{17} + x^{16} + x^{14} + x^{11} + x^{9} + x^{8} + x^{6},$$
$$p_{12}(x) = x^{112} + x^{109} + x^{105} + x^{101} + x^{100} + x^{96} + x^{93} + x^{89} + x^{85} + x^{81} + x^{80} + x^{68} + x^{65} + x^{61} + x^{57} + x^{53} + x^{52} + x^{48} + x^{45} + x^{41} + x^{37} + x^{33} + x^{29} + x^{25} + x^{21} + x^{17} + x^{16} + x^{4} + x + 1,$$

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

$$p_0(x) = x^{126} + x^{124} + x^{118} + x^{116} + x^{114} + x^{108} + x^{98} + x^{94} + x^{84} + x^{82} + x^{80} + x^{76} + x^{74} + x^{70} + x^{66} + x^{64} + x^{62} + x^{54} + x^{52} + x^{44} + x^{42},$$
$$p_3(x) = x^{114} + x^{112} + x^{108} + x^{100} + x^{98} + x^{96} + x^{94} + x^{92} + x^{90} + x^{86} + x^{84} + x^{72} + x^{70} + x^{68} + x^{62} + x^{50} + x^{46} + x^{44} + x^{42} + x^{40} + x^{30} + x^{28} + x^{22} + x^{18} + x^{14} + x^{12},$$
$$p_6(x) = x^{122} + x^{120} + x^{114} + x^{112} + x^{110} + x^{106} + x^{104} + x^{102} + x^{100} + x^{90} + x^{86} + x^{84} + x^{80} + x^{78} + x^{76} + x^{72} + x^{64} + x^{62} + x^{60} + x^{54} + x^{52} + x^{46} + x^{44} + x^{40} + x^{36} + x^{34} + x^{26} + x^{18} + x^{12} + x^{10} + x^{6} + 1,$$
$$p_9(x) = x^{124} + x^{122} + x^{116} + x^{104} + x^{96} + x^{90} + x^{86} + x^{82} + x^{80} + x^{76} + x^{74} + x^{70} + x^{68} + x^{60} + x^{56} + x^{54} + x^{50} + x^{48} + x^{46} + x^{38} + x^{36} + x^{30} + x^{28} + x^{26} + x^{20} + x^{18} + x^{14} + x^{12} + x^{10} + x^{8} + x^{6} + x^{4},$$
$$p_{12}(x) = x^{124} + x^{120} + x^{116} + x^{112} + x^{108} + x^{104} + x^{76} + x^{72} + x^{60} + x^{56} + x^{44} + x^{40} + x^{36} + x^{32} + x^{4} + 1,$$

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

$$p_0(x) = x^{117} + x^{116} + x^{115} + x^{111} + x^{110} + x^{108} + x^{107} + x^{106} + x^{105} + x^{104} + x^{101} + x^{97} + x^{94} + x^{93} + x^{92} + x^{87} + x^{85} + x^{84} + x^{83} + x^{80} + x^{79} + x^{78} + x^{74} + x^{73} + x^{71} + x^{70} + x^{69} + x^{67} + x^{62} + x^{61} + x^{59} + x^{58} + x^{56} + x^{55} + x^{52} + x^{50} + x^{48} + x^{42} + x^{41} + x^{39} + x^{38} + x^{37} + x^{36} + x^{34} + x^{33} + x^{31} + x^{28} + x^{25} + x^{24},$$
$$p_3(x) = x^{116} + x^{115} + x^{114} + x^{113} + x^{112} + x^{110} + x^{108} + x^{107} + x^{106} + x^{104} + x^{101} + x^{98} + x^{97} + x^{96} + x^{94} + x^{93} + x^{92} + x^{89} + x^{88} + x^{86} + x^{79} + x^{78} + x^{77} + x^{74} + x^{73} + x^{71} + x^{69} + x^{67} + x^{63} + x^{60} + x^{58} + x^{57}$$

$$
\begin{aligned}
&+ x^{56} + x^{54} + x^{53} + x^{52} + x^{50} + x^{47} + x^{44} + x^{41} + x^{37} + x^{34} + x^{32}\\
&+ x^{31} + x^{30} + x^{29} + x^{27} + x^{26} + x^{25} + x^{24} + x^{23} + x^{21} + x^{17} + x^{16},\\
p_6(x) = {}& x^{116} + x^{115} + x^{114} + x^{113} + x^{112} + x^{111} + x^{107} + x^{105} + x^{103} + x^{102}\\
&+ x^{98} + x^{96} + x^{95} + x^{94} + x^{92} + x^{89} + x^{88} + x^{87} + x^{84} + x^{83} + x^{81}\\
&+ x^{79} + x^{78} + x^{73} + x^{72} + x^{69} + x^{68} + x^{66} + x^{65} + x^{63} + x^{59} + x^{58}\\
&+ x^{53} + x^{52} + x^{49} + x^{48} + x^{46} + x^{45} + x^{44} + x^{38} + x^{35} + x^{33} + x^{30}\\
&+ x^{27} + x^{26} + x^{23} + x^{21} + x^{18} + x^{16} + x^{15} + x^{12} + x^{9} + x^{8} + x^{4} + x\\
&+ 1,\\
p_9(x) = {}& x^{116} + x^{113} + x^{109} + x^{105} + x^{104} + x^{84} + x^{81} + x^{77} + x^{73} + x^{72} + x^{68}\\
&+ x^{65} + x^{61} + x^{57} + x^{56} + x^{20} + x^{17} + x^{13} + x^{9} + x^{8},\\
p_{12}(x) = {}& x^{116} + x^{113} + x^{112} + x^{104} + x^{101} + x^{100} + x^{96} + x^{93} + x^{89} + x^{85}\\
&+ x^{84} + x^{80} + x^{77} + x^{73} + x^{72} + x^{56} + x^{53} + x^{52} + x^{48} + x^{45} + x^{41}\\
&+ x^{37} + x^{33} + x^{29} + x^{25} + x^{21} + x^{20} + x^{16} + x^{13} + x^{9} + x^{8} + x^{4} + x\\
&+ 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) = {}& x^{116} + x^{113} + x^{112} + x^{110} + x^{106} + x^{105} + x^{103} + x^{100} + x^{99} + x^{98}\\
&+ x^{97} + x^{96} + x^{92} + x^{89} + x^{86} + x^{85} + x^{83} + x^{82} + x^{81} + x^{79} + x^{76}\\
&+ x^{74} + x^{73} + x^{72} + x^{71} + x^{70} + x^{69} + x^{67} + x^{66} + x^{65} + x^{64} + x^{63}\\
&+ x^{61} + x^{60} + x^{59} + x^{58} + x^{55} + x^{52} + x^{48} + x^{47} + x^{46} + x^{44} + x^{43}\\
&+ x^{42} + x^{38} + x^{37} + x^{36} + x^{35} + x^{33},\\
p_3(x) = {}& x^{109} + x^{102} + x^{99} + x^{98} + x^{97} + x^{96} + x^{94} + x^{93} + x^{92} + x^{91} + x^{90}\\
&+ x^{86} + x^{83} + x^{82} + x^{81} + x^{80} + x^{78} + x^{76} + x^{75} + x^{74} + x^{69} + x^{62}\\
&+ x^{59} + x^{58} + x^{57} + x^{56} + x^{54} + x^{52} + x^{51} + x^{50} + x^{37} + x^{30} + x^{27}\\
&+ x^{26} + x^{25} + x^{24} + x^{22} + x^{20} + x^{19} + x^{18},\\
p_6(x) = {}& x^{110} + x^{98} + x^{96} + x^{88} + x^{86} + x^{80} + x^{76} + x^{70} + x^{64} + x^{62} + x^{54}\\
&+ x^{52} + x^{50} + x^{48} + x^{44} + x^{42} + x^{40} + x^{38} + x^{36} + x^{34} + x^{30} + x^{28}\\
&+ x^{26} + x^{18} + x^{14} + x^{12},\\
p_9(x) = {}& x^{111} + x^{104} + x^{101} + x^{100} + x^{99} + x^{98} + x^{97} + x^{96} + x^{95} + x^{94} + x^{93}\\
&+ x^{92} + x^{91} + x^{90} + x^{89} + x^{88} + x^{87} + x^{86} + x^{85} + x^{84} + x^{83} + x^{82}\\
&+ x^{81} + x^{80} + x^{78} + x^{77} + x^{76} + x^{75} + x^{74} + x^{73} + x^{71} + x^{70} + x^{63}\\
&+ x^{56} + x^{53} + x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{47} + x^{46} + x^{45} + x^{44}\\
&+ x^{43} + x^{42} + x^{41} + x^{40} + x^{39} + x^{38} + x^{37} + x^{36} + x^{35} + x^{34} + x^{33}\\
&+ x^{32} + x^{31} + x^{30} + x^{29} + x^{28} + x^{27} + x^{26} + x^{25} + x^{24} + x^{23} + x^{22}\\
&+ x^{21} + x^{20} + x^{19} + x^{18} + x^{17} + x^{16} + x^{14} + x^{13} + x^{12} + x^{11} + x^{10}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{9} + x^{7} + x^{6},\\
p_{12}(x) &= x^{112} + x^{100} + x^{92} + x^{88} + x^{84} + x^{76} + x^{72} + x^{52} + x^{44} + x^{40} + x^{36}\\
&+ x^{32} + x^{28} + x^{24} + x^{20} + x^{12} + x^{8} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{126} + x^{125} + x^{124} + x^{123} + x^{122} + x^{119} + x^{118} + x^{116} + x^{115} + x^{109}\\
&+ x^{102} + x^{100} + x^{99} + x^{98} + x^{96} + x^{93} + x^{92} + x^{90} + x^{88} + x^{85} + x^{83}\\
&+ x^{81} + x^{79} + x^{75} + x^{69} + x^{68} + x^{67} + x^{66} + x^{65} + x^{63} + x^{62} + x^{59}\\
&+ x^{58} + x^{54} + x^{52} + x^{51} + x^{48} + x^{42} + x^{41} + x^{40} + x^{39} + x^{37} + x^{36}\\
&+ x^{34} + x^{33},\\
p_3(x) &= x^{125} + x^{118} + x^{115} + x^{114} + x^{112} + x^{110} + x^{108} + x^{107} + x^{103} + x^{102}\\
&+ x^{101} + x^{100} + x^{98} + x^{97} + x^{96} + x^{95} + x^{94} + x^{93} + x^{90} + x^{87} + x^{84}\\
&+ x^{83} + x^{81} + x^{79} + x^{78} + x^{76} + x^{72} + x^{70} + x^{69} + x^{68} + x^{67} + x^{63}\\
&+ x^{61} + x^{60} + x^{59} + x^{57} + x^{55} + x^{53} + x^{52} + x^{51} + x^{50} + x^{46} + x^{43}\\
&+ x^{42} + x^{40} + x^{38} + x^{37} + x^{36} + x^{35} + x^{31} + x^{29} + x^{28} + x^{27} + x^{25}\\
&+ x^{23} + x^{20} + x^{19} + x^{18},\\
p_6(x) &= x^{126} + x^{112} + x^{110} + x^{104} + x^{100} + x^{98} + x^{90} + x^{88} + x^{84} + x^{80} + x^{78}\\
&+ x^{76} + x^{74} + x^{62} + x^{60} + x^{54} + x^{52} + x^{44} + x^{42} + x^{36} + x^{34} + x^{32}\\
&+ x^{30} + x^{26} + x^{22} + x^{16} + x^{14} + x^{12},\\
p_9(x) &= x^{127} + x^{120} + x^{117} + x^{116} + x^{114} + x^{113} + x^{112} + x^{110} + x^{109} + x^{107}\\
&+ x^{106} + x^{104} + x^{101} + x^{100} + x^{99} + x^{98} + x^{97} + x^{96} + x^{94} + x^{93}\\
&+ x^{92} + x^{91} + x^{90} + x^{89} + x^{87} + x^{86} + x^{83} + x^{76} + x^{73} + x^{72} + x^{71}\\
&+ x^{70} + x^{69} + x^{68} + x^{66} + x^{65} + x^{64} + x^{62} + x^{61} + x^{59} + x^{58} + x^{56}\\
&+ x^{53} + x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{47} + x^{46} + x^{45} + x^{44} + x^{43}\\
&+ x^{42} + x^{41} + x^{40} + x^{39} + x^{38} + x^{37} + x^{36} + x^{35} + x^{34} + x^{33} + x^{32}\\
&+ x^{30} + x^{29} + x^{28} + x^{27} + x^{26} + x^{25} + x^{23} + x^{22} + x^{19} + x^{15} + x^{12}\\
&+ x^{9} + x^{7} + x^{6},\\
p_{12}(x) &= x^{128} + x^{112} + x^{108} + x^{96} + x^{92} + x^{88} + x^{84} + x^{80} + x^{72} + x^{68} + x^{60}\\
&+ x^{44} + x^{40} + x^{36} + x^{28} + x^{24} + x^{20} + x^{8} + x^{4} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{117} + x^{113} + x^{112} + x^{111} + x^{108} + x^{107} + x^{104} + x^{102} + x^{101} + x^{100}\\
&+ x^{98} + x^{97} + x^{94} + x^{93} + x^{92} + x^{91} + x^{89} + x^{88} + x^{85} + x^{83} + x^{79}\\
&+ x^{78} + x^{76} + x^{71} + x^{67} + x^{66} + x^{65} + x^{64} + x^{63} + x^{62} + x^{61} + x^{57}\\
&+ x^{56} + x^{52} + x^{51} + x^{50} + x^{49} + x^{47} + x^{42},
\end{aligned}
$$

$$
\begin{aligned}
p_3(x) &= x^{116} + x^{115} + x^{113} + x^{111} + x^{110} + x^{109} + x^{108} + x^{106} + x^{105} + x^{103} \\
&\quad + x^{102} + x^{101} + x^{98} + x^{97} + x^{96} + x^{93} + x^{92} + x^{91} + x^{89} + x^{88} + x^{87} \\
&\quad + x^{82} + x^{80} + x^{65} + x^{64} + x^{62} + x^{60} + x^{57} + x^{55} + x^{52} + x^{50} + x^{49} \\
&\quad + x^{48} + x^{47} + x^{44} + x^{42} + x^{41} + x^{40} + x^{39} + x^{35} + x^{34} + x^{33} + x^{29} \\
&\quad + x^{27} + x^{25} + x^{22}, \\
p_6(x) &= x^{116} + x^{115} + x^{113} + x^{110} + x^{109} + x^{108} + x^{107} + x^{105} + x^{104} + x^{103} \\
&\quad + x^{101} + x^{100} + x^{99} + x^{96} + x^{95} + x^{94} + x^{90} + x^{88} + x^{86} + x^{85} + x^{83} \\
&\quad + x^{81} + x^{79} + x^{78} + x^{76} + x^{74} + x^{71} + x^{70} + x^{69} + x^{64} + x^{62} + x^{60} \\
&\quad + x^{59} + x^{57} + x^{55} + x^{51} + x^{50} + x^{49} + x^{43} + x^{40} + x^{39} + x^{38} + x^{37} \\
&\quad + x^{32} + x^{31} + x^{30} + x^{23} + x^{22} + x^{21} + x^{19} + x^{18} + x^{16} + x^{14} + x^{4} + x \\
&\quad + 1, \\
p_9(x) &= x^{116} + x^{113} + x^{109} + x^{105} + x^{104} + x^{84} + x^{81} + x^{77} + x^{73} + x^{72} + x^{68} \\
&\quad + x^{65} + x^{61} + x^{57} + x^{56} + x^{20} + x^{17} + x^{13} + x^{9} + x^{8}, \\
p_{12}(x) &= x^{116} + x^{113} + x^{112} + x^{104} + x^{101} + x^{100} + x^{96} + x^{93} + x^{89} + x^{85} \\
&\quad + x^{84} + x^{80} + x^{77} + x^{73} + x^{72} + x^{56} + x^{53} + x^{52} + x^{48} + x^{45} + x^{41} \\
&\quad + x^{37} + x^{33} + x^{29} + x^{25} + x^{21} + x^{20} + x^{16} + x^{13} + x^{9} + x^{8} + x^{4} + x \\
&\quad + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{117} + x^{116} + x^{115} + x^{111} + x^{110} + x^{108} + x^{107} + x^{106} + x^{105} + x^{104} \\
&\quad + x^{101} + x^{97} + x^{94} + x^{93} + x^{92} + x^{87} + x^{85} + x^{84} + x^{83} + x^{80} + x^{79} \\
&\quad + x^{78} + x^{74} + x^{73} + x^{71} + x^{70} + x^{69} + x^{67} + x^{62} + x^{61} + x^{59} + x^{58} \\
&\quad + x^{56} + x^{55} + x^{52} + x^{50} + x^{48} + x^{42} + x^{41} + x^{39} + x^{38} + x^{37} + x^{36} \\
&\quad + x^{34} + x^{33} + x^{31} + x^{28} + x^{25} + x^{24}, \\
p_3(x) &= x^{116} + x^{115} + x^{114} + x^{113} + x^{112} + x^{110} + x^{108} + x^{107} + x^{106} + x^{104} \\
&\quad + x^{101} + x^{98} + x^{97} + x^{96} + x^{94} + x^{93} + x^{92} + x^{89} + x^{88} + x^{86} + x^{79} \\
&\quad + x^{78} + x^{77} + x^{74} + x^{73} + x^{71} + x^{69} + x^{67} + x^{63} + x^{60} + x^{58} + x^{57} \\
&\quad + x^{56} + x^{54} + x^{53} + x^{52} + x^{50} + x^{47} + x^{44} + x^{41} + x^{37} + x^{34} + x^{32} \\
&\quad + x^{31} + x^{30} + x^{29} + x^{27} + x^{26} + x^{25} + x^{24} + x^{23} + x^{21} + x^{17} + x^{16}, \\
p_6(x) &= x^{116} + x^{115} + x^{114} + x^{113} + x^{112} + x^{111} + x^{107} + x^{105} + x^{103} + x^{102} \\
&\quad + x^{98} + x^{96} + x^{95} + x^{94} + x^{92} + x^{89} + x^{88} + x^{87} + x^{84} + x^{83} + x^{81} \\
&\quad + x^{79} + x^{78} + x^{73} + x^{72} + x^{69} + x^{68} + x^{66} + x^{65} + x^{63} + x^{59} + x^{58} \\
&\quad + x^{53} + x^{52} + x^{49} + x^{48} + x^{46} + x^{45} + x^{44} + x^{38} + x^{35} + x^{33} + x^{30} \\
&\quad + x^{27} + x^{26} + x^{23} + x^{21} + x^{18} + x^{16} + x^{15} + x^{12} + x^{9} + x^{8} + x^{4} + x \\
&\quad + 1,
\end{aligned}
$$

$$\begin{aligned}
p_9(x) &= x^{116} + x^{113} + x^{109} + x^{105} + x^{104} + x^{84} + x^{81} + x^{77} + x^{73} + x^{72} + x^{68} \\
&\quad + x^{65} + x^{61} + x^{57} + x^{56} + x^{20} + x^{17} + x^{13} + x^{9} + x^{8}, \\
p_{12}(x) &= x^{116} + x^{113} + x^{112} + x^{104} + x^{101} + x^{100} + x^{96} + x^{93} + x^{89} + x^{85} \\
&\quad + x^{84} + x^{80} + x^{77} + x^{73} + x^{72} + x^{56} + x^{53} + x^{52} + x^{48} + x^{45} + x^{41} \\
&\quad + x^{37} + x^{33} + x^{29} + x^{25} + x^{21} + x^{20} + x^{16} + x^{13} + x^{9} + x^{8} + x^{4} + x \\
&\quad + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{126} + x^{125} + x^{124} + x^{123} + x^{122} + x^{119} + x^{118} + x^{116} + x^{115} + x^{109} \\
&\quad + x^{102} + x^{100} + x^{99} + x^{98} + x^{96} + x^{93} + x^{92} + x^{90} + x^{88} + x^{85} + x^{83} \\
&\quad + x^{81} + x^{79} + x^{75} + x^{69} + x^{68} + x^{67} + x^{66} + x^{65} + x^{63} + x^{62} + x^{59} \\
&\quad + x^{58} + x^{54} + x^{52} + x^{51} + x^{48} + x^{42} + x^{41} + x^{40} + x^{39} + x^{37} + x^{36} \\
&\quad + x^{34} + x^{33}, \\
p_3(x) &= x^{125} + x^{118} + x^{115} + x^{114} + x^{112} + x^{110} + x^{108} + x^{107} + x^{103} + x^{102} \\
&\quad + x^{101} + x^{100} + x^{98} + x^{97} + x^{96} + x^{95} + x^{94} + x^{93} + x^{90} + x^{87} + x^{84} \\
&\quad + x^{83} + x^{81} + x^{79} + x^{78} + x^{76} + x^{72} + x^{70} + x^{69} + x^{68} + x^{67} + x^{63} \\
&\quad + x^{61} + x^{60} + x^{59} + x^{57} + x^{55} + x^{53} + x^{52} + x^{51} + x^{50} + x^{46} + x^{43} \\
&\quad + x^{42} + x^{40} + x^{38} + x^{37} + x^{36} + x^{35} + x^{31} + x^{29} + x^{28} + x^{27} + x^{25} \\
&\quad + x^{23} + x^{20} + x^{19} + x^{18}, \\
p_6(x) &= x^{126} + x^{112} + x^{110} + x^{104} + x^{100} + x^{98} + x^{90} + x^{88} + x^{84} + x^{80} + x^{78} \\
&\quad + x^{76} + x^{74} + x^{62} + x^{60} + x^{54} + x^{52} + x^{44} + x^{42} + x^{36} + x^{34} + x^{32} \\
&\quad + x^{30} + x^{26} + x^{22} + x^{16} + x^{14} + x^{12}, \\
p_9(x) &= x^{127} + x^{120} + x^{117} + x^{116} + x^{114} + x^{113} + x^{112} + x^{110} + x^{109} + x^{107} \\
&\quad + x^{106} + x^{104} + x^{101} + x^{100} + x^{99} + x^{98} + x^{97} + x^{96} + x^{94} + x^{93} \\
&\quad + x^{92} + x^{91} + x^{90} + x^{89} + x^{87} + x^{86} + x^{83} + x^{76} + x^{73} + x^{72} + x^{71} \\
&\quad + x^{70} + x^{69} + x^{68} + x^{66} + x^{65} + x^{64} + x^{62} + x^{61} + x^{59} + x^{58} + x^{56} \\
&\quad + x^{53} + x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{47} + x^{46} + x^{45} + x^{44} + x^{43} \\
&\quad + x^{42} + x^{41} + x^{40} + x^{39} + x^{38} + x^{37} + x^{36} + x^{35} + x^{34} + x^{33} + x^{32} \\
&\quad + x^{30} + x^{29} + x^{28} + x^{27} + x^{26} + x^{25} + x^{23} + x^{22} + x^{19} + x^{15} + x^{12} \\
&\quad + x^{9} + x^{7} + x^{6}, \\
p_{12}(x) &= x^{128} + x^{112} + x^{108} + x^{96} + x^{92} + x^{88} + x^{84} + x^{80} + x^{72} + x^{68} + x^{60} \\
&\quad + x^{44} + x^{40} + x^{36} + x^{28} + x^{24} + x^{20} + x^{8} + x^{4} + 1,
\end{aligned}$$

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

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

$$p_0(x) = x^{116} + x^{113} + x^{112} + x^{110} + x^{106} + x^{105} + x^{103} + x^{100} + x^{99} + x^{98}$$

$$
\begin{aligned}
&+ x^{97} + x^{96} + x^{92} + x^{89} + x^{86} + x^{85} + x^{83} + x^{82} + x^{81} + x^{79} + x^{76} \\
&+ x^{74} + x^{73} + x^{72} + x^{71} + x^{70} + x^{69} + x^{67} + x^{66} + x^{65} + x^{64} + x^{63} \\
&+ x^{61} + x^{60} + x^{59} + x^{58} + x^{55} + x^{52} + x^{48} + x^{47} + x^{46} + x^{44} + x^{43} \\
&+ x^{42} + x^{38} + x^{37} + x^{36} + x^{35} + x^{33},
\end{aligned}
$$

$$
\begin{aligned}
p_3(x) &= x^{109} + x^{102} + x^{99} + x^{98} + x^{97} + x^{96} + x^{94} + x^{93} + x^{92} + x^{91} + x^{90} \\
&+ x^{86} + x^{83} + x^{82} + x^{81} + x^{80} + x^{78} + x^{76} + x^{75} + x^{74} + x^{69} + x^{62} \\
&+ x^{59} + x^{58} + x^{57} + x^{56} + x^{54} + x^{52} + x^{51} + x^{50} + x^{37} + x^{30} + x^{27} \\
&+ x^{26} + x^{25} + x^{24} + x^{22} + x^{20} + x^{19} + x^{18}, \\
p_6(x) &= x^{110} + x^{98} + x^{96} + x^{88} + x^{86} + x^{80} + x^{76} + x^{70} + x^{64} + x^{62} + x^{54} \\
&+ x^{52} + x^{50} + x^{48} + x^{44} + x^{42} + x^{40} + x^{38} + x^{36} + x^{34} + x^{30} + x^{28} \\
&+ x^{26} + x^{18} + x^{14} + x^{12}, \\
p_9(x) &= x^{111} + x^{104} + x^{101} + x^{100} + x^{99} + x^{98} + x^{97} + x^{96} + x^{95} + x^{94} + x^{93} \\
&+ x^{92} + x^{91} + x^{90} + x^{89} + x^{88} + x^{87} + x^{86} + x^{85} + x^{84} + x^{83} + x^{82} \\
&+ x^{81} + x^{80} + x^{78} + x^{77} + x^{76} + x^{75} + x^{74} + x^{73} + x^{71} + x^{70} + x^{63} \\
&+ x^{56} + x^{53} + x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{47} + x^{46} + x^{45} + x^{44} \\
&+ x^{43} + x^{42} + x^{41} + x^{40} + x^{39} + x^{38} + x^{37} + x^{36} + x^{35} + x^{34} + x^{33} \\
&+ x^{32} + x^{31} + x^{30} + x^{29} + x^{28} + x^{27} + x^{26} + x^{25} + x^{24} + x^{23} + x^{22} \\
&+ x^{21} + x^{20} + x^{19} + x^{18} + x^{17} + x^{16} + x^{14} + x^{13} + x^{12} + x^{11} + x^{10} \\
&+ x^{9} + x^{7} + x^{6}, \\
p_{12}(x) &= x^{112} + x^{100} + x^{92} + x^{88} + x^{84} + x^{76} + x^{72} + x^{52} + x^{44} + x^{40} + x^{36} \\
&+ x^{32} + x^{28} + x^{24} + x^{20} + x^{12} + x^{8} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{117} + x^{113} + x^{112} + x^{111} + x^{108} + x^{107} + x^{104} + x^{102} + x^{101} + x^{100} \\
&+ x^{98} + x^{97} + x^{94} + x^{93} + x^{92} + x^{91} + x^{89} + x^{88} + x^{85} + x^{83} + x^{79} \\
&+ x^{78} + x^{76} + x^{71} + x^{67} + x^{66} + x^{65} + x^{64} + x^{63} + x^{62} + x^{61} + x^{57} \\
&+ x^{56} + x^{52} + x^{51} + x^{50} + x^{49} + x^{47} + x^{42}, \\
p_3(x) &= x^{116} + x^{115} + x^{113} + x^{111} + x^{110} + x^{109} + x^{108} + x^{106} + x^{105} + x^{103} \\
&+ x^{102} + x^{101} + x^{98} + x^{97} + x^{96} + x^{93} + x^{92} + x^{91} + x^{89} + x^{88} + x^{87} \\
&+ x^{82} + x^{80} + x^{65} + x^{64} + x^{62} + x^{60} + x^{57} + x^{55} + x^{52} + x^{50} + x^{49} \\
&+ x^{48} + x^{47} + x^{44} + x^{42} + x^{41} + x^{40} + x^{39} + x^{35} + x^{34} + x^{33} + x^{29} \\
&+ x^{27} + x^{25} + x^{22}, \\
p_6(x) &= x^{116} + x^{115} + x^{113} + x^{110} + x^{109} + x^{108} + x^{107} + x^{105} + x^{104} + x^{103} \\
&+ x^{101} + x^{100} + x^{99} + x^{96} + x^{95} + x^{94} + x^{90} + x^{88} + x^{86} + x^{85} + x^{83} \\
&+ x^{81} + x^{79} + x^{78} + x^{76} + x^{74} + x^{71} + x^{70} + x^{69} + x^{64} + x^{62} + x^{60}
\end{aligned}
$$

$$\begin{aligned}
&+ x^{59} + x^{57} + x^{55} + x^{51} + x^{50} + x^{49} + x^{43} + x^{40} + x^{39} + x^{38} + x^{37}\\
&+ x^{32} + x^{31} + x^{30} + x^{23} + x^{22} + x^{21} + x^{19} + x^{18} + x^{16} + x^{14} + x^{4} + x\\
&+ 1,\\
p_9(x) &= x^{116} + x^{113} + x^{109} + x^{105} + x^{104} + x^{84} + x^{81} + x^{77} + x^{73} + x^{72} + x^{68}\\
&+ x^{65} + x^{61} + x^{57} + x^{56} + x^{20} + x^{17} + x^{13} + x^{9} + x^{8},\\
p_{12}(x) &= x^{116} + x^{113} + x^{112} + x^{104} + x^{101} + x^{100} + x^{96} + x^{93} + x^{89} + x^{85}\\
&+ x^{84} + x^{80} + x^{77} + x^{73} + x^{72} + x^{56} + x^{53} + x^{52} + x^{48} + x^{45} + x^{41}\\
&+ x^{37} + x^{33} + x^{29} + x^{25} + x^{21} + x^{20} + x^{16} + x^{13} + x^{9} + x^{8} + x^{4} + x\\
&+ 1,
\end{aligned}$$

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

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

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

n	$\Lambda(n)$	n	$\Lambda(n)$	n	$\Lambda(n)$	n	$\Lambda(n)$
0	[1, 2]	1025	[1660, 1356]	2050	[2695, 523]	3075	[381, 2595]
1	[3, 4]	1026	[1661, 1597]	2051	[2696, 2697]	3076	[2374, 837]
2	[5, 6]	1027	[1567, 1662]	2052	[684, 2698]	3077	[2238, 906]
3	[7, 8]	1028	[1663, 484]	2053	[2699, 227]	3078	[3495, 863]
4	[9, 10]	1029	[1664, 1665]	2054	[2700, 2701]	3079	[3496, 929]
5	[11, 12]	1030	[1666, 212]	2055	[2702, 1706]	3080	[3497, 1232]
6	[13, 14]	1031	[1667, 475]	2056	[2703, 2704]	3081	[3198, 1139]
7	[15, 16]	1032	[1668, 1551]	2057	[169, 128]	3082	[3498, 234]
8	[17, 18]	1033	[1669, 546]	2058	[1393, 1832]	3083	[277, 3184]
9	[19, 20]	1034	[1515, 1670]	2059	[672, 2645]	3084	[3499, 3240]
10	[21, 22]	1035	[1671, 631]	2060	[2705, 2646]	3085	[3500, 1030]
11	[23, 24]	1036	[1456, 1672]	2061	[1395, 2706]	3086	[3501, 847]
12	[25, 26]	1037	[475, 1647]	2062	[2706, 1831]	3087	[3407, 2439]
13	[27, 28]	1038	[1673, 1674]	2063	[2646, 460]	3088	[3502, 2108]
14	[29, 30]	1039	[1675, 1676]	2064	[2707, 1832]	3089	[2379, 1295]
15	[31, 32]	1040	[1677, 570]	2065	[2708, 2709]	3090	[1126, 2073]
16	[33, 34]	1041	[1678, 571]	2066	[2710, 2711]	3091	[3503, 1024]
17	[35, 36]	1042	[1641, 567]	2067	[2712, 2713]	3092	[3504, 1026]
18	[37, 38]	1043	[1465, 1679]	2068	[1975, 1540]	3093	[2321, 3254]
19	[8, 39]	1044	[1680, 1681]	2069	[468, 473]	3094	[3505, 1103]
20	[40, 41]	1045	[1682, 1683]	2070	[2714, 2715]	3095	[2340, 3506]
21	[42, 43]	1046	[1684, 1418]	2071	[2716, 559]	3096	[1133, 27]
22	[44, 45]	1047	[1685, 700]	2072	[1658, 1871]	3097	[2195, 1279]
23	[46, 47]	1048	[1686, 1687]	2073	[2717, 2658]	3098	[3507, 1283]
24	[48, 49]	1049	[1688, 1689]	2074	[2718, 1602]	3099	[3508, 860]
25	[50, 51]	1050	[530, 1377]	2075	[2719, 2720]	3100	[3509, 3260]
26	[52, 53]	1051	[1438, 783]	2076	[2721, 1647]	3101	[3510, 304]
27	[54, 55]	1052	[1690, 785]	2077	[2722, 2723]	3102	[946, 3412]

28	[56, 57]	1053	[163, 488]	2078	[2724, 160]	3103	[3511, 101]
29	[58, 59]	1054	[1691, 1692]	2079	[2725, 229]	3104	[3512, 3513]
30	[60, 61]	1055	[1693, 449]	2080	[1662, 699]	3105	[3514, 425]
31	[62, 63]	1056	[1694, 1695]	2081	[2726, 731]	3106	[3515, 2242]
32	[64, 65]	1057	[1696, 1356]	2082	[2727, 734]	3107	[2393, 2480]
33	[66, 67]	1058	[1697, 604]	2083	[2728, 579]	3108	[3516, 2149]
34	[68, 69]	1059	[1698, 1699]	2084	[774, 1866]	3109	[3339, 958]
35	[70, 71]	1060	[1700, 1701]	2085	[1701, 2729]	3110	[3517, 361]
36	[4, 19]	1061	[1702, 545]	2086	[2730, 1853]	3111	[3518, 3342]
37	[72, 73]	1062	[1703, 1378]	2087	[2731, 1984]	3112	[1102, 86]
38	[74, 75]	1063	[1704, 1705]	2088	[2732, 764]	3113	[3519, 788]
39	[16, 76]	1064	[1706, 1365]	2089	[2733, 1728]	3114	[2330, 3231]
40	[77, 78]	1065	[1707, 575]	2090	[2734, 225]	3115	[3334, 3269]
41	[79, 80]	1066	[1428, 1708]	2091	[2735, 1978]	3116	[3520, 242]
42	[81, 82]	1067	[786, 1587]	2092	[2736, 174]	3117	[3521, 400]
43	[83, 84]	1068	[1709, 1705]	2093	[2737, 1742]	3118	[3522, 806]
44	[85, 86]	1069	[1375, 1710]	2094	[2738, 1562]	3119	[3523, 2362]
45	[87, 88]	1070	[1711, 756]	2095	[479, 2739]	3120	[3524, 2581]
46	[89, 90]	1071	[1712, 1713]	2096	[2740, 521]	3121	[3525, 2478]
47	[91, 92]	1072	[1714, 140]	2097	[772, 1484]	3122	[3526, 2365]
48	[93, 94]	1073	[47, 142]	2098	[2741, 1552]	3123	[3527, 2443]
49	[95, 96]	1074	[1715, 706]	2099	[2742, 1493]	3124	[3528, 2057]
50	[97, 98]	1075	[1716, 1717]	2100	[2743, 1872]	3125	[3529, 110]
51	[99, 100]	1076	[1718, 1554]	2101	[2744, 2692]	3126	[3404, 3530]
52	[101, 71]	1077	[1719, 1720]	2102	[2745, 152]	3127	[3531, 1254]
53	[102, 103]	1078	[1721, 1477]	2103	[2729, 693]	3128	[409, 3328]
54	[104, 105]	1079	[1722, 469]	2104	[2746, 451]	3129	[3532, 2469]
55	[106, 107]	1080	[1723, 1630]	2105	[2747, 1716]	3130	[2311, 3198]
56	[108, 109]	1081	[1724, 1471]	2106	[2748, 1860]	3131	[892, 2218]
57	[110, 111]	1082	[1725, 1726]	2107	[2749, 591]	3132	[3533, 914]
58	[112, 113]	1083	[1727, 1728]	2108	[2750, 1777]	3133	[3534, 1180]
59	[114, 115]	1084	[1729, 1381]	2109	[2751, 1990]	3134	[3535, 2342]
60	[116, 117]	1085	[1730, 1731]	2110	[2752, 50]	3135	[1022, 2256]
61	[118, 119]	1086	[1732, 1733]	2111	[2753, 695]	3136	[3536, 2186]
62	[120, 121]	1087	[1734, 503]	2112	[509, 1729]	3137	[895, 2184]
63	[122, 123]	1088	[1735, 1736]	2113	[555, 1830]	3138	[3537, 396]
64	[124, 125]	1089	[1737, 167]	2114	[2754, 1585]	3139	[3538, 979]
65	[126, 127]	1090	[1477, 1738]	2115	[1434, 1902]	3140	[434, 3205]
66	[128, 129]	1091	[1739, 1740]	2116	[2755, 1650]	3141	[3539, 313]
67	[130, 131]	1092	[1741, 1742]	2117	[2756, 159]	3142	[1038, 3307]
68	[132, 133]	1093	[1632, 1556]	2118	[2757, 2742]	3143	[2191, 3224]
69	[134, 135]	1094	[1743, 1744]	2119	[2758, 1474]	3144	[3540, 1296]
70	[136, 137]	1095	[1745, 34]	2120	[448, 2759]	3145	[3541, 4]
71	[138, 139]	1096	[563, 545]	2121	[2760, 630]	3146	[2539, 2077]

72	[140, 141]	1097	[1746, 1339]	2122	[2761, 204]	3147	[3542, 2218]
73	[142, 143]	1098	[1747, 1643]	2123	[152, 2762]	3148	[3543, 913]
74	[144, 145]	1099	[12, 1448]	2124	[2763, 1836]	3149	[2169, 805]
75	[146, 147]	1100	[714, 1748]	2125	[2764, 2765]	3150	[3544, 2074]
76	[32, 148]	1101	[1749, 1488]	2126	[1591, 1982]	3151	[3545, 1066]
77	[149, 150]	1102	[1750, 1751]	2127	[2766, 1990]	3152	[2080, 2128]
78	[151, 152]	1103	[1752, 190]	2128	[2767, 39]	3153	[3546, 1084]
79	[153, 154]	1104	[1753, 758]	2129	[2768, 2769]	3154	[3547, 954]
80	[155, 156]	1105	[1754, 222]	2130	[2770, 627]	3155	[2383, 95]
81	[157, 158]	1106	[1755, 477]	2131	[2771, 1910]	3156	[3179, 2615]
82	[159, 160]	1107	[1756, 720]	2132	[2772, 37]	3157	[3548, 881]
83	[161, 14]	1108	[1757, 1758]	2133	[2773, 486]	3158	[3549, 885]
84	[162, 163]	1109	[1759, 1437]	2134	[2774, 1757]	3159	[3550, 28]
85	[164, 165]	1110	[1760, 616]	2135	[2775, 1508]	3160	[3551, 2167]
86	[166, 167]	1111	[1761, 1428]	2136	[1413, 1655]	3161	[1231, 2234]
87	[168, 169]	1112	[1762, 478]	2137	[2776, 468]	3162	[3552, 83]
88	[170, 171]	1113	[1763, 1764]	2138	[2777, 2778]	3163	[3231, 278]
89	[172, 173]	1114	[1765, 1766]	2139	[2779, 1780]	3164	[266, 420]
90	[174, 175]	1115	[1485, 197]	2140	[1577, 123]	3165	[3553, 1088]
91	[176, 174]	1116	[1767, 717]	2141	[2780, 2781]	3166	[3554, 2136]
92	[177, 178]	1117	[488, 1768]	2142	[2782, 141]	3167	[3555, 3424]
93	[179, 180]	1118	[1769, 1770]	2143	[1552, 1464]	3168	[3556, 1174]
94	[181, 182]	1119	[1771, 1340]	2144	[2783, 1787]	3169	[3557, 84]
95	[183, 184]	1120	[1772, 1773]	2145	[2784, 743]	3170	[2266, 826]
96	[185, 186]	1121	[1774, 747]	2146	[2785, 1784]	3171	[3558, 323]
97	[187, 188]	1122	[1775, 729]	2147	[2786, 1629]	3172	[3559, 2008]
98	[189, 190]	1123	[1776, 1777]	2148	[731, 736]	3173	[3560, 2439]
99	[191, 192]	1124	[1778, 1365]	2149	[733, 1783]	3174	[2196, 3452]
100	[193, 194]	1125	[1779, 711]	2150	[127, 2787]	3175	[3561, 3562]
101	[195, 196]	1126	[1780, 194]	2151	[2788, 1970]	3176	[2698, 1539]
102	[197, 198]	1127	[1781, 129]	2152	[1468, 702]	3177	[3563, 3067]
103	[199, 200]	1128	[1782, 1783]	2153	[2789, 514]	3178	[590, 669]
104	[201, 202]	1129	[586, 1784]	2154	[2790, 2791]	3179	[3564, 741]
105	[203, 204]	1130	[1785, 752]	2155	[2792, 754]	3180	[3565, 1378]
106	[205, 154]	1131	[1717, 1402]	2156	[2793, 2794]	3181	[3566, 2706]
107	[206, 207]	1132	[1400, 730]	2157	[2795, 687]	3182	[1370, 650]
108	[208, 209]	1133	[59, 1786]	2158	[2720, 1522]	3183	[3567, 1717]
109	[210, 211]	1134	[61, 1787]	2159	[2796, 765]	3184	[3568, 1509]
110	[212, 213]	1135	[1788, 1689]	2160	[2797, 768]	3185	[3569, 1933]
111	[214, 215]	1136	[644, 1528]	2161	[2798, 1483]	3186	[537, 1688]
112	[216, 217]	1137	[1789, 1790]	2162	[2799, 1531]	3187	[1764, 1530]
113	[218, 219]	1138	[1791, 592]	2163	[2800, 2778]	3188	[1982, 2737]
114	[220, 221]	1139	[1792, 1347]	2164	[2801, 1965]	3189	[552, 1631]
115	[222, 223]	1140	[1793, 1576]	2165	[2802, 1525]	3190	[3570, 3571]

116	[224, 225]	1141	[1794, 1383]	2166	[217, 565]	3191	[1670, 2939]
117	[226, 227]	1142	[1795, 602]	2167	[2803, 2793]	3192	[3572, 3573]
118	[228, 229]	1143	[1796, 1607]	2168	[2804, 1924]	3193	[3574, 2863]
119	[230, 231]	1144	[1797, 217]	2169	[1815, 602]	3194	[3575, 206]
120	[232, 233]	1145	[1798, 1799]	2170	[2805, 1903]	3195	[442, 2947]
121	[234, 235]	1146	[1800, 1498]	2171	[2806, 1947]	3196	[3576, 3577]
122	[236, 237]	1147	[1638, 1547]	2172	[2701, 1545]	3197	[657, 1529]
123	[238, 239]	1148	[1801, 610]	2173	[1391, 2676]	3198	[3578, 3017]
124	[240, 103]	1149	[1802, 1803]	2174	[2807, 1729]	3199	[539, 741]
125	[241, 242]	1150	[1804, 1805]	2175	[55, 639]	3200	[2781, 1610]
126	[243, 244]	1151	[1806, 539]	2176	[2808, 223]	3201	[3579, 2888]
127	[245, 246]	1152	[1807, 1735]	2177	[2809, 140]	3202	[1910, 2781]
128	[247, 248]	1153	[1808, 1809]	2178	[1728, 663]	3203	[3580, 1833]
129	[249, 250]	1154	[710, 598]	2179	[1347, 49]	3204	[3581, 230]
130	[251, 252]	1155	[1810, 1359]	2180	[1751, 2810]	3205	[3582, 2665]
131	[253, 254]	1156	[215, 1811]	2181	[2811, 2812]	3206	[670, 1445]
132	[255, 256]	1157	[1812, 1666]	2182	[2680, 1614]	3207	[3583, 1557]
133	[257, 258]	1158	[1813, 1757]	2183	[1672, 1495]	3208	[484, 584]
134	[259, 260]	1159	[1814, 1815]	2184	[2813, 1945]	3209	[1726, 655]
135	[261, 262]	1160	[1816, 1770]	2185	[2814, 2815]	3210	[3584, 1938]
136	[263, 264]	1161	[1817, 1818]	2186	[676, 1844]	3211	[3562, 2984]
137	[265, 266]	1162	[188, 1819]	2187	[2816, 2654]	3212	[1738, 2723]
138	[267, 268]	1163	[1508, 593]	2188	[2817, 2734]	3213	[3585, 745]
139	[269, 270]	1164	[1820, 1821]	2189	[2818, 549]	3214	[3586, 1921]
140	[271, 272]	1165	[1822, 1823]	2190	[1444, 2819]	3215	[3587, 2686]
141	[273, 274]	1166	[1824, 1825]	2191	[2820, 726]	3216	[3588, 2829]
142	[90, 275]	1167	[1826, 1827]	2192	[2821, 2822]	3217	[3589, 201]
143	[92, 90]	1168	[204, 1828]	2193	[2823, 1577]	3218	[3590, 1965]
144	[276, 277]	1169	[1829, 1830]	2194	[2824, 595]	3219	[3017, 1664]
145	[278, 279]	1170	[1831, 526]	2195	[2825, 1935]	3220	[3591, 3592]
146	[280, 281]	1171	[1832, 1526]	2196	[1481, 2826]	3221	[3593, 202]
147	[282, 283]	1172	[460, 1395]	2197	[2827, 500]	3222	[3594, 2856]
148	[63, 284]	1173	[1833, 136]	2198	[2828, 2636]	3223	[3595, 640]
149	[285, 286]	1174	[1469, 1834]	2199	[621, 2829]	3224	[3596, 1666]
150	[287, 288]	1175	[1835, 214]	2200	[2830, 2831]	3225	[3597, 2835]
151	[289, 290]	1176	[719, 1836]	2201	[158, 1950]	3226	[3598, 1716]
152	[291, 292]	1177	[1837, 1838]	2202	[2832, 497]	3227	[2787, 633]
153	[293, 294]	1178	[1839, 134]	2203	[2833, 2826]	3228	[167, 1992]
154	[295, 261]	1179	[1840, 195]	2204	[2834, 2641]	3229	[1984, 3145]
155	[296, 297]	1180	[1841, 1736]	2205	[2835, 523]	3230	[3599, 2729]
156	[298, 299]	1181	[1842, 782]	2206	[2836, 699]	3231	[3600, 1862]
157	[300, 301]	1182	[1471, 638]	2207	[1740, 1511]	3232	[3601, 3602]
158	[302, 303]	1183	[1372, 44]	2208	[2837, 2589]	3233	[3603, 1962]
159	[304, 305]	1184	[1843, 1844]	2209	[2838, 1819]	3234	[3604, 1950]

160	[306, 307]	1185	[1845, 686]	2210	[2839, 740]	3235	[3605, 652]
161	[308, 309]	1186	[1846, 1384]	2211	[2840, 1599]	3236	[3606, 3099]
162	[310, 311]	1187	[1847, 1848]	2212	[2841, 1433]	3237	[3607, 562]
163	[312, 313]	1188	[1379, 1849]	2213	[2842, 1370]	3238	[2932, 2668]
164	[314, 315]	1189	[1850, 594]	2214	[2843, 2655]	3239	[3608, 513]
165	[316, 317]	1190	[1851, 630]	2215	[2844, 1542]	3240	[3609, 197]
166	[318, 319]	1191	[1852, 1853]	2216	[747, 2742]	3241	[2690, 2701]
167	[320, 321]	1192	[1854, 723]	2217	[2845, 639]	3242	[655, 3172]
168	[322, 247]	1193	[198, 1855]	2218	[2846, 1558]	3243	[190, 3610]
169	[323, 324]	1194	[1856, 1436]	2219	[2847, 2848]	3244	[3611, 3173]
170	[325, 105]	1195	[1784, 1492]	2220	[2694, 1960]	3245	[1520, 1756]
171	[326, 327]	1196	[1857, 222]	2221	[2849, 464]	3246	[1570, 765]
172	[328, 329]	1197	[41, 1858]	2222	[1501, 1681]	3247	[1589, 1699]
173	[330, 331]	1198	[1558, 1720]	2223	[2850, 2851]	3248	[3612, 725]
174	[332, 333]	1199	[192, 1604]	2224	[2852, 2853]	3249	[3613, 2704]
175	[334, 335]	1200	[1859, 1860]	2225	[1, 35]	3250	[3614, 3004]
176	[336, 334]	1201	[1861, 629]	2226	[2854, 37]	3251	[3615, 1959]
177	[337, 326]	1202	[156, 1468]	2227	[1425, 1521]	3252	[2739, 1559]
178	[338, 339]	1203	[553, 661]	2228	[2855, 1654]	3253	[3616, 1724]
179	[340, 341]	1204	[450, 1862]	2229	[2856, 1773]	3254	[3617, 147]
180	[342, 343]	1205	[1863, 1580]	2230	[2857, 1480]	3255	[1946, 3618]
181	[344, 345]	1206	[1864, 693]	2231	[1970, 1939]	3256	[3619, 1925]
182	[346, 347]	1207	[1865, 1866]	2232	[2858, 156]	3257	[440, 2809]
183	[348, 349]	1208	[1867, 177]	2233	[2859, 33]	3258	[694, 1754]
184	[350, 351]	1209	[1868, 621]	2234	[2860, 38]	3259	[3620, 2865]
185	[352, 21]	1210	[1869, 470]	2235	[2861, 144]	3260	[3621, 148]
186	[353, 354]	1211	[1870, 1871]	2236	[535, 1724]	3261	[3043, 208]
187	[355, 111]	1212	[557, 1506]	2237	[2862, 2863]	3262	[1705, 3090]
188	[356, 357]	1213	[1629, 1507]	2238	[2864, 519]	3263	[2890, 2804]
189	[358, 359]	1214	[1872, 1873]	2239	[2865, 1551]	3264	[3622, 578]
190	[360, 315]	1215	[1874, 1875]	2240	[1827, 2866]	3265	[3623, 3624]
191	[361, 362]	1216	[1536, 182]	2241	[2867, 626]	3266	[2994, 1667]
192	[363, 364]	1217	[1876, 600]	2242	[2868, 1400]	3267	[3625, 1956]
193	[365, 366]	1218	[1614, 1751]	2243	[2869, 126]	3268	[3626, 1610]
194	[367, 106]	1219	[629, 1596]	2244	[2870, 1490]	3269	[3627, 1375]
195	[368, 369]	1220	[1877, 1369]	2245	[2871, 1338]	3270	[3628, 560]
196	[370, 371]	1221	[1878, 1632]	2246	[734, 2855]	3271	[3629, 1954]
197	[372, 373]	1222	[1879, 673]	2247	[2872, 2787]	3272	[3630, 698]
198	[374, 375]	1223	[583, 1880]	2248	[2873, 2874]	3273	[1683, 132]
199	[376, 377]	1224	[1881, 1569]	2249	[700, 2875]	3274	[3631, 1540]
200	[378, 379]	1225	[1882, 1612]	2250	[2876, 544]	3275	[3632, 443]
201	[380, 381]	1226	[1883, 617]	2251	[498, 1372]	3276	[1386, 2]
202	[382, 370]	1227	[1884, 8]	2252	[2769, 2822]	3277	[3633, 2868]
203	[383, 384]	1228	[1885, 503]	2253	[2877, 2878]	3278	[1844, 3133]

204	[385, 386]	1229	[1886, 1887]	2254	[2879, 1414]	3279	[184, 2815]
205	[387, 388]	1230	[1430, 1803]	2255	[2880, 1596]	3280	[531, 3634]
206	[389, 390]	1231	[1888, 1889]	2256	[2881, 605]	3281	[3635, 1445]
207	[391, 392]	1232	[1777, 625]	2257	[2676, 636]	3282	[1463, 2654]
208	[393, 338]	1233	[1710, 1422]	2258	[2882, 2883]	3283	[2778, 205]
209	[394, 263]	1234	[1890, 1543]	2259	[2884, 1420]	3284	[3636, 1779]
210	[395, 396]	1235	[1891, 1892]	2260	[2885, 2850]	3285	[3637, 438]
211	[397, 398]	1236	[1893, 1638]	2261	[2886, 678]	3286	[3638, 2803]
212	[399, 400]	1237	[1894, 1450]	2262	[2887, 688]	3287	[3639, 2878]
213	[401, 402]	1238	[1676, 588]	2263	[1758, 1722]	3288	[3640, 2993]
214	[403, 404]	1239	[1895, 210]	2264	[1987, 1926]	3289	[3641, 1442]
215	[69, 405]	1240	[160, 1676]	2265	[2888, 2874]	3290	[57, 2648]
216	[406, 407]	1241	[1896, 1897]	2266	[1595, 2715]	3291	[3642, 3643]
217	[408, 409]	1242	[1858, 1898]	2267	[2889, 2819]	3292	[3644, 2764]
218	[410, 411]	1243	[1899, 586]	2268	[1654, 2890]	3293	[219, 1856]
219	[412, 413]	1244	[1900, 1855]	2269	[2891, 694]	3294	[3645, 3646]
220	[414, 415]	1245	[1389, 454]	2270	[2892, 2732]	3295	[729, 2693]
221	[416, 417]	1246	[1554, 1562]	2271	[1768, 216]	3296	[1587, 3647]
222	[418, 419]	1247	[1901, 1902]	2272	[2893, 1461]	3297	[3648, 3634]
223	[420, 421]	1248	[1903, 41]	2273	[688, 2894]	3298	[678, 33]
224	[422, 423]	1249	[1904, 1905]	2274	[2895, 1885]	3299	[3649, 3025]
225	[424, 425]	1250	[1906, 1627]	2275	[2896, 2725]	3300	[3650, 783]
226	[426, 427]	1251	[1907, 1908]	2276	[606, 2848]	3301	[2657, 1891]
227	[428, 429]	1252	[1909, 1910]	2277	[2897, 696]	3302	[3651, 3598]
228	[430, 305]	1253	[1911, 1912]	2278	[2898, 1537]	3303	[3652, 2687]
229	[431, 432]	1254	[1913, 448]	2279	[2899, 186]	3304	[3653, 1493]
230	[433, 434]	1255	[196, 714]	2280	[2900, 1357]	3305	[3654, 1905]
231	[435, 436]	1256	[1914, 657]	2281	[1974, 1432]	3306	[3655, 1703]
232	[437, 438]	1257	[481, 1915]	2282	[1499, 491]	3307	[3656, 2793]
233	[439, 440]	1258	[1681, 1557]	2283	[2901, 2709]	3308	[3657, 2657]
234	[441, 442]	1259	[1905, 1594]	2284	[2902, 2850]	3309	[3658, 556]
235	[443, 125]	1260	[1916, 718]	2285	[625, 1452]	3310	[3659, 606]
236	[45, 444]	1261	[1917, 1766]	2286	[2903, 1368]	3311	[2961, 1607]
237	[445, 446]	1262	[1918, 1880]	2287	[2904, 2905]	3312	[3577, 3660]
238	[447, 448]	1263	[1919, 2]	2288	[2794, 1987]	3313	[533, 2971]
239	[449, 450]	1264	[1920, 1831]	2289	[2815, 649]	3314	[1497, 1908]
240	[451, 452]	1265	[38, 528]	2290	[2906, 773]	3315	[3661, 45]
241	[453, 454]	1266	[1921, 1922]	2291	[2907, 2687]	3316	[3662, 558]
242	[455, 456]	1267	[604, 1743]	2292	[663, 626]	3317	[3663, 2710]
243	[457, 458]	1268	[1923, 1875]	2293	[2908, 137]	3318	[3664, 1903]
244	[459, 460]	1269	[1924, 1925]	2294	[2822, 1973]	3319	[3665, 1749]
245	[461, 462]	1270	[1926, 161]	2295	[2909, 2855]	3320	[3666, 3147]
246	[463, 464]	1271	[610, 727]	2296	[2910, 2866]	3321	[3667, 2766]
247	[465, 466]	1272	[1927, 728]	2297	[2911, 1655]	3322	[129, 3048]

248	[467, 468]	1273	[1928, 737]	2298	[2912, 2774]	3323	[3668, 1786]
249	[469, 470]	1274	[1929, 1518]	2299	[2913, 1665]	3324	[2917, 2831]
250	[471, 456]	1275	[1930, 1362]	2300	[2914, 1768]	3325	[3669, 3015]
251	[472, 473]	1276	[1931, 506]	2301	[2915, 1622]	3326	[3009, 572]
252	[474, 475]	1277	[736, 1932]	2302	[2916, 2917]	3327	[3670, 3008]
253	[476, 477]	1278	[1783, 1933]	2303	[1604, 1935]	3328	[3671, 641]
254	[478, 479]	1279	[1934, 1740]	2304	[2918, 2919]	3329	[3672, 2834]
255	[480, 481]	1280	[1935, 1674]	2305	[2920, 1849]	3330	[3673, 745]
256	[482, 161]	1281	[1936, 1754]	2306	[2921, 2922]	3331	[1853, 2771]
257	[483, 484]	1282	[1937, 1713]	2307	[2923, 1641]	3332	[3674, 3159]
258	[485, 486]	1283	[1687, 1818]	2308	[592, 2708]	3333	[1736, 3624]
259	[487, 488]	1284	[712, 1938]	2309	[2924, 2669]	3334	[3675, 2794]
260	[489, 490]	1285	[231, 1591]	2310	[2925, 150]	3335	[3660, 146]
261	[491, 492]	1286	[1939, 1940]	2311	[2926, 1701]	3336	[3055, 517]
262	[493, 494]	1287	[1828, 1534]	2312	[135, 483]	3337	[3100, 1780]
263	[495, 496]	1288	[1941, 458]	2313	[2927, 1354]	3338	[3676, 2777]
264	[497, 498]	1289	[1556, 1942]	2314	[2928, 213]	3339	[3677, 1576]
265	[499, 500]	1290	[1943, 134]	2315	[1563, 608]	3340	[3678, 1894]
266	[501, 502]	1291	[1713, 1944]	2316	[2929, 1615]	3341	[466, 2840]
267	[503, 504]	1292	[1945, 1946]	2317	[1692, 446]	3342	[3679, 1932]
268	[505, 506]	1293	[171, 1947]	2318	[2930, 2931]	3343	[1626, 3129]
269	[507, 508]	1294	[1948, 1403]	2319	[1353, 2932]	3344	[3680, 1756]
270	[131, 442]	1295	[1949, 711]	2320	[2933, 1404]	3345	[643, 2764]
271	[180, 509]	1296	[1950, 1657]	2321	[2934, 1924]	3346	[3681, 1536]
272	[510, 511]	1297	[1951, 1952]	2322	[2935, 1915]	3347	[3682, 3062]
273	[143, 512]	1298	[581, 1687]	2323	[2936, 2937]	3348	[2715, 1921]
274	[513, 514]	1299	[1953, 133]	2324	[776, 2868]	3349	[2759, 3643]
275	[173, 515]	1300	[1922, 597]	2325	[2938, 2939]	3350	[1437, 634]
276	[516, 517]	1301	[1337, 1752]	2326	[1866, 1637]	3351	[726, 1962]
277	[518, 519]	1302	[1338, 1626]	2327	[2940, 2703]	3352	[1942, 1694]
278	[520, 163]	1303	[1933, 1954]	2328	[2941, 2942]	3353	[3683, 173]
279	[521, 522]	1304	[1955, 1811]	2329	[2943, 2944]	3354	[2692, 3664]
280	[523, 524]	1305	[1956, 1957]	2330	[2945, 1572]	3355	[3684, 1863]
281	[525, 526]	1306	[1958, 1662]	2331	[571, 159]	3356	[1838, 3669]
282	[527, 528]	1307	[10, 1959]	2332	[2946, 2947]	3357	[1408, 1712]
283	[529, 530]	1308	[1960, 580]	2333	[2948, 2949]	3358	[3685, 1530]
284	[121, 531]	1309	[464, 1961]	2334	[2950, 2951]	3359	[3686, 2926]
285	[532, 533]	1310	[1962, 1963]	2335	[2952, 682]	3360	[3687, 1744]
286	[534, 535]	1311	[1964, 535]	2336	[2953, 712]	3361	[3688, 1522]
287	[536, 537]	1312	[1965, 7]	2337	[2954, 1410]	3362	[3689, 1621]
288	[538, 539]	1313	[1966, 553]	2338	[2955, 2932]	3363	[3690, 1499]
289	[540, 541]	1314	[1967, 450]	2339	[1593, 463]	3364	[1657, 3573]
290	[542, 143]	1315	[1968, 1926]	2340	[2956, 766]	3365	[2810, 1615]
291	[543, 544]	1316	[1969, 1970]	2341	[2957, 1580]	3366	[3691, 2762]

292	[545, 546]	1317	[1971, 1972]	2342	[1689, 1337]	3367	[646, 1412]
293	[547, 548]	1318	[1973, 1974]	2343	[2958, 121]	3368	[1961, 1762]
294	[549, 550]	1319	[1572, 1975]	2344	[2642, 2959]	3369	[3692, 1948]
295	[551, 552]	1320	[1976, 1942]	2345	[1597, 2734]	3370	[651, 2732]
296	[145, 553]	1321	[1977, 1978]	2346	[154, 2664]	3371	[3693, 2670]
297	[554, 555]	1322	[1979, 1620]	2347	[2960, 2961]	3372	[194, 575]
298	[556, 557]	1323	[615, 1827]	2348	[2944, 1616]	3373	[528, 1969]
299	[558, 559]	1324	[1980, 633]	2349	[2962, 1438]	3374	[3694, 563]
300	[517, 560]	1325	[1731, 12]	2350	[2963, 728]	3375	[3695, 3038]
301	[561, 562]	1326	[1981, 1982]	2351	[508, 2964]	3376	[524, 1368]
302	[446, 563]	1327	[1983, 1984]	2352	[2965, 171]	3377	[2665, 3028]
303	[564, 565]	1328	[1985, 530]	2353	[756, 2864]	3378	[3696, 611]
304	[566, 567]	1329	[1986, 1987]	2354	[2966, 2967]	3379	[39, 3571]
305	[568, 569]	1330	[1988, 466]	2355	[2968, 727]	3380	[3697, 1679]
306	[570, 571]	1331	[1989, 750]	2356	[2967, 640]	3381	[1952, 3054]
307	[211, 568]	1332	[1990, 1553]	2357	[2969, 127]	3382	[3698, 1600]
308	[572, 573]	1333	[1991, 644]	2358	[2970, 196]	3383	[3699, 3618]
309	[574, 43]	1334	[1992, 1731]	2359	[2762, 1360]	3384	[3700, 1852]
310	[575, 576]	1335	[1993, 1479]	2360	[2971, 172]	3385	[519, 3092]
311	[577, 142]	1336	[248, 911]	2361	[2972, 1710]	3386	[2636, 499]
312	[578, 579]	1337	[903, 955]	2362	[567, 1643]	3387	[3701, 3021]
313	[580, 581]	1338	[1994, 74]	2363	[2973, 1358]	3388	[3702, 3660]
314	[582, 583]	1339	[1995, 922]	2364	[2974, 179]	3389	[3048, 2733]
315	[584, 585]	1340	[1996, 1997]	2365	[2975, 1484]	3390	[3703, 1822]
316	[560, 586]	1341	[1998, 1257]	2366	[506, 2976]	3391	[1862, 1472]
317	[587, 588]	1342	[1999, 2000]	2367	[2826, 658]	3392	[3643, 1649]
318	[589, 590]	1343	[2001, 1244]	2368	[2977, 2774]	3393	[3704, 1494]
319	[591, 592]	1344	[2002, 2003]	2369	[1541, 2736]	3394	[3705, 1940]
320	[593, 594]	1345	[792, 827]	2370	[2978, 444]	3395	[1441, 3602]
321	[595, 596]	1346	[2004, 95]	2371	[2979, 200]	3396	[599, 3706]
322	[597, 467]	1347	[2005, 2006]	2372	[2980, 1571]	3397	[3707, 3121]
323	[598, 599]	1348	[2007, 822]	2373	[1583, 1349]	3398	[3708, 1521]
324	[600, 601]	1349	[2008, 1283]	2374	[2981, 522]	3399	[3709, 3598]
325	[602, 32]	1350	[1306, 377]	2375	[2982, 2983]	3400	[1902, 1601]
326	[603, 604]	1351	[852, 1066]	2376	[2984, 465]	3401	[1547, 1863]
327	[605, 606]	1352	[2009, 413]	2377	[229, 623]	3402	[3710, 3035]
328	[607, 608]	1353	[2010, 2011]	2378	[2939, 508]	3403	[3711, 2708]
329	[609, 610]	1354	[315, 1223]	2379	[1637, 695]	3404	[3712, 1748]
330	[611, 612]	1355	[2012, 1135]	2380	[2985, 2658]	3405	[1932, 1542]
331	[613, 598]	1356	[1182, 319]	2381	[1630, 2986]	3406	[3713, 1535]
332	[614, 615]	1357	[1150, 2013]	2382	[627, 2987]	3407	[3714, 534]
333	[616, 617]	1358	[2014, 2015]	2383	[2709, 2967]	3408	[3715, 3716]
334	[618, 619]	1359	[954, 2016]	2384	[2988, 1957]	3409	[462, 177]
335	[620, 621]	1360	[292, 960]	2385	[2697, 2989]	3410	[1461, 1837]

336	[2, 620]	1361	[2017, 1063]	2386	[1459, 1619]	3411	[3066, 1845]
337	[622, 623]	1362	[2018, 889]	2387	[1773, 481]	3412	[3717, 551]
338	[624, 625]	1363	[2019, 253]	2388	[2990, 1476]	3413	[3718, 3719]
339	[626, 627]	1364	[861, 1004]	2389	[2991, 2688]	3414	[3720, 2893]
340	[628, 629]	1365	[1215, 2020]	2390	[2992, 512]	3415	[3721, 509]
341	[630, 631]	1366	[2021, 2022]	2391	[2993, 2994]	3416	[3722, 1828]
342	[632, 581]	1367	[2023, 981]	2392	[2995, 2996]	3417	[3716, 3019]
343	[633, 561]	1368	[2024, 1008]	2393	[2997, 1861]	3418	[3723, 2739]
344	[634, 605]	1369	[2025, 2026]	2394	[2673, 2717]	3419	[706, 556]
345	[635, 636]	1370	[2027, 1139]	2395	[2998, 1891]	3420	[3724, 2759]
346	[637, 638]	1371	[2028, 2029]	2396	[2999, 1343]	3421	[3725, 1617]
347	[639, 219]	1372	[1025, 2030]	2397	[3000, 2645]	3422	[1525, 1885]
348	[640, 641]	1373	[2031, 2032]	2398	[3001, 513]	3423	[3726, 2937]
349	[642, 643]	1374	[2033, 1001]	2399	[3002, 198]	3424	[3727, 479]
350	[641, 644]	1375	[1270, 2034]	2400	[3003, 498]	3425	[3728, 1605]
351	[645, 646]	1376	[849, 2035]	2401	[2668, 439]	3426	[2986, 1948]
352	[647, 44]	1377	[2036, 2037]	2402	[2688, 3004]	3427	[3729, 3587]
353	[648, 649]	1378	[2038, 253]	2403	[3005, 2959]	3428	[3730, 465]
354	[650, 651]	1379	[2039, 2040]	2404	[3006, 1816]	3429	[1404, 2812]
355	[652, 653]	1380	[2041, 2042]	2405	[3007, 2994]	3430	[3731, 203]
356	[654, 655]	1381	[2043, 2044]	2406	[3008, 3009]	3431	[486, 1726]
357	[656, 657]	1382	[2045, 408]	2407	[3010, 1541]	3432	[764, 779]
358	[658, 139]	1383	[2046, 2047]	2408	[3011, 2864]	3433	[209, 1833]
359	[659, 212]	1384	[1323, 2048]	2409	[1912, 555]	3434	[2947, 1779]
360	[660, 661]	1385	[2049, 868]	2410	[3012, 1873]	3435	[3732, 1465]
361	[662, 663]	1386	[2050, 2051]	2411	[3013, 1952]	3436	[3719, 455]
362	[664, 665]	1387	[2052, 2053]	2412	[594, 1602]	3437	[221, 1983]
363	[666, 667]	1388	[799, 101]	2413	[3014, 683]	3438	[2905, 767]
364	[668, 145]	1389	[2054, 2055]	2414	[3015, 1456]	3439	[3733, 1414]
365	[669, 670]	1390	[2056, 1220]	2415	[3016, 209]	3440	[2853, 1353]
366	[671, 672]	1391	[88, 2057]	2416	[1381, 3017]	3441	[3734, 489]
367	[673, 674]	1392	[2058, 921]	2417	[3018, 3019]	3442	[3735, 493]
368	[675, 676]	1393	[947, 2059]	2418	[3020, 1898]	3443	[1786, 1749]
369	[677, 678]	1394	[2059, 2060]	2419	[1708, 3021]	3444	[3736, 1342]
370	[679, 680]	1395	[2061, 2062]	2420	[1770, 50]	3445	[3147, 1535]
371	[490, 681]	1396	[2063, 281]	2421	[3022, 499]	3446	[3737, 1963]
372	[682, 683]	1397	[2064, 1170]	2422	[1787, 2949]	3447	[3738, 2993]
373	[550, 684]	1398	[2065, 2066]	2423	[3023, 742]	3448	[3739, 457]
374	[685, 686]	1399	[2067, 830]	2424	[2641, 1972]	3449	[3740, 529]
375	[687, 688]	1400	[1320, 2068]	2425	[680, 1388]	3450	[3741, 452]
376	[689, 612]	1401	[2069, 2070]	2426	[3024, 1960]	3451	[3742, 1851]
377	[690, 684]	1402	[2071, 2072]	2427	[3025, 1617]	3452	[3743, 705]
378	[691, 692]	1403	[270, 891]	2428	[526, 1392]	3453	[3744, 3101]
379	[693, 694]	1404	[832, 883]	2429	[3026, 757]	3454	[3745, 1762]

380	[695, 696]	1405	[2073, 1231]	2430	[3027, 3028]	3455	[3746, 1511]
381	[697, 180]	1406	[2074, 361]	2431	[3029, 2883]	3456	[3747, 3172]
382	[541, 698]	1407	[2075, 893]	2432	[3030, 1434]	3457	[3748, 3610]
383	[699, 700]	1408	[2076, 2077]	2433	[579, 1733]	3458	[3749, 3054]
384	[701, 702]	1409	[2078, 1098]	2434	[3031, 1415]	3459	[3750, 2693]
385	[703, 704]	1410	[2053, 2079]	2435	[3032, 2961]	3460	[1742, 1589]
386	[705, 706]	1411	[331, 2080]	2436	[1446, 1459]	3461	[3751, 1874]
387	[707, 708]	1412	[2081, 2082]	2437	[1545, 3029]	3462	[3752, 2642]
388	[709, 710]	1413	[2083, 2084]	2438	[1834, 2983]	3463	[3753, 128]
389	[711, 712]	1414	[2085, 956]	2439	[3033, 1569]	3464	[3754, 1943]
390	[713, 714]	1415	[2086, 1041]	2440	[3034, 504]	3465	[3755, 1842]
391	[715, 231]	1416	[2087, 2088]	2441	[2922, 757]	3466	[3756, 162]
392	[716, 717]	1417	[794, 2089]	2442	[3035, 2713]	3467	[3757, 590]
393	[718, 719]	1418	[2090, 2091]	2443	[762, 462]	3468	[1417, 1739]
394	[720, 497]	1419	[309, 2092]	2444	[3036, 1861]	3469	[3758, 1820]
395	[588, 721]	1420	[2093, 1198]	2445	[661, 1346]	3470	[1621, 1761]
396	[722, 722]	1421	[2094, 1265]	2446	[3037, 1823]	3471	[3759, 2810]
397	[723, 210]	1422	[901, 2095]	2447	[653, 1660]	3472	[665, 611]
398	[569, 570]	1423	[2096, 278]	2448	[638, 3038]	3473	[649, 3760]
399	[724, 651]	1424	[2097, 2098]	2449	[1357, 3008]	3474	[1452, 3121]
400	[725, 726]	1425	[959, 2099]	2450	[3039, 2772]	3475	[2765, 457]
401	[727, 59]	1426	[2068, 1135]	2451	[3040, 1422]	3476	[686, 2926]
402	[728, 729]	1427	[2100, 1036]	2452	[3041, 584]	3477	[3761, 589]
403	[730, 731]	1428	[2101, 988]	2453	[3042, 3043]	3478	[3762, 658]
404	[732, 733]	1429	[327, 2102]	2454	[3044, 524]	3479	[3763, 1845]
405	[133, 734]	1430	[956, 2103]	2455	[3045, 1397]	3480	[1938, 1943]
406	[735, 736]	1431	[1118, 1221]	2456	[1825, 780]	3481	[738, 2777]
407	[53, 131]	1432	[2104, 2105]	2457	[1537, 2772]	3482	[3764, 476]
408	[737, 738]	1433	[423, 2088]	2458	[1720, 2996]	3483	[1421, 2766]
409	[739, 740]	1434	[2106, 350]	2459	[36, 2925]	3484	[3765, 1648]
410	[741, 742]	1435	[2107, 115]	2460	[3046, 1581]	3485	[3766, 1712]
411	[631, 743]	1436	[413, 816]	2461	[125, 1914]	3486	[3767, 1507]
412	[744, 596]	1437	[313, 2108]	2462	[512, 3001]	3487	[1848, 3682]
413	[745, 746]	1438	[2109, 1331]	2463	[3047, 3048]	3488	[3768, 779]
414	[511, 747]	1439	[2110, 392]	2464	[3049, 1956]	3489	[3004, 1704]
415	[748, 749]	1440	[2111, 948]	2465	[3050, 1927]	3490	[3769, 1851]
416	[186, 10]	1441	[272, 2112]	2466	[514, 1571]	3491	[2669, 3127]
417	[681, 750]	1442	[926, 2113]	2467	[3051, 3049]	3492	[1423, 144]
418	[751, 752]	1443	[2114, 810]	2468	[3052, 2771]	3493	[3770, 1897]
419	[753, 754]	1444	[2115, 334]	2469	[3053, 774]	3494	[3771, 3145]
420	[755, 756]	1445	[2116, 2117]	2470	[3054, 1703]	3495	[546, 1872]
421	[757, 758]	1446	[1169, 1287]	2471	[2874, 3055]	3496	[1518, 1904]
422	[759, 760]	1447	[2118, 959]	2472	[2704, 203]	3497	[3772, 208]
423	[761, 762]	1448	[24, 1073]	2473	[444, 1391]	3498	[2987, 443]

424	[763, 764]	1449	[2119, 327]	2474	[3056, 572]	3499	[3038, 476]
425	[765, 766]	1450	[917, 1058]	2475	[147, 2769]	3500	[3773, 1667]
426	[767, 768]	1451	[1160, 879]	2476	[683, 2697]	3501	[3624, 2703]
427	[769, 770]	1452	[2120, 2121]	2477	[3057, 483]	3502	[1809, 3774]
428	[771, 772]	1453	[940, 2122]	2478	[3058, 1570]	3503	[3775, 1660]
429	[773, 774]	1454	[884, 1090]	2479	[3059, 1939]	3504	[3776, 1567]
430	[775, 776]	1455	[2123, 924]	2480	[3060, 207]	3505	[696, 1711]
431	[777, 778]	1456	[2124, 1040]	2481	[601, 645]	3506	[3777, 1922]
432	[779, 179]	1457	[2125, 351]	2482	[1343, 725]	3507	[3778, 1711]
433	[780, 165]	1458	[2126, 1206]	2483	[1836, 126]	3508	[3779, 1649]
434	[781, 782]	1459	[2127, 2128]	2484	[3061, 3062]	3509	[3780, 1975]
435	[783, 784]	1460	[2129, 1029]	2485	[3063, 1360]	3510	[3118, 1408]
436	[785, 786]	1461	[2000, 2115]	2486	[1897, 1825]	3511	[2848, 485]
437	[787, 788]	1462	[2130, 1120]	2487	[3064, 1951]	3512	[2831, 3104]
438	[789, 790]	1463	[2131, 2132]	2488	[3065, 1563]	3513	[3781, 1834]
439	[791, 792]	1464	[2133, 2134]	2489	[1947, 3066]	3514	[3782, 3036]
440	[793, 794]	1465	[2135, 841]	2490	[612, 3067]	3515	[3783, 634]
441	[795, 796]	1466	[2136, 952]	2491	[2951, 2906]	3516	[2819, 2951]
442	[252, 797]	1467	[2137, 902]	2492	[2919, 1524]	3517	[3784, 576]
443	[798, 252]	1468	[2134, 2138]	2493	[3068, 61]	3518	[3785, 3104]
444	[86, 799]	1469	[1020, 408]	2494	[3069, 2698]	3519	[3786, 3787]
445	[800, 801]	1470	[2139, 1125]	2495	[1733, 1912]	3520	[3788, 3789]
446	[802, 803]	1471	[961, 2140]	2496	[3070, 51]	3521	[3790, 467]
447	[804, 805]	1472	[2141, 2071]	2497	[3071, 1553]	3522	[1823, 3111]
448	[806, 807]	1473	[2142, 2143]	2498	[3072, 1526]	3523	[1624, 2907]
449	[808, 3]	1474	[2144, 2145]	2499	[3073, 2984]	3524	[3791, 2986]
450	[809, 810]	1475	[1016, 2097]	2500	[3074, 1392]	3525	[3792, 3127]
451	[811, 812]	1476	[2146, 2147]	2501	[3075, 2664]	3526	[3793, 3664]
452	[813, 814]	1477	[2148, 2149]	2502	[3076, 463]	3527	[200, 3036]
453	[815, 816]	1478	[2150, 2151]	2503	[3077, 1423]	3528	[768, 3562]
454	[817, 818]	1479	[2051, 1218]	2504	[1959, 537]	3529	[34, 214]
455	[819, 820]	1480	[814, 2152]	2505	[3078, 615]	3530	[3794, 215]
456	[821, 822]	1481	[2153, 1160]	2506	[1362, 493]	3531	[3795, 2690]
457	[823, 824]	1482	[2154, 2155]	2507	[3079, 2919]	3532	[749, 2917]
458	[825, 826]	1483	[1083, 2156]	2508	[3080, 2907]	3533	[1679, 2856]
459	[827, 828]	1484	[2029, 372]	2509	[1579, 2835]	3534	[2653, 1842]
460	[829, 830]	1485	[2157, 374]	2510	[3081, 3082]	3535	[3082, 2958]
461	[831, 832]	1486	[2158, 307]	2511	[3083, 3001]	3536	[3796, 2736]
462	[833, 834]	1487	[1276, 2159]	2512	[2989, 3084]	3537	[1892, 158]
463	[835, 836]	1488	[2160, 2161]	2513	[3085, 580]	3538	[3797, 3133]
464	[837, 838]	1489	[2162, 2163]	2514	[3086, 1806]	3539	[3573, 2750]
465	[839, 840]	1490	[842, 2164]	2515	[3087, 1765]	3540	[3798, 2717]
466	[841, 842]	1491	[2165, 1170]	2516	[3088, 719]	3541	[1699, 1386]
467	[843, 844]	1492	[2166, 2167]	2517	[3089, 3090]	3542	[3799, 2737]

468	[845, 801]	1493	[1233, 2168]	2518	[3091, 3092]	3543	[3760, 2735]
469	[846, 847]	1494	[1173, 2169]	2519	[3093, 674]	3544	[3800, 3706]
470	[848, 849]	1495	[2170, 2171]	2520	[1600, 1951]	3545	[3801, 2879]
471	[850, 350]	1496	[2112, 859]	2521	[3094, 1670]	3546	[3802, 1739]
472	[851, 852]	1497	[2055, 2172]	2522	[1650, 739]	3547	[1830, 2661]
473	[844, 853]	1498	[2173, 2174]	2523	[1419, 2791]	3548	[573, 1474]
474	[854, 855]	1499	[2175, 2176]	2524	[3095, 1515]	3549	[3803, 1482]
475	[856, 857]	1500	[2177, 2178]	2525	[3096, 1708]	3550	[3804, 1485]
476	[858, 859]	1501	[2179, 2178]	2526	[692, 2680]	3551	[1957, 543]
477	[860, 861]	1502	[2180, 69]	2527	[3097, 681]	3552	[1849, 162]
478	[862, 855]	1503	[2181, 2182]	2528	[1411, 35]	3553	[3805, 1737]
479	[324, 863]	1504	[2183, 2016]	2529	[3098, 751]	3554	[502, 3646]
480	[864, 865]	1505	[2184, 2185]	2530	[3099, 3100]	3555	[3806, 1595]
481	[866, 867]	1506	[991, 2186]	2531	[3101, 1620]	3556	[3807, 3118]
482	[868, 29]	1507	[2187, 2188]	2532	[3062, 2725]	3557	[3787, 2818]
483	[869, 870]	1508	[2189, 1053]	2533	[3102, 2840]	3558	[1799, 600]
484	[262, 871]	1509	[993, 2190]	2534	[3103, 2733]	3559	[2942, 1624]
485	[872, 873]	1510	[1248, 2191]	2535	[3104, 776]	3560	[3808, 2925]
486	[874, 875]	1511	[2192, 2193]	2536	[3105, 146]	3561	[3809, 372]
487	[876, 877]	1512	[2194, 923]	2537	[3106, 1469]	3562	[3810, 2525]
488	[311, 878]	1513	[873, 2195]	2538	[3107, 1992]	3563	[3811, 2624]
489	[879, 880]	1514	[886, 2196]	2539	[3108, 1475]	3564	[1293, 2497]
490	[881, 882]	1515	[2197, 2198]	2540	[1972, 2922]	3565	[3812, 102]
491	[883, 884]	1516	[2199, 942]	2541	[3109, 3110]	3566	[2003, 2498]
492	[885, 886]	1517	[888, 1115]	2542	[3111, 1339]	3567	[3813, 2071]
493	[887, 888]	1518	[357, 2025]	2543	[1492, 3082]	3568	[890, 888]
494	[889, 890]	1519	[2200, 1107]	2544	[3112, 1419]	3569	[2237, 1158]
495	[891, 892]	1520	[1245, 1237]	2545	[1875, 1822]	3570	[1085, 2519]
496	[290, 893]	1521	[2201, 1295]	2546	[1432, 1498]	3571	[3814, 1178]
497	[894, 895]	1522	[2202, 2203]	2547	[3113, 1892]	3572	[2416, 2400]
498	[896, 897]	1523	[2204, 2034]	2548	[619, 151]	3573	[3815, 2451]
499	[898, 899]	1524	[2205, 2206]	2549	[3114, 2890]	3574	[3816, 2257]
500	[900, 901]	1525	[2207, 906]	2550	[3115, 437]	3575	[3817, 391]
501	[902, 903]	1526	[2208, 2002]	2551	[3116, 3084]	3576	[3818, 961]
502	[904, 905]	1527	[2209, 2210]	2552	[3117, 60]	3577	[3819, 3378]
503	[906, 907]	1528	[1131, 995]	2553	[452, 3118]	3578	[2405, 100]
504	[908, 909]	1529	[2211, 2212]	2554	[3119, 1672]	3579	[2246, 2621]
505	[910, 911]	1530	[2213, 1033]	2555	[3120, 2905]	3580	[3820, 2416]
506	[912, 913]	1531	[2214, 1130]	2556	[470, 1645]	3581	[2006, 851]
507	[914, 915]	1532	[2215, 88]	2557	[3121, 2902]	3582	[3821, 1240]
508	[916, 917]	1533	[2216, 405]	2558	[3122, 3043]	3583	[405, 2245]
509	[918, 919]	1534	[386, 2017]	2559	[3123, 1816]	3584	[3822, 373]
510	[920, 921]	1535	[2217, 346]	2560	[3124, 3015]	3585	[3823, 2355]
511	[922, 923]	1536	[2218, 2093]	2561	[3092, 578]	3586	[250, 2278]

512	[275, 924]	1537	[1073, 72]	2562	[3125, 1616]	3587	[3824, 864]
513	[925, 926]	1538	[1334, 2219]	2563	[3126, 1495]	3588	[1108, 241]
514	[927, 928]	1539	[2220, 2221]	2564	[3127, 1889]	3589	[3463, 3323]
515	[329, 929]	1540	[2222, 2223]	2565	[3128, 3129]	3590	[3825, 1093]
516	[930, 931]	1541	[1110, 332]	2566	[1448, 1425]	3591	[3826, 2284]
517	[932, 933]	1542	[2224, 23]	2567	[3130, 3066]	3592	[3827, 3813]
518	[934, 3]	1543	[2225, 2226]	2568	[3131, 1355]	3593	[3828, 2222]
519	[935, 936]	1544	[2227, 409]	2569	[3132, 2750]	3594	[3829, 2315]
520	[937, 938]	1545	[2228, 2229]	2570	[1744, 3025]	3595	[3183, 1130]
521	[939, 940]	1546	[1071, 2230]	2571	[3133, 708]	3596	[3830, 1248]
522	[941, 942]	1547	[2231, 2232]	2572	[1354, 547]	3597	[3831, 2566]
523	[943, 944]	1548	[2233, 2234]	2573	[3134, 1413]	3598	[3832, 2399]
524	[945, 946]	1549	[2235, 807]	2574	[3135, 2964]	3599	[1140, 876]
525	[921, 244]	1550	[2236, 1080]	2575	[3136, 494]	3600	[2091, 2313]
526	[366, 947]	1551	[119, 2237]	2576	[2851, 1735]	3601	[1296, 1078]
527	[948, 949]	1552	[239, 2238]	2577	[3137, 2912]	3602	[3833, 2513]
528	[73, 950]	1553	[283, 2239]	2578	[3138, 1446]	3603	[1204, 864]
529	[951, 952]	1554	[2240, 2241]	2579	[3067, 1548]	3604	[3834, 1280]
530	[286, 953]	1555	[878, 67]	2580	[3110, 534]	3605	[3835, 2239]
531	[233, 954]	1556	[915, 2242]	2581	[3139, 1764]	3606	[3836, 2099]
532	[955, 956]	1557	[2243, 2244]	2582	[3140, 1758]	3607	[3435, 2244]
533	[957, 328]	1558	[2245, 2246]	2583	[3141, 1436]	3608	[3837, 2103]
534	[958, 959]	1559	[2247, 2248]	2584	[3142, 2809]	3609	[3838, 2261]
535	[960, 961]	1560	[2249, 992]	2585	[1908, 1480]	3610	[3839, 2583]
536	[962, 963]	1561	[913, 844]	2586	[3143, 2989]	3611	[2262, 2410]
537	[964, 965]	1562	[2250, 2251]	2587	[3144, 1403]	3612	[3840, 1108]
538	[966, 335]	1563	[2252, 2098]	2588	[3145, 2944]	3613	[3841, 1091]
539	[967, 308]	1564	[1332, 1184]	2589	[2589, 2589]	3614	[2203, 1189]
540	[400, 391]	1565	[2253, 275]	2590	[1880, 2673]	3615	[2022, 1315]
541	[968, 856]	1566	[2254, 947]	2591	[3146, 3009]	3616	[2082, 62]
542	[969, 970]	1567	[2255, 1209]	2592	[1612, 3147]	3617	[3842, 827]
543	[971, 359]	1568	[2256, 326]	2593	[3019, 3035]	3618	[3843, 3503]
544	[972, 238]	1569	[2032, 2257]	2594	[3148, 1761]	3619	[2580, 2460]
545	[803, 973]	1570	[788, 1301]	2595	[3149, 2851]	3620	[3844, 119]
546	[974, 975]	1571	[2258, 2259]	2596	[1954, 188]	3621	[1162, 272]
547	[976, 116]	1572	[2260, 2222]	2597	[1811, 1476]	3622	[3845, 1271]
548	[977, 118]	1573	[2261, 2262]	2598	[3150, 2942]	3623	[105, 263]
549	[978, 979]	1574	[2263, 1078]	2599	[3151, 1821]	3624	[3846, 3264]
550	[980, 981]	1575	[936, 1057]	2600	[3152, 1837]	3625	[989, 3315]
551	[982, 983]	1576	[2264, 2265]	2601	[3153, 2711]	3626	[3847, 2379]
552	[984, 985]	1577	[359, 2266]	2602	[1398, 199]	3627	[22, 2151]
553	[986, 987]	1578	[2267, 909]	2603	[3154, 1358]	3628	[3848, 343]
554	[975, 987]	1579	[2268, 2269]	2604	[3155, 1961]	3629	[2371, 2314]
555	[988, 989]	1580	[2270, 423]	2605	[3156, 1743]	3630	[3849, 3441]

556	[990, 991]	1581	[2271, 2272]	2606	[3157, 489]	3631	[3850, 2526]
557	[992, 993]	1582	[1298, 2008]	2607	[674, 1583]	3632	[3851, 1099]
558	[994, 114]	1583	[2273, 349]	2608	[49, 195]	3633	[3852, 2276]
559	[995, 996]	1584	[2274, 1332]	2609	[1805, 201]	3634	[3853, 1299]
560	[997, 998]	1585	[2275, 1321]	2610	[3158, 491]	3635	[3854, 2473]
561	[999, 1000]	1586	[2272, 1333]	2611	[1490, 1765]	3636	[3855, 1223]
562	[1001, 1002]	1587	[2102, 2276]	2612	[2711, 785]	3637	[2178, 2041]
563	[1003, 974]	1588	[2190, 116]	2613	[3159, 1418]	3638	[2066, 2269]
564	[1004, 1005]	1589	[2277, 2278]	2614	[3160, 650]	3639	[3856, 2251]
565	[1006, 1007]	1590	[2279, 2280]	2615	[3161, 1421]	3640	[3857, 3530]
566	[317, 1008]	1591	[117, 2022]	2616	[1377, 2912]	3641	[2047, 256]
567	[1009, 82]	1592	[2281, 993]	2617	[3162, 574]	3642	[3858, 2412]
568	[396, 1010]	1593	[2282, 2136]	2618	[3163, 2894]	3643	[3859, 1123]
569	[398, 109]	1594	[2283, 2284]	2619	[2964, 1574]	3644	[824, 889]
570	[1011, 1012]	1595	[2285, 1152]	2620	[2937, 3099]	3645	[970, 431]
571	[109, 306]	1596	[2286, 809]	2621	[3164, 3029]	3646	[3860, 3412]
572	[1013, 1014]	1597	[2015, 1188]	2622	[3165, 614]	3647	[3861, 3330]
573	[1015, 1016]	1598	[1196, 2287]	2623	[3166, 2765]	3648	[2389, 2380]
574	[1017, 1018]	1599	[2288, 2191]	2624	[3167, 47]	3649	[3862, 435]
575	[1019, 1020]	1600	[2289, 2056]	2625	[3168, 3006]	3650	[3863, 1293]
576	[1021, 1022]	1601	[2290, 428]	2626	[3169, 1628]	3651	[3864, 2137]
577	[1023, 795]	1602	[1052, 435]	2627	[784, 3049]	3652	[3865, 3212]
578	[1024, 1025]	1603	[2291, 2168]	2628	[3170, 1652]	3653	[3866, 1173]
579	[1026, 1027]	1604	[362, 2292]	2629	[2791, 1683]	3654	[3867, 907]
580	[1028, 1029]	1605	[2293, 1268]	2630	[3171, 2681]	3655	[3868, 1157]
581	[1030, 1031]	1606	[2294, 2295]	2631	[2959, 687]	3656	[3869, 953]
582	[1032, 1033]	1607	[2296, 63]	2632	[3172, 3006]	3657	[3262, 3435]
583	[1034, 1035]	1608	[2297, 1026]	2633	[2976, 1790]	3658	[836, 1046]
584	[870, 1036]	1609	[2298, 2299]	2634	[1388, 3173]	3659	[2343, 2241]
585	[871, 912]	1610	[2300, 949]	2635	[3174, 1944]	3660	[3870, 282]
586	[1037, 1038]	1611	[2301, 1125]	2636	[237, 2473]	3661	[3871, 2091]
587	[1039, 1040]	1612	[2302, 385]	2637	[928, 1044]	3662	[2241, 2517]
588	[1041, 1042]	1613	[1144, 1138]	2638	[3175, 1292]	3663	[3872, 1081]
589	[1043, 1044]	1614	[1200, 2303]	2639	[828, 1264]	3664	[3873, 79]
590	[1045, 1046]	1615	[2304, 2305]	2640	[3176, 1050]	3665	[2305, 245]
591	[1047, 1048]	1616	[2306, 2307]	2641	[3177, 2587]	3666	[3874, 3226]
592	[1049, 1050]	1617	[2308, 2309]	2642	[3178, 3179]	3667	[1188, 2340]
593	[1051, 1052]	1618	[2310, 2311]	2643	[2171, 374]	3668	[979, 980]
594	[1053, 294]	1619	[2312, 2313]	2644	[3180, 817]	3669	[3875, 1122]
595	[1054, 969]	1620	[2314, 2315]	2645	[1171, 2428]	3670	[942, 3310]
596	[1055, 1056]	1621	[2316, 2101]	2646	[3181, 2061]	3671	[3876, 235]
597	[1057, 845]	1622	[2317, 1193]	2647	[2060, 1997]	3672	[3393, 2198]
598	[1058, 881]	1623	[2318, 2294]	2648	[3182, 353]	3673	[3877, 973]
599	[78, 367]	1624	[2319, 2320]	2649	[2251, 3183]	3674	[3878, 2090]

600	[1059, 1060]	1625	[1274, 2321]	2650	[3184, 2485]	3675	[857, 836]
601	[1061, 1062]	1626	[100, 1199]	2651	[3185, 2153]	3676	[2026, 2610]
602	[1063, 1064]	1627	[2322, 2126]	2652	[1242, 303]	3677	[3879, 1255]
603	[1065, 358]	1628	[2323, 2322]	2653	[3186, 1328]	3678	[3880, 2256]
604	[1066, 1067]	1629	[84, 2189]	2654	[3187, 3180]	3679	[875, 64]
605	[1068, 1069]	1630	[1136, 320]	2655	[3188, 1196]	3680	[2364, 3503]
606	[1070, 1071]	1631	[2324, 915]	2656	[3189, 75]	3681	[3881, 112]
607	[1072, 1073]	1632	[2325, 2326]	2657	[3190, 958]	3682	[3882, 2267]
608	[1074, 1075]	1633	[2327, 2289]	2658	[3191, 411]	3683	[1099, 250]
609	[1076, 1077]	1634	[2328, 1203]	2659	[2561, 2513]	3684	[3883, 1190]
610	[1078, 1079]	1635	[2329, 2002]	2660	[2011, 2145]	3685	[2320, 2451]
611	[1080, 1081]	1636	[2020, 2330]	2661	[3192, 3193]	3686	[2444, 2232]
612	[1082, 1083]	1637	[1316, 1270]	2662	[3194, 106]	3687	[3884, 2590]
613	[1084, 1085]	1638	[949, 2271]	2663	[425, 1328]	3688	[3885, 2378]
614	[1086, 1087]	1639	[82, 1239]	2664	[294, 868]	3689	[905, 2364]
615	[1088, 1089]	1640	[1010, 1192]	2665	[2113, 2580]	3690	[3886, 883]
616	[1090, 1091]	1641	[1042, 2331]	2666	[3195, 936]	3691	[2105, 2365]
617	[1092, 1093]	1642	[1192, 2117]	2667	[3196, 284]	3692	[3887, 270]
618	[1094, 1095]	1643	[1008, 395]	2668	[3197, 3198]	3693	[107, 982]
619	[1096, 291]	1644	[2332, 379]	2669	[867, 3199]	3694	[2460, 2297]
620	[1097, 1098]	1645	[2333, 862]	2670	[3200, 984]	3695	[919, 2389]
621	[6, 1099]	1646	[2334, 407]	2671	[3201, 2264]	3696	[339, 790]
622	[1100, 328]	1647	[2335, 2029]	2672	[2412, 311]	3697	[2034, 3418]
623	[1101, 1102]	1648	[2336, 2337]	2673	[1035, 3191]	3698	[3888, 2079]
624	[1103, 919]	1649	[2338, 874]	2674	[2585, 1186]	3699	[810, 1028]
625	[1104, 1105]	1650	[2339, 2340]	2675	[1152, 1122]	3700	[3889, 1294]
626	[1106, 1030]	1651	[1098, 1011]	2676	[3202, 795]	3701	[1220, 2358]
627	[1107, 1108]	1652	[2341, 1262]	2677	[3203, 2391]	3702	[3890, 950]
628	[1109, 1110]	1653	[2248, 1314]	2678	[2084, 2325]	3703	[3513, 98]
629	[94, 1111]	1654	[1257, 83]	2679	[2230, 873]	3704	[98, 364]
630	[1112, 1113]	1655	[2342, 2343]	2680	[1198, 1242]	3705	[3891, 1309]
631	[796, 1114]	1656	[2344, 2062]	2681	[3204, 3205]	3706	[3892, 2400]
632	[1115, 1116]	1657	[303, 1096]	2682	[3206, 324]	3707	[3893, 80]
633	[1117, 1118]	1658	[1272, 2345]	2683	[2337, 2135]	3708	[2098, 2142]
634	[1119, 1120]	1659	[2346, 404]	2684	[3207, 421]	3709	[3894, 2092]
635	[1121, 92]	1660	[2132, 268]	2685	[3208, 360]	3710	[3895, 1151]
636	[1122, 1088]	1661	[1142, 1276]	2686	[3209, 3210]	3711	[2469, 2604]
637	[1123, 1124]	1662	[2048, 2347]	2687	[3211, 2064]	3712	[2435, 2578]
638	[1125, 1126]	1663	[2348, 2347]	2688	[3212, 3213]	3713	[3896, 1002]
639	[1127, 1128]	1664	[2349, 1335]	2689	[3214, 1265]	3714	[3897, 960]
640	[1129, 1004]	1665	[1318, 1103]	2690	[3215, 2130]	3715	[3199, 353]
641	[1130, 1131]	1666	[2350, 401]	2691	[3216, 2093]	3716	[3898, 2005]
642	[1132, 1113]	1667	[2351, 2352]	2692	[1091, 3212]	3717	[3899, 1075]
643	[402, 1133]	1668	[2353, 239]	2693	[3217, 3218]	3718	[3900, 1308]

644	[235, 233]	1669	[2354, 2355]	2694	[3219, 1028]	3719	[3901, 821]
645	[1134, 1006]	1670	[2356, 2357]	2695	[3220, 845]	3720	[855, 2000]
646	[1135, 931]	1671	[2358, 1268]	2696	[2615, 369]	3721	[816, 933]
647	[952, 87]	1672	[924, 2359]	2697	[853, 1112]	3722	[2239, 812]
648	[859, 346]	1673	[2360, 1118]	2698	[1095, 1289]	3723	[369, 1087]
649	[351, 1136]	1674	[2361, 1232]	2699	[3221, 16]	3724	[1174, 1161]
650	[1137, 1138]	1675	[2307, 1041]	2700	[3222, 2228]	3725	[3902, 402]
651	[1139, 1140]	1676	[305, 2362]	2701	[3223, 1005]	3726	[3903, 2156]
652	[1141, 1142]	1677	[2117, 2307]	2702	[3224, 2581]	3727	[2030, 2352]
653	[1143, 1144]	1678	[307, 304]	2703	[3225, 2539]	3728	[2432, 3463]
654	[1145, 312]	1679	[2363, 2364]	2704	[246, 3226]	3729	[2163, 3404]
655	[1146, 362]	1680	[2365, 2193]	2705	[2455, 829]	3730	[3904, 841]
656	[1147, 436]	1681	[2193, 2294]	2706	[830, 366]	3731	[3452, 385]
657	[1148, 93]	1682	[2366, 2066]	2707	[2397, 2208]	3732	[2265, 297]
658	[1149, 1150]	1683	[2367, 2368]	2708	[3227, 1207]	3733	[3905, 3199]
659	[1151, 1152]	1684	[2369, 309]	2709	[1050, 2342]	3734	[3906, 2159]
660	[1153, 1154]	1685	[863, 1253]	2710	[3228, 1333]	3735	[3907, 1133]
661	[1155, 1156]	1686	[2370, 2371]	2711	[1081, 2555]	3736	[3908, 2030]
662	[1157, 1106]	1687	[1116, 102]	2712	[3229, 1323]	3737	[3909, 1067]
663	[1158, 1107]	1688	[2372, 903]	2713	[3230, 3231]	3738	[3910, 2359]
664	[1159, 1160]	1689	[965, 2373]	2714	[3232, 401]	3739	[3911, 2037]
665	[1161, 1162]	1690	[2174, 1335]	2715	[2284, 2383]	3740	[3441, 1109]
666	[1163, 1136]	1691	[1194, 2374]	2716	[3233, 1079]	3741	[3912, 386]
667	[1164, 828]	1692	[2375, 852]	2717	[3234, 948]	3742	[3913, 3224]
668	[1165, 904]	1693	[2376, 2056]	2718	[2550, 388]	3743	[3914, 1216]
669	[1166, 1167]	1694	[2377, 345]	2719	[3235, 878]	3744	[3915, 1100]
670	[1168, 1169]	1695	[2378, 2379]	2720	[3236, 3237]	3745	[2212, 862]
671	[1170, 1171]	1696	[2380, 1150]	2721	[2164, 1311]	3746	[2480, 2074]
672	[281, 1172]	1697	[2381, 1106]	2722	[2229, 1104]	3747	[3916, 2343]
673	[274, 1173]	1698	[2382, 2383]	2723	[2149, 1277]	3748	[1114, 1326]
674	[1128, 1174]	1699	[2384, 2350]	2724	[1238, 2078]	3749	[3917, 935]
675	[1175, 797]	1700	[2385, 2140]	2725	[3238, 2078]	3750	[1322, 3813]
676	[1176, 1039]	1701	[2232, 1201]	2726	[3239, 861]	3751	[419, 3393]
677	[1177, 886]	1702	[2386, 2223]	2727	[3240, 3193]	3752	[3918, 2613]
678	[1178, 68]	1703	[2387, 2370]	2728	[2590, 895]	3753	[909, 2435]
679	[1179, 799]	1704	[2388, 2389]	2729	[3241, 3183]	3754	[2606, 259]
680	[1180, 1181]	1705	[2390, 2391]	2730	[3242, 995]	3755	[3919, 2068]
681	[880, 1182]	1706	[1212, 904]	2731	[3243, 803]	3756	[1062, 2407]
682	[1183, 1184]	1707	[2392, 2393]	2732	[3244, 2042]	3757	[3920, 93]
683	[417, 1185]	1708	[1036, 1214]	2733	[3245, 1158]	3758	[3921, 96]
684	[1186, 885]	1709	[2394, 1126]	2734	[2016, 3246]	3759	[882, 1038]
685	[1187, 1188]	1710	[2151, 236]	2735	[3247, 2102]	3760	[3922, 3506]
686	[1189, 1190]	1711	[2395, 2371]	2736	[3248, 3249]	3761	[2206, 1331]
687	[1191, 1192]	1712	[2396, 2397]	2737	[3250, 2133]	3762	[67, 269]

688	[1193, 1194]	1713	[2077, 1015]	2738	[3251, 1069]	3763	[3923, 3213]
689	[1195, 1196]	1714	[2398, 273]	2739	[2352, 1292]	3764	[2155, 860]
690	[1093, 1095]	1715	[1156, 2212]	2740	[3252, 941]	3765	[3924, 1214]
691	[1197, 1198]	1716	[2092, 415]	2741	[2368, 2133]	3766	[3925, 2448]
692	[1199, 1200]	1717	[2399, 2317]	2742	[3253, 3254]	3767	[3530, 2606]
693	[1201, 1202]	1718	[2400, 2250]	2743	[2526, 2505]	3768	[1190, 340]
694	[983, 418]	1719	[2172, 384]	2744	[2564, 15]	3769	[3926, 1112]
695	[1203, 1204]	1720	[1000, 2131]	2745	[3255, 419]	3770	[3927, 896]
696	[1205, 1206]	1721	[2401, 891]	2746	[893, 266]	3771	[3928, 1111]
697	[931, 1207]	1722	[2402, 2299]	2747	[3256, 236]	3772	[3929, 2148]
698	[1208, 91]	1723	[2403, 2061]	2748	[3257, 299]	3773	[2583, 856]
699	[1209, 972]	1724	[2404, 2405]	2749	[264, 3180]	3774	[3930, 1221]
700	[1210, 865]	1725	[301, 234]	2750	[3258, 1104]	3775	[3931, 1182]
701	[1211, 357]	1726	[2406, 2407]	2751	[3259, 283]	3776	[3932, 2048]
702	[299, 1212]	1727	[2408, 2409]	2752	[3260, 79]	3777	[3933, 260]
703	[1213, 1212]	1728	[2410, 358]	2753	[2299, 969]	3778	[3934, 1287]
704	[1214, 1215]	1729	[343, 1298]	2754	[388, 2552]	3779	[3935, 1063]
705	[1044, 1216]	1730	[2411, 2152]	2755	[3261, 3262]	3780	[242, 381]
706	[1216, 992]	1731	[321, 2412]	2756	[840, 840]	3781	[807, 2209]
707	[1217, 1218]	1732	[897, 2413]	2757	[3263, 1233]	3782	[2447, 849]
708	[1219, 1220]	1733	[2414, 27]	2758	[3264, 2105]	3783	[3269, 1068]
709	[1221, 422]	1734	[2415, 1238]	2759	[3265, 24]	3784	[3936, 339]
710	[1222, 78]	1735	[805, 325]	2760	[3266, 254]	3785	[3937, 72]
711	[1223, 1224]	1736	[1014, 2416]	2761	[3267, 2246]	3786	[3938, 291]
712	[1225, 1226]	1737	[2417, 2418]	2762	[3268, 3269]	3787	[3939, 978]
713	[1111, 1227]	1738	[2147, 1195]	2763	[3270, 2437]	3788	[2425, 1102]
714	[1185, 1228]	1739	[2419, 2361]	2764	[3271, 837]	3789	[3940, 1311]
715	[1229, 117]	1740	[2089, 2179]	2765	[3272, 2184]	3790	[838, 2279]
716	[1230, 1231]	1741	[2420, 2237]	2766	[3273, 3274]	3791	[3375, 3330]
717	[1232, 1233]	1742	[1167, 2052]	2767	[345, 1077]	3792	[3279, 2544]
718	[1234, 1068]	1743	[2421, 259]	2768	[2276, 3274]	3793	[2418, 3375]
719	[1235, 1236]	1744	[2422, 851]	2769	[3275, 2111]	3794	[3941, 818]
720	[1237, 896]	1745	[2423, 2326]	2770	[2373, 251]	3795	[2219, 1178]
721	[1040, 1238]	1746	[2424, 1302]	2771	[3276, 3181]	3796	[2223, 3382]
722	[1239, 1240]	1747	[1012, 1018]	2772	[3277, 2321]	3797	[2095, 899]
723	[1018, 397]	1748	[371, 2425]	2773	[3278, 1200]	3798	[1075, 2011]
724	[1241, 1242]	1749	[2426, 2393]	2774	[2037, 3279]	3799	[377, 1167]
725	[1243, 1011]	1750	[2287, 2015]	2775	[3280, 871]	3800	[427, 3260]
726	[1244, 1245]	1751	[1138, 2166]	2776	[3281, 890]	3801	[3942, 262]
727	[1077, 1246]	1752	[911, 2069]	2777	[3282, 29]	3802	[3506, 23]
728	[1247, 1248]	1753	[2427, 2428]	2778	[2610, 295]	3803	[3307, 1083]
729	[1228, 298]	1754	[2429, 420]	2779	[3283, 367]	3804	[1271, 1306]
730	[1249, 1250]	1755	[2430, 880]	2780	[2458, 2221]	3805	[3943, 320]
731	[1251, 1252]	1756	[2431, 2432]	2781	[3284, 2301]	3806	[2103, 3346]

732	[1253, 1254]	1757	[354, 247]	2782	[3285, 65]	3807	[3944, 2172]
733	[1255, 1256]	1758	[2259, 846]	2783	[2186, 3240]	3808	[30, 1247]
734	[256, 1257]	1759	[812, 2055]	2784	[1285, 2322]	3809	[3945, 2694]
735	[1258, 1071]	1760	[1002, 1092]	2785	[3286, 2166]	3810	[202, 1820]
736	[1250, 1259]	1761	[2433, 2262]	2786	[3287, 1114]	3811	[477, 2877]
737	[1260, 1261]	1762	[2434, 2435]	2787	[3288, 3289]	3812	[3946, 199]
738	[1262, 963]	1763	[2436, 1186]	2788	[3290, 2272]	3813	[3947, 1658]
739	[1263, 1264]	1764	[2437, 914]	2789	[3291, 1284]	3814	[3948, 132]
740	[1265, 1266]	1765	[2438, 1227]	2790	[3205, 2137]	3815	[3949, 2686]
741	[335, 1023]	1766	[2439, 286]	2791	[3292, 378]	3816	[3950, 547]
742	[1267, 1155]	1767	[2440, 17]	2792	[2409, 926]	3817	[1674, 716]
743	[1268, 1255]	1768	[2441, 2209]	2793	[2269, 2612]	3818	[3634, 2931]
744	[1269, 1270]	1769	[2442, 2059]	2794	[953, 1151]	3819	[3951, 3111]
745	[929, 1271]	1770	[2443, 2444]	2795	[3293, 1193]	3820	[3952, 593]
746	[973, 1272]	1771	[2445, 2196]	2796	[933, 1048]	3821	[3953, 3100]
747	[1273, 1274]	1772	[2446, 955]	2797	[3294, 295]	3822	[3090, 1809]
748	[1275, 1276]	1773	[2315, 2447]	2798	[3295, 73]	3823	[3954, 185]
749	[1277, 1278]	1774	[2448, 428]	2799	[3296, 2097]	3824	[3774, 521]
750	[1279, 1280]	1775	[2449, 399]	2800	[3297, 2576]	3825	[3955, 1858]
751	[1281, 1282]	1776	[2450, 1195]	2801	[3298, 15]	3826	[3956, 2976]
752	[1283, 1070]	1777	[2451, 2043]	2802	[3299, 416]	3827	[3957, 1694]
753	[390, 1284]	1778	[2452, 277]	2803	[3300, 2035]	3828	[3958, 2987]
754	[392, 1285]	1779	[2453, 2135]	2804	[3301, 237]	3829	[3959, 653]
755	[1286, 1031]	1780	[2454, 2455]	2805	[3302, 2444]	3830	[3960, 620]
756	[1287, 935]	1781	[28, 91]	2806	[268, 1222]	3831	[3961, 3640]
757	[1288, 829]	1782	[297, 2163]	2807	[3303, 2043]	3832	[1819, 1692]
758	[1289, 1290]	1783	[1254, 2409]	2808	[3304, 290]	3833	[1349, 451]
759	[1291, 238]	1784	[2456, 2003]	2809	[3305, 3185]	3834	[3962, 3585]
760	[1292, 1293]	1785	[2457, 2131]	2810	[3306, 3307]	3835	[1665, 2834]
761	[1294, 833]	1786	[1246, 2458]	2811	[65, 2174]	3836	[2983, 3678]
762	[1295, 1296]	1787	[2459, 2460]	2812	[3308, 1032]	3837	[3963, 1881]
763	[1297, 1298]	1788	[2461, 2020]	2813	[3309, 375]	3838	[2713, 574]
764	[1299, 1300]	1789	[2462, 1053]	2814	[3310, 1060]	3839	[3964, 455]
765	[790, 916]	1790	[2463, 87]	2815	[822, 112]	3840	[1898, 3110]
766	[1301, 1302]	1791	[2464, 1301]	2816	[3254, 1142]	3841	[3789, 1848]
767	[1303, 1304]	1792	[2465, 838]	2817	[3246, 424]	3842	[3965, 670]
768	[1305, 1306]	1793	[2466, 1211]	2818	[3311, 980]	3843	[3966, 767]
769	[1307, 1064]	1794	[2280, 2467]	2819	[2313, 257]	3844	[3967, 2862]
770	[1308, 1309]	1795	[2468, 1259]	2820	[3312, 1010]	3845	[3028, 2681]
771	[1310, 897]	1796	[923, 2469]	2821	[3313, 996]	3846	[3592, 155]
772	[1311, 1312]	1797	[985, 1006]	2822	[3314, 892]	3847	[3646, 1489]
773	[1313, 1314]	1798	[1060, 922]	2823	[3315, 2248]	3848	[3968, 3774]
774	[1315, 1316]	1799	[2470, 1061]	2824	[3316, 2495]	3849	[1479, 1896]
775	[1317, 1318]	1800	[2471, 1016]	2825	[2108, 2361]	3850	[2894, 3159]

776	[1319, 1320]	1801	[2472, 18]	2826	[2152, 301]	3851	[3969, 2818]
777	[1321, 1322]	1802	[2473, 927]	2827	[3317, 2065]	3852	[3970, 205]
778	[333, 1323]	1803	[2474, 967]	2828	[3193, 2452]	3853	[717, 2853]
779	[1324, 342]	1804	[2475, 258]	2829	[3318, 1247]	3854	[3971, 1856]
780	[1325, 1326]	1805	[2476, 323]	2830	[3319, 1201]	3855	[1373, 1881]
781	[1327, 882]	1806	[2477, 1322]	2831	[3320, 3304]	3856	[3972, 3760]
782	[1328, 1049]	1807	[820, 1014]	2832	[2601, 2550]	3857	[3973, 609]
783	[1329, 1330]	1808	[2210, 2478]	2833	[2168, 1080]	3858	[750, 2653]
784	[1331, 1332]	1809	[2479, 2480]	2834	[3321, 2604]	3859	[3974, 1373]
785	[1333, 1334]	1810	[2481, 2303]	2835	[3322, 2279]	3860	[3975, 2902]
786	[1335, 1084]	1811	[404, 2148]	2836	[3323, 870]	3861	[3976, 773]
787	[1336, 1337]	1812	[2482, 399]	2837	[2500, 2397]	3862	[3977, 3575]
788	[51, 1338]	1813	[1046, 2259]	2838	[3324, 2138]	3863	[3706, 618]
789	[1339, 1340]	1814	[877, 1123]	2839	[3325, 1171]	3864	[3978, 1969]
790	[1341, 738]	1815	[2483, 64]	2840	[3326, 3327]	3865	[515, 3585]
791	[1342, 1343]	1816	[2484, 2208]	2841	[3328, 2106]	3866	[1361, 1815]
792	[1344, 1345]	1817	[1056, 2370]	2842	[347, 282]	3867	[3979, 2801]
793	[223, 496]	1818	[1031, 110]	2843	[3329, 1049]	3868	[766, 2862]
794	[1346, 1347]	1819	[2485, 802]	2844	[75, 821]	3869	[1803, 1806]
795	[1348, 1349]	1820	[2486, 2487]	2845	[3330, 412]	3870	[1766, 529]
796	[1350, 175]	1821	[2488, 2314]	2846	[3331, 1000]	3871	[458, 1887]
797	[473, 1351]	1822	[2489, 340]	2847	[2244, 1252]	3872	[3980, 3120]
798	[1352, 1353]	1823	[2490, 2325]	2848	[1069, 3262]	3873	[3981, 155]
799	[165, 1354]	1824	[2491, 1272]	2849	[3332, 2612]	3874	[1695, 2936]
800	[562, 1355]	1825	[2492, 2493]	2850	[2478, 2564]	3875	[3982, 1524]
801	[1356, 1357]	1826	[2494, 1321]	2851	[2013, 2311]	3876	[3983, 439]
802	[1358, 1359]	1827	[1087, 2495]	2852	[1236, 1274]	3877	[2829, 1927]
803	[1360, 1361]	1828	[2496, 787]	2853	[3333, 3334]	3878	[3984, 2735]
804	[43, 1362]	1829	[2497, 21]	2854	[3335, 74]	3879	[3985, 1914]
805	[1363, 36]	1830	[1154, 2476]	2855	[258, 3208]	3880	[3986, 1722]
806	[1364, 531]	1831	[2498, 2058]	2856	[3336, 360]	3881	[1978, 1482]
807	[1365, 502]	1832	[1997, 2063]	2857	[3337, 2360]	3882	[3987, 3669]
808	[1366, 784]	1833	[2499, 2500]	2858	[3338, 2134]	3883	[3988, 3122]
809	[1367, 619]	1834	[2242, 344]	2859	[2167, 3339]	3884	[1627, 533]
810	[1368, 1369]	1835	[2121, 2501]	2860	[2587, 2155]	3885	[1531, 1852]
811	[225, 1370]	1836	[2502, 245]	2861	[3340, 1194]	3886	[3989, 1478]
812	[1371, 1372]	1837	[2503, 1024]	2862	[3341, 1092]	3887	[3990, 1489]
813	[1355, 1373]	1838	[2504, 2505]	2863	[3342, 999]	3888	[3991, 1812]
814	[1374, 561]	1839	[2506, 261]	2864	[3343, 2527]	3889	[3129, 3719]
815	[137, 751]	1840	[260, 370]	2865	[3344, 2452]	3890	[1940, 2720]
816	[596, 1375]	1841	[2257, 940]	2866	[3345, 3346]	3891	[1514, 1799]
817	[1376, 1377]	1842	[2507, 1279]	2867	[2072, 3210]	3892	[2949, 1793]
818	[1378, 53]	1843	[2508, 397]	2868	[3347, 2060]	3893	[3992, 1916]
819	[227, 1379]	1844	[2309, 2065]	2869	[3348, 2458]	3894	[2723, 748]

820	[1380, 1381]	1845	[2509, 424]	2870	[3349, 1256]	3895	[3618, 3651]
821	[1382, 216]	1846	[2510, 1316]	2871	[3350, 2044]	3896	[1509, 3120]
822	[1383, 1384]	1847	[2511, 857]	2872	[76, 3264]	3897	[1944, 1550]
823	[1385, 1386]	1848	[2512, 2413]	2873	[3351, 884]	3898	[1442, 1652]
824	[1387, 1388]	1849	[2513, 312]	2874	[2621, 2228]	3899	[3993, 1704]
825	[770, 1389]	1850	[2514, 1312]	2875	[3352, 1055]	3900	[3994, 2936]
826	[1390, 1391]	1851	[2515, 796]	2876	[3353, 2069]	3901	[778, 1383]
827	[1392, 1393]	1852	[2516, 2517]	2877	[3354, 1074]	3902	[1790, 1342]
828	[1394, 1395]	1853	[2518, 2519]	2878	[3355, 62]	3903	[3995, 1601]
829	[1396, 671]	1854	[2362, 317]	2879	[3356, 2544]	3904	[3996, 1412]
830	[1397, 1345]	1855	[1226, 2520]	2880	[1312, 808]	3905	[3997, 3682]
831	[500, 1398]	1856	[2521, 877]	2881	[3357, 1070]	3906	[3998, 151]
832	[1399, 1400]	1857	[2522, 2229]	2882	[2044, 978]	3907	[3647, 1737]
833	[1401, 1402]	1858	[2523, 833]	2883	[3358, 2250]	3908	[2866, 3592]
834	[1403, 1404]	1859	[2524, 902]	2884	[18, 2094]	3909	[3571, 2886]
835	[623, 614]	1860	[2525, 2449]	2885	[3359, 2013]	3910	[2931, 3734]
836	[1405, 7]	1861	[379, 2526]	2886	[3360, 2122]	3911	[3173, 3742]
837	[1406, 1361]	1862	[2527, 416]	2887	[3361, 1042]	3912	[3999, 3647]
838	[522, 170]	1863	[2528, 2230]	2888	[3362, 2287]	3913	[4000, 716]
839	[1407, 1408]	1864	[2529, 983]	2889	[3327, 3249]	3914	[4001, 1619]
840	[1409, 568]	1865	[2495, 2047]	2890	[3363, 2573]	3915	[1483, 2670]
841	[1410, 1411]	1866	[1314, 1203]	2891	[2407, 342]	3916	[2812, 3787]
842	[1412, 1413]	1867	[2292, 338]	2892	[1266, 1299]	3917	[1889, 2918]
843	[1414, 1415]	1868	[2530, 398]	2893	[3364, 1116]	3918	[3021, 3575]
844	[1416, 1417]	1869	[2487, 967]	2894	[3365, 2494]	3919	[4002, 3167]
845	[708, 680]	1870	[288, 867]	2895	[3366, 2095]	3920	[4003, 1904]
846	[1418, 1419]	1871	[1089, 2531]	2896	[3367, 905]	3921	[4004, 3742]
847	[1420, 1421]	1872	[2532, 2053]	2897	[1261, 6]	3922	[4005, 1688]
848	[1422, 1423]	1873	[2505, 2182]	2898	[2156, 984]	3923	[4006, 1648]
849	[1424, 1425]	1874	[2533, 422]	2899	[3368, 989]	3924	[148, 1874]
850	[1426, 645]	1875	[284, 1994]	2900	[2234, 2418]	3925	[1915, 2803]
851	[1427, 1428]	1876	[2534, 264]	2901	[3369, 341]	3926	[2996, 1763]
852	[1429, 786]	1877	[2535, 2331]	2902	[3370, 3310]	3927	[1622, 3640]
853	[1415, 1430]	1878	[2536, 831]	2903	[3371, 2025]	3928	[4007, 2875]
854	[1431, 1432]	1879	[2537, 1128]	2904	[3372, 1215]	3929	[4008, 3678]
855	[1433, 1434]	1880	[1033, 938]	2905	[944, 2090]	3930	[4009, 1472]
856	[1435, 549]	1881	[2538, 2195]	2906	[3373, 1315]	3931	[782, 591]
857	[1436, 1437]	1882	[1282, 2226]	2907	[3374, 3375]	3932	[1539, 2960]
858	[1369, 1438]	1883	[2159, 2539]	2908	[1280, 1061]	3933	[4010, 548]
859	[1439, 469]	1884	[115, 427]	2909	[254, 1261]	3934	[4011, 1548]
860	[1440, 1441]	1885	[2540, 1009]	2910	[2531, 1055]	3935	[3602, 2973]
861	[754, 1442]	1886	[2541, 2113]	2911	[1300, 1035]	3936	[4012, 2804]
862	[1443, 1444]	1887	[2542, 1239]	2912	[3376, 20]	3937	[2883, 652]
863	[1445, 1446]	1888	[2543, 2265]	2913	[3377, 2555]	3938	[2863, 3150]

864	[1447, 1448]	1889	[2544, 2289]	2914	[818, 406]	3939	[213, 1605]
865	[1449, 1450]	1890	[2545, 2089]	2915	[1113, 390]	3940	[1818, 3587]
866	[1451, 1452]	1891	[2546, 2041]	2916	[3378, 2390]	3941	[4013, 2958]
867	[1453, 1454]	1892	[2547, 269]	2917	[3379, 876]	3942	[742, 4006]
868	[548, 60]	1893	[1278, 2405]	2918	[3380, 2354]	3943	[2875, 595]
869	[1455, 1456]	1894	[2548, 1222]	2919	[3381, 3382]	3944	[4014, 2973]
870	[1457, 601]	1895	[1240, 1039]	2920	[3383, 1131]	3945	[4015, 1224]
871	[492, 1454]	1896	[2549, 2550]	2921	[3384, 1007]	3946	[1206, 378]
872	[1458, 1459]	1897	[2551, 2552]	2922	[3385, 2219]	3947	[4016, 1089]
873	[1460, 1461]	1898	[80, 2346]	2923	[2331, 1009]	3948	[4017, 257]
874	[1462, 1463]	1899	[2553, 1277]	2924	[3249, 1209]	3949	[4018, 1245]
875	[1464, 1465]	1900	[2347, 2554]	2925	[3386, 1109]	3950	[826, 3407]
876	[1466, 597]	1901	[2555, 820]	2926	[3387, 1124]	3951	[4019, 985]
877	[1467, 1468]	1902	[2088, 2443]	2927	[3388, 395]	3952	[3218, 2028]
878	[576, 1469]	1903	[2556, 1085]	2928	[1181, 118]	3953	[4020, 3472]
879	[1470, 1471]	1904	[2557, 2283]	2929	[3389, 794]	3954	[4021, 2449]
880	[1472, 221]	1905	[2558, 2330]	2930	[3390, 1140]	3955	[3213, 2121]
881	[1473, 762]	1906	[415, 1211]	2931	[3391, 879]	3956	[2467, 2101]
882	[1474, 1475]	1907	[1202, 814]	2932	[3392, 3393]	3957	[2295, 3237]
883	[1476, 1477]	1908	[2559, 2153]	2933	[3289, 2147]	3958	[2070, 1244]
884	[1478, 1479]	1909	[2560, 1172]	2934	[3394, 2266]	3959	[4022, 2132]
885	[1480, 1481]	1910	[2519, 2561]	2935	[3395, 2345]	3960	[4023, 1204]
886	[1482, 1483]	1911	[2562, 988]	2936	[3396, 982]	3961	[3210, 2582]
887	[1484, 1485]	1912	[2413, 1154]	2937	[3397, 2142]	3962	[3346, 2354]
888	[1486, 1430]	1913	[2563, 2564]	2938	[3398, 916]	3963	[4024, 344]
889	[1487, 599]	1914	[2565, 2280]	2939	[2198, 831]	3964	[4025, 2585]
890	[1488, 55]	1915	[865, 2566]	2940	[3399, 246]	3965	[4026, 2627]
891	[1489, 1490]	1916	[2567, 2501]	2941	[3400, 2179]	3966	[2627, 2494]
892	[1491, 1492]	1917	[2568, 371]	2942	[3401, 2245]	3967	[2145, 3342]
893	[1493, 1494]	1918	[2569, 2084]	2943	[3402, 2080]	3968	[4027, 321]
894	[1495, 682]	1919	[2570, 2425]	2944	[3403, 3404]	3969	[4028, 348]
895	[1496, 490]	1920	[244, 2455]	2945	[3405, 3279]	3970	[279, 1304]
896	[454, 1497]	1921	[2571, 1057]	2946	[2138, 2309]	3971	[2624, 3334]
897	[1450, 710]	1922	[2278, 2036]	2947	[3406, 3407]	3972	[2122, 2203]
898	[1498, 1499]	1923	[2572, 1058]	2948	[3408, 2282]	3973	[4029, 2112]
899	[1500, 1501]	1924	[2573, 2282]	2949	[3409, 3315]	3974	[4030, 1062]
900	[1502, 718]	1925	[2574, 2185]	2950	[375, 2368]	3975	[4031, 2073]
901	[1503, 515]	1926	[2575, 2576]	2951	[3410, 2260]	3976	[4032, 22]
902	[1504, 749]	1927	[2577, 2578]	2952	[3411, 417]	3977	[4033, 802]
903	[1505, 1506]	1928	[2579, 2580]	2953	[3412, 3218]	3978	[1124, 3378]
904	[1507, 1508]	1929	[2581, 2337]	2954	[1027, 331]	3979	[4034, 2169]
905	[1506, 1509]	1930	[2582, 2583]	2955	[3413, 3191]	3980	[2188, 944]
906	[1510, 1411]	1931	[2584, 2373]	2956	[1259, 2357]	3981	[4035, 298]
907	[1511, 1501]	1932	[1252, 2585]	2957	[3414, 2271]	3982	[4036, 332]

908	[1512, 226]	1933	[1256, 1100]	2958	[3415, 2210]	3983	[4037, 793]
909	[1513, 1514]	1934	[2586, 2292]	2959	[3416, 2582]	3984	[4038, 1290]
910	[758, 1515]	1935	[364, 1001]	2960	[3417, 2094]	3985	[432, 1148]
911	[1516, 178]	1936	[1207, 2587]	2961	[2221, 1308]	3986	[2345, 3179]
912	[494, 1517]	1937	[2588, 2589]	2962	[3418, 2573]	3987	[4039, 975]
913	[1454, 1514]	1938	[1224, 2590]	2963	[3419, 1228]	3988	[3237, 2111]
914	[702, 1518]	1939	[2591, 817]	2964	[3420, 412]	3989	[987, 2051]
915	[1519, 1520]	1940	[2592, 406]	2965	[2176, 2161]	3990	[4040, 842]
916	[1340, 511]	1941	[2593, 2476]	2966	[2501, 2082]	3991	[2355, 2350]
917	[1521, 1473]	1942	[2326, 2378]	2967	[341, 1294]	3992	[1007, 1020]
918	[1522, 667]	1943	[2594, 2595]	2968	[1105, 114]	3993	[4041, 1278]
919	[1523, 1398]	1944	[2596, 1161]	2969	[3421, 2058]	3994	[2517, 2301]
920	[1524, 1525]	1945	[1067, 2261]	2970	[3422, 1185]	3995	[113, 2392]
921	[1526, 1397]	1946	[2554, 2298]	2971	[3423, 970]	3996	[429, 2083]
922	[1527, 1528]	1947	[2161, 793]	2972	[3424, 901]	3997	[4042, 1027]
923	[1529, 705]	1948	[2597, 832]	2973	[3425, 2380]	3998	[3274, 1032]
924	[175, 778]	1949	[2598, 2238]	2974	[3426, 1202]	3999	[981, 1320]
925	[1530, 1531]	1950	[2599, 2498]	2975	[2566, 1052]	4000	[2143, 2320]
926	[1532, 720]	1951	[2079, 1157]	2976	[3427, 2028]	4001	[4043, 2115]
927	[1533, 1534]	1952	[2600, 2601]	2977	[3428, 354]	4002	[4044, 248]
928	[1535, 1536]	1953	[2602, 1285]	2978	[2613, 2432]	4003	[103, 946]
929	[608, 1537]	1954	[2603, 2485]	2979	[3429, 333]	4004	[4045, 2164]
930	[1538, 1539]	1955	[2604, 787]	2980	[907, 2260]	4005	[4046, 1023]
931	[1540, 1541]	1956	[2605, 2606]	2981	[3430, 325]	4006	[4047, 2358]
932	[1542, 1543]	1957	[2607, 1253]	2982	[2357, 2032]	4007	[4048, 2447]
933	[1544, 1545]	1958	[2608, 2531]	2983	[3431, 3339]	4008	[4049, 68]
934	[1546, 1547]	1959	[2609, 2610]	2984	[3432, 3418]	4009	[2182, 2206]
935	[1548, 692]	1960	[2611, 251]	2985	[3433, 274]	4010	[4050, 2052]
936	[1534, 437]	1961	[2612, 2613]	2986	[3434, 3435]	4011	[4051, 1199]
937	[1549, 1550]	1962	[2614, 2615]	2987	[3436, 241]	4012	[4052, 2026]
938	[1551, 1552]	1963	[2616, 2554]	2988	[3437, 2189]	4013	[4053, 875]
939	[1553, 1554]	1964	[1309, 26]	2989	[3438, 1148]	4014	[4054, 429]
940	[1555, 1556]	1965	[2226, 17]	2990	[938, 2537]	4015	[1384, 1579]
941	[1557, 1558]	1966	[111, 1155]	2991	[3439, 2063]	4016	[1821, 3101]
942	[1559, 760]	1967	[96, 2527]	2992	[71, 3424]	4017	[4055, 485]
943	[1560, 669]	1968	[2617, 308]	2993	[3440, 2070]	4018	[4056, 1894]
944	[1561, 1517]	1969	[2618, 2106]	2994	[2359, 3441]	4019	[4057, 1574]
945	[1562, 1563]	1970	[950, 273]	2995	[1120, 1282]	4020	[2878, 3577]
946	[1564, 1351]	1971	[2619, 418]	2996	[384, 2437]	4021	[4058, 2886]
947	[1345, 671]	1972	[2620, 2621]	2997	[3442, 2006]	4022	[585, 505]
948	[1565, 172]	1973	[996, 2360]	2998	[3443, 2346]	4023	[1475, 583]
949	[1566, 136]	1974	[421, 941]	2999	[3444, 30]	4024	[1748, 1478]
950	[141, 1441]	1975	[2622, 1110]	3000	[1172, 3181]	4025	[4059, 505]
951	[504, 1567]	1976	[2391, 1022]	3001	[3445, 927]	4026	[150, 2879]

952	[1568, 170]	1977	[2623, 1334]	3002	[3382, 1226]	4027	[559, 3122]
953	[1569, 616]	1978	[1290, 2624]	3003	[3446, 1025]	4028	[4060, 2661]
954	[438, 1570]	1979	[2625, 1012]	3004	[3447, 2390]	4029	[4061, 1697]
955	[1571, 1572]	1980	[2626, 999]	3005	[3448, 846]	4030	[4062, 3150]
956	[1573, 585]	1981	[20, 1330]	3006	[3449, 2392]	4031	[1855, 1859]
957	[1574, 609]	1982	[436, 2627]	3007	[3450, 2317]	4032	[4063, 748]
958	[1575, 135]	1983	[2628, 2297]	3008	[319, 2448]	4033	[4064, 1896]
959	[1576, 733]	1984	[2629, 808]	3009	[3451, 3452]	4034	[14, 2893]
960	[544, 1577]	1985	[2630, 2036]	3010	[1304, 974]	4035	[1528, 558]
961	[1550, 665]	1986	[2595, 2575]	3011	[899, 2601]	4036	[4065, 3651]
962	[1578, 1579]	1987	[2631, 2497]	3012	[3453, 1181]	4037	[4066, 1346]
963	[1580, 1581]	1988	[2632, 306]	3013	[1184, 2038]	4038	[698, 3167]
964	[1582, 1583]	1989	[349, 1144]	3014	[3454, 853]	4039	[4067, 4006]
965	[1584, 557]	1990	[2633, 113]	3015	[3455, 3184]	4040	[1543, 2801]
966	[746, 1585]	1991	[2099, 2040]	3016	[3456, 834]	4041	[3610, 1628]
967	[1586, 1587]	1992	[2634, 2295]	3017	[2042, 1318]	4042	[4068, 2906]
968	[1588, 1589]	1993	[2635, 1056]	3018	[3457, 1156]	4043	[4069, 618]
969	[1590, 1591]	1994	[123, 2636]	3019	[3458, 2575]	4044	[565, 2888]
970	[1592, 1593]	1995	[2637, 1529]	3020	[3459, 2143]	4045	[1860, 3716]
971	[1594, 1595]	1996	[2638, 780]	3021	[3460, 2374]	4046	[496, 447]
972	[1596, 449]	1997	[2639, 672]	3022	[1284, 1169]	4047	[4070, 1664]
973	[1359, 1597]	1998	[2640, 2641]	3023	[2578, 965]	4048	[760, 589]
974	[1598, 492]	1999	[1645, 2642]	3024	[3461, 2298]	4049	[4071, 2877]
975	[1599, 1600]	2000	[2643, 1946]	3025	[3462, 3463]	4050	[4072, 2960]
976	[1601, 226]	2001	[2644, 1389]	3026	[3464, 1289]	4051	[4073, 1859]
977	[1602, 230]	2002	[2645, 2646]	3027	[1326, 1262]	4052	[2655, 2710]
978	[1603, 1604]	2003	[2647, 1393]	3028	[3465, 3323]	4053	[4074, 2971]
979	[1605, 643]	2004	[2648, 185]	3029	[1005, 348]	4054	[4075, 3055]
980	[1606, 1481]	2005	[2649, 552]	3030	[2303, 2305]	4055	[2040, 874]
981	[1607, 770]	2006	[1581, 1433]	3031	[3466, 2126]	4056	[4076, 917]
982	[1608, 746]	2007	[2650, 2648]	3032	[3467, 347]	4057	[4077, 107]
983	[207, 753]	2008	[2651, 1974]	3033	[3468, 1090]	4058	[4078, 1266]
984	[1609, 753]	2009	[2652, 2653]	3034	[797, 2283]	4059	[2185, 2267]
985	[1610, 1611]	2010	[2654, 2655]	3035	[3469, 2467]	4060	[1227, 824]
986	[1494, 1612]	2011	[2656, 1611]	3036	[3470, 94]	4061	[373, 2487]
987	[1613, 1614]	2012	[139, 2657]	3037	[3471, 1300]	4062	[3472, 3289]
988	[1615, 1417]	2013	[2658, 673]	3038	[2140, 3472]	4063	[1048, 998]
989	[1616, 57]	2014	[2659, 1379]	3039	[26, 3304]	4064	[2057, 1180]
990	[1617, 676]	2015	[2660, 1738]	3040	[1029, 2399]	4065	[4079, 1237]
991	[1618, 573]	2016	[2661, 1805]	3041	[2552, 2188]	4066	[963, 2005]
992	[1619, 1444]	2017	[704, 1706]	3042	[3473, 292]	4067	[4080, 279]
993	[182, 1420]	2018	[2662, 1488]	3043	[3474, 2537]	4068	[4081, 928]
994	[1620, 1621]	2019	[2663, 730]	3044	[3475, 2190]	4069	[4082, 1096]
995	[752, 1463]	2020	[1873, 1410]	3045	[2428, 792]	4070	[411, 3513]

996	[1402, 1622]	2021	[2664, 1812]	3046	[3476, 3246]	4071	[1302, 1250]
997	[1623, 1624]	2022	[1887, 2665]	3047	[3477, 329]	4072	[4083, 2561]
998	[1625, 1626]	2023	[2666, 1838]	3048	[3478, 2410]	4073	[801, 2525]
999	[743, 1627]	2024	[2667, 2668]	3049	[1330, 2264]	4074	[4084, 432]
1000	[1628, 1629]	2025	[1871, 2669]	3050	[3479, 19]	4075	[834, 2130]
1001	[667, 1630]	2026	[2670, 551]	3051	[847, 991]	4076	[1351, 1697]
1002	[1631, 1632]	2027	[2671, 1793]	3052	[3480, 76]	4077	[178, 1916]
1003	[1633, 1599]	2028	[2672, 2673]	3053	[3481, 3208]	4078	[3084, 2865]
1004	[1634, 1594]	2029	[2674, 550]	3054	[3482, 2038]	4079	[636, 3789]
1005	[1635, 440]	2030	[1963, 1945]	3055	[3483, 2083]	4080	[4085, 1983]
1006	[1636, 1637]	2031	[2675, 2676]	3056	[3484, 1015]	4081	[4086, 2918]
1007	[1611, 1638]	2032	[2677, 1473]	3057	[2035, 288]	4082	[4087, 543]
1008	[1639, 722]	2033	[2678, 1631]	3058	[3485, 1162]	4083	[4088, 206]
1009	[1640, 721]	2034	[1925, 1593]	3059	[998, 3185]	4084	[4089, 3734]
1010	[721, 1641]	2035	[2679, 2680]	3060	[3486, 2072]	4085	[2493, 2171]
1011	[1642, 211]	2036	[456, 184]	3061	[3487, 912]	4086	[2520, 3327]
1012	[1643, 723]	2037	[2681, 169]	3062	[3488, 431]	4087	[4090, 972]
1013	[1644, 1645]	2038	[2682, 478]	3063	[3489, 2017]	4088	[4091, 1115]
1014	[1646, 646]	2039	[1517, 541]	3064	[2128, 809]	4089	[4092, 1105]
1015	[1647, 772]	2040	[2683, 1464]	3065	[3226, 1074]	4090	[4093, 447]
1016	[1648, 704]	2041	[2684, 1973]	3066	[3490, 1189]	4091	[4094, 1763]
1017	[1649, 1650]	2042	[2685, 1752]	3067	[3491, 3328]	4092	[4095, 1559]
1018	[1651, 569]	2043	[2686, 1520]	3068	[1218, 434]	4093	[1064, 806]
1019	[1652, 737]	2044	[2687, 2688]	3069	[1079, 2176]	4094	[407, 1236]
1020	[1653, 1654]	2045	[2689, 739]	3070	[3492, 1994]	4095	[2576, 2493]
1021	[1655, 192]	2046	[740, 2690]	3071	[3493, 1246]		
1022	[1656, 1657]	2047	[2691, 1695]	3072	[2062, 2064]		
1023	[1585, 1658]	2048	[617, 2692]	3073	[3494, 2520]		
1024	[1659, 1497]	2049	[2693, 2694]	3074	[1264, 2500]		

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	683	1	1366	1	2049	0	2732	1	3415	1
1	0	684	1	1367	0	2050	1	2733	0	3416	1
2	0	685	0	1368	1	2051	0	2734	0	3417	1
3	0	686	1	1369	0	2052	1	2735	1	3418	1
4	0	687	0	1370	0	2053	1	2736	1	3419	0
5	0	688	0	1371	1	2054	0	2737	1	3420	1
6	0	689	0	1372	1	2055	1	2738	1	3421	1
7	0	690	0	1373	0	2056	0	2739	0	3422	0
8	0	691	0	1374	0	2057	1	2740	0	3423	0
9	0	692	0	1375	1	2058	1	2741	0	3424	0
10	0	693	0	1376	0	2059	1	2742	1	3425	1
11	0	694	0	1377	0	2060	0	2743	0	3426	1

12	1	695	0	1378	0	2061	1	2744	1	3427	0
13	0	696	1	1379	0	2062	0	2745	0	3428	0
14	1	697	0	1380	0	2063	0	2746	0	3429	1
15	0	698	0	1381	0	2064	0	2747	1	3430	0
16	0	699	1	1382	0	2065	1	2748	1	3431	0
17	0	700	1	1383	0	2066	0	2749	1	3432	1
18	0	701	0	1384	1	2067	1	2750	0	3433	0
19	0	702	1	1385	0	2068	0	2751	0	3434	1
20	1	703	0	1386	1	2069	1	2752	1	3435	0
21	0	704	0	1387	1	2070	1	2753	0	3436	0
22	0	705	1	1388	0	2071	0	2754	1	3437	1
23	0	706	0	1389	0	2072	1	2755	0	3438	1
24	1	707	1	1390	0	2073	1	2756	1	3439	0
25	1	708	1	1391	1	2074	0	2757	0	3440	0
26	1	709	1	1392	1	2075	0	2758	1	3441	1
27	0	710	0	1393	1	2076	0	2759	1	3442	1
28	1	711	0	1394	1	2077	1	2760	1	3443	0
29	1	712	1	1395	1	2078	1	2761	0	3444	0
30	1	713	1	1396	0	2079	0	2762	1	3445	0
31	0	714	1	1397	0	2080	0	2763	1	3446	0
32	0	715	0	1398	1	2081	1	2764	1	3447	0
33	0	716	0	1399	1	2082	1	2765	0	3448	1
34	0	717	1	1400	0	2083	0	2766	1	3449	1
35	0	718	1	1401	1	2084	0	2767	1	3450	1
36	0	719	0	1402	0	2085	0	2768	0	3451	1
37	0	720	0	1403	0	2086	1	2769	1	3452	0
38	0	721	1	1404	1	2087	1	2770	0	3453	1
39	0	722	1	1405	1	2088	1	2771	1	3454	0
40	1	723	0	1406	0	2089	0	2772	1	3455	1
41	0	724	0	1407	0	2090	0	2773	1	3456	0
42	0	725	1	1408	0	2091	1	2774	1	3457	0
43	1	726	1	1409	1	2092	1	2775	1	3458	1
44	0	727	0	1410	1	2093	1	2776	1	3459	0
45	0	728	0	1411	1	2094	1	2777	1	3460	0
46	0	729	1	1412	1	2095	0	2778	0	3461	1
47	0	730	0	1413	0	2096	0	2779	0	3462	0
48	1	731	0	1414	0	2097	0	2780	1	3463	0
49	1	732	0	1415	1	2098	0	2781	0	3464	0
50	1	733	0	1416	1	2099	1	2782	1	3465	1
51	0	734	0	1417	0	2100	0	2783	0	3466	1
52	1	735	1	1418	0	2101	1	2784	0	3467	0
53	1	736	0	1419	1	2102	0	2785	0	3468	0
54	0	737	0	1420	1	2103	1	2786	0	3469	0
55	1	738	1	1421	1	2104	0	2787	1	3470	0

56	1	739	0	1422	0	2105	1	2788	0	3471	0
57	0	740	0	1423	0	2106	1	2789	0	3472	0
58	1	741	0	1424	0	2107	1	2790	0	3473	1
59	0	742	1	1425	1	2108	0	2791	1	3474	0
60	1	743	1	1426	0	2109	0	2792	0	3475	0
61	1	744	0	1427	0	2110	1	2793	1	3476	1
62	0	745	0	1428	1	2111	0	2794	1	3477	1
63	0	746	0	1429	0	2112	1	2795	0	3478	0
64	0	747	1	1430	0	2113	0	2796	1	3479	1
65	0	748	0	1431	0	2114	1	2797	1	3480	1
66	0	749	0	1432	0	2115	1	2798	1	3481	1
67	0	750	0	1433	0	2116	0	2799	0	3482	0
68	0	751	1	1434	1	2117	1	2800	0	3483	1
69	0	752	1	1435	1	2118	0	2801	0	3484	0
70	0	753	1	1436	0	2119	1	2802	1	3485	1
71	0	754	0	1437	1	2120	0	2803	1	3486	1
72	0	755	1	1438	0	2121	1	2804	1	3487	1
73	0	756	0	1439	1	2122	0	2805	1	3488	0
74	0	757	1	1440	0	2123	0	2806	1	3489	0
75	1	758	1	1441	0	2124	1	2807	0	3490	0
76	0	759	1	1442	1	2125	1	2808	0	3491	1
77	1	760	0	1443	1	2126	0	2809	1	3492	0
78	1	761	0	1444	1	2127	1	2810	1	3493	1
79	0	762	0	1445	0	2128	1	2811	0	3494	0
80	1	763	0	1446	1	2129	0	2812	0	3495	1
81	0	764	1	1447	0	2130	0	2813	1	3496	1
82	0	765	1	1448	1	2131	1	2814	1	3497	1
83	1	766	1	1449	1	2132	1	2815	0	3498	0
84	0	767	0	1450	0	2133	1	2816	0	3499	1
85	0	768	0	1451	1	2134	1	2817	0	3500	0
86	1	769	0	1452	0	2135	1	2818	0	3501	1
87	0	770	1	1453	1	2136	0	2819	1	3502	0
88	1	771	1	1454	1	2137	1	2820	0	3503	0
89	0	772	0	1455	0	2138	1	2821	0	3504	0
90	0	773	0	1456	1	2139	0	2822	1	3505	1
91	0	774	0	1457	1	2140	1	2823	1	3506	1
92	1	775	1	1458	0	2141	1	2824	1	3507	0
93	1	776	0	1459	1	2142	1	2825	0	3508	1
94	1	777	0	1460	0	2143	1	2826	1	3509	1
95	1	778	0	1461	1	2144	0	2827	0	3510	1
96	0	779	0	1462	0	2145	0	2828	0	3511	1
97	1	780	1	1463	1	2146	0	2829	0	3512	0
98	1	781	0	1464	1	2147	0	2830	1	3513	0
99	0	782	0	1465	1	2148	0	2831	0	3514	1

100	1	783	0	1466	0	2149	0	2832	1	3515	0
101	1	784	0	1467	1	2150	1	2833	1	3516	1
102	1	785	1	1468	1	2151	0	2834	0	3517	1
103	0	786	0	1469	1	2152	1	2835	0	3518	1
104	0	787	0	1470	0	2153	0	2836	1	3519	1
105	1	788	0	1471	0	2154	0	2837	1	3520	0
106	1	789	0	1472	1	2155	0	2838	0	3521	1
107	0	790	1	1473	1	2156	1	2839	1	3522	1
108	1	791	1	1474	0	2157	0	2840	1	3523	0
109	0	792	1	1475	1	2158	0	2841	0	3524	0
110	0	793	1	1476	0	2159	1	2842	1	3525	0
111	0	794	0	1477	0	2160	1	2843	1	3526	0
112	1	795	1	1478	1	2161	1	2844	1	3527	0
113	0	796	1	1479	0	2162	0	2845	0	3528	0
114	0	797	1	1480	0	2163	0	2846	0	3529	0
115	1	798	1	1481	0	2164	0	2847	1	3530	1
116	1	799	0	1482	0	2165	1	2848	1	3531	1
117	0	800	0	1483	1	2166	0	2849	0	3532	0
118	1	801	0	1484	0	2167	1	2850	1	3533	1
119	1	802	0	1485	0	2168	1	2851	1	3534	0
120	0	803	1	1486	0	2169	0	2852	0	3535	0
121	1	804	1	1487	0	2170	1	2853	0	3536	1
122	0	805	1	1488	1	2171	1	2854	0	3537	1
123	1	806	0	1489	0	2172	0	2855	0	3538	0
124	0	807	0	1490	1	2173	1	2856	1	3539	0
125	1	808	1	1491	1	2174	0	2857	1	3540	1
126	0	809	0	1492	0	2175	1	2858	0	3541	1
127	1	810	1	1493	0	2176	0	2859	1	3542	0
128	0	811	0	1494	0	2177	1	2860	1	3543	1
129	0	812	1	1495	1	2178	1	2861	1	3544	0
130	0	813	1	1496	1	2179	0	2862	1	3545	1
131	0	814	0	1497	1	2180	1	2863	1	3546	1
132	0	815	1	1498	1	2181	0	2864	1	3547	0
133	0	816	1	1499	1	2182	1	2865	1	3548	0
134	0	817	0	1500	1	2183	1	2866	0	3549	0
135	0	818	0	1501	0	2184	1	2867	1	3550	1
136	0	819	1	1502	1	2185	1	2868	0	3551	1
137	1	820	0	1503	0	2186	0	2869	1	3552	0
138	0	821	0	1504	1	2187	0	2870	1	3553	0
139	1	822	0	1505	1	2188	0	2871	1	3554	0
140	0	823	0	1506	0	2189	0	2872	0	3555	1
141	1	824	1	1507	0	2190	1	2873	1	3556	0
142	0	825	1	1508	0	2191	0	2874	1	3557	0
143	1	826	0	1509	1	2192	0	2875	0	3558	0

144	0	827	1	1510	0	2193	1	2876	1	3559	1
145	1	828	1	1511	0	2194	1	2877	1	3560	1
146	1	829	0	1512	1	2195	0	2878	0	3561	1
147	1	830	0	1513	0	2196	0	2879	1	3562	1
148	0	831	1	1514	0	2197	0	2880	0	3563	0
149	1	832	1	1515	0	2198	0	2881	0	3564	0
150	0	833	1	1516	0	2199	0	2882	1	3565	0
151	1	834	0	1517	0	2200	1	2883	1	3566	0
152	0	835	1	1518	1	2201	0	2884	0	3567	0
153	0	836	1	1519	1	2202	1	2885	0	3568	1
154	1	837	0	1520	0	2203	1	2886	0	3569	1
155	1	838	1	1521	0	2204	0	2887	1	3570	1
156	0	839	0	1522	1	2205	0	2888	0	3571	0
157	0	840	1	1523	0	2206	1	2889	0	3572	0
158	0	841	1	1524	0	2207	0	2890	0	3573	0
159	0	842	1	1525	0	2208	1	2891	1	3574	0
160	1	843	0	1526	1	2209	0	2892	0	3575	0
161	1	844	1	1527	0	2210	1	2893	1	3576	1
162	0	845	1	1528	0	2211	1	2894	1	3577	0
163	1	846	0	1529	1	2212	0	2895	1	3578	1
164	0	847	1	1530	1	2213	1	2896	1	3579	0
165	0	848	0	1531	1	2214	1	2897	1	3580	1
166	1	849	0	1532	1	2215	1	2898	1	3581	1
167	0	850	0	1533	1	2216	1	2899	1	3582	0
168	0	851	0	1534	1	2217	0	2900	1	3583	0
169	1	852	0	1535	0	2218	0	2901	0	3584	0
170	1	853	1	1536	0	2219	1	2902	1	3585	1
171	0	854	0	1537	0	2220	0	2903	0	3586	0
172	0	855	0	1538	0	2221	0	2904	1	3587	1
173	1	856	1	1539	0	2222	0	2905	1	3588	1
174	0	857	0	1540	0	2223	1	2906	0	3589	0
175	1	858	0	1541	0	2224	0	2907	1	3590	1
176	0	859	1	1542	0	2225	0	2908	1	3591	1
177	1	860	0	1543	0	2226	0	2909	1	3592	1
178	0	861	0	1544	1	2227	1	2910	1	3593	1
179	1	862	1	1545	0	2228	0	2911	1	3594	0
180	0	863	0	1546	0	2229	1	2912	1	3595	0
181	1	864	0	1547	1	2230	1	2913	0	3596	1
182	1	865	1	1548	1	2231	1	2914	0	3597	0
183	1	866	1	1549	1	2232	0	2915	1	3598	0
184	0	867	1	1550	0	2233	1	2916	1	3599	1
185	0	868	0	1551	1	2234	1	2917	0	3600	1
186	1	869	0	1552	1	2235	1	2918	0	3601	1
187	1	870	1	1553	1	2236	0	2919	0	3602	1

188	1	871	0	1554	0	2237	1	2920	1	3603	0
189	1	872	0	1555	1	2238	1	2921	0	3604	1
190	1	873	0	1556	1	2239	1	2922	1	3605	0
191	0	874	0	1557	1	2240	0	2923	0	3606	0
192	0	875	1	1558	1	2241	1	2924	1	3607	0
193	1	876	0	1559	0	2242	0	2925	0	3608	1
194	1	877	1	1560	1	2243	1	2926	0	3609	1
195	1	878	1	1561	1	2244	1	2927	1	3610	1
196	0	879	0	1562	1	2245	1	2928	1	3611	1
197	1	880	1	1563	1	2246	0	2929	0	3612	1
198	0	881	1	1564	0	2247	0	2930	0	3613	1
199	0	882	0	1565	1	2248	1	2931	0	3614	1
200	0	883	0	1566	1	2249	1	2932	0	3615	1
201	0	884	1	1567	0	2250	1	2933	1	3616	1
202	1	885	0	1568	0	2251	0	2934	0	3617	0
203	1	886	0	1569	1	2252	1	2935	0	3618	0
204	0	887	0	1570	0	2253	1	2936	1	3619	1
205	1	888	0	1571	1	2254	1	2937	1	3620	0
206	0	889	0	1572	0	2255	0	2938	0	3621	1
207	0	890	1	1573	0	2256	0	2939	0	3622	1
208	1	891	0	1574	0	2257	0	2940	0	3623	1
209	0	892	1	1575	1	2258	1	2941	1	3624	1
210	0	893	0	1576	1	2259	0	2942	1	3625	0
211	0	894	1	1577	1	2260	0	2943	0	3626	1
212	0	895	1	1578	0	2261	0	2944	1	3627	0
213	0	896	0	1579	1	2262	1	2945	0	3628	1
214	0	897	0	1580	0	2263	0	2946	1	3629	1
215	0	898	1	1581	1	2264	1	2947	1	3630	0
216	1	899	1	1582	0	2265	0	2948	1	3631	1
217	0	900	1	1583	0	2266	0	2949	1	3632	1
218	0	901	0	1584	1	2267	0	2950	0	3633	1
219	0	902	1	1585	1	2268	1	2951	1	3634	1
220	0	903	1	1586	1	2269	1	2952	0	3635	1
221	1	904	0	1587	0	2270	0	2953	1	3636	0
222	1	905	0	1588	1	2271	1	2954	0	3637	1
223	1	906	0	1589	1	2272	1	2955	1	3638	0
224	1	907	0	1590	1	2273	0	2956	0	3639	0
225	0	908	1	1591	0	2274	1	2957	0	3640	1
226	0	909	0	1592	1	2275	1	2958	1	3641	1
227	1	910	1	1593	1	2276	0	2959	1	3642	0
228	1	911	0	1594	0	2277	1	2960	1	3643	0
229	0	912	0	1595	0	2278	1	2961	0	3644	1
230	1	913	1	1596	0	2279	1	2962	1	3645	1
231	0	914	1	1597	1	2280	1	2963	0	3646	1

232	0	915	1	1598	1	2281	1	2964	1	3647	1
233	1	916	1	1599	1	2282	1	2965	0	3648	0
234	1	917	0	1600	0	2283	0	2966	0	3649	1
235	1	918	1	1601	0	2284	1	2967	1	3650	1
236	0	919	0	1602	0	2285	0	2968	0	3651	1
237	0	920	0	1603	1	2286	0	2969	1	3652	0
238	1	921	1	1604	1	2287	1	2970	0	3653	0
239	1	922	0	1605	1	2288	1	2971	0	3654	1
240	0	923	1	1606	1	2289	0	2972	0	3655	1
241	1	924	1	1607	1	2290	0	2973	1	3656	0
242	1	925	1	1608	1	2291	1	2974	1	3657	0
243	0	926	1	1609	1	2292	0	2975	1	3658	1
244	1	927	1	1610	0	2293	1	2976	0	3659	1
245	1	928	0	1611	1	2294	1	2977	0	3660	0
246	1	929	0	1612	1	2295	1	2978	1	3661	1
247	0	930	0	1613	0	2296	1	2979	1	3662	1
248	0	931	0	1614	0	2297	1	2980	0	3663	0
249	0	932	0	1615	0	2298	1	2981	0	3664	0
250	0	933	1	1616	0	2299	0	2982	1	3665	1
251	0	934	0	1617	0	2300	0	2983	0	3666	0
252	0	935	1	1618	0	2301	1	2984	1	3667	0
253	0	936	1	1619	0	2302	1	2985	0	3668	1
254	1	937	1	1620	1	2303	1	2986	1	3669	1
255	0	938	1	1621	0	2304	0	2987	0	3670	0
256	0	939	1	1622	1	2305	1	2988	1	3671	0
257	0	940	1	1623	0	2306	0	2989	1	3672	1
258	0	941	1	1624	0	2307	0	2990	1	3673	0
259	0	942	0	1625	0	2308	0	2991	0	3674	0
260	0	943	1	1626	1	2309	1	2992	0	3675	0
261	0	944	1	1627	0	2310	0	2993	0	3676	0
262	0	945	1	1628	1	2311	0	2994	1	3677	0
263	0	946	0	1629	0	2312	0	2995	0	3678	1
264	1	947	1	1630	1	2313	1	2996	0	3679	1
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267	0	950	1	1633	0	2316	0	2999	0	3682	0
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269	1	952	0	1635	0	2318	0	3001	0	3684	0
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271	0	954	0	1637	1	2320	1	3003	0	3686	0
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274	1	957	0	1640	1	2323	1	3006	1	3689	0
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280	1	963	0	1646	0	2329	0	3012	1	3695	0
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282	1	965	1	1648	1	2331	0	3014	0	3697	0
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285	1	968	1	1651	0	2334	0	3017	0	3700	0
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288	0	971	0	1654	1	2337	0	3020	0	3703	0
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296	1	979	1	1662	0	2345	1	3028	1	3711	1
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368	1	1051	0	1734	0	2417	0	3100	1	3783	0
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370	0	1053	1	1736	0	2419	1	3102	0	3785	1
371	1	1054	1	1737	0	2420	0	3103	1	3786	1
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395	0	1078	1	1761	1	2444	0	3127	1	3810	1
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536	0	1219	1	1902	1	2585	0	3268	1	3951	0
537	0	1220	0	1903	0	2586	0	3269	0	3952	1
538	0	1221	1	1904	0	2587	1	3270	1	3953	0
539	1	1222	0	1905	0	2588	1	3271	1	3954	1

540	1	1223	0	1906	0	2589	0	3272	0	3955	1
541	1	1224	1	1907	0	2590	0	3273	1	3956	1
542	1	1225	1	1908	0	2591	1	3274	1	3957	1
543	0	1226	1	1909	0	2592	1	3275	1	3958	1
544	0	1227	1	1910	0	2593	1	3276	1	3959	0
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546	1	1229	0	1912	0	2595	0	3278	1	3961	0
547	0	1230	0	1913	0	2596	0	3279	0	3962	1
548	0	1231	0	1914	0	2597	0	3280	1	3963	1
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