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

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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 $(a,b) = (z+1, z^6+z^2+z+1)$.

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 $(a,b)=(z+1,z^6+z^2+z+1)$, 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 $\mathrm{CF}(a,b)$*,*

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

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

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

2. Proof

Define the sequences of polynomials $(P_n(z))_{n\ge0}$ and $(Q_n(z))_{n\ge0}$ 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 $n\ge0$

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

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

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

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

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

for some positive integer d_n. Hence,

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

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

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

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

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

of the vector

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

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

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

Lemma 2.1. *We have*

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

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

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

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

Proof. We give the proof of the identity

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

the proofs of the others being similar.

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

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

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

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

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

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

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

Define

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

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

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

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

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

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

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 $u = 2^{2k}$,

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

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

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

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

which can be rewritten as

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

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

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

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

First we calculate an 2-automaton that generates T from its minimal polynomial and its first terms. This automaton has 3981 states; its transition function and output function can be found in the annex. Let $A(s, w)$ denote the state reached after reading w from right to left starting from the state s, and τ the output function. Define

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

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

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

$$\begin{aligned}0 &= \tau(A(s,1)) + \tau(A(s,10)) + \tau(A(s,101)) + \tau(A(s,110))\\ &\quad + \tau(A(s,1011)),\end{aligned} \tag{2.25}$$

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

$$\begin{aligned}0 &= \tau(A(s,10)) + \tau(A(s,11)) + \tau(A(s,101)) + \tau(A(s,110))\\ &\quad + \tau(A(s,1101)),\end{aligned} \tag{2.27}$$

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

$$\begin{aligned}1 &= \tau(A(s,\epsilon)) + \tau(A(s,1)) + \tau(A(s,11)) + \tau(A(s,100))\\ &\quad + \tau(A(s,101)) + \tau(A(s,110)) + \tau(A(s,111)),\end{aligned} \tag{2.28}$$

$$1 = \tau(A(s,10)) + \tau(A(s,11)) + \tau(A(s,1000)), \tag{2.29}$$

$$0 = \tau(A(s,\epsilon)) + \tau(A(s,11)) + \tau(A(s,100)) + \tau(A(s,1001)), \tag{2.30}$$

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

$$\begin{aligned}0 &= \tau(A(s,1)) + \tau(A(s,10)) + \tau(A(s,101)) + \tau(A(s,110))\\ &\quad + \tau(A(s,1011)),\end{aligned} \tag{2.32}$$

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

$$\begin{aligned}0 &= \tau(A(s,10)) + \tau(A(s,11)) + \tau(A(s,101)) + \tau(A(s,110))\\ &\quad + \tau(A(s,1101)),\end{aligned} \tag{2.34}$$

for $s = A(i, 0^{2k})$. We find that $(A(i, 0^{26}), E_{26}) = (A(i, 0^{14}), E_{14})$, so that we only have to verify that identities (2.21) through (2.34) hold for $2 \le k \le 13$, 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 $u = 2^{2k-1}$,*

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

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

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

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 $n \ge 2$, 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

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

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

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

For all $n \le 14$, 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. □

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

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

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

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

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

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

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

Define

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

where

$$\begin{aligned}
q_0(x) &= x^{22} + x^{20} + x^{19} + x^{17} + x^{16} + x^{14} + x^{13} + x^{12} + x^{11} + x^{10} + x^9 + x^8 \\
&\quad + x^7 + x^6 + x^4, \\
q_1(x) &= x^{20} + x^{18} + x^{17} + x^{15} + x^{13} + x^{10} + x^9 + x^6 + x^4 + x^3 + x^2 + x, \\
q_2(x) &= x^{22} + x^{20} + x^{18} + x^{16} + x^{14} + x^8 + x^4 + 1, \\
q_3(x) &= x^{20} + x^{18} + x^{17} + x^{15} + x^{13} + x^{10} + x^9 + x^6 + x^4 + x^3 + x^2 + x, \\
q_4(x) &= x^{22} + x^{20} + x^{19} + x^{18} + x^{17} + x^{13} + x^{12} + x^{11} + x^9 + x^8 + x^7 + x^6 + x^2 \\
&\quad .
\end{aligned}$$

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

3. Annexe

All 16 polynomials are of the form

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

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

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

$$\begin{aligned}
p_0(x) &= x^{132} + x^{128} + x^{126} + x^{122} + x^{118} + x^{116} + x^{114} + x^{110} + x^{104} + x^{98} \\
&\quad + x^{96} + x^{88} + x^{84} + x^{82} + x^{74} + x^{72} + x^{70} + x^{68} + x^{66} + x^{62} + x^{56} \\
&\quad + x^{54} + x^{48} + x^{44} + x^{42} + x^{40} + x^{38} + x^{34} + x^{30} + x^{28} + x^{26} + x^{24} \\
&\quad + x^{22} + x^{20} + x^{12}, \\
p_3(x) &= x^{128} + x^{124} + x^{116} + x^{114} + x^{102} + x^{100} + x^{98} + x^{88} + x^{78} + x^{76} \\
&\quad + x^{74} + x^{72} + x^{70} + x^{68} + x^{66} + x^{64} + x^{62} + x^{58} + x^{46} + x^{44} + x^{40} \\
&\quad + x^{36} + x^{34} + x^{30} + x^{28} + x^{24} + x^{20} + x^{16} + x^{12} + x^8, \\
p_6(x) &= x^{126} + x^{124} + x^{116} + x^{112} + x^{106} + x^{100} + x^{98} + x^{96} + x^{94} + x^{92} \\
&\quad + x^{90} + x^{84} + x^{82} + x^{74} + x^{72} + x^{70} + x^{66} + x^{60} + x^{58} + x^{56} + x^{54} \\
&\quad + x^{46} + x^{44} + x^{38} + x^{32} + x^{30} + x^{28} + x^{24} + x^{18} + x^{16} + x^{14} + x^{12}
\end{aligned}$$

$$
\begin{aligned}
&+ x^{10} + x^4 + x^2 + 1,\\
p_9(x) &= x^{128} + x^{122} + x^{118} + x^{116} + x^{110} + x^{108} + x^{106} + x^{102} + x^{98} + x^{88}\\
&+ x^{82} + x^{78} + x^{76} + x^{72} + x^{70} + x^{68} + x^{64} + x^{60} + x^{56} + x^{48} + x^{46}\\
&+ x^{42} + x^{40} + x^{38} + x^{34} + x^{32} + x^{30} + x^{26} + x^{22} + x^{12} + x^6 + x^2,\\
p_{12}(x) &= x^{132} + x^{128} + x^{124} + x^{120} + x^{116} + x^{112} + x^{76} + x^{72} + x^{68} + x^{64}\\
&+ x^{52} + x^{48} + x^{44} + x^{40} + x^4 + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{117} + x^{115} + x^{114} + x^{113} + x^{112} + x^{111} + x^{110} + x^{106} + x^{105} + x^{103}\\
&+ x^{102} + x^{99} + x^{98} + x^{96} + x^{94} + x^{93} + x^{91} + x^{90} + x^{89} + x^{85} + x^{79}\\
&+ x^{78} + x^{77} + x^{75} + x^{74} + x^{73} + x^{70} + x^{65} + x^{63} + x^{58} + x^{56} + x^{55}\\
&+ x^{53} + x^{48} + x^{46} + x^{45} + x^{44} + x^{35} + x^{34} + x^{33} + x^{28} + x^{27} + x^{26}\\
&+ x^{25} + x^{24} + x^{23} + x^{21} + x^{19} + x^{18},\\
p_3(x) &= x^{99} + x^{97} + x^{91} + x^{87} + x^{85} + x^{83} + x^{79} + x^{77} + x^{71} + x^{69} + x^{67}\\
&+ x^{55} + x^{53} + x^{43} + x^{35} + x^{31} + x^{29} + x^{25} + x^{23} + x^{21} + x^{17} + x^9,\\
p_6(x) &= x^{105} + x^{103} + x^{102} + x^{100} + x^{98} + x^{94} + x^{93} + x^{92} + x^{90} + x^{88} + x^{85}\\
&+ x^{84} + x^{81} + x^{78} + x^{75} + x^{74} + x^{73} + x^{71} + x^{70} + x^{69} + x^{68} + x^{67}\\
&+ x^{65} + x^{64} + x^{63} + x^{62} + x^{59} + x^{56} + x^{55} + x^{50} + x^{49} + x^{48} + x^{46}\\
&+ x^{45} + x^{44} + x^{43} + x^{42} + x^{39} + x^{37} + x^{36} + x^{34} + x^{33} + x^{32} + x^{31}\\
&+ x^{30} + x^{29} + x^{26} + x^{23} + x^{22} + x^{21} + x^{19} + x^{18} + x^{16} + x^{14} + x^{13}\\
&+ x^{11} + x^7 + x^6,\\
p_9(x) &= x^{111} + x^{109} + x^{105} + x^{99} + x^{97} + x^{95} + x^{93} + x^{89} + x^{87} + x^{83} + x^{77}\\
&+ x^{75} + x^{71} + x^{69} + x^{67} + x^{61} + x^{59} + x^{57} + x^{51} + x^{47} + x^{45} + x^{43}\\
&+ x^{41} + x^{37} + x^{35} + x^{29} + x^{21} + x^{17} + x^{15} + x^{11} + x^5 + x^3,\\
p_{12}(x) &= x^{117} + x^{115} + x^{114} + x^{112} + x^{111} + x^{110} + x^{109} + x^{108} + x^{105} + x^{103}\\
&+ x^{102} + x^{100} + x^{99} + x^{98} + x^{97} + x^{96} + x^{93} + x^{91} + x^{90} + x^{89} + x^{88}\\
&+ x^{85} + x^{83} + x^{82} + x^{81} + x^{80} + x^{69} + x^{67} + x^{66} + x^{64} + x^{63} + x^{62}\\
&+ x^{61} + x^{60} + x^{57} + x^{55} + x^{54} + x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{45}\\
&+ x^{43} + x^{42} + x^{41} + x^{40} + x^{33} + x^{31} + x^{30} + x^{29} + x^{28} + x^{25} + x^{23}\\
&+ x^{22} + x^{20} + x^{19} + x^{18} + x^{17} + x^{16} + x^{13} + x^{11} + x^{10} + x^9 + x^8 + x^5\\
&+ x^3 + x^2 + x + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{117} + x^{115} + x^{114} + x^{113} + x^{112} + x^{111} + x^{110} + x^{106} + x^{105} + x^{103}\\
&+ x^{102} + x^{99} + x^{98} + x^{96} + x^{94} + x^{93} + x^{91} + x^{90} + x^{89} + x^{85} + x^{79}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{78} + x^{77} + x^{75} + x^{74} + x^{73} + x^{70} + x^{65} + x^{63} + x^{58} + x^{56} + x^{55} \\
&+ x^{53} + x^{48} + x^{46} + x^{45} + x^{44} + x^{35} + x^{34} + x^{33} + x^{28} + x^{27} + x^{26} \\
&+ x^{25} + x^{24} + x^{23} + x^{21} + x^{19} + x^{18}, \\
p_3(x) &= x^{99} + x^{97} + x^{91} + x^{87} + x^{85} + x^{83} + x^{79} + x^{77} + x^{71} + x^{69} + x^{67} \\
&+ x^{55} + x^{53} + x^{43} + x^{35} + x^{31} + x^{29} + x^{25} + x^{23} + x^{21} + x^{17} + x^{9}, \\
p_6(x) &= x^{105} + x^{103} + x^{102} + x^{100} + x^{98} + x^{94} + x^{93} + x^{92} + x^{90} + x^{88} + x^{85} \\
&+ x^{84} + x^{81} + x^{78} + x^{75} + x^{74} + x^{73} + x^{71} + x^{70} + x^{69} + x^{68} + x^{67} \\
&+ x^{65} + x^{64} + x^{63} + x^{62} + x^{59} + x^{56} + x^{55} + x^{50} + x^{49} + x^{48} + x^{46} \\
&+ x^{45} + x^{44} + x^{43} + x^{42} + x^{39} + x^{37} + x^{36} + x^{34} + x^{33} + x^{32} + x^{31} \\
&+ x^{30} + x^{29} + x^{26} + x^{23} + x^{22} + x^{21} + x^{19} + x^{18} + x^{16} + x^{14} + x^{13} \\
&+ x^{11} + x^{7} + x^{6}, \\
p_9(x) &= x^{111} + x^{109} + x^{105} + x^{99} + x^{97} + x^{95} + x^{93} + x^{89} + x^{87} + x^{83} + x^{77} \\
&+ x^{75} + x^{71} + x^{69} + x^{67} + x^{61} + x^{59} + x^{57} + x^{51} + x^{47} + x^{45} + x^{43} \\
&+ x^{41} + x^{37} + x^{35} + x^{29} + x^{21} + x^{17} + x^{15} + x^{11} + x^{5} + x^{3}, \\
p_{12}(x) &= x^{117} + x^{115} + x^{114} + x^{112} + x^{111} + x^{110} + x^{109} + x^{108} + x^{105} + x^{103} \\
&+ x^{102} + x^{100} + x^{99} + x^{98} + x^{97} + x^{96} + x^{93} + x^{91} + x^{90} + x^{89} + x^{88} \\
&+ x^{85} + x^{83} + x^{82} + x^{81} + x^{80} + x^{69} + x^{67} + x^{66} + x^{64} + x^{63} + x^{62} \\
&+ x^{61} + x^{60} + x^{57} + x^{55} + x^{54} + x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{45} \\
&+ x^{43} + x^{42} + x^{41} + x^{40} + x^{33} + x^{31} + x^{30} + x^{29} + x^{28} + x^{25} + x^{23} \\
&+ x^{22} + x^{20} + x^{19} + x^{18} + x^{17} + x^{16} + x^{13} + x^{11} + x^{10} + x^{9} + x^{8} + x^{5} \\
&+ x^{3} + x^{2} + x + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{102} + x^{94} + x^{88} + x^{86} + x^{84} + x^{80} + x^{76} + x^{74} + x^{72} + x^{68} + x^{64} \\
&+ x^{62} + x^{56} + x^{54} + x^{50} + x^{46} + x^{40} + x^{36} + x^{34} + x^{32} + x^{30} + x^{26} \\
&+ x^{24}, \\
p_3(x) &= x^{98} + x^{92} + x^{90} + x^{82} + x^{78} + x^{76} + x^{74} + x^{72} + x^{70} + x^{68} + x^{66} \\
&+ x^{64} + x^{62} + x^{56} + x^{54} + x^{42} + x^{40} + x^{36} + x^{30} + x^{26} + x^{16} + x^{10} \\
&+ x^{8} + x^{6}, \\
p_6(x) &= x^{96} + x^{92} + x^{90} + x^{88} + x^{86} + x^{84} + x^{82} + x^{80} + x^{78} + x^{76} + x^{74} \\
&+ x^{66} + x^{60} + x^{58} + x^{56} + x^{54} + x^{50} + x^{48} + x^{42} + x^{40} + x^{36} + x^{34} \\
&+ x^{28} + x^{26} + x^{10} + x^{8} + x^{6} + 1, \\
p_9(x) &= x^{98} + x^{94} + x^{90} + x^{88} + x^{80} + x^{76} + x^{72} + x^{62} + x^{56} + x^{52} + x^{46} \\
&+ x^{44} + x^{38} + x^{36} + x^{32} + x^{26} + x^{24} + x^{22} + x^{20} + x^{14} + x^{4} + x^{2}, \\
p_{12}(x) &= x^{102} + x^{96} + x^{94} + x^{90} + x^{82} + x^{80} + x^{54} + x^{48} + x^{46} + x^{42} + x^{34}
\end{aligned}
$$

$$+ x^{32} + x^{22} + x^{16} + x^{14} + x^{10} + x^2 + 1,$$

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

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

$$\begin{aligned}
p_0(x) &= x^{102} + x^{86} + x^{84} + x^{82} + x^{80} + x^{78} + x^{76} + x^{74} + x^{72} + x^{70} + x^{66} \\
&\quad + x^{62} + x^{58} + x^{52} + x^{50} + x^{44} + x^{42} + x^{22} + x^{20} + x^{14} + x^{12}, \\
p_3(x) &= x^{98} + x^{92} + x^{82} + x^{76} + x^{72} + x^{70} + x^{68} + x^{66} + x^{64} + x^{62} + x^{56} \\
&\quad + x^{50} + x^{46} + x^{40} + x^{38} + x^{36} + x^{34} + x^{30} + x^{26} + x^{22} + x^{16} + x^{8}, \\
p_6(x) &= x^{96} + x^{94} + x^{92} + x^{84} + x^{82} + x^{80} + x^{72} + x^{70} + x^{62} + x^{60} + x^{58} \\
&\quad + x^{56} + x^{52} + x^{50} + x^{46} + x^{44} + x^{42} + x^{38} + x^{32} + x^{30} + x^{28} + x^{26} \\
&\quad + x^{20} + x^{14} + x^{10} + x^{6} + x^{4} + 1, \\
p_9(x) &= x^{98} + x^{94} + x^{90} + x^{88} + x^{80} + x^{76} + x^{72} + x^{62} + x^{56} + x^{52} + x^{46} \\
&\quad + x^{44} + x^{38} + x^{36} + x^{32} + x^{26} + x^{24} + x^{22} + x^{20} + x^{14} + x^{4} + x^{2}, \\
p_{12}(x) &= x^{102} + x^{96} + x^{94} + x^{90} + x^{82} + x^{80} + x^{54} + x^{48} + x^{46} + x^{42} + x^{34} \\
&\quad + x^{32} + x^{22} + x^{16} + x^{14} + x^{10} + x^{2} + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{117} + x^{115} + x^{114} + x^{113} + x^{112} + x^{111} + x^{110} + x^{106} + x^{100} + x^{99} \\
&\quad + x^{96} + x^{92} + x^{89} + x^{87} + x^{86} + x^{85} + x^{83} + x^{82} + x^{80} + x^{79} + x^{76} \\
&\quad + x^{75} + x^{73} + x^{69} + x^{68} + x^{67} + x^{63} + x^{60} + x^{59} + x^{58} + x^{56} + x^{55} \\
&\quad + x^{54} + x^{51} + x^{49} + x^{48} + x^{46} + x^{44} + x^{42} + x^{40} + x^{39} + x^{37} + x^{35} \\
&\quad + x^{33} + x^{32} + x^{29} + x^{27}, \\
p_3(x) &= x^{99} + x^{97} + x^{91} + x^{87} + x^{85} + x^{83} + x^{79} + x^{77} + x^{71} + x^{69} + x^{67} \\
&\quad + x^{55} + x^{53} + x^{43} + x^{35} + x^{31} + x^{29} + x^{25} + x^{23} + x^{21} + x^{17} + x^{9}, \\
p_6(x) &= x^{105} + x^{103} + x^{102} + x^{100} + x^{98} + x^{94} + x^{93} + x^{92} + x^{90} + x^{88} + x^{85} \\
&\quad + x^{84} + x^{81} + x^{78} + x^{75} + x^{74} + x^{73} + x^{71} + x^{70} + x^{69} + x^{68} + x^{67} \\
&\quad + x^{65} + x^{64} + x^{63} + x^{62} + x^{59} + x^{56} + x^{55} + x^{50} + x^{49} + x^{48} + x^{46} \\
&\quad + x^{45} + x^{44} + x^{43} + x^{42} + x^{39} + x^{37} + x^{36} + x^{34} + x^{33} + x^{32} + x^{31} \\
&\quad + x^{30} + x^{29} + x^{26} + x^{23} + x^{22} + x^{21} + x^{19} + x^{18} + x^{16} + x^{14} + x^{13} \\
&\quad + x^{11} + x^{7} + x^{6}, \\
p_9(x) &= x^{111} + x^{109} + x^{105} + x^{99} + x^{97} + x^{95} + x^{93} + x^{89} + x^{87} + x^{83} + x^{77} \\
&\quad + x^{75} + x^{71} + x^{69} + x^{67} + x^{61} + x^{59} + x^{57} + x^{51} + x^{47} + x^{45} + x^{43} \\
&\quad + x^{41} + x^{37} + x^{35} + x^{29} + x^{21} + x^{17} + x^{15} + x^{11} + x^{5} + x^{3}, \\
p_{12}(x) &= x^{117} + x^{115} + x^{114} + x^{112} + x^{111} + x^{110} + x^{109} + x^{108} + x^{105} + x^{103} \\
&\quad + x^{102} + x^{100} + x^{99} + x^{98} + x^{97} + x^{96} + x^{93} + x^{91} + x^{90} + x^{89} + x^{88} \\
&\quad + x^{85} + x^{83} + x^{82} + x^{81} + x^{80} + x^{69} + x^{67} + x^{66} + x^{64} + x^{63} + x^{62}
\end{aligned}$$

$$
\begin{aligned}
&+ x^{61} + x^{60} + x^{57} + x^{55} + x^{54} + x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{45}\\
&+ x^{43} + x^{42} + x^{41} + x^{40} + x^{33} + x^{31} + x^{30} + x^{29} + x^{28} + x^{25} + x^{23}\\
&+ x^{22} + x^{20} + x^{19} + x^{18} + x^{17} + x^{16} + x^{13} + x^{11} + x^{10} + x^{9} + x^{8} + x^{5}\\
&+ x^{3} + x^{2} + x + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{117} + x^{115} + x^{114} + x^{113} + x^{112} + x^{111} + x^{110} + x^{106} + x^{100} + x^{99}\\
&\quad + x^{96} + x^{92} + x^{89} + x^{87} + x^{86} + x^{85} + x^{83} + x^{82} + x^{80} + x^{79} + x^{76}\\
&\quad + x^{75} + x^{73} + x^{69} + x^{68} + x^{67} + x^{63} + x^{60} + x^{59} + x^{58} + x^{56} + x^{55}\\
&\quad + x^{54} + x^{51} + x^{49} + x^{48} + x^{46} + x^{44} + x^{42} + x^{40} + x^{39} + x^{37} + x^{35}\\
&\quad + x^{33} + x^{32} + x^{29} + x^{27},\\
p_3(x) &= x^{99} + x^{97} + x^{91} + x^{87} + x^{85} + x^{83} + x^{79} + x^{77} + x^{71} + x^{69} + x^{67}\\
&\quad + x^{55} + x^{53} + x^{43} + x^{35} + x^{31} + x^{29} + x^{25} + x^{23} + x^{21} + x^{17} + x^{9},\\
p_6(x) &= x^{105} + x^{103} + x^{102} + x^{100} + x^{98} + x^{94} + x^{93} + x^{92} + x^{90} + x^{88} + x^{85}\\
&\quad + x^{84} + x^{81} + x^{78} + x^{75} + x^{74} + x^{73} + x^{71} + x^{70} + x^{69} + x^{68} + x^{67}\\
&\quad + x^{65} + x^{64} + x^{63} + x^{62} + x^{59} + x^{56} + x^{55} + x^{50} + x^{49} + x^{48} + x^{46}\\
&\quad + x^{45} + x^{44} + x^{43} + x^{42} + x^{39} + x^{37} + x^{36} + x^{34} + x^{33} + x^{32} + x^{31}\\
&\quad + x^{30} + x^{29} + x^{26} + x^{23} + x^{22} + x^{21} + x^{19} + x^{18} + x^{16} + x^{14} + x^{13}\\
&\quad + x^{11} + x^{7} + x^{6},\\
p_9(x) &= x^{111} + x^{109} + x^{105} + x^{99} + x^{97} + x^{95} + x^{93} + x^{89} + x^{87} + x^{83} + x^{77}\\
&\quad + x^{75} + x^{71} + x^{69} + x^{67} + x^{61} + x^{59} + x^{57} + x^{51} + x^{47} + x^{45} + x^{43}\\
&\quad + x^{41} + x^{37} + x^{35} + x^{29} + x^{21} + x^{17} + x^{15} + x^{11} + x^{5} + x^{3},\\
p_{12}(x) &= x^{117} + x^{115} + x^{114} + x^{112} + x^{111} + x^{110} + x^{109} + x^{108} + x^{105} + x^{103}\\
&\quad + x^{102} + x^{100} + x^{99} + x^{98} + x^{97} + x^{96} + x^{93} + x^{91} + x^{90} + x^{89} + x^{88}\\
&\quad + x^{85} + x^{83} + x^{82} + x^{81} + x^{80} + x^{69} + x^{67} + x^{66} + x^{64} + x^{63} + x^{62}\\
&\quad + x^{61} + x^{60} + x^{57} + x^{55} + x^{54} + x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{45}\\
&\quad + x^{43} + x^{42} + x^{41} + x^{40} + x^{33} + x^{31} + x^{30} + x^{29} + x^{28} + x^{25} + x^{23}\\
&\quad + x^{22} + x^{20} + x^{19} + x^{18} + x^{17} + x^{16} + x^{13} + x^{11} + x^{10} + x^{9} + x^{8} + x^{5}\\
&\quad + x^{3} + x^{2} + x + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{132} + x^{128} + x^{126} + x^{124} + x^{122} + x^{120} + x^{118} + x^{116} + x^{114} + x^{106}\\
&\quad + x^{102} + x^{98} + x^{94} + x^{86} + x^{84} + x^{82} + x^{80} + x^{76} + x^{74} + x^{68} + x^{66}\\
&\quad + x^{60} + x^{50} + x^{44} + x^{42},\\
p_3(x) &= x^{128} + x^{124} + x^{120} + x^{110} + x^{108} + x^{106} + x^{104} + x^{100} + x^{98} + x^{88}
\end{aligned}
$$

$$\begin{aligned}
&+ x^{80} + x^{78} + x^{72} + x^{64} + x^{60} + x^{56} + x^{54} + x^{46} + x^{44} + x^{40} + x^{36}\\
&+ x^{34} + x^{30} + x^{28} + x^{24} + x^{20} + x^{10} + x^{6},\\
p_6(x) &= x^{126} + x^{116} + x^{114} + x^{112} + x^{110} + x^{108} + x^{104} + x^{102} + x^{98} + x^{96}\\
&+ x^{94} + x^{92} + x^{90} + x^{82} + x^{72} + x^{64} + x^{62} + x^{60} + x^{56} + x^{48} + x^{46}\\
&+ x^{40} + x^{38} + x^{36} + x^{30} + x^{18} + x^{14} + x^{12} + x^{8} + x^{6} + x^{2} + 1,\\
p_9(x) &= x^{128} + x^{122} + x^{118} + x^{116} + x^{110} + x^{108} + x^{106} + x^{102} + x^{98} + x^{88}\\
&+ x^{82} + x^{78} + x^{76} + x^{72} + x^{70} + x^{68} + x^{64} + x^{60} + x^{56} + x^{48} + x^{46}\\
&+ x^{42} + x^{40} + x^{38} + x^{34} + x^{32} + x^{30} + x^{26} + x^{22} + x^{12} + x^{6} + x^{2},\\
p_{12}(x) &= x^{132} + x^{128} + x^{124} + x^{120} + x^{116} + x^{112} + x^{76} + x^{72} + x^{68} + x^{64}\\
&+ x^{52} + x^{48} + x^{44} + x^{40} + x^{4} + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{117} + x^{115} + x^{114} + x^{112} + x^{110} + x^{105} + x^{103} + x^{102} + x^{100} + x^{97}\\
&+ x^{94} + x^{92} + x^{88} + x^{85} + x^{82} + x^{81} + x^{79} + x^{78} + x^{77} + x^{73} + x^{71}\\
&+ x^{70} + x^{69} + x^{68} + x^{65} + x^{63} + x^{60} + x^{59} + x^{57} + x^{52} + x^{49} + x^{48}\\
&+ x^{46} + x^{45} + x^{44} + x^{42} + x^{41} + x^{39} + x^{34} + x^{32} + x^{31} + x^{30} + x^{26}\\
&+ x^{25} + x^{24} + x^{23} + x^{22} + x^{20} + x^{17} + x^{13} + x^{12},\\
p_3(x) &= x^{109} + x^{107} + x^{106} + x^{104} + x^{102} + x^{97} + x^{95} + x^{94} + x^{93} + x^{92} + x^{91}\\
&+ x^{90} + x^{89} + x^{88} + x^{84} + x^{82} + x^{70} + x^{69} + x^{68} + x^{67} + x^{65} + x^{63}\\
&+ x^{62} + x^{61} + x^{59} + x^{57} + x^{56} + x^{54} + x^{53} + x^{51} + x^{50} + x^{49} + x^{47}\\
&+ x^{44} + x^{40} + x^{39} + x^{38} + x^{36} + x^{33} + x^{30} + x^{29} + x^{28} + x^{27} + x^{25}\\
&+ x^{24} + x^{23} + x^{20} + x^{15} + x^{14} + x^{12} + x^{9} + x^{8},\\
p_6(x) &= x^{111} + x^{108} + x^{107} + x^{106} + x^{105} + x^{104} + x^{103} + x^{100} + x^{99} + x^{97}\\
&+ x^{96} + x^{95} + x^{90} + x^{86} + x^{84} + x^{83} + x^{81} + x^{79} + x^{77} + x^{76} + x^{75}\\
&+ x^{74} + x^{73} + x^{69} + x^{68} + x^{67} + x^{66} + x^{65} + x^{64} + x^{61} + x^{58} + x^{57}\\
&+ x^{56} + x^{55} + x^{49} + x^{48} + x^{47} + x^{46} + x^{45} + x^{44} + x^{43} + x^{42} + x^{41}\\
&+ x^{38} + x^{36} + x^{35} + x^{34} + x^{26} + x^{25} + x^{22} + x^{21} + x^{18} + x^{17} + x^{13}\\
&+ x^{9} + x^{4} + x^{3} + x^{2} + x + 1,\\
p_9(x) &= x^{109} + x^{107} + x^{106} + x^{104} + x^{103} + x^{102} + x^{101} + x^{100} + x^{93} + x^{91}\\
&+ x^{90} + x^{88} + x^{87} + x^{86} + x^{85} + x^{84} + x^{61} + x^{59} + x^{58} + x^{56} + x^{55}\\
&+ x^{54} + x^{53} + x^{52} + x^{45} + x^{43} + x^{42} + x^{40} + x^{39} + x^{38} + x^{37} + x^{36}\\
&+ x^{29} + x^{27} + x^{26} + x^{24} + x^{23} + x^{22} + x^{21} + x^{20} + x^{13} + x^{11} + x^{10}\\
&+ x^{8} + x^{7} + x^{6} + x^{5} + x^{4},\\
p_{12}(x) &= x^{117} + x^{115} + x^{114} + x^{112} + x^{111} + x^{110} + x^{108} + x^{107} + x^{106} + x^{105}\\
&+ x^{104} + x^{101} + x^{99} + x^{98} + x^{97} + x^{96} + x^{89} + x^{87} + x^{86} + x^{84} + x^{83}
\end{aligned}$$

$$+ x^{82} + x^{81} + x^{80} + x^{69} + x^{67} + x^{66} + x^{64} + x^{63} + x^{62} + x^{60} + x^{59} + x^{58} + x^{57} + x^{56} + x^{53} + x^{51} + x^{50} + x^{49} + x^{48} + x^{41} + x^{39} + x^{38} + x^{37} + x^{36} + x^{33} + x^{31} + x^{30} + x^{28} + x^{27} + x^{26} + x^{25} + x^{24} + x^{21} + x^{19} + x^{18} + x^{17} + x^{16} + x^{9} + x^{7} + x^{6} + x^{4} + x^{3} + x^{2} + x + 1,$$

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

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

$$\begin{aligned}
p_0(x) &= x^{112} + x^{106} + x^{105} + x^{102} + x^{101} + x^{100} + x^{98} + x^{97} + x^{96} + x^{95} \\
&\quad + x^{94} + x^{93} + x^{92} + x^{91} + x^{88} + x^{86} + x^{79} + x^{78} + x^{76} + x^{73} + x^{72} \\
&\quad + x^{67} + x^{66} + x^{64} + x^{62} + x^{61} + x^{60} + x^{58} + x^{56} + x^{55} + x^{54} + x^{53} \\
&\quad + x^{52} + x^{51} + x^{50} + x^{49} + x^{43} + x^{42} + x^{41} + x^{36} + x^{34} + x^{32} + x^{30} \\
&\quad + x^{29} + x^{25} + x^{23} + x^{22} + x^{21} + x^{18}, \\
p_3(x) &= x^{94} + x^{91} + x^{87} + x^{86} + x^{85} + x^{83} + x^{81} + x^{80} + x^{78} + x^{76} + x^{74} \\
&\quad + x^{72} + x^{68} + x^{67} + x^{66} + x^{64} + x^{63} + x^{62} + x^{61} + x^{60} + x^{58} + x^{57} \\
&\quad + x^{55} + x^{53} + x^{49} + x^{48} + x^{47} + x^{45} + x^{44} + x^{43} + x^{42} + x^{41} + x^{38} \\
&\quad + x^{35} + x^{31} + x^{30} + x^{29} + x^{27} + x^{25} + x^{24} + x^{20} + x^{19} + x^{18} + x^{16} \\
&\quad + x^{15} + x^{13} + x^{12} + x^{11} + x^{10} + x^{9}, \\
p_6(x) &= x^{100} + x^{96} + x^{94} + x^{90} + x^{86} + x^{84} + x^{76} + x^{74} + x^{68} + x^{62} + x^{54} \\
&\quad + x^{52} + x^{50} + x^{46} + x^{42} + x^{34} + x^{30} + x^{24} + x^{22} + x^{16} + x^{12} + x^{10} \\
&\quad + x^{8} + x^{6}, \\
p_9(x) &= x^{106} + x^{103} + x^{100} + x^{99} + x^{90} + x^{87} + x^{84} + x^{83} + x^{58} + x^{55} + x^{52} \\
&\quad + x^{51} + x^{42} + x^{39} + x^{36} + x^{35} + x^{26} + x^{23} + x^{20} + x^{19} + x^{10} + x^{7} \\
&\quad + x^{4} + x^{3}, \\
p_{12}(x) &= x^{112} + x^{108} + x^{104} + x^{96} + x^{84} + x^{80} + x^{64} + x^{60} + x^{56} + x^{48} + x^{36} \\
&\quad + x^{28} + x^{24} + x^{16} + x^{4} + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{132} + x^{126} + x^{125} + x^{124} + x^{122} + x^{121} + x^{120} + x^{115} + x^{113} + x^{112} \\
&\quad + x^{111} + x^{109} + x^{108} + x^{107} + x^{104} + x^{102} + x^{100} + x^{99} + x^{98} + x^{97} \\
&\quad + x^{96} + x^{92} + x^{91} + x^{90} + x^{89} + x^{88} + x^{85} + x^{83} + x^{81} + x^{79} + x^{75} \\
&\quad + x^{73} + x^{72} + x^{71} + x^{70} + x^{69} + x^{66} + x^{62} + x^{61} + x^{59} + x^{57} + x^{54} \\
&\quad + x^{52} + x^{46} + x^{45} + x^{43} + x^{41} + x^{39} + x^{35} + x^{28} + x^{27}, \\
p_3(x) &= x^{114} + x^{111} + x^{107} + x^{105} + x^{102} + x^{101} + x^{100} + x^{98} + x^{97} + x^{96} \\
&\quad + x^{95} + x^{94} + x^{91} + x^{88} + x^{87} + x^{82} + x^{80} + x^{79} + x^{77} + x^{75} + x^{74} \\
&\quad + x^{70} + x^{69} + x^{66} + x^{64} + x^{63} + x^{62} + x^{61} + x^{54} + x^{51} + x^{50} + x^{45} \\
&\quad + x^{43} + x^{42} + x^{40} + x^{38} + x^{34} + x^{33} + x^{32} + x^{30} + x^{29} + x^{28} + x^{27}
\end{aligned}$$

$$
\begin{aligned}
&+ x^{26} + x^{23} + x^{20} + x^{19} + x^{14} + x^{12} + x^{11} + x^{10} + x^{9},\\
p_6(x) &= x^{120} + x^{116} + x^{114} + x^{112} + x^{110} + x^{104} + x^{98} + x^{96} + x^{92} + x^{88}\\
&+ x^{78} + x^{74} + x^{68} + x^{66} + x^{64} + x^{60} + x^{58} + x^{56} + x^{54} + x^{52} + x^{46}\\
&+ x^{44} + x^{34} + x^{30} + x^{28} + x^{24} + x^{20} + x^{16} + x^{8} + x^{6},\\
p_9(x) &= x^{126} + x^{123} + x^{120} + x^{119} + x^{118} + x^{115} + x^{114} + x^{112} + x^{108} + x^{107}\\
&+ x^{106} + x^{103} + x^{102} + x^{100} + x^{98} + x^{96} + x^{94} + x^{92} + x^{90} + x^{88}\\
&+ x^{84} + x^{83} + x^{78} + x^{75} + x^{72} + x^{71} + x^{70} + x^{67} + x^{66} + x^{64} + x^{60}\\
&+ x^{59} + x^{58} + x^{55} + x^{54} + x^{52} + x^{50} + x^{48} + x^{44} + x^{43} + x^{42} + x^{39}\\
&+ x^{38} + x^{36} + x^{34} + x^{32} + x^{28} + x^{27} + x^{26} + x^{23} + x^{22} + x^{20} + x^{18}\\
&+ x^{16} + x^{14} + x^{12} + x^{10} + x^{8} + x^{4} + x^{3},\\
p_{12}(x) &= x^{132} + x^{128} + x^{112} + x^{108} + x^{104} + x^{84} + x^{64} + x^{60} + x^{56} + x^{52} + x^{48}\\
&+ x^{28} + x^{24} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{117} + x^{115} + x^{114} + x^{112} + x^{110} + x^{109} + x^{107} + x^{106} + x^{104} + x^{103}\\
&+ x^{102} + x^{100} + x^{99} + x^{97} + x^{96} + x^{94} + x^{93} + x^{91} + x^{90} + x^{88} + x^{85}\\
&+ x^{82} + x^{80} + x^{76} + x^{74} + x^{73} + x^{71} + x^{69} + x^{66} + x^{64} + x^{63} + x^{61}\\
&+ x^{60} + x^{58} + x^{56} + x^{55} + x^{53} + x^{52} + x^{51} + x^{50} + x^{49} + x^{47} + x^{44}\\
&+ x^{42} + x^{38} + x^{37} + x^{36} + x^{35} + x^{33},\\
p_3(x) &= x^{109} + x^{107} + x^{106} + x^{104} + x^{102} + x^{101} + x^{99} + x^{98} + x^{96} + x^{95}\\
&+ x^{94} + x^{92} + x^{91} + x^{89} + x^{88} + x^{86} + x^{85} + x^{83} + x^{81} + x^{79} + x^{78}\\
&+ x^{77} + x^{76} + x^{73} + x^{71} + x^{69} + x^{67} + x^{66} + x^{62} + x^{57} + x^{56} + x^{53}\\
&+ x^{52} + x^{50} + x^{44} + x^{43} + x^{42} + x^{40} + x^{39} + x^{38} + x^{37} + x^{36} + x^{34}\\
&+ x^{33} + x^{29} + x^{27} + x^{25} + x^{22} + x^{21} + x^{19} + x^{16} + x^{14} + x^{13} + x^{12},\\
p_6(x) &= x^{111} + x^{109} + x^{108} + x^{103} + x^{100} + x^{97} + x^{89} + x^{88} + x^{87} + x^{84} + x^{83}\\
&+ x^{81} + x^{71} + x^{70} + x^{69} + x^{67} + x^{65} + x^{64} + x^{63} + x^{62} + x^{61} + x^{59}\\
&+ x^{58} + x^{57} + x^{53} + x^{51} + x^{48} + x^{46} + x^{44} + x^{43} + x^{42} + x^{40} + x^{39}\\
&+ x^{38} + x^{34} + x^{31} + x^{30} + x^{29} + x^{22} + x^{21} + x^{20} + x^{19} + x^{16} + x^{15}\\
&+ x^{13} + x^{12} + x^{11} + x^{5} + x^{3} + x^{2} + x + 1,\\
p_9(x) &= x^{109} + x^{107} + x^{106} + x^{104} + x^{103} + x^{102} + x^{101} + x^{100} + x^{93} + x^{91}\\
&+ x^{90} + x^{88} + x^{87} + x^{86} + x^{85} + x^{84} + x^{61} + x^{59} + x^{58} + x^{56} + x^{55}\\
&+ x^{54} + x^{53} + x^{52} + x^{45} + x^{43} + x^{42} + x^{40} + x^{39} + x^{38} + x^{37} + x^{36}\\
&+ x^{29} + x^{27} + x^{26} + x^{24} + x^{23} + x^{22} + x^{21} + x^{20} + x^{13} + x^{11} + x^{10}\\
&+ x^{8} + x^{7} + x^{6} + x^{5} + x^{4},\\
p_{12}(x) &= x^{117} + x^{115} + x^{114} + x^{112} + x^{111} + x^{110} + x^{108} + x^{107} + x^{106} + x^{105}
\end{aligned}
$$

$$+ x^{104} + x^{101} + x^{99} + x^{98} + x^{97} + x^{96} + x^{89} + x^{87} + x^{86} + x^{84} + x^{83}$$
$$+ x^{82} + x^{81} + x^{80} + x^{69} + x^{67} + x^{66} + x^{64} + x^{63} + x^{62} + x^{60} + x^{59}$$
$$+ x^{58} + x^{57} + x^{56} + x^{53} + x^{51} + x^{50} + x^{49} + x^{48} + x^{41} + x^{39} + x^{38}$$
$$+ x^{37} + x^{36} + x^{33} + x^{31} + x^{30} + x^{28} + x^{27} + x^{26} + x^{25} + x^{24} + x^{21}$$
$$+ x^{19} + x^{18} + x^{17} + x^{16} + x^{9} + x^{7} + x^{6} + x^{4} + x^{3} + x^{2} + x + 1,$$

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

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

$$\begin{aligned}
p_0(x) &= x^{117} + x^{115} + x^{114} + x^{112} + x^{110} + x^{105} + x^{103} + x^{102} + x^{100} + x^{97} \\
&\quad + x^{94} + x^{92} + x^{88} + x^{85} + x^{82} + x^{81} + x^{79} + x^{78} + x^{77} + x^{73} + x^{71} \\
&\quad + x^{70} + x^{69} + x^{68} + x^{65} + x^{63} + x^{60} + x^{59} + x^{57} + x^{52} + x^{49} + x^{48} \\
&\quad + x^{46} + x^{45} + x^{44} + x^{42} + x^{41} + x^{39} + x^{34} + x^{32} + x^{31} + x^{30} + x^{26} \\
&\quad + x^{25} + x^{24} + x^{23} + x^{22} + x^{20} + x^{17} + x^{13} + x^{12}, \\
p_3(x) &= x^{109} + x^{107} + x^{106} + x^{104} + x^{102} + x^{97} + x^{95} + x^{94} + x^{93} + x^{92} + x^{91} \\
&\quad + x^{90} + x^{89} + x^{88} + x^{84} + x^{82} + x^{70} + x^{69} + x^{68} + x^{67} + x^{65} + x^{63} \\
&\quad + x^{62} + x^{61} + x^{59} + x^{57} + x^{56} + x^{54} + x^{53} + x^{51} + x^{50} + x^{49} + x^{47} \\
&\quad + x^{44} + x^{40} + x^{39} + x^{38} + x^{36} + x^{33} + x^{30} + x^{29} + x^{28} + x^{27} + x^{25} \\
&\quad + x^{24} + x^{23} + x^{20} + x^{15} + x^{14} + x^{12} + x^{9} + x^{8}, \\
p_6(x) &= x^{111} + x^{108} + x^{107} + x^{106} + x^{105} + x^{104} + x^{103} + x^{100} + x^{99} + x^{97} \\
&\quad + x^{96} + x^{95} + x^{90} + x^{86} + x^{84} + x^{83} + x^{81} + x^{79} + x^{77} + x^{76} + x^{75} \\
&\quad + x^{74} + x^{73} + x^{69} + x^{68} + x^{67} + x^{66} + x^{65} + x^{64} + x^{61} + x^{58} + x^{57} \\
&\quad + x^{56} + x^{55} + x^{49} + x^{48} + x^{47} + x^{46} + x^{45} + x^{44} + x^{43} + x^{42} + x^{41} \\
&\quad + x^{38} + x^{36} + x^{35} + x^{34} + x^{26} + x^{25} + x^{22} + x^{21} + x^{18} + x^{17} + x^{13} \\
&\quad + x^{9} + x^{4} + x^{3} + x^{2} + x + 1, \\
p_9(x) &= x^{109} + x^{107} + x^{106} + x^{104} + x^{103} + x^{102} + x^{101} + x^{100} + x^{93} + x^{91} \\
&\quad + x^{90} + x^{88} + x^{87} + x^{86} + x^{85} + x^{84} + x^{61} + x^{59} + x^{58} + x^{56} + x^{55} \\
&\quad + x^{54} + x^{53} + x^{52} + x^{45} + x^{43} + x^{42} + x^{40} + x^{39} + x^{38} + x^{37} + x^{36} \\
&\quad + x^{29} + x^{27} + x^{26} + x^{24} + x^{23} + x^{22} + x^{21} + x^{20} + x^{13} + x^{11} + x^{10} \\
&\quad + x^{8} + x^{7} + x^{6} + x^{5} + x^{4}, \\
p_{12}(x) &= x^{117} + x^{115} + x^{114} + x^{112} + x^{111} + x^{110} + x^{108} + x^{107} + x^{106} + x^{105} \\
&\quad + x^{104} + x^{101} + x^{99} + x^{98} + x^{97} + x^{96} + x^{89} + x^{87} + x^{86} + x^{84} + x^{83} \\
&\quad + x^{82} + x^{81} + x^{80} + x^{69} + x^{67} + x^{66} + x^{64} + x^{63} + x^{62} + x^{60} + x^{59} \\
&\quad + x^{58} + x^{57} + x^{56} + x^{53} + x^{51} + x^{50} + x^{49} + x^{48} + x^{41} + x^{39} + x^{38} \\
&\quad + x^{37} + x^{36} + x^{33} + x^{31} + x^{30} + x^{28} + x^{27} + x^{26} + x^{25} + x^{24} + x^{21} \\
&\quad + x^{19} + x^{18} + x^{17} + x^{16} + x^{9} + x^{7} + x^{6} + x^{4} + x^{3} + x^{2} + x + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) = {} & x^{132} + x^{126} + x^{125} + x^{124} + x^{122} + x^{121} + x^{120} + x^{115} + x^{113} + x^{112} \\
& + x^{111} + x^{109} + x^{108} + x^{107} + x^{104} + x^{102} + x^{100} + x^{99} + x^{98} + x^{97} \\
& + x^{96} + x^{92} + x^{91} + x^{90} + x^{89} + x^{88} + x^{85} + x^{83} + x^{81} + x^{79} + x^{75} \\
& + x^{73} + x^{72} + x^{71} + x^{70} + x^{69} + x^{66} + x^{62} + x^{61} + x^{59} + x^{57} + x^{54} \\
& + x^{52} + x^{46} + x^{45} + x^{43} + x^{41} + x^{39} + x^{35} + x^{28} + x^{27}, \\
p_3(x) = {} & x^{114} + x^{111} + x^{107} + x^{105} + x^{102} + x^{101} + x^{100} + x^{98} + x^{97} + x^{96} \\
& + x^{95} + x^{94} + x^{91} + x^{88} + x^{87} + x^{82} + x^{80} + x^{79} + x^{77} + x^{75} + x^{74} \\
& + x^{70} + x^{69} + x^{66} + x^{64} + x^{63} + x^{62} + x^{61} + x^{54} + x^{51} + x^{50} + x^{45} \\
& + x^{43} + x^{42} + x^{40} + x^{38} + x^{34} + x^{33} + x^{32} + x^{30} + x^{29} + x^{28} + x^{27} \\
& + x^{26} + x^{23} + x^{20} + x^{19} + x^{14} + x^{12} + x^{11} + x^{10} + x^{9}, \\
p_6(x) = {} & x^{120} + x^{116} + x^{114} + x^{112} + x^{110} + x^{104} + x^{98} + x^{96} + x^{92} + x^{88} \\
& + x^{78} + x^{74} + x^{68} + x^{66} + x^{64} + x^{60} + x^{58} + x^{56} + x^{54} + x^{52} + x^{46} \\
& + x^{44} + x^{34} + x^{30} + x^{28} + x^{24} + x^{20} + x^{16} + x^{8} + x^{6}, \\
p_9(x) = {} & x^{126} + x^{123} + x^{120} + x^{119} + x^{118} + x^{115} + x^{114} + x^{112} + x^{108} + x^{107} \\
& + x^{106} + x^{103} + x^{102} + x^{100} + x^{98} + x^{96} + x^{94} + x^{92} + x^{90} + x^{88} \\
& + x^{84} + x^{83} + x^{78} + x^{75} + x^{72} + x^{71} + x^{70} + x^{67} + x^{66} + x^{64} + x^{60} \\
& + x^{59} + x^{58} + x^{55} + x^{54} + x^{52} + x^{50} + x^{48} + x^{44} + x^{43} + x^{42} + x^{39} \\
& + x^{38} + x^{36} + x^{34} + x^{32} + x^{28} + x^{27} + x^{26} + x^{23} + x^{22} + x^{20} + x^{18} \\
& + x^{16} + x^{14} + x^{12} + x^{10} + x^{8} + x^{4} + x^{3}, \\
p_{12}(x) = {} & x^{132} + x^{128} + x^{112} + x^{108} + x^{104} + x^{84} + x^{64} + x^{60} + x^{56} + x^{52} + x^{48} \\
& + x^{28} + x^{24} + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) = {} & x^{112} + x^{106} + x^{105} + x^{102} + x^{101} + x^{100} + x^{98} + x^{97} + x^{96} + x^{95} \\
& + x^{94} + x^{93} + x^{92} + x^{91} + x^{88} + x^{86} + x^{79} + x^{78} + x^{76} + x^{73} + x^{72} \\
& + x^{67} + x^{66} + x^{64} + x^{62} + x^{61} + x^{60} + x^{58} + x^{56} + x^{55} + x^{54} + x^{53} \\
& + x^{52} + x^{51} + x^{50} + x^{49} + x^{43} + x^{42} + x^{41} + x^{36} + x^{34} + x^{32} + x^{30} \\
& + x^{29} + x^{25} + x^{23} + x^{22} + x^{21} + x^{18}, \\
p_3(x) = {} & x^{94} + x^{91} + x^{87} + x^{86} + x^{85} + x^{83} + x^{81} + x^{80} + x^{78} + x^{76} + x^{74} \\
& + x^{72} + x^{68} + x^{67} + x^{66} + x^{64} + x^{63} + x^{62} + x^{61} + x^{60} + x^{58} + x^{57} \\
& + x^{55} + x^{53} + x^{49} + x^{48} + x^{47} + x^{45} + x^{44} + x^{43} + x^{42} + x^{41} + x^{38} \\
& + x^{35} + x^{31} + x^{30} + x^{29} + x^{27} + x^{25} + x^{24} + x^{20} + x^{19} + x^{18} + x^{16} \\
& + x^{15} + x^{13} + x^{12} + x^{11} + x^{10} + x^{9}, \\
p_6(x) = {} & x^{100} + x^{96} + x^{94} + x^{90} + x^{86} + x^{84} + x^{76} + x^{74} + x^{68} + x^{62} + x^{54}
\end{aligned}$$

$$
\begin{aligned}
&+ x^{52} + x^{50} + x^{46} + x^{42} + x^{34} + x^{30} + x^{24} + x^{22} + x^{16} + x^{12} + x^{10} \\
&+ x^{8} + x^{6}, \\
p_9(x) &= x^{106} + x^{103} + x^{100} + x^{99} + x^{90} + x^{87} + x^{84} + x^{83} + x^{58} + x^{55} + x^{52} \\
&+ x^{51} + x^{42} + x^{39} + x^{36} + x^{35} + x^{26} + x^{23} + x^{20} + x^{19} + x^{10} + x^{7} \\
&+ x^{4} + x^{3}, \\
p_{12}(x) &= x^{112} + x^{108} + x^{104} + x^{96} + x^{84} + x^{80} + x^{64} + x^{60} + x^{56} + x^{48} + x^{36} \\
&+ x^{28} + x^{24} + x^{16} + x^{4} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{117} + x^{115} + x^{114} + x^{112} + x^{110} + x^{109} + x^{107} + x^{106} + x^{104} + x^{103} \\
&+ x^{102} + x^{100} + x^{99} + x^{97} + x^{96} + x^{94} + x^{93} + x^{91} + x^{90} + x^{88} + x^{85} \\
&+ x^{82} + x^{80} + x^{76} + x^{74} + x^{73} + x^{71} + x^{69} + x^{66} + x^{64} + x^{63} + x^{61} \\
&+ x^{60} + x^{58} + x^{56} + x^{55} + x^{53} + x^{52} + x^{51} + x^{50} + x^{49} + x^{47} + x^{44} \\
&+ x^{42} + x^{38} + x^{37} + x^{36} + x^{35} + x^{33}, \\
p_3(x) &= x^{109} + x^{107} + x^{106} + x^{104} + x^{102} + x^{101} + x^{99} + x^{98} + x^{96} + x^{95} \\
&+ x^{94} + x^{92} + x^{91} + x^{89} + x^{88} + x^{86} + x^{85} + x^{83} + x^{81} + x^{79} + x^{78} \\
&+ x^{77} + x^{76} + x^{73} + x^{71} + x^{69} + x^{67} + x^{66} + x^{62} + x^{57} + x^{56} + x^{53} \\
&+ x^{52} + x^{50} + x^{44} + x^{43} + x^{42} + x^{40} + x^{39} + x^{38} + x^{37} + x^{36} + x^{34} \\
&+ x^{33} + x^{29} + x^{27} + x^{25} + x^{22} + x^{21} + x^{19} + x^{16} + x^{14} + x^{13} + x^{12}, \\
p_6(x) &= x^{111} + x^{109} + x^{108} + x^{103} + x^{100} + x^{97} + x^{89} + x^{88} + x^{87} + x^{84} + x^{83} \\
&+ x^{81} + x^{71} + x^{70} + x^{69} + x^{67} + x^{65} + x^{64} + x^{63} + x^{62} + x^{61} + x^{59} \\
&+ x^{58} + x^{57} + x^{53} + x^{51} + x^{48} + x^{46} + x^{44} + x^{43} + x^{42} + x^{40} + x^{39} \\
&+ x^{38} + x^{34} + x^{31} + x^{30} + x^{29} + x^{22} + x^{21} + x^{20} + x^{19} + x^{16} + x^{15} \\
&+ x^{13} + x^{12} + x^{11} + x^{5} + x^{3} + x^{2} + x + 1, \\
p_9(x) &= x^{109} + x^{107} + x^{106} + x^{104} + x^{103} + x^{102} + x^{101} + x^{100} + x^{93} + x^{91} \\
&+ x^{90} + x^{88} + x^{87} + x^{86} + x^{85} + x^{84} + x^{61} + x^{59} + x^{58} + x^{56} + x^{55} \\
&+ x^{54} + x^{53} + x^{52} + x^{45} + x^{43} + x^{42} + x^{40} + x^{39} + x^{38} + x^{37} + x^{36} \\
&+ x^{29} + x^{27} + x^{26} + x^{24} + x^{23} + x^{22} + x^{21} + x^{20} + x^{13} + x^{11} + x^{10} \\
&+ x^{8} + x^{7} + x^{6} + x^{5} + x^{4}, \\
p_{12}(x) &= x^{117} + x^{115} + x^{114} + x^{112} + x^{111} + x^{110} + x^{108} + x^{107} + x^{106} + x^{105} \\
&+ x^{104} + x^{101} + x^{99} + x^{98} + x^{97} + x^{96} + x^{89} + x^{87} + x^{86} + x^{84} + x^{83} \\
&+ x^{82} + x^{81} + x^{80} + x^{69} + x^{67} + x^{66} + x^{64} + x^{63} + x^{62} + x^{60} + x^{59} \\
&+ x^{58} + x^{57} + x^{56} + x^{53} + x^{51} + x^{50} + x^{49} + x^{48} + x^{41} + x^{39} + x^{38} \\
&+ x^{37} + x^{36} + x^{33} + x^{31} + x^{30} + x^{28} + x^{27} + x^{26} + x^{25} + x^{24} + x^{21} \\
&+ x^{19} + x^{18} + x^{17} + x^{16} + x^{9} + x^{7} + x^{6} + x^{4} + x^{3} + x^{2} + x + 1,
\end{aligned}
$$

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

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

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

n	$\Lambda(n)$	n	$\Lambda(n)$	n	$\Lambda(n)$	n	$\Lambda(n)$
0	[1, 2]	996	[1723, 1724]	1992	[2962, 2715]	2988	[3726, 3727]
1	[3, 4]	997	[533, 1725]	1993	[2550, 1365]	2989	[1708, 736]
2	[5, 6]	998	[1726, 1727]	1994	[2639, 2963]	2990	[3504, 1765]
3	[7, 8]	999	[1728, 1729]	1995	[455, 1168]	2991	[550, 1954]
4	[9, 10]	1000	[1663, 658]	1996	[2923, 2964]	2992	[3414, 3657]
5	[11, 12]	1001	[1574, 1730]	1997	[2965, 1279]	2993	[2302, 3728]
6	[13, 14]	1002	[1731, 1732]	1998	[1268, 366]	2994	[3597, 3615]
7	[15, 16]	1003	[1733, 706]	1999	[2966, 2967]	2995	[2351, 2361]
8	[17, 18]	1004	[1734, 219]	2000	[2968, 2969]	2996	[3664, 1830]
9	[19, 20]	1005	[1735, 1736]	2001	[2970, 2971]	2997	[3459, 1864]
10	[21, 22]	1006	[504, 1737]	2002	[2972, 2973]	2998	[3729, 3506]
11	[23, 24]	1007	[773, 1738]	2003	[955, 2452]	2999	[1565, 845]
12	[25, 26]	1008	[1739, 1740]	2004	[2819, 2826]	3000	[829, 3730]
13	[27, 28]	1009	[1741, 127]	2005	[2974, 2680]	3001	[849, 1596]
14	[29, 30]	1010	[1650, 1742]	2006	[2975, 2976]	3002	[3728, 2077]
15	[31, 32]	1011	[1743, 1744]	2007	[2728, 2977]	3003	[42, 1826]
16	[33, 34]	1012	[799, 1745]	2008	[363, 1159]	3004	[859, 622]
17	[35, 36]	1013	[763, 1746]	2009	[2813, 2732]	3005	[3731, 1707]
18	[37, 38]	1014	[1747, 1748]	2010	[2730, 2978]	3006	[1827, 3732]
19	[39, 40]	1015	[1749, 1750]	2011	[2979, 2980]	3007	[637, 2334]
20	[41, 42]	1016	[1751, 1752]	2012	[2667, 1505]	3008	[2102, 2096]
21	[43, 44]	1017	[1753, 1754]	2013	[2981, 2858]	3009	[1891, 817]
22	[45, 46]	1018	[1755, 1756]	2014	[1322, 2524]	3010	[3733, 3646]
23	[47, 48]	1019	[727, 493]	2015	[2982, 2914]	3011	[1802, 1584]
24	[49, 50]	1020	[1757, 144]	2016	[2983, 2984]	3012	[3734, 2001]
25	[51, 52]	1021	[1611, 1758]	2017	[2985, 247]	3013	[3735, 3736]
26	[53, 54]	1022	[698, 1759]	2018	[1346, 2986]	3014	[2401, 3737]
27	[55, 56]	1023	[1760, 1761]	2019	[1356, 273]	3015	[645, 2230]
28	[57, 58]	1024	[8, 1762]	2020	[2742, 1367]	3016	[2267, 1753]
29	[59, 60]	1025	[1763, 1764]	2021	[2932, 1025]	3017	[3738, 1879]
30	[61, 62]	1026	[1765, 1766]	2022	[2562, 1494]	3018	[3739, 1966]
31	[63, 64]	1027	[1767, 858]	2023	[2987, 2988]	3019	[1855, 3317]
32	[28, 65]	1028	[1768, 1769]	2024	[2989, 461]	3020	[3740, 3444]
33	[66, 67]	1029	[203, 1770]	2025	[2990, 2991]	3021	[3605, 3741]
34	[68, 69]	1030	[205, 1771]	2026	[2756, 2992]	3022	[3582, 1568]
35	[70, 71]	1031	[1561, 215]	2027	[2829, 372]	3023	[3742, 3743]
36	[72, 73]	1032	[1772, 1530]	2028	[2993, 2573]	3024	[3744, 2372]
37	[74, 75]	1033	[864, 1773]	2029	[2794, 2869]	3025	[3707, 811]
38	[76, 77]	1034	[1774, 1775]	2030	[2899, 2570]	3026	[3745, 646]

39	[78, 79]	1035	[1776, 196]	2031	[2900, 2994]	3027	[3561, 3685]
40	[80, 81]	1036	[1777, 1778]	2032	[349, 2995]	3028	[3584, 3746]
41	[82, 83]	1037	[1779, 525]	2033	[2996, 2997]	3029	[2379, 3669]
42	[84, 85]	1038	[1780, 788]	2034	[2998, 2645]	3030	[3747, 1840]
43	[86, 87]	1039	[1722, 746]	2035	[2999, 2474]	3031	[3748, 3600]
44	[88, 89]	1040	[189, 1781]	2036	[2685, 3000]	3032	[3512, 3333]
45	[90, 91]	1041	[1782, 1726]	2037	[3001, 2791]	3033	[3749, 1896]
46	[92, 93]	1042	[1783, 1784]	2038	[2424, 2880]	3034	[1805, 3380]
47	[94, 95]	1043	[1785, 1786]	2039	[2507, 2769]	3035	[3750, 3555]
48	[96, 97]	1044	[1787, 1788]	2040	[3002, 309]	3036	[2121, 1538]
49	[98, 99]	1045	[1789, 1790]	2041	[3003, 1380]	3037	[3751, 684]
50	[100, 101]	1046	[1791, 1792]	2042	[1522, 1456]	3038	[3720, 3509]
51	[102, 103]	1047	[1642, 1793]	2043	[3004, 3005]	3039	[1988, 3729]
52	[104, 105]	1048	[1794, 1795]	2044	[2440, 3006]	3040	[3628, 1755]
53	[106, 107]	1049	[559, 1796]	2045	[3007, 3008]	3041	[1754, 2259]
54	[108, 109]	1050	[1797, 1798]	2046	[2697, 3009]	3042	[789, 3750]
55	[110, 111]	1051	[1799, 1800]	2047	[3010, 2868]	3043	[3752, 3320]
56	[112, 113]	1052	[1801, 1802]	2048	[2967, 3011]	3044	[1730, 3587]
57	[114, 115]	1053	[1803, 678]	2049	[3012, 1191]	3045	[506, 663]
58	[116, 117]	1054	[1804, 1805]	2050	[3013, 3014]	3046	[2111, 1873]
59	[118, 119]	1055	[212, 1806]	2051	[3015, 2565]	3047	[137, 3288]
60	[120, 121]	1056	[1807, 1612]	2052	[3016, 3017]	3048	[481, 3651]
61	[122, 123]	1057	[743, 188]	2053	[1106, 1490]	3049	[3406, 2139]
62	[124, 125]	1058	[1808, 1791]	2054	[1400, 1398]	3050	[3753, 3754]
63	[126, 127]	1059	[1809, 1810]	2055	[326, 2631]	3051	[3755, 2289]
64	[128, 129]	1060	[1811, 1812]	2056	[2785, 3018]	3052	[3507, 847]
65	[130, 131]	1061	[1770, 1749]	2057	[2994, 933]	3053	[3756, 1699]
66	[132, 133]	1062	[1813, 517]	2058	[3019, 2439]	3054	[3713, 241]
67	[134, 135]	1063	[1814, 1815]	2059	[3020, 333]	3055	[3696, 3757]
68	[136, 137]	1064	[1816, 1817]	2060	[3021, 3022]	3056	[1607, 3580]
69	[138, 139]	1065	[1745, 1818]	2061	[3023, 3024]	3057	[1590, 1917]
70	[140, 141]	1066	[1819, 1820]	2062	[3025, 3026]	3058	[1857, 3457]
71	[142, 143]	1067	[1821, 1822]	2063	[3027, 3028]	3059	[3758, 3733]
72	[144, 145]	1068	[1823, 1824]	2064	[1130, 413]	3060	[2178, 3347]
73	[146, 147]	1069	[1825, 1683]	2065	[3029, 3030]	3061	[2033, 3759]
74	[148, 149]	1070	[1826, 1827]	2066	[2584, 3031]	3062	[232, 2191]
75	[150, 151]	1071	[1828, 1829]	2067	[3032, 3033]	3063	[1628, 1715]
76	[152, 153]	1072	[1830, 1831]	2068	[1053, 2804]	3064	[2236, 1915]
77	[154, 61]	1073	[1832, 1833]	2069	[3034, 2575]	3065	[2088, 3752]
78	[155, 156]	1074	[1834, 243]	2070	[3035, 3036]	3066	[3741, 605]
79	[157, 158]	1075	[1835, 1836]	2071	[3037, 1510]	3067	[2201, 3725]
80	[159, 160]	1076	[1837, 668]	2072	[2928, 3038]	3068	[3760, 774]
81	[161, 162]	1077	[1838, 1839]	2073	[3039, 104]	3069	[3761, 3762]
82	[163, 164]	1078	[1840, 1664]	2074	[3040, 3041]	3070	[2020, 766]

83	[165, 166]	1079	[1841, 1704]	2075	[2497, 3042]	3071	[582, 3547]
84	[167, 168]	1080	[1842, 1843]	2076	[3043, 319]	3072	[3339, 3691]
85	[169, 170]	1081	[1844, 1845]	2077	[2872, 2482]	3073	[2391, 3377]
86	[171, 172]	1082	[1846, 1847]	2078	[3044, 2653]	3074	[3675, 3488]
87	[173, 174]	1083	[1848, 1849]	2079	[3045, 2893]	3075	[3763, 2075]
88	[175, 176]	1084	[1850, 1851]	2080	[3031, 2566]	3076	[3759, 3764]
89	[177, 178]	1085	[1852, 1853]	2081	[439, 2538]	3077	[3765, 3751]
90	[179, 180]	1086	[1854, 1855]	2082	[2935, 3046]	3078	[2166, 3492]
91	[181, 182]	1087	[1856, 1857]	2083	[1495, 3047]	3079	[3766, 3767]
92	[183, 184]	1088	[1858, 1859]	2084	[3048, 404]	3080	[868, 3753]
93	[185, 186]	1089	[1860, 752]	2085	[2780, 2922]	3081	[1537, 3348]
94	[2, 187]	1090	[1861, 1862]	2086	[1404, 3049]	3082	[3768, 3564]
95	[188, 189]	1091	[1863, 1760]	2087	[3050, 3051]	3083	[1622, 2117]
96	[190, 191]	1092	[1764, 715]	2088	[3052, 3053]	3084	[3329, 3686]
97	[192, 193]	1093	[1864, 1865]	2089	[3054, 122]	3085	[3662, 3565]
98	[194, 195]	1094	[1866, 536]	2090	[314, 1409]	3086	[1916, 1649]
99	[196, 197]	1095	[1867, 1868]	2091	[3055, 3040]	3087	[3769, 3468]
100	[198, 199]	1096	[1869, 808]	2092	[3056, 3044]	3088	[3770, 1854]
101	[200, 201]	1097	[765, 1870]	2093	[1162, 3057]	3089	[2308, 547]
102	[202, 203]	1098	[1871, 1872]	2094	[3058, 3059]	3090	[3771, 3772]
103	[204, 205]	1099	[1873, 1874]	2095	[1444, 2557]	3091	[3419, 3695]
104	[206, 177]	1100	[1716, 161]	2096	[2745, 1244]	3092	[3671, 1972]
105	[207, 208]	1101	[1875, 1876]	2097	[3060, 900]	3093	[3307, 155]
106	[209, 210]	1102	[1877, 1878]	2098	[3061, 2989]	3094	[1839, 2387]
107	[211, 212]	1103	[1879, 628]	2099	[2741, 1497]	3095	[2294, 3289]
108	[213, 214]	1104	[1880, 1881]	2100	[2414, 1375]	3096	[1738, 2273]
109	[215, 216]	1105	[1882, 1883]	2101	[3062, 3063]	3097	[2355, 3682]
110	[217, 218]	1106	[1884, 1885]	2102	[3064, 1205]	3098	[3678, 1983]
111	[219, 220]	1107	[616, 1774]	2103	[3065, 3066]	3099	[2113, 528]
112	[221, 222]	1108	[1665, 1886]	2104	[3067, 1414]	3100	[3647, 3773]
113	[223, 224]	1109	[1573, 1887]	2105	[337, 2929]	3101	[3774, 3689]
114	[225, 226]	1110	[1888, 1889]	2106	[3068, 3069]	3102	[2207, 2225]
115	[227, 228]	1111	[1890, 1891]	2107	[3070, 2831]	3103	[1993, 819]
116	[229, 230]	1112	[1892, 1893]	2108	[3030, 2894]	3104	[1817, 3411]
117	[231, 232]	1113	[1894, 1895]	2109	[1416, 3071]	3105	[3772, 3484]
118	[233, 234]	1114	[1896, 1897]	2110	[1208, 360]	3106	[2390, 3760]
119	[235, 236]	1115	[1898, 194]	2111	[3072, 1016]	3107	[861, 3755]
120	[131, 237]	1116	[1899, 1900]	2112	[2925, 975]	3108	[191, 530]
121	[238, 142]	1117	[1624, 1901]	2113	[2588, 3070]	3109	[3528, 2254]
122	[239, 240]	1118	[618, 1902]	2114	[3073, 1083]	3110	[3350, 1645]
123	[241, 242]	1119	[1893, 1903]	2115	[2537, 913]	3111	[2215, 3775]
124	[243, 244]	1120	[1904, 1905]	2116	[3074, 2941]	3112	[1736, 1757]
125	[245, 47]	1121	[1906, 1907]	2117	[2658, 3075]	3113	[3398, 2171]
126	[246, 247]	1122	[1908, 1909]	2118	[2540, 2498]	3114	[3698, 823]

127	[248, 249]	1123	[40, 713]	2119	[3076, 3077]	3115	[2064, 1861]
128	[85, 250]	1124	[1910, 626]	2120	[3078, 3079]	3116	[3776, 2138]
129	[251, 252]	1125	[1911, 1912]	2121	[3080, 2974]	3117	[1870, 1959]
130	[253, 254]	1126	[1913, 1914]	2122	[2461, 3067]	3118	[3773, 179]
131	[255, 256]	1127	[1915, 1916]	2123	[2950, 114]	3119	[2031, 2056]
132	[257, 258]	1128	[1917, 1918]	2124	[2438, 3081]	3120	[3417, 1705]
133	[259, 260]	1129	[1919, 1890]	2125	[3082, 3083]	3121	[1671, 3661]
134	[261, 262]	1130	[1651, 2]	2126	[2944, 3084]	3122	[1694, 573]
135	[263, 264]	1131	[1920, 1921]	2127	[1152, 2470]	3123	[3572, 2099]
136	[265, 266]	1132	[1922, 1923]	2128	[3085, 2777]	3124	[2293, 691]
137	[267, 268]	1133	[1849, 555]	2129	[3086, 3087]	3125	[3649, 3705]
138	[269, 270]	1134	[1924, 1925]	2130	[3088, 1107]	3126	[2106, 3777]
139	[271, 272]	1135	[1926, 1803]	2131	[3051, 3089]	3127	[1549, 3503]
140	[273, 274]	1136	[1927, 1928]	2132	[3090, 995]	3128	[3778, 1913]
141	[275, 263]	1137	[1929, 1930]	2133	[422, 3091]	3129	[1874, 1629]
142	[276, 277]	1138	[1931, 1932]	2134	[2621, 1272]	3130	[3779, 3534]
143	[278, 279]	1139	[761, 693]	2135	[1212, 1114]	3131	[3388, 3780]
144	[280, 281]	1140	[1933, 1934]	2136	[2964, 2920]	3132	[593, 3781]
145	[282, 283]	1141	[1775, 860]	2137	[3092, 1166]	3133	[3782, 3622]
146	[73, 284]	1142	[1935, 1936]	2138	[322, 429]	3134	[1914, 3670]
147	[285, 286]	1143	[1937, 1938]	2139	[1206, 2886]	3135	[3385, 2287]
148	[287, 288]	1144	[1939, 1690]	2140	[2517, 3093]	3136	[2231, 1528]
149	[289, 290]	1145	[1940, 1941]	2141	[3094, 3095]	3137	[2042, 3335]
150	[291, 292]	1146	[1942, 1943]	2142	[2716, 2931]	3138	[3290, 3415]
151	[293, 294]	1147	[1944, 1801]	2143	[3096, 1405]	3139	[3483, 3610]
152	[295, 296]	1148	[853, 1945]	2144	[1359, 2762]	3140	[3680, 3477]
153	[297, 298]	1149	[1946, 1641]	2145	[2532, 3097]	3141	[3746, 3783]
154	[299, 300]	1150	[1947, 1846]	2146	[1247, 3098]	3142	[3784, 656]
155	[301, 282]	1151	[1948, 1949]	2147	[2726, 3099]	3143	[2025, 3585]
156	[302, 303]	1152	[1950, 1951]	2148	[3100, 3101]	3144	[2285, 3478]
157	[300, 304]	1153	[1952, 1953]	2149	[1126, 427]	3145	[3785, 3536]
158	[305, 306]	1154	[1954, 1582]	2150	[1489, 1270]	3146	[1648, 3674]
159	[307, 308]	1155	[835, 1955]	2151	[3102, 1362]	3147	[1691, 3786]
160	[309, 310]	1156	[1956, 1585]	2152	[1424, 3103]	3148	[3787, 1763]
161	[311, 312]	1157	[1957, 1958]	2153	[3104, 3105]	3149	[3693, 1731]
162	[313, 314]	1158	[1959, 1660]	2154	[3106, 2506]	3150	[3788, 128]
163	[315, 316]	1159	[1960, 1961]	2155	[945, 3107]	3151	[1923, 1869]
164	[317, 318]	1160	[58, 1962]	2156	[1303, 925]	3152	[3789, 3313]
165	[319, 320]	1161	[1963, 1964]	2157	[3108, 1496]	3153	[3780, 3790]
166	[321, 322]	1162	[846, 1965]	2158	[3109, 1170]	3154	[2306, 3734]
167	[323, 324]	1163	[1966, 1967]	2159	[373, 1177]	3155	[3521, 2006]
168	[325, 326]	1164	[1968, 1525]	2160	[1501, 2579]	3156	[2072, 1768]
169	[327, 328]	1165	[1969, 1970]	2161	[3110, 3088]	3157	[1961, 2341]
170	[329, 330]	1166	[1971, 772]	2162	[3111, 3112]	3158	[3791, 2028]

171	[331, 332]	1167	[1972, 1973]	2163	[3113, 2939]	3159	[473, 3418]
172	[333, 334]	1168	[242, 204]	2164	[3114, 3115]	3160	[3623, 1619]
173	[335, 25]	1169	[208, 1974]	2165	[3116, 3117]	3161	[3581, 3556]
174	[336, 337]	1170	[1975, 1976]	2166	[3118, 1218]	3162	[197, 3472]
175	[296, 338]	1171	[1977, 1777]	2167	[2795, 3119]	3163	[3533, 1526]
176	[298, 339]	1172	[1773, 1978]	2168	[75, 3054]	3164	[1964, 568]
177	[340, 341]	1173	[1781, 1979]	2169	[2910, 982]	3165	[2275, 3740]
178	[342, 343]	1174	[1980, 1981]	2170	[3120, 984]	3166	[696, 3792]
179	[344, 345]	1175	[135, 1982]	2171	[1387, 1131]	3167	[1740, 1646]
180	[346, 347]	1176	[1983, 560]	2172	[1134, 2651]	3168	[1732, 869]
181	[348, 349]	1177	[1921, 1984]	2173	[3121, 2866]	3169	[3423, 487]
182	[350, 351]	1178	[703, 1985]	2174	[3122, 3123]	3170	[3754, 3793]
183	[352, 353]	1179	[1986, 1987]	2175	[3124, 3125]	3171	[3794, 3795]
184	[354, 355]	1180	[133, 1988]	2176	[2559, 2520]	3172	[2015, 1610]
185	[356, 357]	1181	[1989, 768]	2177	[3126, 1215]	3173	[2037, 3788]
186	[358, 359]	1182	[599, 1990]	2178	[3127, 3128]	3174	[708, 780]
187	[360, 361]	1183	[1991, 1741]	2179	[3018, 1349]	3175	[841, 3791]
188	[362, 363]	1184	[1992, 1993]	2180	[3129, 3130]	3176	[3796, 2032]
189	[364, 365]	1185	[673, 1994]	2181	[3131, 16]	3177	[471, 3599]
190	[366, 257]	1186	[1995, 1996]	2182	[2687, 928]	3178	[3490, 3479]
191	[367, 368]	1187	[1997, 1779]	2183	[2945, 3132]	3179	[830, 3306]
192	[369, 370]	1188	[809, 719]	2184	[3041, 3133]	3180	[1788, 3797]
193	[371, 17]	1189	[705, 1998]	2185	[3134, 3135]	3181	[2131, 827]
194	[372, 373]	1190	[1984, 790]	2186	[2817, 3136]	3182	[3762, 3429]
195	[374, 375]	1191	[1999, 2000]	2187	[3123, 90]	3183	[3797, 3672]
196	[347, 376]	1192	[2001, 2002]	2188	[3137, 1020]	3184	[3781, 3424]
197	[377, 378]	1193	[1982, 2003]	2189	[1044, 1379]	3185	[1539, 3604]
198	[379, 380]	1194	[664, 2004]	2190	[2946, 935]	3186	[2251, 3798]
199	[381, 382]	1195	[570, 2005]	2191	[24, 2801]	3187	[3702, 3799]
200	[383, 384]	1196	[2006, 2007]	2192	[26, 2486]	3188	[3701, 3796]
201	[385, 386]	1197	[2008, 2009]	2193	[3138, 3139]	3189	[3694, 3437]
202	[387, 388]	1198	[2010, 1601]	2194	[3140, 1204]	3190	[2079, 3789]
203	[389, 390]	1199	[2011, 566]	2195	[1008, 3096]	3191	[1918, 1808]
204	[391, 392]	1200	[569, 2012]	2196	[3141, 3142]	3192	[2047, 3749]
205	[393, 379]	1201	[1976, 2013]	2197	[3143, 1258]	3193	[3795, 3609]
206	[394, 395]	1202	[2014, 2015]	2198	[3046, 2664]	3194	[1868, 1717]
207	[396, 397]	1203	[2016, 2017]	2199	[3047, 2411]	3195	[639, 3742]
208	[398, 399]	1204	[220, 2018]	2200	[3144, 3145]	3196	[3800, 1668]
209	[400, 401]	1205	[2019, 2020]	2201	[3146, 3147]	3197	[2313, 1809]
210	[402, 403]	1206	[483, 2021]	2202	[3148, 1438]	3198	[1889, 33]
211	[404, 64]	1207	[180, 2022]	2203	[3145, 2879]	3199	[3801, 3779]
212	[405, 406]	1208	[2023, 2024]	2204	[2436, 78]	3200	[3460, 1863]
213	[407, 408]	1209	[230, 2025]	2205	[1350, 911]	3201	[3802, 3704]
214	[409, 410]	1210	[1790, 865]	2206	[1071, 120]	3202	[3699, 2394]

215	[411, 412]	1211	[1798, 2026]	2207	[3149, 3150]	3203	[822, 3747]
216	[413, 414]	1212	[2027, 1898]	2208	[399, 3151]	3204	[1903, 850]
217	[415, 416]	1213	[2028, 2029]	2209	[3152, 1121]	3205	[1973, 3803]
218	[417, 418]	1214	[2030, 2031]	2210	[441, 3153]	3206	[2280, 1804]
219	[419, 420]	1215	[2032, 2033]	2211	[3154, 3155]	3207	[3804, 3805]
220	[421, 422]	1216	[2034, 2035]	2212	[3117, 1157]	3208	[2367, 3327]
221	[423, 424]	1217	[2036, 2037]	2213	[3156, 971]	3209	[3319, 1952]
222	[425, 426]	1218	[2038, 2039]	2214	[3157, 3080]	3210	[603, 3806]
223	[427, 428]	1219	[1771, 1652]	2215	[1369, 3146]	3211	[3717, 3636]
224	[429, 430]	1220	[2040, 2041]	2216	[1113, 3158]	3212	[2368, 1924]
225	[431, 432]	1221	[1778, 2042]	2217	[1051, 3029]	3213	[2021, 1947]
226	[433, 434]	1222	[1865, 2043]	2218	[3159, 3160]	3214	[3344, 3714]
227	[435, 336]	1223	[2044, 2045]	2219	[2679, 2936]	3215	[3807, 3715]
228	[436, 437]	1224	[2046, 2047]	2220	[256, 3161]	3216	[3403, 3523]
229	[438, 439]	1225	[2048, 2049]	2221	[1427, 3162]	3217	[3621, 2128]
230	[440, 441]	1226	[1965, 2050]	2222	[2921, 3012]	3218	[158, 480]
231	[442, 443]	1227	[2051, 2052]	2223	[2953, 2814]	3219	[1786, 3392]
232	[444, 445]	1228	[201, 2053]	2224	[3071, 2934]	3220	[3531, 1899]
233	[446, 447]	1229	[757, 2054]	2225	[1435, 84]	3221	[3391, 173]
234	[448, 449]	1230	[56, 2055]	2226	[3150, 1002]	3222	[3372, 3808]
235	[450, 451]	1231	[2056, 2057]	2227	[3163, 3131]	3223	[1525, 1799]
236	[452, 453]	1232	[1758, 828]	2228	[914, 3164]	3224	[1527, 1877]
237	[454, 455]	1233	[2058, 1548]	2229	[3165, 3166]	3225	[3809, 3677]
238	[456, 348]	1234	[2059, 2060]	2230	[3167, 3065]	3226	[3550, 3450]
239	[457, 458]	1235	[1529, 832]	2231	[125, 2410]	3227	[3810, 3589]
240	[459, 460]	1236	[2061, 2062]	2232	[2852, 3114]	3228	[3811, 1986]
241	[461, 462]	1237	[2063, 2064]	2233	[447, 1155]	3229	[3798, 509]
242	[463, 464]	1238	[2065, 2066]	2234	[283, 317]	3230	[2195, 3294]
243	[465, 466]	1239	[2067, 2068]	2235	[3168, 2885]	3231	[3386, 745]
244	[467, 468]	1240	[2069, 2070]	2236	[2847, 297]	3232	[1815, 3785]
245	[469, 96]	1241	[2071, 2072]	2237	[3169, 1445]	3233	[683, 206]
246	[470, 471]	1242	[1625, 1963]	2238	[2435, 1274]	3234	[3562, 3723]
247	[472, 473]	1243	[1679, 217]	2239	[3057, 2480]	3235	[3712, 3328]
248	[474, 233]	1244	[2073, 2023]	2240	[3166, 3020]	3236	[3318, 3681]
249	[475, 476]	1245	[2074, 581]	2241	[3170, 3171]	3237	[3812, 652]
250	[12, 477]	1246	[2075, 2076]	2242	[1203, 3172]	3238	[3487, 3645]
251	[478, 479]	1247	[2077, 1579]	2243	[3173, 3174]	3239	[2159, 3745]
252	[480, 481]	1248	[2078, 2079]	2244	[3175, 3073]	3240	[3543, 3341]
253	[482, 483]	1249	[2080, 475]	2245	[3164, 2975]	3241	[214, 1946]
254	[484, 136]	1250	[2081, 1662]	2246	[3176, 3126]	3242	[872, 3801]
255	[485, 486]	1251	[692, 724]	2247	[1330, 1403]	3243	[3402, 3467]
256	[487, 488]	1252	[2082, 2083]	2248	[2650, 3004]	3244	[2052, 3399]
257	[489, 490]	1253	[1591, 802]	2249	[437, 2549]	3245	[3653, 3405]
258	[491, 492]	1254	[1928, 1546]	2250	[3177, 3019]	3246	[2158, 2378]

259	[493, 494]	1255	[2084, 2085]	2251	[943, 2415]	3247	[2149, 3811]
260	[495, 496]	1256	[2086, 2087]	2252	[3178, 2614]	3248	[2188, 3638]
261	[497, 498]	1257	[716, 630]	2253	[3179, 3016]	3249	[2066, 2108]
262	[499, 500]	1258	[614, 2088]	2254	[3180, 2865]	3250	[1943, 3774]
263	[501, 502]	1259	[2085, 1892]	2255	[3181, 2625]	3251	[3505, 756]
264	[503, 504]	1260	[2089, 154]	2256	[3182, 3183]	3252	[168, 3630]
265	[505, 506]	1261	[785, 2090]	2257	[3184, 3010]	3253	[1998, 1789]
266	[507, 508]	1262	[2091, 744]	2258	[3091, 3060]	3254	[1706, 2271]
267	[509, 510]	1263	[2076, 2092]	2259	[2991, 425]	3255	[516, 670]
268	[511, 512]	1264	[1886, 2093]	2260	[3079, 3185]	3256	[1951, 3629]
269	[513, 514]	1265	[2094, 2095]	2261	[2547, 3186]	3257	[1557, 3603]
270	[515, 516]	1266	[649, 198]	2262	[3099, 1123]	3258	[184, 3731]
271	[517, 518]	1267	[2096, 689]	2263	[3187, 2586]	3259	[3573, 3498]
272	[193, 519]	1268	[1843, 2097]	2264	[277, 1110]	3260	[3475, 3813]
273	[520, 521]	1269	[2098, 51]	2265	[2555, 3188]	3261	[3814, 575]
274	[522, 523]	1270	[2099, 854]	2266	[2766, 882]	3262	[3596, 3652]
275	[524, 503]	1271	[2100, 1816]	2267	[3059, 3189]	3263	[3786, 3802]
276	[525, 526]	1272	[2101, 53]	2268	[1023, 3190]	3264	[1720, 3761]
277	[139, 527]	1273	[1784, 2102]	2269	[3158, 259]	3265	[1693, 3612]
278	[528, 529]	1274	[2103, 2104]	2270	[3191, 1057]	3266	[3815, 1672]
279	[530, 531]	1275	[2105, 2106]	2271	[2654, 3192]	3267	[1912, 3735]
280	[532, 533]	1276	[1902, 2107]	2272	[2525, 2627]	3268	[3764, 1712]
281	[534, 535]	1277	[2108, 2080]	2273	[1373, 3064]	3269	[3687, 2235]
282	[536, 537]	1278	[805, 2109]	2274	[1357, 3116]	3270	[3458, 3667]
283	[538, 539]	1279	[2110, 2111]	2275	[2913, 3193]	3271	[843, 730]
284	[145, 540]	1280	[2112, 2113]	2276	[1096, 3194]	3272	[838, 1767]
285	[541, 542]	1281	[2002, 2114]	2277	[1318, 2528]	3273	[585, 3322]
286	[543, 544]	1282	[518, 2115]	2278	[1486, 3195]	3274	[1637, 3522]
287	[545, 546]	1283	[2116, 1811]	2279	[2927, 3196]	3275	[2190, 3816]
288	[547, 548]	1284	[2117, 2118]	2280	[1418, 2985]	3276	[3767, 3817]
289	[549, 550]	1285	[2119, 2120]	2281	[2958, 2840]	3277	[3818, 686]
290	[551, 552]	1286	[1684, 2121]	2282	[3119, 3197]	3278	[3806, 3770]
291	[553, 554]	1287	[2122, 1577]	2283	[2961, 1384]	3279	[2382, 3614]
292	[555, 556]	1288	[2123, 2124]	2284	[2859, 2824]	3280	[3730, 3716]
293	[521, 557]	1289	[2125, 2126]	2285	[1200, 2888]	3281	[3625, 2314]
294	[558, 559]	1290	[1626, 2127]	2286	[1111, 3198]	3282	[3819, 3778]
295	[560, 561]	1291	[2128, 1743]	2287	[3199, 3129]	3283	[3820, 1049]
296	[562, 563]	1292	[2129, 1837]	2288	[3200, 3165]	3284	[2850, 3124]
297	[564, 565]	1293	[2130, 2131]	2289	[3201, 3202]	3285	[1437, 3154]
298	[566, 567]	1294	[2132, 2133]	2290	[3203, 2952]	3286	[3821, 100]
299	[568, 569]	1295	[2097, 2134]	2291	[3204, 2567]	3287	[2491, 1225]
300	[226, 570]	1296	[2135, 2136]	2292	[2930, 1352]	3288	[3822, 1515]
301	[571, 572]	1297	[2137, 638]	2293	[2878, 1317]	3289	[1491, 86]
302	[573, 574]	1298	[2138, 223]	2294	[3205, 2445]	3290	[1074, 299]

303	[575, 576]	1299	[2139, 152]	2295	[3206, 3207]	3291	[2705, 3823]
304	[577, 578]	1300	[1905, 1871]	2296	[3017, 1467]	3292	[3253, 3824]
305	[579, 580]	1301	[2140, 2141]	2297	[1520, 3208]	3293	[2429, 3825]
306	[581, 582]	1302	[733, 1594]	2298	[2442, 3209]	3294	[934, 2835]
307	[583, 207]	1303	[1756, 2142]	2299	[2862, 2558]	3295	[3098, 906]
308	[584, 585]	1304	[2143, 1553]	2300	[2887, 3210]	3296	[993, 3826]
309	[586, 587]	1305	[488, 1554]	2301	[3211, 3055]	3297	[3212, 3001]
310	[588, 589]	1306	[1981, 2144]	2302	[2757, 3212]	3298	[1300, 2798]
311	[590, 591]	1307	[2145, 2146]	2303	[3213, 335]	3299	[970, 1302]
312	[592, 593]	1308	[1766, 2147]	2304	[2948, 3003]	3300	[1262, 2514]
313	[594, 595]	1309	[2148, 2149]	2305	[3214, 3215]	3301	[1493, 302]
314	[596, 597]	1310	[2150, 2151]	2306	[3216, 1360]	3302	[3077, 3213]
315	[598, 599]	1311	[2152, 2153]	2307	[3217, 3218]	3303	[2572, 2848]
316	[600, 601]	1312	[2154, 2155]	2308	[3219, 2696]	3304	[2643, 3257]
317	[602, 603]	1313	[240, 2156]	2309	[3220, 3221]	3305	[2807, 3827]
318	[539, 604]	1314	[1792, 1735]	2310	[966, 1129]	3306	[3828, 2905]
319	[605, 606]	1315	[2157, 2158]	2311	[1237, 2636]	3307	[416, 3829]
320	[607, 608]	1316	[1600, 2159]	2312	[1183, 2545]	3308	[378, 2917]
321	[609, 610]	1317	[2160, 2161]	2313	[959, 2446]	3309	[3830, 3191]
322	[611, 612]	1318	[2162, 2163]	2314	[2834, 1339]	3310	[3831, 878]
323	[613, 614]	1319	[2026, 2164]	2315	[3038, 3170]	3311	[3832, 3163]
324	[615, 616]	1320	[2165, 2166]	2316	[81, 3222]	3312	[1523, 2413]
325	[617, 618]	1321	[1571, 2167]	2317	[3223, 3224]	3313	[3264, 3068]
326	[619, 620]	1322	[2050, 2168]	2318	[359, 3056]	3314	[3833, 3834]
327	[621, 239]	1323	[2169, 2170]	2319	[3225, 3226]	3315	[1504, 3835]
328	[622, 623]	1324	[2171, 2172]	2320	[890, 3127]	3316	[3005, 1081]
329	[624, 625]	1325	[567, 2173]	2321	[3227, 456]	3317	[3836, 3837]
330	[626, 627]	1326	[2174, 2175]	2322	[2554, 2828]	3318	[2823, 3173]
331	[628, 629]	1327	[2176, 676]	2323	[3228, 3229]	3319	[3210, 19]
332	[630, 631]	1328	[2177, 2178]	2324	[1311, 3230]	3320	[3053, 454]
333	[632, 633]	1329	[2179, 579]	2325	[3231, 3232]	3321	[3838, 1297]
334	[634, 635]	1330	[2180, 2181]	2326	[3233, 3234]	3322	[3280, 3839]
335	[636, 637]	1331	[2182, 2183]	2327	[3235, 904]	3323	[3840, 1475]
336	[638, 639]	1332	[2184, 1832]	2328	[2628, 3178]	3324	[1115, 2471]
337	[640, 641]	1333	[2185, 2186]	2329	[3006, 3236]	3325	[3841, 3842]
338	[561, 642]	1334	[2187, 2188]	2330	[3008, 1458]	3326	[87, 417]
339	[565, 643]	1335	[2189, 2190]	2331	[254, 3237]	3327	[883, 3843]
340	[644, 645]	1336	[2191, 1719]	2332	[3238, 1288]	3328	[1160, 421]
341	[646, 647]	1337	[2192, 138]	2333	[3239, 3025]	3329	[97, 3216]
342	[648, 649]	1338	[1580, 1807]	2334	[2596, 2583]	3330	[3844, 1101]
343	[650, 651]	1339	[2193, 2140]	2335	[3240, 2448]	3331	[918, 1165]
344	[652, 653]	1340	[2194, 2195]	2336	[1431, 3134]	3332	[2419, 1254]
345	[654, 655]	1341	[2196, 2197]	2337	[3130, 3241]	3333	[1173, 998]
346	[656, 657]	1342	[2198, 2199]	2338	[1277, 1197]	3334	[2663, 3845]

347	[658, 659]	1343	[2200, 2201]	2339	[3042, 3242]	3335	[3245, 2443]
348	[660, 661]	1344	[839, 2202]	2340	[3097, 3243]	3336	[3011, 3846]
349	[10, 662]	1345	[2024, 2203]	2341	[895, 3244]	3337	[1479, 3847]
350	[663, 664]	1346	[2204, 2205]	2342	[2495, 3245]	3338	[2407, 3848]
351	[665, 666]	1347	[2206, 2207]	2343	[345, 3246]	3339	[1342, 3844]
352	[38, 667]	1348	[2208, 2209]	2344	[3247, 3248]	3340	[3281, 2597]
353	[668, 497]	1349	[1653, 1957]	2345	[2700, 2855]	3341	[2768, 3156]
354	[669, 522]	1350	[1881, 1587]	2346	[1422, 3062]	3342	[2581, 3072]
355	[670, 671]	1351	[2210, 2211]	2347	[1239, 3249]	3343	[1305, 889]
356	[672, 673]	1352	[1994, 2212]	2348	[3250, 3100]	3344	[466, 3157]
357	[674, 675]	1353	[666, 2213]	2349	[3251, 3052]	3345	[390, 1035]
358	[676, 677]	1354	[795, 157]	2350	[2751, 3235]	3346	[2841, 3159]
359	[678, 679]	1355	[2214, 2215]	2351	[2789, 2846]	3347	[953, 3849]
360	[680, 681]	1356	[2216, 181]	2352	[3252, 3253]	3348	[1476, 2863]
361	[682, 229]	1357	[1761, 2217]	2353	[2781, 3254]	3349	[926, 2430]
362	[677, 683]	1358	[2057, 2218]	2354	[3255, 88]	3350	[3850, 3851]
363	[684, 685]	1359	[2219, 2220]	2355	[3256, 2611]	3351	[2783, 2725]
364	[686, 687]	1360	[1750, 2125]	2356	[2799, 2955]	3352	[343, 1097]
365	[688, 615]	1361	[2221, 2222]	2357	[2563, 1242]	3353	[1516, 2460]
366	[689, 690]	1362	[2223, 2224]	2358	[3022, 3179]	3354	[3069, 415]
367	[691, 692]	1363	[2225, 2226]	2359	[2820, 2856]	3355	[3852, 2787]
368	[693, 694]	1364	[1859, 2227]	2360	[3105, 2622]	3356	[3853, 3090]
369	[695, 696]	1365	[2228, 2229]	2361	[3257, 2959]	3357	[1448, 3821]
370	[697, 698]	1366	[2230, 2231]	2362	[3190, 3228]	3358	[885, 3854]
371	[699, 37]	1367	[218, 1564]	2363	[3258, 3259]	3359	[2772, 3169]
372	[700, 701]	1368	[1742, 2071]	2364	[324, 2979]	3360	[3089, 2634]
373	[702, 703]	1369	[1900, 2232]	2365	[3260, 2875]	3361	[30, 2892]
374	[704, 705]	1370	[234, 2233]	2366	[3261, 448]	3362	[2924, 2489]
375	[706, 621]	1371	[498, 2234]	2367	[3262, 3263]	3363	[3834, 2987]
376	[707, 708]	1372	[2235, 2236]	2368	[1109, 3264]	3364	[972, 2516]
377	[709, 710]	1373	[2237, 2238]	2369	[2698, 3176]	3365	[103, 1029]
378	[711, 712]	1374	[2239, 2240]	2370	[3265, 2660]	3366	[3063, 990]
379	[713, 714]	1375	[2241, 2242]	2371	[3266, 2519]	3367	[2677, 1469]
380	[715, 716]	1376	[1552, 2243]	2372	[2618, 2999]	3368	[2971, 442]
381	[717, 718]	1377	[1682, 2244]	2373	[3267, 3268]	3369	[3827, 3217]
382	[719, 720]	1378	[479, 2112]	2374	[2681, 289]	3370	[3855, 1149]
383	[721, 722]	1379	[1752, 1544]	2375	[2748, 293]	3371	[3856, 3857]
384	[723, 55]	1380	[2245, 1856]	2376	[2764, 2901]	3372	[3858, 423]
385	[724, 725]	1381	[2246, 2247]	2377	[2845, 1328]	3373	[3854, 3039]
386	[726, 727]	1382	[2248, 2249]	2378	[3269, 1323]	3374	[3851, 3859]
387	[728, 729]	1383	[2250, 165]	2379	[2508, 3255]	3375	[3860, 1248]
388	[730, 731]	1384	[2167, 2251]	2380	[2641, 3074]	3376	[3861, 3862]
389	[732, 733]	1385	[2252, 1676]	2381	[1252, 3270]	3377	[3863, 3045]
390	[734, 735]	1386	[514, 2253]	2382	[3271, 2462]	3378	[2853, 3864]

391	[736, 737]	1387	[2254, 1950]	2383	[1498, 2473]	3379	[3107, 2624]
392	[738, 739]	1388	[2151, 2255]	2384	[1363, 398]	3380	[2720, 2983]
393	[740, 741]	1389	[2175, 2256]	2385	[3272, 3273]	3381	[1124, 3048]
394	[742, 743]	1390	[1996, 2135]	2386	[1446, 880]	3382	[3236, 3865]
395	[744, 695]	1391	[2035, 1697]	2387	[2733, 3274]	3383	[2876, 3199]
396	[745, 45]	1392	[2257, 2258]	2388	[2903, 3275]	3384	[1287, 3240]
397	[746, 747]	1393	[755, 2204]	2389	[3185, 3276]	3385	[3866, 3867]
398	[748, 749]	1394	[2259, 704]	2390	[3186, 3120]	3386	[3868, 3869]
399	[750, 751]	1395	[1604, 2008]	2391	[249, 2806]	3387	[3870, 1408]
400	[752, 753]	1396	[2260, 2261]	2392	[1410, 2906]	3388	[3871, 1325]
401	[754, 755]	1397	[2262, 227]	2393	[3277, 1331]	3389	[1473, 2784]
402	[756, 757]	1398	[490, 1572]	2394	[2735, 3278]	3390	[1383, 3002]
403	[758, 759]	1399	[2263, 2264]	2395	[3279, 2619]	3391	[3872, 1391]
404	[760, 761]	1400	[2265, 2200]	2396	[3195, 2644]	3392	[3873, 1040]
405	[762, 763]	1401	[2266, 2267]	2397	[3075, 2417]	3393	[3874, 3820]
406	[764, 765]	1402	[2268, 2269]	2398	[2409, 3280]	3394	[3846, 3875]
407	[766, 767]	1403	[2120, 2270]	2399	[3244, 3281]	3395	[3014, 3876]
408	[768, 769]	1404	[2229, 2239]	2400	[3282, 894]	3396	[3875, 1256]
409	[770, 771]	1405	[2271, 2272]	2401	[2919, 2965]	3397	[3877, 1031]
410	[772, 773]	1406	[2273, 820]	2402	[1, 1849]	3398	[2963, 2873]
411	[774, 775]	1407	[722, 2262]	2403	[1661, 2320]	3399	[2464, 3267]
412	[776, 777]	1408	[2274, 2275]	2404	[1979, 3283]	3400	[1188, 1240]
413	[778, 779]	1409	[595, 1536]	2405	[529, 130]	3401	[426, 3878]
414	[780, 781]	1410	[597, 2276]	2406	[2286, 3284]	3402	[957, 2882]
415	[779, 782]	1411	[2277, 2278]	2407	[753, 742]	3403	[3879, 1151]
416	[783, 784]	1412	[2279, 1858]	2408	[2092, 1842]	3404	[1104, 2403]
417	[162, 785]	1413	[2144, 2280]	2409	[3285, 2065]	3405	[3880, 3881]
418	[786, 787]	1414	[2281, 2282]	2410	[3286, 49]	3406	[121, 3833]
419	[788, 789]	1415	[2203, 1906]	2411	[2371, 3287]	3407	[2750, 1266]
420	[790, 791]	1416	[1862, 2283]	2412	[3288, 836]	3408	[3882, 311]
421	[792, 793]	1417	[2093, 2284]	2413	[662, 2241]	3409	[1482, 3883]
422	[794, 795]	1418	[1800, 2285]	2414	[3289, 501]	3410	[2895, 3884]
423	[796, 797]	1419	[606, 2286]	2415	[2399, 3290]	3411	[2633, 3885]
424	[798, 799]	1420	[2287, 2288]	2416	[3291, 2123]	3412	[3886, 2763]
425	[800, 801]	1421	[2289, 1908]	2417	[2124, 3292]	3413	[3847, 3887]
426	[802, 803]	1422	[2249, 213]	2418	[2009, 2063]	3414	[1088, 3058]
427	[804, 805]	1423	[1630, 2290]	2419	[3293, 1838]	3415	[272, 3271]
428	[806, 807]	1424	[2291, 2292]	2420	[3294, 1911]	3416	[1086, 3888]
429	[808, 809]	1425	[1907, 2293]	2421	[2340, 3295]	3417	[1223, 2655]
430	[612, 810]	1426	[1949, 2294]	2422	[3296, 171]	3418	[2652, 2466]
431	[811, 812]	1427	[2295, 1566]	2423	[3297, 3298]	3419	[3889, 1411]
432	[813, 814]	1428	[2296, 867]	2424	[3299, 760]	3420	[932, 3890]
433	[815, 816]	1429	[1885, 2297]	2425	[3300, 1776]	3421	[2683, 1291]
434	[817, 818]	1430	[1551, 2298]	2426	[3301, 3302]	3422	[303, 3838]

435	[819, 140]	1431	[2299, 1695]	2427	[633, 3303]	3423	[1406, 3891]
436	[820, 770]	1432	[2243, 584]	2428	[3304, 2326]	3424	[1091, 1022]
437	[821, 822]	1433	[2029, 2300]	2429	[2359, 1920]	3425	[2984, 285]
438	[823, 824]	1434	[2301, 2302]	2430	[2244, 3305]	3426	[1466, 3227]
439	[825, 826]	1435	[2303, 2304]	2431	[3306, 3307]	3427	[3859, 3892]
440	[827, 32]	1436	[2305, 2306]	2432	[3308, 3309]	3428	[1216, 3872]
441	[828, 829]	1437	[2307, 2308]	2433	[3310, 3311]	3429	[1478, 3250]
442	[759, 830]	1438	[2041, 2309]	2434	[48, 3312]	3430	[916, 3893]
443	[831, 515]	1439	[2310, 2311]	2435	[3313, 2105]	3431	[1171, 3894]
444	[832, 11]	1440	[769, 2312]	2436	[2264, 2059]	3432	[3895, 2734]
445	[620, 833]	1441	[712, 1713]	2437	[3314, 3315]	3433	[1371, 2684]
446	[834, 835]	1442	[477, 2192]	2438	[3316, 1995]	3434	[974, 1492]
447	[836, 837]	1443	[837, 2313]	2439	[1987, 2303]	3435	[3896, 973]
448	[824, 838]	1444	[2314, 2315]	2440	[3317, 3318]	3436	[3897, 3898]
449	[176, 839]	1445	[2316, 2317]	2441	[793, 3319]	3437	[3209, 2699]
450	[840, 841]	1446	[2318, 2319]	2442	[3320, 3321]	3438	[3865, 3899]
451	[842, 843]	1447	[2320, 794]	2443	[3322, 3323]	3439	[1118, 1009]
452	[476, 844]	1448	[182, 596]	2444	[3324, 1835]	3440	[3884, 3866]
453	[845, 846]	1449	[2321, 2322]	2445	[3325, 3326]	3441	[2938, 3108]
454	[847, 520]	1450	[642, 2323]	2446	[3327, 2036]	3442	[2976, 3211]
455	[848, 849]	1451	[2003, 2324]	2447	[2353, 57]	3443	[2977, 1412]
456	[850, 851]	1452	[2325, 1944]	2448	[3328, 3329]	3444	[3193, 3874]
457	[852, 853]	1453	[2326, 2327]	2449	[3330, 3331]	3445	[3139, 1013]
458	[854, 855]	1454	[2328, 680]	2450	[1872, 3332]	3446	[2512, 978]
459	[856, 857]	1455	[2329, 2330]	2451	[3333, 2189]	3447	[3867, 2982]
460	[858, 859]	1456	[2331, 2332]	2452	[2356, 3334]	3448	[1320, 2771]
461	[860, 644]	1457	[1696, 2333]	2453	[3335, 1968]	3449	[1324, 2753]
462	[210, 861]	1458	[2334, 1656]	2454	[563, 3336]	3450	[2954, 1304]
463	[862, 750]	1459	[2335, 2252]	2455	[3337, 3338]	3451	[3900, 3247]
464	[863, 864]	1460	[2336, 1927]	2456	[751, 3339]	3452	[2605, 2712]
465	[865, 866]	1461	[2337, 2338]	2457	[527, 3340]	3453	[286, 3897]
466	[867, 868]	1462	[2319, 2339]	2458	[3341, 3342]	3454	[1381, 1477]
467	[869, 870]	1463	[2146, 2340]	2459	[3343, 478]	3455	[2467, 452]
468	[871, 872]	1464	[1932, 660]	2460	[679, 3344]	3456	[2503, 1005]
469	[873, 192]	1465	[2341, 2342]	2461	[1631, 3345]	3457	[2825, 3901]
470	[874, 875]	1466	[510, 873]	2462	[519, 8]	3458	[2790, 948]
471	[876, 877]	1467	[1795, 2103]	2463	[1535, 3346]	3459	[1084, 891]
472	[878, 879]	1468	[2343, 2344]	2464	[3347, 485]	3460	[3084, 3140]
473	[880, 881]	1469	[629, 1933]	2465	[3348, 3349]	3461	[3197, 1231]
474	[882, 883]	1470	[2345, 1882]	2466	[2172, 499]	3462	[318, 3896]
475	[884, 885]	1471	[2346, 2237]	2467	[1829, 2152]	3463	[2487, 1093]
476	[886, 887]	1472	[2347, 821]	2468	[1887, 3350]	3464	[3902, 1073]
477	[443, 269]	1473	[2348, 2349]	2469	[1638, 1926]	3465	[1024, 3903]
478	[408, 888]	1474	[2114, 1960]	2470	[3351, 3352]	3466	[1440, 3886]

479	[889, 890]	1475	[2350, 2351]	2471	[844, 3353]	3467	[3878, 3904]
480	[891, 255]	1476	[2352, 2353]	2472	[1657, 2210]	3468	[3905, 3906]
481	[892, 893]	1477	[2354, 2355]	2473	[576, 3354]	3469	[3907, 2668]
482	[894, 895]	1478	[2247, 2177]	2474	[3355, 834]	3470	[3908, 3831]
483	[896, 897]	1479	[587, 2356]	2475	[720, 1680]	3471	[2686, 3832]
484	[898, 899]	1480	[2227, 2228]	2476	[685, 2310]	3472	[1128, 3830]
485	[900, 901]	1481	[2357, 1931]	2477	[3352, 524]	3473	[2911, 346]
486	[902, 903]	1482	[2358, 2359]	2478	[2333, 2061]	3474	[2890, 1065]
487	[904, 905]	1483	[1847, 2193]	2479	[1593, 2185]	3475	[2773, 2522]
488	[906, 907]	1484	[2360, 1825]	2480	[3356, 3357]	3476	[1196, 3909]
489	[908, 340]	1485	[2361, 1875]	2481	[657, 3358]	3477	[2809, 3910]
490	[909, 910]	1486	[2362, 2363]	2482	[3359, 2346]	3478	[1392, 3911]
491	[911, 912]	1487	[2364, 2358]	2483	[3360, 3361]	3479	[3912, 3856]
492	[913, 914]	1488	[2365, 1942]	2484	[3362, 3363]	3480	[2669, 2441]
493	[915, 916]	1489	[2366, 2367]	2485	[3364, 852]	3481	[93, 3258]
494	[458, 917]	1490	[2317, 1616]	2486	[52, 3365]	3482	[921, 3913]
495	[897, 918]	1491	[701, 856]	2487	[3366, 1866]	3483	[3825, 2803]
496	[284, 919]	1492	[1686, 2368]	2488	[775, 1739]	3484	[2574, 3914]
497	[920, 921]	1493	[1688, 2328]	2489	[1547, 2101]	3485	[3915, 3822]
498	[922, 315]	1494	[2369, 2370]	2490	[2222, 2048]	3486	[2560, 3916]
499	[923, 924]	1495	[1586, 2371]	2491	[3367, 3356]	3487	[919, 2632]
500	[925, 926]	1496	[54, 723]	2492	[3368, 3369]	3488	[2521, 3917]
501	[927, 358]	1497	[2372, 2137]	2493	[3370, 3371]	3489	[3918, 3912]
502	[928, 929]	1498	[2373, 2067]	2494	[1701, 2248]	3490	[3241, 3855]
503	[351, 930]	1499	[2374, 148]	2495	[1895, 3372]	3491	[879, 3877]
504	[931, 932]	1500	[2375, 150]	2496	[2288, 2180]	3492	[1221, 1343]
505	[933, 934]	1501	[2376, 2357]	2497	[3345, 3373]	3493	[252, 3919]
506	[935, 936]	1502	[186, 1556]	2498	[3374, 491]	3494	[2802, 1141]
507	[937, 938]	1503	[2005, 650]	2499	[3375, 734]	3495	[3278, 3110]
508	[939, 884]	1504	[2377, 740]	2500	[2315, 748]	3496	[412, 3175]
509	[940, 941]	1505	[2378, 2379]	2501	[1769, 3376]	3497	[3024, 3920]
510	[942, 943]	1506	[1569, 1643]	2502	[3377, 2078]	3498	[3243, 3850]
511	[944, 945]	1507	[681, 1782]	2503	[2156, 1700]	3499	[67, 2956]
512	[946, 947]	1508	[46, 2380]	2504	[129, 167]	3500	[3921, 3922]
513	[948, 949]	1509	[2381, 2382]	2505	[3283, 1692]	3501	[3125, 3879]
514	[950, 951]	1510	[2383, 2384]	2506	[2323, 3378]	3502	[3263, 2837]
515	[952, 953]	1511	[2385, 2386]	2507	[3379, 2350]	3503	[3823, 2666]
516	[954, 955]	1512	[2387, 2388]	2508	[153, 175]	3504	[3923, 2450]
517	[956, 957]	1513	[2389, 2390]	2509	[3380, 3381]	3505	[912, 2782]
518	[958, 959]	1514	[2332, 2391]	2510	[2330, 3382]	3506	[2857, 1483]
519	[960, 875]	1515	[810, 2376]	2511	[2282, 3383]	3507	[3924, 961]
520	[961, 962]	1516	[1725, 2392]	2512	[3384, 3385]	3508	[2986, 3180]
521	[963, 964]	1517	[1833, 1813]	2513	[3369, 231]	3509	[3883, 3102]
522	[965, 966]	1518	[2393, 1542]	2514	[870, 3386]	3510	[3115, 3023]

523	[967, 968]	1519	[2394, 2395]	2515	[3387, 3388]	3511	[3899, 3925]
524	[969, 931]	1520	[2396, 1636]	2516	[2388, 3316]	3512	[1042, 3121]
525	[430, 970]	1521	[1709, 2397]	2517	[236, 3389]	3513	[2832, 3905]
526	[971, 972]	1522	[2398, 2399]	2518	[1677, 1880]	3514	[3142, 3902]
527	[973, 974]	1523	[2400, 2401]	2519	[1685, 1718]	3515	[3824, 1451]
528	[975, 253]	1524	[2402, 1503]	2520	[3390, 3391]	3516	[2578, 3918]
529	[976, 977]	1525	[2403, 2404]	2521	[3392, 472]	3517	[1419, 3225]
530	[978, 979]	1526	[279, 2405]	2522	[2224, 672]	3518	[1139, 3926]
531	[980, 981]	1527	[2406, 2407]	2523	[2127, 792]	3519	[2472, 2672]
532	[982, 983]	1528	[2408, 2409]	2524	[3393, 3394]	3520	[3927, 3206]
533	[984, 985]	1529	[2410, 23]	2525	[2168, 3395]	3521	[3881, 3861]
534	[986, 987]	1530	[2411, 2412]	2526	[2142, 3396]	3522	[3928, 1298]
535	[988, 989]	1531	[2413, 2414]	2527	[3365, 3397]	3523	[2940, 2642]
536	[990, 991]	1532	[2415, 2416]	2528	[2161, 1654]	3524	[2812, 2454]
537	[992, 993]	1533	[2417, 1246]	2529	[641, 3398]	3525	[3929, 2909]
538	[901, 994]	1534	[2418, 2419]	2530	[2083, 2198]	3526	[1465, 2749]
539	[995, 996]	1535	[899, 2420]	2531	[3399, 3400]	3527	[3898, 2947]
540	[281, 997]	1536	[1092, 1308]	2532	[3401, 3402]	3528	[3221, 1116]
541	[998, 999]	1537	[2421, 2422]	2533	[801, 3403]	3529	[3254, 1174]
542	[1000, 1001]	1538	[1187, 2423]	2534	[3404, 1550]	3530	[1062, 1015]
543	[1002, 1003]	1539	[434, 2424]	2535	[3321, 2331]	3531	[113, 2870]
544	[1004, 876]	1540	[2425, 2426]	2536	[3405, 3406]	3532	[449, 3272]
545	[1005, 1006]	1541	[2427, 321]	2537	[1970, 3407]	3533	[3930, 2541]
546	[1007, 1008]	1542	[2428, 377]	2538	[3408, 3409]	3534	[3931, 1063]
547	[1009, 1010]	1543	[1348, 2429]	2539	[2205, 3374]	3535	[2864, 2968]
548	[1011, 1012]	1544	[2430, 2431]	2540	[166, 806]	3536	[2776, 2428]
549	[1013, 1014]	1545	[2432, 2433]	2541	[2276, 3410]	3537	[2475, 920]
550	[1015, 271]	1546	[2434, 2435]	2542	[3411, 3412]	3538	[3194, 2833]
551	[1016, 1017]	1547	[258, 2436]	2543	[3413, 3414]	3539	[3268, 988]
552	[1018, 1019]	1548	[2437, 2438]	2544	[3415, 2381]	3540	[3932, 2736]
553	[1020, 1021]	1549	[2439, 2440]	2545	[3416, 2091]	3541	[3171, 3928]
554	[1022, 1023]	1550	[2441, 2442]	2546	[3358, 2321]	3542	[2960, 2504]
555	[4, 1024]	1551	[2443, 2444]	2547	[675, 3417]	3543	[3174, 1263]
556	[1025, 1026]	1552	[2445, 1209]	2548	[3418, 3419]	3544	[3207, 2589]
557	[1027, 1028]	1553	[2446, 2447]	2549	[3420, 2027]	3545	[1340, 2418]
558	[1029, 1030]	1554	[2448, 2449]	2550	[3421, 3359]	3546	[3218, 1499]
559	[1031, 1032]	1555	[907, 1338]	2551	[816, 59]	3547	[1069, 2810]
560	[1033, 1034]	1556	[2450, 2451]	2552	[3422, 1977]	3548	[2444, 1521]
561	[1035, 1036]	1557	[2452, 98]	2553	[797, 3423]	3549	[274, 3933]
562	[1037, 1038]	1558	[1072, 2453]	2554	[3424, 553]	3550	[1309, 3900]
563	[1039, 301]	1559	[2454, 2455]	2555	[1727, 2374]	3551	[3083, 2724]
564	[1040, 1041]	1560	[1175, 1260]	2556	[3425, 146]	3552	[3232, 3144]
565	[962, 1042]	1561	[2456, 2457]	2557	[3426, 3427]	3553	[1235, 3934]
566	[1043, 1044]	1562	[2458, 2459]	2558	[3428, 3390]	3554	[968, 2518]

567	[1045, 1046]	1563	[2460, 1182]	2559	[3429, 3430]	3555	[1397, 3921]
568	[1047, 1048]	1564	[1457, 2461]	2560	[3431, 717]	3556	[3891, 2793]
569	[1049, 1050]	1565	[418, 1261]	2561	[1620, 3401]	3557	[3935, 3936]
570	[341, 1051]	1566	[1076, 1459]	2562	[3432, 1948]	3558	[3937, 2990]
571	[1052, 1053]	1567	[2462, 2463]	2563	[771, 3433]	3559	[2708, 374]
572	[1054, 465]	1568	[105, 2464]	2564	[1746, 688]	3560	[3049, 1374]
573	[1055, 1056]	1569	[2465, 909]	2565	[3434, 3364]	3561	[2973, 305]
574	[91, 295]	1570	[2466, 2467]	2566	[3435, 3436]	3562	[3135, 2896]
575	[1057, 1058]	1571	[2468, 369]	2567	[3437, 2307]	3563	[64, 3938]
576	[1059, 1060]	1572	[1233, 2469]	2568	[3438, 3439]	3564	[3903, 3078]
577	[1061, 1062]	1573	[2470, 1434]	2569	[3440, 2299]	3565	[3189, 3939]
578	[1063, 1064]	1574	[2471, 2472]	2570	[3441, 2305]	3566	[2830, 3923]
579	[1065, 1066]	1575	[2473, 1047]	2571	[3442, 3443]	3567	[1273, 3007]
580	[380, 1067]	1576	[2474, 2475]	2572	[3444, 3445]	3568	[3940, 3941]
581	[1068, 1069]	1577	[2476, 2477]	2573	[1878, 2216]	3569	[2731, 1138]
582	[1070, 1071]	1578	[2478, 2479]	2574	[787, 1860]	3570	[2904, 2501]
583	[71, 1072]	1579	[2480, 2481]	2575	[492, 3420]	3571	[3160, 1193]
584	[1073, 1074]	1580	[2482, 2483]	2576	[3446, 3447]	3572	[2463, 3269]
585	[1075, 1076]	1581	[2484, 2485]	2577	[737, 3448]	3573	[1285, 3858]
586	[1077, 1078]	1582	[2486, 2487]	2578	[739, 3449]	3574	[382, 1286]
587	[1079, 1080]	1583	[888, 275]	2579	[2395, 1710]	3575	[2710, 3930]
588	[1081, 1082]	1584	[2488, 1007]	2580	[3450, 3451]	3576	[3901, 3201]
589	[1083, 1084]	1585	[2489, 367]	2581	[3452, 1751]	3577	[3942, 2775]
590	[1085, 1086]	1586	[2490, 2491]	2582	[1967, 1785]	3578	[3943, 3200]
591	[1087, 1088]	1587	[1172, 118]	2583	[496, 2219]	3579	[3192, 3032]
592	[1089, 1090]	1588	[2492, 2493]	2584	[3453, 3435]	3580	[1484, 1068]
593	[370, 1091]	1589	[2494, 1271]	2585	[2018, 3286]	3581	[3857, 3935]
594	[1026, 1092]	1590	[1064, 2495]	2586	[3454, 842]	3582	[2978, 2842]
595	[1093, 1094]	1591	[2496, 2497]	2587	[3455, 648]	3583	[3944, 2659]
596	[1095, 1096]	1592	[2498, 2499]	2588	[3456, 3375]	3584	[2719, 2854]
597	[1097, 1098]	1593	[2500, 1142]	2589	[3457, 3458]	3585	[2582, 2821]
598	[330, 1099]	1594	[2501, 2502]	2590	[552, 726]	3586	[3945, 3184]
599	[1100, 325]	1595	[1314, 2503]	2591	[1822, 2162]	3587	[1415, 3152]
600	[1101, 1102]	1596	[2504, 2505]	2592	[2107, 3459]	3588	[3826, 1079]
601	[1103, 1104]	1597	[2506, 2507]	2593	[3332, 3460]	3589	[964, 3946]
602	[1105, 1106]	1598	[77, 2508]	2594	[3461, 2335]	3590	[3939, 3908]
603	[1107, 1108]	1599	[2509, 2510]	2595	[1655, 700]	3591	[2815, 2970]
604	[994, 1109]	1600	[1080, 2511]	2596	[3462, 3453]	3592	[3161, 3947]
605	[1110, 1111]	1601	[403, 2512]	2597	[556, 3463]	3593	[1250, 3138]
606	[1112, 1113]	1602	[2513, 1388]	2598	[3464, 665]	3594	[3876, 3929]
607	[1114, 1115]	1603	[2514, 2515]	2599	[3465, 3466]	3595	[3948, 68]
608	[1116, 459]	1604	[2516, 2517]	2600	[3467, 1867]	3596	[2569, 1474]
609	[1117, 1118]	1605	[2518, 1103]	2601	[2133, 3404]	3597	[2754, 3841]
610	[1119, 1120]	1606	[2519, 963]	2602	[3468, 3469]	3598	[2992, 1085]

611	[1121, 1122]	1607	[2520, 1253]	2603	[3447, 132]	3599	[875, 3223]
612	[1123, 1124]	1608	[930, 2521]	2604	[3470, 3471]	3600	[2722, 3233]
613	[1125, 1126]	1609	[2522, 2523]	2605	[3472, 3308]	3601	[3249, 1276]
614	[1127, 1128]	1610	[2524, 2525]	2606	[3439, 3473]	3602	[109, 937]
615	[1129, 1130]	1611	[2526, 2527]	2607	[2068, 2385]	3603	[89, 3949]
616	[1131, 1132]	1612	[2483, 1471]	2608	[2324, 2318]	3604	[3155, 2468]
617	[1133, 1134]	1613	[2528, 2529]	2609	[3346, 3474]	3605	[3888, 3021]
618	[1135, 976]	1614	[65, 2476]	2610	[3315, 3475]	3606	[3151, 2456]
619	[1136, 1137]	1615	[2530, 1341]	2611	[3427, 3476]	3607	[1227, 387]
620	[1138, 364]	1616	[2531, 2532]	2612	[3477, 2094]	3608	[2412, 2701]
621	[1010, 1139]	1617	[1108, 2533]	2613	[3478, 707]	3609	[3112, 3137]
622	[1140, 1105]	1618	[1048, 2534]	2614	[3305, 3368]	3610	[3926, 3942]
623	[1141, 922]	1619	[368, 2535]	2615	[3479, 3370]	3611	[3950, 3085]
624	[1142, 1143]	1620	[2536, 2537]	2616	[3412, 2016]	3612	[2637, 3852]
625	[1144, 394]	1621	[2538, 1321]	2617	[2220, 1969]	3613	[1219, 952]
626	[334, 1145]	1622	[2539, 2540]	2618	[3480, 2257]	3614	[3270, 2530]
627	[1066, 1045]	1623	[2541, 1423]	2619	[3481, 2116]	3615	[1120, 3204]
628	[355, 1146]	1624	[2542, 2543]	2620	[2213, 2019]	3616	[3128, 1125]
629	[1147, 1148]	1625	[406, 2544]	2621	[2392, 3393]	3617	[1169, 3027]
630	[1149, 1150]	1626	[2545, 1421]	2622	[3482, 3483]	3618	[1301, 2568]
631	[1151, 1152]	1627	[2546, 2547]	2623	[3484, 3485]	3619	[3230, 2912]
632	[1153, 1154]	1628	[1296, 2548]	2624	[1640, 3486]	3620	[3913, 2561]
633	[1155, 1156]	1629	[2549, 2550]	2625	[237, 3487]	3621	[3248, 3219]
634	[1157, 1158]	1630	[2551, 2552]	2626	[3488, 1828]	3622	[1335, 980]
635	[1159, 1160]	1631	[2553, 2554]	2627	[3489, 3490]	3623	[3951, 80]
636	[1161, 1162]	1632	[999, 2555]	2628	[1703, 3491]	3624	[288, 992]
637	[1163, 1164]	1633	[1046, 1313]	2629	[3492, 1848]	3625	[2449, 2729]
638	[1165, 70]	1634	[1500, 74]	2630	[1990, 3493]	3626	[1190, 419]
639	[1166, 1167]	1635	[2556, 72]	2631	[777, 507]	3627	[2477, 1439]
640	[1168, 1169]	1636	[2557, 2500]	2632	[3448, 2362]	3628	[2479, 1236]
641	[1170, 1171]	1637	[2558, 2559]	2633	[3494, 3495]	3629	[2765, 2933]
642	[1034, 1172]	1638	[401, 1436]	2634	[1711, 3496]	3630	[328, 1267]
643	[1041, 1173]	1639	[1462, 2560]	2635	[2232, 2301]	3631	[3246, 3952]
644	[1174, 1175]	1640	[2561, 2562]	2636	[2062, 3497]	3632	[2511, 2808]
645	[1176, 307]	1641	[410, 2563]	2637	[3498, 815]	3633	[3864, 2818]
646	[1177, 1178]	1642	[2564, 1463]	2638	[3493, 3489]	3634	[3953, 3167]
647	[1179, 1180]	1643	[2565, 2484]	2639	[3499, 169]	3635	[3954, 3265]
648	[1143, 1181]	1644	[2459, 1429]	2640	[667, 1598]	3636	[3893, 3836]
649	[1182, 1183]	1645	[2566, 1377]	2641	[784, 3500]	3637	[2552, 1386]
650	[1184, 1185]	1646	[2567, 436]	2642	[3501, 1780]	3638	[3869, 1319]
651	[1186, 1187]	1647	[2568, 2569]	2643	[1729, 3502]	3639	[3183, 2898]
652	[881, 1188]	1648	[2570, 2406]	2644	[3503, 3504]	3640	[1060, 1264]
653	[1189, 327]	1649	[2571, 2572]	2645	[1737, 3505]	3641	[3955, 2998]
654	[1038, 1190]	1650	[2573, 2574]	2646	[3506, 3507]	3642	[2737, 3953]

655	[1191, 1192]	1651	[2575, 2576]	2647	[3508, 3422]	3643	[3956, 267]
656	[1193, 1194]	1652	[1181, 1202]	2648	[3400, 1687]	3644	[2502, 3860]
657	[1195, 1196]	1653	[2577, 2578]	2649	[3509, 2150]	3645	[3275, 3143]
658	[1197, 1198]	1654	[2579, 1481]	2650	[857, 1634]	3646	[1327, 383]
659	[1146, 92]	1655	[2580, 2581]	2651	[3510, 682]	3647	[3957, 344]
660	[1199, 1200]	1656	[1164, 2582]	2652	[1958, 238]	3648	[3093, 3256]
661	[1201, 1127]	1657	[2583, 2584]	2653	[3511, 185]	3649	[979, 3122]
662	[1202, 1203]	1658	[2585, 950]	2654	[643, 3512]	3650	[2871, 2526]
663	[1204, 1144]	1659	[2586, 450]	2655	[2043, 3513]	3651	[977, 3954]
664	[1205, 1206]	1660	[2587, 2588]	2656	[2045, 2329]	3652	[2860, 3951]
665	[1207, 1208]	1661	[2589, 2590]	2657	[3514, 3515]	3653	[2606, 2744]
666	[1209, 1210]	1662	[2591, 2592]	2658	[2039, 2143]	3654	[3916, 3214]
667	[1211, 1212]	1663	[1294, 2593]	2659	[3516, 9]	3655	[3894, 1251]
668	[1158, 1207]	1664	[2594, 1000]	2660	[3517, 3518]	3656	[3958, 356]
669	[1213, 1214]	1665	[2595, 2596]	2661	[1930, 2030]	3657	[3887, 3959]
670	[1215, 1216]	1666	[2431, 2437]	2662	[1836, 2246]	3658	[3960, 2877]
671	[264, 1217]	1667	[2597, 2598]	2663	[3309, 3301]	3659	[3147, 3262]
672	[1218, 1219]	1668	[2599, 2600]	2664	[3519, 3520]	3660	[3829, 3181]
673	[1220, 1221]	1669	[2601, 2602]	2665	[2004, 3521]	3661	[2603, 3205]
674	[1222, 1223]	1670	[1167, 2603]	2666	[1583, 3465]	3662	[338, 2816]
675	[339, 1224]	1671	[2604, 2605]	2667	[3354, 728]	3663	[3961, 1430]
676	[107, 391]	1672	[1282, 2606]	2668	[3522, 2176]	3664	[2786, 2916]
677	[1225, 1226]	1673	[2607, 2608]	2669	[2136, 607]	3665	[2433, 3220]
678	[1098, 1227]	1674	[2609, 2610]	2670	[3523, 3384]	3666	[2646, 3251]
679	[1228, 331]	1675	[2611, 2612]	2671	[3524, 3525]	3667	[1056, 2851]
680	[1229, 1230]	1676	[905, 2613]	2672	[694, 2089]	3668	[3911, 1135]
681	[1231, 1186]	1677	[2614, 2615]	2673	[2012, 2122]	3669	[2453, 3871]
682	[1232, 440]	1678	[2616, 1306]	2674	[2297, 2281]	3670	[3103, 986]
683	[462, 1233]	1679	[2617, 2618]	2675	[3526, 2058]	3671	[1468, 2943]
684	[1234, 1235]	1680	[83, 2539]	2676	[3361, 562]	3672	[2937, 3252]
685	[1236, 1237]	1681	[2619, 965]	2677	[3527, 3528]	3673	[3962, 2966]
686	[1238, 1239]	1682	[2620, 2621]	2678	[228, 786]	3674	[2849, 2542]
687	[1240, 1241]	1683	[2622, 2623]	2679	[1978, 3529]	3675	[3946, 3868]
688	[1242, 923]	1684	[2624, 446]	2680	[3530, 549]	3676	[3172, 3231]
689	[936, 1243]	1685	[2625, 2626]	2681	[1897, 551]	3677	[3845, 3963]
690	[1244, 1245]	1686	[996, 1039]	2682	[2054, 636]	3678	[3964, 3873]
691	[1246, 1247]	1687	[2627, 2628]	2683	[2055, 3531]	3679	[3965, 1485]
692	[1248, 1249]	1688	[2629, 2630]	2684	[2233, 3532]	3680	[3966, 3960]
693	[1210, 1250]	1689	[2631, 265]	2685	[2234, 163]	3681	[3837, 2839]
694	[1251, 1252]	1690	[2632, 2633]	2686	[143, 3533]	3682	[3132, 3945]
695	[1253, 1153]	1691	[2634, 2635]	2687	[3534, 3535]	3683	[2600, 892]
696	[1254, 1255]	1692	[2636, 2637]	2688	[3536, 2393]	3684	[2902, 2678]
697	[1256, 1257]	1693	[2638, 2639]	2689	[2095, 2396]	3685	[3081, 3092]
698	[1258, 1259]	1694	[2640, 2641]	2690	[1945, 3537]	3686	[2692, 3109]

699	[1260, 76]	1695	[2642, 2643]	2691	[1744, 2345]	3687	[1275, 3948]
700	[1261, 1262]	1696	[2644, 438]	2692	[866, 1975]	3688	[1487, 1511]
701	[1263, 94]	1697	[2645, 2646]	2693	[3538, 1929]	3689	[2915, 3260]
702	[1264, 1265]	1698	[2647, 2648]	2694	[3539, 534]	3690	[3904, 1238]
703	[1266, 313]	1699	[929, 2649]	2695	[1633, 732]	3691	[3967, 3853]
704	[1267, 1268]	1700	[460, 2650]	2696	[3292, 697]	3692	[3095, 3013]
705	[1269, 352]	1701	[2651, 1393]	2697	[3540, 3300]	3693	[3202, 2689]
706	[1270, 457]	1702	[1433, 2652]	2698	[2242, 3541]	3694	[3934, 444]
707	[1271, 5]	1703	[2493, 2513]	2699	[735, 3542]	3695	[2505, 2993]
708	[1272, 1273]	1704	[2653, 2647]	2700	[36, 3425]	3696	[3938, 3955]
709	[1274, 1275]	1705	[1224, 2654]	2701	[3287, 1606]	3697	[1413, 3927]
710	[1276, 1277]	1706	[2655, 2656]	2702	[3449, 3543]	3698	[1460, 3882]
711	[428, 1278]	1707	[2657, 402]	2703	[3544, 2291]	3699	[2949, 3279]
712	[1279, 1280]	1708	[1337, 2658]	2704	[3331, 2034]	3700	[3234, 956]
713	[1281, 1282]	1709	[2659, 940]	2705	[1674, 3545]	3701	[3919, 1095]
714	[877, 1283]	1710	[2660, 469]	2706	[3546, 3540]	3702	[1389, 3956]
715	[1284, 1285]	1711	[2661, 1213]	2707	[3547, 1850]	3703	[3273, 1027]
716	[1286, 1287]	1712	[2662, 2663]	2708	[3548, 3549]	3704	[2404, 3968]
717	[1288, 1059]	1713	[2664, 2665]	2709	[729, 3343]	3705	[981, 3937]
718	[1289, 1290]	1714	[2666, 2667]	2710	[731, 3550]	3706	[3198, 960]
719	[1291, 1292]	1715	[2668, 1136]	2711	[2126, 3551]	3707	[2743, 1428]
720	[1293, 1294]	1716	[2548, 2669]	2712	[3471, 3310]	3708	[3925, 2951]
721	[1295, 1296]	1717	[2670, 2671]	2713	[2290, 2196]	3709	[3914, 1089]
722	[1297, 435]	1718	[2672, 2616]	2714	[151, 3552]	3710	[266, 3082]
723	[1298, 112]	1719	[2649, 2673]	2715	[3553, 3554]	3711	[3952, 2599]
724	[1299, 1300]	1720	[1420, 2674]	2716	[1597, 1570]	3712	[2612, 3940]
725	[1198, 1301]	1721	[1442, 1336]	2717	[3555, 511]	3713	[3959, 463]
726	[1302, 915]	1722	[2675, 908]	2718	[3556, 3557]	3714	[1028, 3943]
727	[1019, 1303]	1723	[2676, 2677]	2719	[3558, 3559]	3715	[3242, 3035]
728	[1304, 1305]	1724	[2678, 2679]	2720	[2087, 3560]	3716	[2997, 3969]
729	[1306, 1307]	1725	[983, 2494]	2721	[3396, 3561]	3717	[2648, 3141]
730	[1308, 1309]	1726	[2680, 2681]	2722	[2186, 3562]	3718	[3133, 3266]
731	[1310, 1311]	1727	[2682, 2683]	2723	[32, 3563]	3719	[3839, 3863]
732	[294, 1312]	1728	[2684, 2685]	2724	[3564, 2119]	3720	[3941, 3282]
733	[1313, 1314]	1729	[1378, 2686]	2725	[3565, 2206]	3721	[1036, 1070]
734	[1315, 1316]	1730	[2422, 2687]	2726	[3566, 3567]	3722	[432, 2796]
735	[1317, 1318]	1731	[2688, 1517]	2727	[50, 2165]	3723	[3136, 1004]
736	[1319, 1320]	1732	[2689, 1519]	2728	[2322, 2279]	3724	[1003, 3168]
737	[1321, 1322]	1733	[2690, 2607]	2729	[3568, 3569]	3725	[2988, 2458]
738	[1323, 1324]	1734	[2691, 2692]	2730	[3570, 1971]	3726	[3028, 2551]
739	[1325, 1075]	1735	[2693, 1326]	2731	[3571, 2184]	3727	[3947, 2718]
740	[1326, 1327]	1736	[2694, 280]	2732	[2342, 3572]	3728	[3848, 2585]
741	[1328, 1329]	1737	[2695, 1351]	2733	[1938, 2130]	3729	[3196, 3924]
742	[420, 1330]	1738	[250, 1441]	2734	[3371, 3573]	3730	[1255, 2695]

743	[1331, 1332]	1739	[2696, 2697]	2735	[526, 1666]	3731	[353, 2640]
744	[1145, 1333]	1740	[1376, 2698]	2736	[3574, 1989]	3732	[2827, 2891]
745	[1334, 1335]	1741	[1094, 396]	2737	[3575, 2263]	3733	[3237, 3957]
746	[1336, 1337]	1742	[1154, 276]	2738	[574, 3576]	3734	[3215, 2972]
747	[1338, 1055]	1743	[2699, 2700]	2739	[3577, 1814]	3735	[2995, 3965]
748	[1339, 1340]	1744	[2701, 2702]	2740	[2312, 3578]	3736	[3222, 3966]
749	[22, 350]	1745	[2703, 1061]	2741	[3579, 2373]	3737	[1366, 3828]
750	[1341, 1342]	1746	[2704, 2705]	2742	[1659, 1563]	3738	[3033, 2657]
751	[1343, 1344]	1747	[332, 2706]	2743	[2304, 2040]	3739	[3969, 1453]
752	[1345, 1346]	1748	[947, 2707]	2744	[3363, 2073]	3740	[99, 3094]
753	[1347, 1348]	1749	[1067, 2708]	2745	[3580, 2074]	3741	[2980, 1112]
754	[1349, 106]	1750	[2709, 2710]	2746	[3295, 3581]	3742	[3968, 2962]
755	[1156, 1350]	1751	[2711, 405]	2747	[1941, 3511]	3743	[2969, 3203]
756	[1351, 389]	1752	[2712, 2432]	2748	[3397, 558]	3744	[2774, 3050]
757	[453, 1161]	1753	[1185, 2713]	2749	[3491, 3582]	3745	[3229, 3113]
758	[1352, 1353]	1754	[2529, 2714]	2750	[3463, 594]	3746	[3949, 3086]
759	[1354, 1355]	1755	[2715, 2716]	2751	[1901, 3583]	3747	[3910, 942]
760	[123, 1356]	1756	[2717, 1426]	2752	[3284, 2174]	3748	[951, 3239]
761	[1017, 1357]	1757	[2718, 2719]	2753	[2170, 532]	3749	[3009, 2425]
762	[1358, 1359]	1758	[2656, 1454]	2754	[156, 3584]	3750	[3890, 944]
763	[1360, 1361]	1759	[1257, 2720]	2755	[1644, 1581]	3751	[3036, 2717]
764	[1362, 1363]	1760	[1006, 1184]	2756	[3585, 1852]	3752	[376, 2738]
765	[308, 1364]	1761	[2721, 2722]	2757	[3586, 804]	3753	[1514, 3106]
766	[1365, 1366]	1762	[16, 2723]	2758	[1955, 1991]	3754	[887, 3961]
767	[1367, 896]	1763	[2724, 1284]	2759	[3587, 2208]	3755	[3862, 1443]
768	[1368, 381]	1764	[2725, 1368]	2760	[2022, 1603]	3756	[1012, 2691]
769	[1316, 1369]	1765	[1280, 2726]	2761	[1806, 2221]	3757	[2451, 261]
770	[1370, 1371]	1766	[357, 2546]	2762	[2060, 3588]	3758	[247, 3177]
771	[1032, 110]	1767	[1449, 967]	2763	[199, 754]	3759	[2881, 2434]
772	[1312, 323]	1768	[2727, 2728]	2764	[3589, 3590]	3760	[3276, 2779]
773	[1372, 1373]	1769	[2729, 2730]	2765	[3537, 3591]	3761	[2673, 1310]
774	[1374, 1011]	1770	[388, 2709]	2766	[3357, 2132]	3762	[2674, 2496]
775	[1375, 1376]	1771	[392, 2577]	2767	[1618, 3592]	3763	[3066, 3043]
776	[1377, 1378]	1772	[1278, 2731]	2768	[3593, 3594]	3764	[1455, 2509]
777	[1379, 939]	1773	[1507, 116]	2769	[3595, 3596]	3765	[1450, 1117]
778	[270, 29]	1774	[2732, 2733]	2770	[610, 3597]	3766	[1137, 3970]
779	[1380, 1381]	1775	[2734, 2735]	2771	[2164, 3598]	3767	[2907, 1199]
780	[1382, 1383]	1776	[2736, 2737]	2772	[3599, 2316]	3768	[3885, 3076]
781	[1384, 1385]	1777	[2738, 2739]	2773	[3560, 2169]	3769	[3274, 3907]
782	[1386, 1387]	1778	[2740, 2741]	2774	[1793, 3438]	3770	[2665, 3870]
783	[1150, 946]	1779	[1355, 2742]	2775	[3600, 3304]	3771	[3188, 3037]
784	[1388, 1389]	1780	[1407, 1396]	2776	[3601, 709]	3772	[3971, 3915]
785	[397, 1390]	1781	[2515, 2743]	2777	[3602, 1728]	3773	[117, 3932]
786	[1391, 1392]	1782	[1230, 2682]	2778	[3603, 3508]	3774	[1021, 3061]

787	[1393, 1345]	1783	[119, 1370]	2779	[3604, 2038]	3775	[2623, 3971]
788	[1394, 1395]	1784	[2744, 2745]	2780	[2311, 3291]	3776	[1102, 2957]
789	[1396, 1397]	1785	[2746, 1033]	2781	[627, 3605]	3777	[1364, 3967]
790	[1398, 354]	1786	[2747, 2748]	2782	[601, 538]	3778	[3909, 2884]
791	[1399, 1400]	1787	[2749, 902]	2783	[3606, 2369]	3779	[95, 2874]
792	[1401, 898]	1788	[2598, 2750]	2784	[1925, 609]	3780	[1390, 1295]
793	[910, 1402]	1789	[468, 2727]	2785	[2349, 2148]	3781	[1090, 400]
794	[115, 124]	1790	[989, 2751]	2786	[3578, 3446]	3782	[1249, 3880]
795	[1403, 1404]	1791	[2752, 2693]	2787	[2309, 3527]	3783	[2702, 3950]
796	[1405, 1406]	1792	[2753, 2694]	2788	[3607, 183]	3784	[3843, 2981]
797	[1099, 1407]	1793	[1425, 2754]	2789	[1531, 3608]	3785	[3842, 3277]
798	[1408, 1119]	1794	[1058, 2408]	2790	[3353, 513]	3786	[2778, 2758]
799	[1409, 1410]	1795	[1344, 2478]	2791	[3609, 2187]	3787	[2843, 969]
800	[1411, 1394]	1796	[2755, 2675]	2792	[3610, 3611]	3788	[3000, 82]
801	[1412, 1372]	1797	[2543, 2756]	2793	[3612, 3613]	3789	[3933, 1447]
802	[1014, 1413]	1798	[1030, 2757]	2794	[3614, 3544]	3790	[2455, 3238]
803	[1414, 1415]	1799	[1503, 1133]	2795	[2115, 3426]	3791	[451, 3104]
804	[306, 1416]	1800	[2758, 2759]	2796	[3615, 1614]	3792	[2836, 1100]
805	[1417, 1418]	1801	[292, 1228]	2797	[141, 134]	3793	[3920, 3111]
806	[320, 1419]	1802	[2760, 1315]	2798	[2134, 3616]	3794	[3224, 3015]
807	[903, 1420]	1803	[2761, 2488]	2799	[651, 474]	3795	[3259, 3182]
808	[1421, 1422]	1804	[2762, 2617]	2800	[3617, 634]	3796	[2592, 2996]
809	[1423, 1424]	1805	[2763, 2764]	2801	[1820, 1647]	3797	[3849, 3962]
810	[1122, 1425]	1806	[1452, 2765]	2802	[2118, 3618]	3798	[3208, 2594]
811	[1426, 1427]	1807	[2481, 2766]	2803	[2253, 3570]	3799	[3922, 1513]
812	[1428, 1220]	1808	[2767, 2768]	2804	[147, 3462]	3800	[3087, 2601]
813	[1429, 251]	1809	[1243, 108]	2805	[3336, 1935]	3801	[2739, 3931]
814	[1430, 1431]	1810	[2769, 2770]	2806	[3619, 3620]	3802	[2635, 3958]
815	[1432, 1433]	1811	[2771, 2772]	2807	[3611, 3621]	3803	[2942, 3187]
816	[1434, 1435]	1812	[1245, 2773]	2808	[623, 3464]	3804	[2706, 3944]
817	[1436, 1437]	1813	[1078, 958]	2809	[3383, 3461]	3805	[2707, 2755]
818	[1438, 1054]	1814	[2602, 2774]	2810	[1824, 1723]	3806	[384, 2822]
819	[1439, 1440]	1815	[2775, 2776]	2811	[2163, 2051]	3807	[3226, 2908]
820	[1441, 1442]	1816	[2777, 2778]	2812	[2292, 2046]	3808	[991, 1269]
821	[1443, 1444]	1817	[2779, 2780]	2813	[3622, 3623]	3809	[3153, 3964]
822	[1445, 1446]	1818	[985, 2781]	2814	[3624, 3625]	3810	[2867, 3149]
823	[1447, 1448]	1819	[2782, 2783]	2815	[170, 2364]	3811	[3101, 3118]
824	[1385, 1449]	1820	[2784, 2785]	2816	[2217, 571]	3812	[375, 1189]
825	[1192, 1450]	1821	[111, 2786]	2817	[3626, 1734]	3813	[3835, 393]
826	[445, 1382]	1822	[2714, 1179]	2818	[3627, 3628]	3814	[3906, 3895]
827	[1451, 1452]	1823	[2787, 2676]	2819	[3629, 588]	3815	[2883, 1472]
828	[1453, 1077]	1824	[2788, 2620]	2820	[3630, 1821]	3816	[2535, 1299]
829	[1454, 1455]	1825	[1283, 2789]	2821	[1667, 1787]	3817	[3970, 2661]
830	[1456, 1457]	1826	[1292, 2790]	2822	[3583, 3297]	3818	[3963, 2629]

831	[1458, 954]	1827	[2791, 2792]	2823	[3631, 3577]	3819	[3892, 3261]
832	[1459, 1460]	1828	[1518, 1293]	2824	[3632, 3633]	3820	[2384, 3972]
833	[1461, 1462]	1829	[2793, 2794]	2825	[3634, 3635]	3821	[1962, 200]
834	[1463, 1464]	1830	[2485, 2795]	2826	[3636, 3637]	3822	[3973, 3812]
835	[1082, 1465]	1831	[2796, 2797]	2827	[3638, 209]	3823	[3777, 1794]
836	[268, 1466]	1832	[2798, 2799]	2828	[3598, 3639]	3824	[3660, 1733]
837	[1467, 1468]	1833	[987, 1232]	2829	[3407, 702]	3825	[2209, 3606]
838	[1469, 1470]	1834	[2800, 2571]	2830	[3451, 3640]	3826	[3792, 586]
839	[1471, 1087]	1835	[2801, 2802]	2831	[2298, 3641]	3827	[2278, 2266]
840	[1472, 1473]	1836	[924, 362]	2832	[1543, 3642]	3828	[2181, 471]
841	[1474, 102]	1837	[2803, 1358]	2833	[589, 1823]	3829	[3643, 1534]
842	[1475, 1476]	1838	[893, 1502]	2834	[546, 2194]	3830	[178, 3722]
843	[1477, 1478]	1839	[997, 1201]	2835	[3594, 3524]	3831	[3641, 1605]
844	[1194, 1479]	1840	[2804, 2595]	2836	[3311, 2375]	3832	[3545, 1904]
845	[1050, 1480]	1841	[2626, 2805]	2837	[34, 3643]	3833	[3618, 3676]
846	[1481, 1482]	1842	[1329, 1354]	2838	[3635, 1560]	3834	[3592, 3726]
847	[1483, 1484]	1843	[2806, 2807]	2839	[3644, 3456]	3835	[3972, 1558]
848	[1485, 1486]	1844	[2808, 2809]	2840	[3645, 1980]	3836	[1595, 3644]
849	[79, 1487]	1845	[2810, 1281]	2841	[608, 3517]	3837	[3445, 1589]
850	[1488, 1489]	1846	[2811, 2812]	2842	[2370, 3494]	3838	[659, 3782]
851	[1490, 1491]	1847	[262, 2813]	2843	[1985, 3480]	3839	[3757, 3548]
852	[1492, 1493]	1848	[2814, 2815]	2844	[3646, 3647]	3840	[1818, 2352]
853	[1494, 1495]	1849	[1506, 2811]	2845	[3474, 2179]	3841	[3525, 2069]
854	[1496, 927]	1850	[2816, 2817]	2846	[3648, 3387]	3842	[1974, 2182]
855	[1497, 1498]	1851	[2818, 2819]	2847	[3608, 2100]	3843	[1876, 3595]
856	[1499, 1500]	1852	[2713, 2820]	2848	[540, 3482]	3844	[2197, 3514]
857	[414, 411]	1853	[2821, 1043]	2849	[591, 3413]	3845	[3334, 3818]
858	[1470, 1140]	1854	[2822, 27]	2850	[531, 3649]	3846	[3974, 3738]
859	[1214, 1501]	1855	[1217, 2823]	2851	[3563, 3325]	3847	[187, 3975]
860	[1502, 1503]	1856	[2824, 2825]	2852	[3650, 2365]	3848	[3518, 3619]
861	[938, 1504]	1857	[2826, 2827]	2853	[1578, 3627]	3849	[1675, 3711]
862	[1505, 1506]	1858	[2828, 291]	2854	[3486, 2343]	3850	[1831, 3455]
863	[361, 1507]	1859	[260, 2829]	2855	[3542, 2277]	3851	[2000, 3976]
864	[1508, 1509]	1860	[2759, 1347]	2856	[3576, 3314]	3852	[3497, 3977]
865	[1510, 342]	1861	[2534, 248]	2857	[714, 2360]	3853	[1796, 1721]
866	[1511, 1512]	1862	[2457, 2830]	2858	[3378, 3632]	3854	[2240, 1658]
867	[1513, 1514]	1863	[1333, 2721]	2859	[3651, 3634]	3855	[2226, 2336]
868	[1515, 1516]	1864	[2831, 407]	2860	[3541, 1592]	3856	[3978, 2295]
869	[1517, 1518]	1865	[304, 2832]	2861	[3652, 3653]	3857	[3979, 3980]
870	[1519, 1520]	1866	[2833, 2834]	2862	[3640, 3654]	3858	[2090, 798]
871	[1521, 1522]	1867	[2835, 2670]	2863	[3655, 3656]	3859	[2270, 3814]
872	[1259, 1523]	1868	[18, 2836]	2864	[3657, 3658]	3860	[3376, 2010]
873	[941, 371]	1869	[2837, 2838]	2865	[3659, 2366]	3861	[3373, 1956]
874	[1524, 1525]	1870	[2839, 2587]	2866	[3302, 3660]	3862	[3515, 602]

875	[1526, 1527]	1871	[2840, 2841]	2867	[3661, 3452]	3863	[3616, 3668]
876	[1528, 1529]	1872	[2842, 2843]	2868	[1545, 3299]	3864	[2013, 541]
877	[1530, 1531]	1873	[2576, 409]	2869	[1909, 1747]	3865	[3732, 1884]
878	[1532, 1533]	1874	[2844, 2845]	2870	[222, 1910]	3866	[3700, 3510]
879	[1534, 1535]	1875	[2846, 2847]	2871	[224, 711]	3867	[557, 3296]
880	[1536, 1537]	1876	[2848, 2849]	2872	[14, 3360]	3868	[1673, 3756]
881	[1538, 1539]	1877	[2405, 2850]	2873	[2017, 583]	3869	[782, 3719]
882	[1540, 1541]	1878	[2851, 278]	2874	[625, 1888]	3870	[3443, 3650]
883	[1542, 1543]	1879	[2630, 2852]	2875	[1613, 3662]	3871	[1567, 2398]
884	[1544, 1545]	1880	[2613, 2853]	2876	[3469, 2260]	3872	[3382, 3355]
885	[1546, 1547]	1881	[2615, 2492]	2877	[3495, 2160]	3873	[3790, 721]
886	[1548, 1549]	1882	[2854, 1289]	2878	[3663, 3664]	3874	[3683, 3586]
887	[1550, 1551]	1883	[2855, 2556]	2879	[1576, 2082]	3875	[3381, 3768]
888	[855, 1552]	1884	[2792, 1334]	2880	[818, 3285]	3876	[3736, 3679]
889	[1553, 796]	1885	[2856, 2857]	2881	[3303, 3574]	3877	[2199, 1772]
890	[1554, 1555]	1886	[2858, 2859]	2882	[62, 3665]	3878	[486, 3776]
891	[1556, 1557]	1887	[2469, 886]	2883	[3666, 2348]	3879	[3690, 3809]
892	[814, 41]	1888	[2797, 66]	2884	[2007, 3442]	3880	[1759, 1678]
893	[1558, 1559]	1889	[1226, 2860]	2885	[3549, 1841]	3881	[2258, 758]
894	[1560, 1561]	1890	[2861, 2761]	2886	[1609, 3470]	3882	[3710, 3558]
895	[1555, 1562]	1891	[2420, 2862]	2887	[1851, 624]	3883	[2109, 2223]
896	[1563, 235]	1892	[2863, 2864]	2888	[3395, 3593]	3884	[3977, 2154]
897	[1564, 1565]	1893	[2865, 1488]	2889	[3639, 3538]	3885	[2070, 3765]
898	[1566, 1567]	1894	[1001, 1432]	2890	[3389, 1819]	3886	[3817, 3684]
899	[1568, 1569]	1895	[2866, 2867]	2891	[3667, 3337]	3887	[1615, 862]
900	[1570, 1571]	1896	[2868, 2844]	2892	[60, 1783]	3888	[1883, 3655]
901	[1572, 1573]	1897	[386, 1018]	2893	[3668, 613]	3889	[2153, 3815]
902	[500, 1574]	1898	[1395, 2591]	2894	[3669, 2354]	3890	[3620, 1639]
903	[661, 617]	1899	[2869, 1147]	2895	[2327, 3501]	3891	[2272, 3579]
904	[1575, 1576]	1900	[2870, 2871]	2896	[3670, 1834]	3892	[3692, 3408]
905	[1577, 1578]	1901	[2838, 2872]	2897	[690, 3671]	3893	[2202, 3440]
906	[1579, 1580]	1902	[2873, 2788]	2898	[3654, 3441]	3894	[535, 3718]
907	[1559, 738]	1903	[2874, 2427]	2899	[3672, 3673]	3895	[3813, 3739]
908	[1581, 813]	1904	[2875, 2876]	2900	[3674, 1623]	3896	[3298, 3784]
909	[1582, 1583]	1905	[69, 2465]	2901	[216, 245]	3897	[542, 1632]
910	[1584, 545]	1906	[2877, 2878]	2902	[3590, 3675]	3898	[544, 3724]
911	[1585, 1586]	1907	[2879, 2688]	2903	[3559, 2081]	3899	[2183, 43]
912	[1587, 1588]	1908	[1241, 2536]	2904	[244, 3607]	3900	[2147, 1627]
913	[1589, 1590]	1909	[2416, 433]	2905	[3676, 3351]	3901	[3633, 1844]
914	[494, 1591]	1910	[424, 2553]	2906	[1853, 2011]	3902	[3783, 2129]
915	[1592, 1593]	1911	[2880, 2881]	2907	[3673, 577]	3903	[1936, 3766]
916	[1594, 1595]	1912	[2882, 2531]	2908	[3677, 3678]	3904	[803, 3697]
917	[1596, 1597]	1913	[290, 2883]	2909	[3679, 3680]	3905	[578, 3530]
918	[1598, 640]	1914	[2884, 2800]	2910	[1588, 1702]	3906	[3642, 3293]

919	[1599, 1600]	1915	[2885, 467]	2911	[3681, 2383]	3907	[3410, 590]
920	[1601, 1602]	1916	[2886, 2887]	2912	[3349, 211]	3908	[2397, 1532]
921	[1603, 1604]	1917	[2888, 2767]	2913	[3682, 3683]	3909	[2212, 3617]
922	[1605, 600]	1918	[2889, 2752]	2914	[3684, 1681]	3910	[537, 3810]
923	[1606, 1607]	1919	[2523, 2890]	2915	[3685, 2086]	3911	[3703, 564]
924	[1608, 1609]	1920	[949, 329]	2916	[3686, 2157]	3912	[3557, 3979]
925	[1610, 1611]	1921	[2891, 1163]	2917	[710, 3687]	3913	[718, 3432]
926	[1612, 1613]	1922	[2723, 2861]	2918	[671, 3648]	3914	[3326, 3744]
927	[1614, 1615]	1923	[2423, 1401]	2919	[3342, 2110]	3915	[3485, 3709]
928	[1616, 505]	1924	[2892, 1234]	2920	[3688, 3379]	3916	[2339, 3807]
929	[1617, 1618]	1925	[2893, 2703]	2921	[3535, 1999]	3917	[3567, 2044]
930	[1619, 776]	1926	[2894, 2895]	2922	[3689, 800]	3918	[3520, 3978]
931	[172, 1620]	1927	[2896, 2662]	2923	[2155, 3688]	3919	[3436, 778]
932	[1621, 1622]	1928	[2499, 2897]	2924	[1762, 3690]	3920	[3743, 1992]
933	[1623, 1624]	1929	[2898, 2899]	2925	[767, 482]	3921	[2261, 2389]
934	[812, 1625]	1930	[2770, 2900]	2926	[3691, 3367]	3922	[3805, 1797]
935	[1602, 1626]	1931	[2901, 2902]	2927	[781, 3692]	3923	[3340, 3434]
936	[1627, 1628]	1932	[1361, 2903]	2928	[3656, 2274]	3924	[3976, 1670]
937	[1629, 1630]	1933	[2593, 2904]	2929	[1533, 3693]	3925	[1934, 3748]
938	[580, 1631]	1934	[1148, 1052]	2930	[647, 3516]	3926	[3665, 159]
939	[1632, 1633]	1935	[2905, 1461]	2931	[3554, 3694]	3927	[1748, 3804]
940	[1634, 699]	1936	[2906, 2907]	2932	[3695, 2098]	3928	[3793, 3663]
941	[1635, 35]	1937	[2908, 2580]	2933	[44, 3696]	3929	[3737, 1997]
942	[1636, 1637]	1938	[2909, 2910]	2934	[2283, 3566]	3930	[3727, 2377]
943	[512, 225]	1939	[2608, 1037]	2935	[3697, 3519]	3931	[3637, 13]
944	[508, 1638]	1940	[1332, 2911]	2936	[174, 3698]	3932	[3803, 3575]
945	[1639, 1640]	1941	[2912, 2913]	2937	[3529, 3699]	3933	[3473, 3546]
946	[1641, 1642]	1942	[2914, 2609]	2938	[1810, 3366]	3934	[2218, 3794]
947	[1643, 1644]	1943	[2610, 2915]	2939	[2256, 3700]	3935	[3551, 3787]
948	[1645, 39]	1944	[2916, 2760]	2940	[2338, 3701]	3936	[3980, 674]
949	[1646, 611]	1945	[2917, 4]	2941	[3500, 3702]	3937	[1698, 3666]
950	[1647, 1648]	1946	[1307, 2564]	2942	[3323, 3454]	3938	[127, 3758]
951	[1649, 1650]	1947	[316, 2918]	2943	[3312, 3568]	3939	[3816, 2145]
952	[826, 1651]	1948	[1290, 2711]	2944	[2344, 3631]	3940	[3476, 3819]
953	[1652, 1653]	1949	[1132, 2919]	2945	[2141, 3428]	3941	[1812, 3362]
954	[1654, 1655]	1950	[2920, 2921]	2946	[2386, 3703]	3942	[2238, 3601]
955	[1656, 1657]	1951	[2922, 2923]	2947	[164, 495]	3943	[653, 2296]
956	[1658, 1659]	1952	[1402, 287]	2948	[2284, 2245]	3944	[631, 783]
957	[1660, 1661]	1953	[1180, 2924]	2949	[2380, 3481]	3945	[2363, 3721]
958	[1662, 1663]	1954	[917, 2925]	2950	[687, 2347]	3946	[3799, 3499]
959	[1664, 1665]	1955	[1464, 2421]	2951	[3502, 1919]	3947	[3706, 592]
960	[1666, 1667]	1956	[2926, 2490]	2952	[149, 3659]	3948	[2104, 3763]
961	[1668, 1669]	1957	[20, 2927]	2953	[3704, 1635]	3949	[3513, 3769]
962	[1670, 1671]	1958	[1178, 2928]	2954	[3705, 3706]	3950	[3433, 3602]

963	[1672, 840]	1959	[2929, 2930]	2955	[1845, 848]	3951	[3409, 619]
964	[548, 1673]	1960	[2931, 2932]	2956	[3552, 2265]	3952	[655, 3626]
965	[554, 1674]	1961	[2933, 2889]	2957	[3394, 3707]	3953	[851, 2400]
966	[1669, 1675]	1962	[2590, 385]	2958	[2211, 1922]	3954	[2269, 2014]
967	[1676, 1677]	1963	[2934, 2935]	2959	[502, 3708]	3955	[2053, 1540]
968	[1678, 1679]	1964	[6, 2638]	2960	[572, 3539]	3956	[2255, 764]
969	[1680, 1621]	1965	[1480, 1211]	2961	[3709, 3710]	3957	[2049, 654]
970	[1681, 1682]	1966	[464, 2746]	2962	[2300, 1689]	3958	[3496, 669]
971	[1683, 1684]	1967	[2527, 2747]	2963	[1541, 3526]	3959	[3975, 863]
972	[160, 1685]	1968	[1353, 1176]	2964	[1714, 1617]	3960	[3808, 221]
973	[604, 1686]	1969	[2936, 2937]	2965	[749, 2268]	3961	[791, 202]
974	[1687, 1688]	1970	[2533, 2938]	2966	[3711, 3712]	3962	[741, 2250]
975	[1689, 484]	1971	[2939, 2940]	2967	[833, 1940]	3963	[3338, 3416]
976	[1690, 1691]	1972	[2941, 2942]	2968	[1953, 3421]	3964	[3532, 3974]
977	[1692, 1693]	1973	[2943, 2944]	2969	[3658, 3713]	3965	[807, 3324]
978	[747, 1694]	1974	[312, 2945]	2970	[1562, 489]	3966	[3588, 598]
979	[1695, 1696]	1975	[395, 1195]	2971	[3613, 831]	3967	[3775, 3771]
980	[1697, 1698]	1976	[1512, 2946]	2972	[3714, 2214]	3968	[523, 3553]
981	[1699, 825]	1977	[2947, 2948]	2973	[3715, 1937]	3969	[3466, 2084]
982	[1700, 1701]	1978	[1509, 2949]	2974	[3716, 1608]	3970	[635, 3800]
983	[1702, 1703]	1979	[365, 2950]	2975	[3430, 3717]	3971	[195, 3973]
984	[1704, 1575]	1980	[2951, 2704]	2976	[3718, 190]	3972	[2805, 3034]
985	[1705, 1706]	1981	[2952, 2953]	2977	[3719, 3431]	3973	[2510, 3889]
986	[1707, 1708]	1982	[2918, 2954]	2978	[3569, 3720]	3974	[2671, 1229]
987	[725, 1709]	1983	[2955, 2926]	2979	[3721, 3571]	3975	[2544, 1508]
988	[1710, 1711]	1984	[2956, 1399]	2980	[2173, 1894]	3976	[3162, 2604]
989	[1712, 1599]	1985	[1265, 1417]	2981	[3722, 2325]	3977	[3026, 431]
990	[1713, 1714]	1986	[2957, 2690]	2982	[3591, 762]	3978	[310, 3840]
991	[1715, 1716]	1987	[101, 2740]	2983	[3708, 1939]	3979	[3917, 1222]
992	[1717, 632]	1988	[2897, 2958]	2984	[3723, 543]	3980	[3936, 3148]
993	[1718, 871]	1989	[2959, 2960]	2985	[3724, 2337]		
994	[1719, 1720]	1990	[2447, 21]	2986	[3725, 3624]		
995	[1721, 1722]	1991	[2426, 2961]	2987	[1724, 3330]		

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	664	1	1328	1	1992	1	2656	0	3320	1
1	0	665	0	1329	1	1993	1	2657	1	3321	0
2	0	666	1	1330	1	1994	1	2658	1	3322	0
3	0	667	1	1331	1	1995	1	2659	1	3323	0
4	0	668	0	1332	1	1996	0	2660	1	3324	1
5	0	669	0	1333	0	1997	1	2661	0	3325	0
6	0	670	1	1334	0	1998	1	2662	0	3326	1
7	0	671	0	1335	0	1999	1	2663	1	3327	0

8	0	672	1	1336	0	2000	1	2664	1	3328	1
9	0	673	1	1337	1	2001	0	2665	0	3329	1
10	1	674	0	1338	0	2002	1	2666	1	3330	1
11	0	675	0	1339	1	2003	1	2667	1	3331	1
12	0	676	1	1340	1	2004	0	2668	1	3332	1
13	0	677	1	1341	0	2005	1	2669	1	3333	0
14	0	678	0	1342	0	2006	0	2670	1	3334	1
15	0	679	0	1343	1	2007	0	2671	1	3335	1
16	1	680	0	1344	1	2008	1	2672	1	3336	1
17	0	681	1	1345	1	2009	0	2673	1	3337	0
18	1	682	0	1346	1	2010	1	2674	1	3338	1
19	0	683	1	1347	1	2011	1	2675	1	3339	0
20	0	684	1	1348	0	2012	1	2676	0	3340	1
21	1	685	0	1349	0	2013	1	2677	1	3341	0
22	1	686	0	1350	0	2014	0	2678	1	3342	0
23	0	687	0	1351	1	2015	1	2679	0	3343	0
24	0	688	0	1352	1	2016	0	2680	0	3344	0
25	0	689	1	1353	1	2017	1	2681	0	3345	0
26	1	690	1	1354	0	2018	1	2682	0	3346	1
27	0	691	0	1355	1	2019	1	2683	1	3347	0
28	1	692	1	1356	1	2020	0	2684	1	3348	0
29	0	693	0	1357	0	2021	0	2685	0	3349	1
30	0	694	1	1358	1	2022	1	2686	0	3350	1
31	0	695	1	1359	0	2023	1	2687	1	3351	0
32	1	696	1	1360	1	2024	1	2688	0	3352	1
33	1	697	0	1361	1	2025	1	2689	0	3353	1
34	1	698	1	1362	0	2026	0	2690	1	3354	1
35	0	699	0	1363	0	2027	0	2691	1	3355	0
36	0	700	0	1364	1	2028	0	2692	0	3356	0
37	1	701	1	1365	1	2029	1	2693	1	3357	1
38	0	702	0	1366	0	2030	0	2694	0	3358	1
39	0	703	1	1367	0	2031	0	2695	0	3359	0
40	0	704	0	1368	1	2032	1	2696	1	3360	1
41	0	705	1	1369	0	2033	1	2697	0	3361	0
42	1	706	0	1370	0	2034	0	2698	0	3362	1
43	1	707	1	1371	0	2035	1	2699	0	3363	0
44	1	708	1	1372	0	2036	0	2700	0	3364	1
45	1	709	0	1373	0	2037	1	2701	1	3365	0
46	0	710	1	1374	1	2038	1	2702	0	3366	0
47	0	711	0	1375	0	2039	1	2703	0	3367	1
48	1	712	1	1376	0	2040	1	2704	1	3368	0
49	0	713	1	1377	1	2041	1	2705	1	3369	0
50	1	714	0	1378	0	2042	1	2706	0	3370	1
51	0	715	1	1379	0	2043	0	2707	1	3371	0

52	0	716	1	1380	0	2044	0	2708	1	3372	0
53	1	717	0	1381	0	2045	0	2709	1	3373	1
54	1	718	0	1382	1	2046	0	2710	0	3374	1
55	0	719	0	1383	0	2047	0	2711	1	3375	1
56	0	720	0	1384	1	2048	1	2712	0	3376	1
57	1	721	1	1385	0	2049	0	2713	0	3377	0
58	1	722	0	1386	1	2050	0	2714	1	3378	0
59	0	723	0	1387	0	2051	0	2715	0	3379	1
60	1	724	0	1388	0	2052	1	2716	1	3380	0
61	0	725	1	1389	1	2053	1	2717	1	3381	0
62	0	726	0	1390	0	2054	0	2718	0	3382	1
63	0	727	0	1391	1	2055	1	2719	1	3383	1
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65	1	729	1	1393	0	2057	1	2721	0	3385	1
66	1	730	0	1394	1	2058	0	2722	0	3386	0
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69	1	733	0	1397	1	2061	0	2725	0	3389	0
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71	0	735	0	1399	1	2063	0	2727	1	3391	1
72	0	736	0	1400	0	2064	1	2728	0	3392	0
73	1	737	0	1401	1	2065	0	2729	0	3393	0
74	1	738	0	1402	0	2066	0	2730	1	3394	1
75	0	739	1	1403	0	2067	0	2731	1	3395	0
76	0	740	1	1404	0	2068	0	2732	1	3396	0
77	1	741	1	1405	0	2069	0	2733	0	3397	0
78	0	742	0	1406	0	2070	0	2734	0	3398	0
79	1	743	1	1407	0	2071	1	2735	1	3399	0
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83	0	747	0	1411	0	2075	0	2739	0	3403	1
84	1	748	1	1412	1	2076	1	2740	1	3404	1
85	1	749	1	1413	0	2077	0	2741	0	3405	1
86	1	750	0	1414	1	2078	1	2742	0	3406	1
87	1	751	1	1415	0	2079	0	2743	0	3407	0
88	1	752	1	1416	0	2080	0	2744	0	3408	1
89	1	753	1	1417	1	2081	0	2745	0	3409	1
90	1	754	0	1418	1	2082	0	2746	0	3410	1
91	1	755	0	1419	1	2083	0	2747	1	3411	0
92	0	756	1	1420	0	2084	0	2748	0	3412	1
93	1	757	0	1421	1	2085	0	2749	0	3413	0
94	0	758	1	1422	1	2086	0	2750	0	3414	1
95	1	759	0	1423	1	2087	0	2751	0	3415	0

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98	0	762	1	1426	1	2090	0	2754	1	3418	1
99	1	763	1	1427	1	2091	0	2755	0	3419	1
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101	1	765	1	1429	1	2093	1	2757	0	3421	1
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103	0	767	0	1431	1	2095	0	2759	0	3423	0
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107	1	771	1	1435	0	2099	0	2763	0	3427	0
108	1	772	1	1436	0	2100	1	2764	0	3428	0
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112	0	776	1	1440	1	2104	1	2768	0	3432	1
113	0	777	0	1441	1	2105	1	2769	1	3433	0
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116	1	780	1	1444	0	2108	1	2772	0	3436	1
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118	0	782	1	1446	0	2110	1	2774	0	3438	1
119	0	783	1	1447	1	2111	0	2775	0	3439	1
120	1	784	0	1448	1	2112	0	2776	0	3440	1
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122	0	786	1	1450	1	2114	0	2778	1	3442	0
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124	0	788	1	1452	0	2116	1	2780	0	3444	1
125	0	789	0	1453	1	2117	1	2781	1	3445	0
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127	0	791	1	1455	0	2119	1	2783	0	3447	0
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129	1	793	0	1457	1	2121	1	2785	1	3449	0
130	1	794	1	1458	0	2122	1	2786	1	3450	1
131	1	795	0	1459	1	2123	0	2787	0	3451	1
132	1	796	0	1460	1	2124	0	2788	0	3452	0
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134	1	798	0	1462	0	2126	1	2790	1	3454	0
135	1	799	1	1463	0	2127	0	2791	0	3455	0
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137	0	801	1	1465	1	2129	0	2793	0	3457	1
138	1	802	0	1466	0	2130	0	2794	1	3458	1
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142	0	806	0	1470	0	2134	1	2798	1	3462	0
143	0	807	0	1471	1	2135	0	2799	1	3463	0
144	0	808	1	1472	0	2136	1	2800	1	3464	0
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146	1	810	1	1474	0	2138	0	2802	0	3466	1
147	0	811	1	1475	0	2139	0	2803	0	3467	0
148	1	812	0	1476	0	2140	1	2804	0	3468	0
149	1	813	1	1477	1	2141	1	2805	1	3469	1
150	0	814	0	1478	1	2142	1	2806	1	3470	0
151	1	815	1	1479	0	2143	0	2807	0	3471	0
152	0	816	1	1480	1	2144	0	2808	0	3472	0
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154	1	818	1	1482	1	2146	0	2810	0	3474	0
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156	1	820	1	1484	0	2148	0	2812	1	3476	0
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158	0	822	0	1486	0	2150	0	2814	1	3478	1
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161	0	825	0	1489	0	2153	1	2817	0	3481	1
162	0	826	1	1490	1	2154	1	2818	1	3482	1
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166	0	830	0	1494	0	2158	1	2822	0	3486	1
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169	1	833	1	1497	1	2161	1	2825	1	3489	0
170	1	834	0	1498	0	2162	0	2826	0	3490	0
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173	1	837	1	1501	0	2165	1	2829	0	3493	1
174	0	838	0	1502	1	2166	0	2830	1	3494	0
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177	1	841	0	1505	1	2169	0	2833	1	3497	0
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180	0	844	1	1508	0	2172	1	2836	1	3500	0
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186	1	850	1	1514	0	2178	1	2842	1	3506	0
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190	1	854	1	1518	1	2182	1	2846	1	3510	1
191	0	855	1	1519	1	2183	1	2847	0	3511	1
192	1	856	0	1520	1	2184	1	2848	1	3512	0
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202	0	866	0	1530	0	2194	1	2858	0	3522	1
203	1	867	0	1531	0	2195	1	2859	0	3523	1
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207	0	871	1	1535	0	2199	0	2863	1	3527	1
208	1	872	0	1536	0	2200	1	2864	0	3528	1
209	1	873	0	1537	0	2201	1	2865	0	3529	0
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211	1	875	0	1539	0	2203	0	2867	0	3531	0
212	1	876	0	1540	0	2204	1	2868	0	3532	0
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214	0	878	1	1542	0	2206	1	2870	0	3534	1
215	1	879	0	1543	0	2207	0	2871	1	3535	0
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217	0	881	1	1545	0	2209	0	2873	1	3537	0
218	0	882	0	1546	1	2210	1	2874	1	3538	1
219	1	883	0	1547	0	2211	1	2875	1	3539	0
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223	0	887	0	1551	0	2215	0	2879	0	3543	1
224	1	888	1	1552	0	2216	1	2880	1	3544	0
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252	1	916	0	1580	0	2244	0	2908	1	3572	0
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298	0	962	0	1626	0	2290	0	2954	1	3618	1
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309	1	973	0	1637	0	2301	1	2965	1	3629	0
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311	0	975	0	1639	0	2303	0	2967	1	3631	1
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567	1	1231	1	1895	1	2559	1	3223	1	3887	0
568	1	1232	0	1896	0	2560	1	3224	0	3888	1
569	1	1233	0	1897	0	2561	1	3225	0	3889	1
570	0	1234	1	1898	1	2562	1	3226	0	3890	0
571	0	1235	0	1899	1	2563	1	3227	0	3891	0
572	1	1236	0	1900	0	2564	1	3228	1	3892	1
573	1	1237	0	1901	0	2565	0	3229	1	3893	0
574	1	1238	0	1902	1	2566	1	3230	1	3894	1
575	1	1239	0	1903	1	2567	1	3231	0	3895	1
576	1	1240	0	1904	1	2568	1	3232	0	3896	1
577	0	1241	1	1905	1	2569	1	3233	1	3897	1
578	0	1242	0	1906	0	2570	1	3234	1	3898	1
579	0	1243	1	1907	0	2571	0	3235	1	3899	1

580	1	1244	1	1908	1	2572	1	3236	1	3900	1
581	0	1245	1	1909	1	2573	1	3237	0	3901	1
582	0	1246	0	1910	0	2574	0	3238	0	3902	0
583	0	1247	0	1911	1	2575	1	3239	0	3903	0
584	1	1248	1	1912	0	2576	1	3240	1	3904	1
585	0	1249	0	1913	1	2577	0	3241	0	3905	0
586	1	1250	0	1914	0	2578	1	3242	0	3906	0
587	0	1251	1	1915	1	2579	1	3243	0	3907	1
588	0	1252	0	1916	0	2580	1	3244	1	3908	0
589	1	1253	1	1917	0	2581	0	3245	1	3909	0
590	0	1254	1	1918	0	2582	0	3246	1	3910	1
591	0	1255	0	1919	0	2583	1	3247	1	3911	0
592	0	1256	0	1920	1	2584	0	3248	1	3912	0
593	0	1257	1	1921	0	2585	1	3249	0	3913	0
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595	1	1259	0	1923	0	2587	0	3251	1	3915	1
596	0	1260	0	1924	1	2588	1	3252	0	3916	0
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624	1	1288	0	1952	0	2616	1	3280	0	3944	0
625	1	1289	0	1953	1	2617	1	3281	1	3945	0
626	0	1290	0	1954	1	2618	1	3282	1	3946	1
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632	0	1296	0	1960	1	2624	1	3288	0	3952	1
633	0	1297	0	1961	1	2625	1	3289	1	3953	1
634	0	1298	0	1962	0	2626	0	3290	1	3954	0
635	1	1299	0	1963	1	2627	0	3291	1	3955	1
636	1	1300	1	1964	0	2628	1	3292	1	3956	0
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654	0	1318	0	1982	0	2646	0	3310	1	3974	1
655	1	1319	0	1983	0	2647	1	3311	1	3975	0
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660	1	1324	0	1988	1	2652	1	3316	0	3980	0
661	0	1325	1	1989	0	2653	1	3317	0		
662	0	1326	1	1990	1	2654	0	3318	1		
663	1	1327	1	1991	1	2655	0	3319	1		

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