PROOF OF THE CONTINUED FRACTION CONJECTURE FOR $(a, b) = (z^4 + 1, z^3 + z^2 + 1)$

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ABSTRACT. The continued fraction conjecture claims that the continued fraction defined by the (a, b)-Thue-Morse sequence is algebraic over $\mathbb{F}_2(x)$ for all pairs of distinct elements (a, b) in $\mathbb{F}_2[x] \setminus \mathbb{F}_2$. In this paper we prove the conjecture for $(a, b) = (z^4 + 1, z^3 + z^2 + 1)$.

1. INTRODUCTION

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

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

as the limit of the finite continued fractions

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

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

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

admits a continued fraction expansion of form (1.1).

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

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

that we shall denote

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

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Theorem 1.1. *When* $(a,b)=(z^4+1, z^3+z^2+1)$, *the two power series* $\mathrm{CF}(a,b)$ *and* $\mathrm{CF}(b,a)$ *are algebraic over* $\mathbb{F}_2(z)$, *with minimal polynomials of the form*

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

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

$$\begin{aligned}
p_0(z)&=z^{21}+z^{20}+z^{19}+z^{17}+z^{15}+z^{14}+z^{12}+z^7+z^3+z^2+1,\\
p_1(z)&=z^{25}+z^{23}+z^{20}+z^{18}+z^{17}+z^{16}+z^{15}+z^{14}+z^{11}+z^6+z^3+z^2,\\
p_2(z)&=z^{28}+z^{24}+z^{22}+z^{16}+z^8+z^6+z^4+1,\\
p_3(z)&=z^{25}+z^{23}+z^{20}+z^{18}+z^{17}+z^{16}+z^{15}+z^{14}+z^{11}+z^6+z^3+z^2,\\
p_4(z)&=z^{22}+z^{21}+z^{20}+z^{19}+z^{17}+z^{16}+z^{15}+z^{14}+z^{12}+z^8+z^7+z^6+z^4\\
&\qquad+z^3+z^2+1,
\end{aligned}$$

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

$$\begin{aligned}
p_0(z)&=z^{21}+z^{20}+z^{19}+z^{17}+z^{16}+z^{15}+z^{14}+z^8+z^7+z^3+z^2+1,\\
p_1(z)&=z^{25}+z^{23}+z^{20}+z^{18}+z^{17}+z^{16}+z^{15}+z^{14}+z^{11}+z^6+z^3+z^2,\\
p_2(z)&=z^{28}+z^{24}+z^{22}+z^{16}+z^8+z^6+z^4+1,\\
p_3(z)&=z^{25}+z^{23}+z^{20}+z^{18}+z^{17}+z^{16}+z^{15}+z^{14}+z^{11}+z^6+z^3+z^2,\\
p_4(z)&=z^{22}+z^{21}+z^{20}+z^{19}+z^{17}+z^{15}+z^{14}+z^7+z^6+z^4+z^3+z^2+1.
\end{aligned}$$

2. Proof

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

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

By the basic properties of continued fractions, we have

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

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

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

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

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

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

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

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

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

for some positive integer d_n. Hence,

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

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

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

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

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

of the vector

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

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

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

Lemma 2.1. *We have*

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

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

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

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

Proof. We give the proof of the identity

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

the proofs of the others being similar.

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

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

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

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

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

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

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

Define

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

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

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

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

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

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

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 $u = 2^{2k}$,

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

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

$$x^7 u = x^{6u} T[u:2u] + x^{5u} T[2u:3u] + x^{4u} T[3u:4u] + x^{3u} T[4u:5u]$$

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

which can be rewritten as

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

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

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

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

First we calculate an 2-automaton that generates T from its minimal polynomial and its first terms. This automaton has 3010 states; its transition function and output function can be found in the annex. Let $A(s, w)$ denote the state reached after reading w from right to left starting from the state s, and τ the output function. Define

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

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

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

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

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

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

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

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

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

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

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

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

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

We give the proof of

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

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

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

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

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

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

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

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

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

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

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

$$\begin{aligned}q_0(x) &= x^{28}+x^{26}+x^{25}+x^{21}+x^{16}+x^{14}+x^{13}+x^{11}+x^{9}+x^{8}+x^{7},\\ q_1(x) &= x^{26}+x^{25}+x^{22}+x^{17}+x^{14}+x^{13}+x^{12}+x^{11}+x^{10}+x^{8}+x^{5}+x^{3},\\ q_2(x) &= x^{28}+x^{24}+x^{22}+x^{20}+x^{12}+x^{6}+x^{4}+1,\\ q_3(x) &= x^{26}+x^{25}+x^{22}+x^{17}+x^{14}+x^{13}+x^{12}+x^{11}+x^{10}+x^{8}+x^{5}+x^{3},\\ q_4(x) &= x^{28}+x^{26}+x^{25}+x^{24}+x^{22}+x^{21}+x^{20}+x^{16}+x^{14}+x^{13}+x^{12}+x^{11}\\ &\quad +x^{9}+x^{8}+x^{7}+x^{6}.\end{aligned}$$

The polynomial $Q(x,y)$ is the candidate for the minimal polynomial of $f(x)$ found by Padé-Hermite approximation. To prove that it is indeed the minimal polynomial of $f(x)$, we only need to prove that it is an irreducible factor of $P(x,y)$ of multiplicity m and $R(x,y) := P(x,y)/Q(x,y)^m$ is not an annihilating polynomial of $f(x)$. We verify the first point directly. For the second point, we find that when we truncate $f(x)$ to order 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 $\phi(M^e,0,0)$:

$$\begin{aligned}p_0(x) = {}& x^{144}+x^{140}+x^{138}+x^{136}+x^{130}+x^{126}+x^{120}+x^{114}+x^{110}+x^{108}\\ &+x^{98}+x^{88}+x^{84}+x^{80}+x^{76}+x^{74}+x^{72}+x^{70}+x^{66}+x^{64}+x^{58}\end{aligned}$$

$$
\begin{aligned}
&+ x^{56} + x^{52} + x^{48} + x^{44} + x^{38} + x^{36},\\
p_3(x) &= x^{140} + x^{138} + x^{136} + x^{128} + x^{126} + x^{124} + x^{120} + x^{118} + x^{112} + x^{110}\\
&+ x^{108} + x^{106} + x^{104} + x^{102} + x^{98} + x^{96} + x^{90} + x^{86} + x^{80} + x^{68}\\
&+ x^{60} + x^{58} + x^{52} + x^{46} + x^{44} + x^{42} + x^{38} + x^{34} + x^{26} + x^{24} + x^{22}\\
&+ x^{20},\\
p_6(x) &= x^{140} + x^{138} + x^{132} + x^{128} + x^{114} + x^{110} + x^{108} + x^{102} + x^{98} + x^{86}\\
&+ x^{84} + x^{80} + x^{78} + x^{76} + x^{70} + x^{68} + x^{64} + x^{60} + x^{58} + x^{56} + x^{52}\\
&+ x^{50} + x^{46} + x^{44} + x^{38} + x^{28} + x^{26} + x^{24} + x^{20} + x^{18} + x^{12} + x^{10}\\
&+ x^{6} + 1,\\
p_9(x) &= x^{140} + x^{138} + x^{136} + x^{132} + x^{130} + x^{124} + x^{116} + x^{112} + x^{110} + x^{108}\\
&+ x^{106} + x^{102} + x^{100} + x^{92} + x^{90} + x^{86} + x^{80} + x^{76} + x^{74} + x^{72} + x^{68}\\
&+ x^{66} + x^{64} + x^{58} + x^{56} + x^{50} + x^{46} + x^{44} + x^{40} + x^{38} + x^{32} + x^{30}\\
&+ x^{28} + x^{24} + x^{18} + x^{16} + x^{14} + x^{12} + x^{10} + x^{6},\\
p_{12}(x) &= x^{144} + x^{136} + x^{128} + x^{112} + x^{48} + x^{40} + x^{24} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{147} + x^{145} + x^{144} + x^{143} + x^{138} + x^{136} + x^{134} + x^{132} + x^{127} + x^{126}\\
&+ x^{121} + x^{120} + x^{119} + x^{116} + x^{114} + x^{113} + x^{112} + x^{111} + x^{108}\\
&+ x^{106} + x^{104} + x^{98} + x^{97} + x^{94} + x^{92} + x^{88} + x^{85} + x^{79} + x^{77} + x^{76}\\
&+ x^{72} + x^{63} + x^{62} + x^{59} + x^{57} + x^{55} + x^{52} + x^{51} + x^{49} + x^{46} + x^{43}\\
&+ x^{42} + x^{41} + x^{40} + x^{39},\\
p_3(x) &= x^{129} + x^{128} + x^{127} + x^{125} + x^{124} + x^{122} + x^{121} + x^{117} + x^{116} + x^{114}\\
&+ x^{112} + x^{111} + x^{109} + x^{108} + x^{107} + x^{105} + x^{104} + x^{103} + x^{101}\\
&+ x^{100} + x^{98} + x^{97} + x^{93} + x^{92} + x^{90} + x^{88} + x^{87} + x^{85} + x^{84} + x^{83}\\
&+ x^{81} + x^{80} + x^{79} + x^{77} + x^{76} + x^{74} + x^{72} + x^{71} + x^{65} + x^{64} + x^{63}\\
&+ x^{59} + x^{58} + x^{57} + x^{51} + x^{50} + x^{48} + x^{47} + x^{41} + x^{40} + x^{39} + x^{35}\\
&+ x^{34} + x^{32} + x^{31} + x^{29} + x^{28} + x^{27},\\
p_6(x) &= x^{135} + x^{132} + x^{131} + x^{130} + x^{127} + x^{125} + x^{124} + x^{123} + x^{120} + x^{119}\\
&+ x^{118} + x^{117} + x^{114} + x^{113} + x^{112} + x^{111} + x^{108} + x^{106} + x^{105}\\
&+ x^{104} + x^{103} + x^{101} + x^{100} + x^{97} + x^{94} + x^{93} + x^{92} + x^{91} + x^{88}\\
&+ x^{87} + x^{86} + x^{85} + x^{83} + x^{82} + x^{81} + x^{79} + x^{78} + x^{75} + x^{72} + x^{70}\\
&+ x^{68} + x^{67} + x^{66} + x^{65} + x^{62} + x^{61} + x^{60} + x^{53} + x^{50} + x^{48} + x^{47}\\
&+ x^{46} + x^{43} + x^{41} + x^{40} + x^{35} + x^{33} + x^{32} + x^{31} + x^{28} + x^{27} + x^{26}\\
&+ x^{25} + x^{23} + x^{22} + x^{21} + x^{19} + x^{18},\\
p_9(x) &= x^{141} + x^{140} + x^{138} + x^{136} + x^{135} + x^{133} + x^{132} + x^{130} + x^{128} + x^{126}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{125} + x^{117} + x^{116} + x^{114} + x^{112} + x^{110} + x^{108} + x^{107} + x^{105} \\
&+ x^{104} + x^{103} + x^{95} + x^{94} + x^{92} + x^{90} + x^{89} + x^{83} + x^{82} + x^{81} + x^{77} \\
&+ x^{76} + x^{75} + x^{71} + x^{70} + x^{68} + x^{67} + x^{65} + x^{64} + x^{62} + x^{61} + x^{59} \\
&+ x^{58} + x^{57} + x^{55} + x^{54} + x^{52} + x^{51} + x^{49} + x^{48} + x^{46} + x^{45} + x^{41} \\
&+ x^{40} + x^{38} + x^{37} + x^{35} + x^{34} + x^{32} + x^{30} + x^{29} + x^{25} + x^{24} + x^{22} \\
&+ x^{21} + x^{17} + x^{16} + x^{15} + x^{11} + x^{10} + x^{9}, \\
p_{12}(x) &= x^{147} + x^{145} + x^{144} + x^{143} + x^{141} + x^{140} + x^{139} + x^{137} + x^{136} + x^{127} \\
&+ x^{125} + x^{124} + x^{123} + x^{121} + x^{120} + x^{115} + x^{113} + x^{112} + x^{51} + x^{49} \\
&+ x^{48} + x^{47} + x^{45} + x^{44} + x^{43} + x^{41} + x^{40} + x^{35} + x^{33} + x^{32} + x^{19} \\
&+ x^{17} + x^{16} + x^{15} + x^{13} + x^{12} + x^{11} + x^{9} + x^{8} + x^{3} + x + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{147} + x^{145} + x^{144} + x^{143} + x^{138} + x^{136} + x^{134} + x^{132} + x^{127} + x^{126} \\
&+ x^{121} + x^{120} + x^{119} + x^{116} + x^{114} + x^{113} + x^{112} + x^{111} + x^{108} \\
&+ x^{106} + x^{104} + x^{98} + x^{97} + x^{94} + x^{92} + x^{88} + x^{85} + x^{79} + x^{77} + x^{76} \\
&+ x^{72} + x^{63} + x^{62} + x^{59} + x^{57} + x^{55} + x^{52} + x^{51} + x^{49} + x^{46} + x^{43} \\
&+ x^{42} + x^{41} + x^{40} + x^{39}, \\
p_3(x) &= x^{129} + x^{128} + x^{127} + x^{125} + x^{124} + x^{122} + x^{121} + x^{117} + x^{116} + x^{114} \\
&+ x^{112} + x^{111} + x^{109} + x^{108} + x^{107} + x^{105} + x^{104} + x^{103} + x^{101} \\
&+ x^{100} + x^{98} + x^{97} + x^{93} + x^{92} + x^{90} + x^{88} + x^{87} + x^{85} + x^{84} + x^{83} \\
&+ x^{81} + x^{80} + x^{79} + x^{77} + x^{76} + x^{74} + x^{72} + x^{71} + x^{65} + x^{64} + x^{63} \\
&+ x^{59} + x^{58} + x^{57} + x^{51} + x^{50} + x^{48} + x^{47} + x^{41} + x^{40} + x^{39} + x^{35} \\
&+ x^{34} + x^{32} + x^{31} + x^{29} + x^{28} + x^{27}, \\
p_6(x) &= x^{135} + x^{132} + x^{131} + x^{130} + x^{127} + x^{125} + x^{124} + x^{123} + x^{120} + x^{119} \\
&+ x^{118} + x^{117} + x^{114} + x^{113} + x^{112} + x^{111} + x^{108} + x^{106} + x^{105} \\
&+ x^{104} + x^{103} + x^{101} + x^{100} + x^{97} + x^{94} + x^{93} + x^{92} + x^{91} + x^{88} \\
&+ x^{87} + x^{86} + x^{85} + x^{83} + x^{82} + x^{81} + x^{79} + x^{78} + x^{75} + x^{72} + x^{70} \\
&+ x^{68} + x^{67} + x^{66} + x^{65} + x^{62} + x^{61} + x^{60} + x^{53} + x^{50} + x^{48} + x^{47} \\
&+ x^{46} + x^{43} + x^{41} + x^{40} + x^{35} + x^{33} + x^{32} + x^{31} + x^{28} + x^{27} + x^{26} \\
&+ x^{25} + x^{23} + x^{22} + x^{21} + x^{19} + x^{18}, \\
p_9(x) &= x^{141} + x^{140} + x^{138} + x^{136} + x^{135} + x^{133} + x^{132} + x^{130} + x^{128} + x^{126} \\
&+ x^{125} + x^{117} + x^{116} + x^{114} + x^{112} + x^{110} + x^{108} + x^{107} + x^{105} \\
&+ x^{104} + x^{103} + x^{95} + x^{94} + x^{92} + x^{90} + x^{89} + x^{83} + x^{82} + x^{81} + x^{77} \\
&+ x^{76} + x^{75} + x^{71} + x^{70} + x^{68} + x^{67} + x^{65} + x^{64} + x^{62} + x^{61} + x^{59} \\
&+ x^{58} + x^{57} + x^{55} + x^{54} + x^{52} + x^{51} + x^{49} + x^{48} + x^{46} + x^{45} + x^{41}
\end{aligned}
$$

$$+x^{40}+x^{38}+x^{37}+x^{35}+x^{34}+x^{32}+x^{30}+x^{29}+x^{25}+x^{24}+x^{22}$$
$$+x^{21}+x^{17}+x^{16}+x^{15}+x^{11}+x^{10}+x^{9},$$
$$p_{12}(x)=x^{147}+x^{145}+x^{144}+x^{143}+x^{141}+x^{140}+x^{139}+x^{137}+x^{136}+x^{127}$$
$$+x^{125}+x^{124}+x^{123}+x^{121}+x^{120}+x^{115}+x^{113}+x^{112}+x^{51}+x^{49}$$
$$+x^{48}+x^{47}+x^{45}+x^{44}+x^{43}+x^{41}+x^{40}+x^{35}+x^{33}+x^{32}+x^{19}$$
$$+x^{17}+x^{16}+x^{15}+x^{13}+x^{12}+x^{11}+x^{9}+x^{8}+x^{3}+x+1,$$

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

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

$$p_0(x)=x^{150}+x^{136}+x^{132}+x^{130}+x^{128}+x^{126}+x^{118}+x^{110}+x^{108}+x^{106}$$
$$+x^{104}+x^{98}+x^{94}+x^{92}+x^{90}+x^{88}+x^{86}+x^{78}+x^{76}+x^{70}+x^{68}$$
$$+x^{66}+x^{60}+x^{58}+x^{56}+x^{46}+x^{42},$$
$$p_3(x)=x^{146}+x^{144}+x^{136}+x^{134}+x^{130}+x^{128}+x^{126}+x^{122}+x^{120}+x^{98}$$
$$+x^{96}+x^{90}+x^{82}+x^{78}+x^{74}+x^{70}+x^{66}+x^{64}+x^{38}+x^{26}+x^{22}$$
$$+x^{18},$$
$$p_6(x)=x^{146}+x^{144}+x^{136}+x^{134}+x^{132}+x^{130}+x^{126}+x^{122}+x^{120}+x^{118}$$
$$+x^{116}+x^{112}+x^{100}+x^{98}+x^{88}+x^{86}+x^{82}+x^{78}+x^{76}+x^{74}+x^{72}$$
$$+x^{68}+x^{66}+x^{62}+x^{60}+x^{58}+x^{52}+x^{48}+x^{44}+x^{42}+x^{36}+x^{34}$$
$$+x^{30}+x^{28}+x^{26}+x^{24}+x^{22}+x^{18}+x^{10}+x^{8}+x^{2}+1,$$
$$p_9(x)=x^{146}+x^{144}+x^{136}+x^{134}+x^{130}+x^{124}+x^{120}+x^{118}+x^{116}+x^{114}$$
$$+x^{110}+x^{108}+x^{104}+x^{100}+x^{98}+x^{94}+x^{92}+x^{90}+x^{88}+x^{84}$$
$$+x^{82}+x^{74}+x^{72}+x^{68}+x^{62}+x^{58}+x^{56}+x^{54}+x^{46}+x^{24}+x^{18}$$
$$+x^{16}+x^{12}+x^{10}+x^{8}+x^{6},$$
$$p_{12}(x)=x^{150}+x^{146}+x^{144}+x^{118}+x^{114}+x^{112}+x^{54}+x^{50}+x^{48}+x^{38}$$
$$+x^{34}+x^{32}+x^{22}+x^{18}+x^{16}+x^{6}+x^{2}+1,$$

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

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

$$p_0(x)=x^{150}+x^{142}+x^{134}+x^{126}+x^{122}+x^{120}+x^{118}+x^{116}+x^{112}+x^{106}$$
$$+x^{104}+x^{102}+x^{100}+x^{96}+x^{94}+x^{90}+x^{78}+x^{64}+x^{56}+x^{52}+x^{50}$$
$$+x^{46}+x^{42}+x^{40}+x^{36},$$
$$p_3(x)=x^{146}+x^{144}+x^{138}+x^{134}+x^{132}+x^{130}+x^{126}+x^{124}+x^{120}+x^{118}$$
$$+x^{116}+x^{114}+x^{110}+x^{108}+x^{104}+x^{100}+x^{98}+x^{92}+x^{90}+x^{88}$$
$$+x^{86}+x^{82}+x^{76}+x^{74}+x^{72}+x^{66}+x^{64}+x^{58}+x^{56}+x^{54}+x^{42}$$
$$+x^{40}+x^{26}+x^{20},$$
$$p_6(x)=x^{146}+x^{144}+x^{142}+x^{138}+x^{136}+x^{132}+x^{130}+x^{128}+x^{124}+x^{122}$$
$$+x^{114}+x^{112}+x^{108}+x^{106}+x^{98}+x^{96}+x^{92}+x^{90}+x^{84}+x^{82}$$

$$+ x^{80} + x^{76} + x^{74} + x^{72} + x^{70} + x^{64} + x^{60} + x^{58} + x^{52} + x^{50} + x^{46} + x^{44} + x^{42} + x^{36} + x^{32} + x^{30} + x^{28} + x^{24} + x^{22} + x^{18} + x^{14} + x^{12} + x^{10} + x^{8} + x^{2} + 1,$$

$$p_9(x) = x^{146} + x^{144} + x^{136} + x^{134} + x^{130} + x^{124} + x^{120} + x^{118} + x^{116} + x^{114} + x^{110} + x^{108} + x^{104} + x^{100} + x^{98} + x^{94} + x^{92} + x^{90} + x^{88} + x^{84} + x^{82} + x^{74} + x^{72} + x^{68} + x^{62} + x^{58} + x^{56} + x^{54} + x^{46} + x^{24} + x^{18} + x^{16} + x^{12} + x^{10} + x^{8} + x^{6},$$

$$p_{12}(x) = x^{150} + x^{146} + x^{144} + x^{118} + x^{114} + x^{112} + x^{54} + x^{50} + x^{48} + x^{38} + x^{34} + x^{32} + x^{22} + x^{18} + x^{16} + x^{6} + x^{2} + 1,$$

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

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

$$p_0(x) = x^{147} + x^{145} + x^{144} + x^{143} + x^{138} + x^{136} + x^{135} + x^{134} + x^{131} + x^{130} + x^{127} + x^{126} + x^{125} + x^{123} + x^{122} + x^{121} + x^{120} + x^{119} + x^{117} + x^{115} + x^{111} + x^{110} + x^{108} + x^{107} + x^{106} + x^{103} + x^{100} + x^{99} + x^{98} + x^{97} + x^{96} + x^{95} + x^{92} + x^{89} + x^{86} + x^{83} + x^{79} + x^{77} + x^{76} + x^{74} + x^{73} + x^{71} + x^{70} + x^{68} + x^{67} + x^{65} + x^{64} + x^{62} + x^{61} + x^{60} + x^{59} + x^{58} + x^{57} + x^{54} + x^{52} + x^{51} + x^{47} + x^{46} + x^{45} + x^{44} + x^{43} + x^{42} + x^{41} + x^{40} + x^{39},$$

$$p_3(x) = x^{129} + x^{128} + x^{127} + x^{125} + x^{124} + x^{122} + x^{121} + x^{117} + x^{116} + x^{114} + x^{112} + x^{111} + x^{109} + x^{108} + x^{107} + x^{105} + x^{104} + x^{103} + x^{101} + x^{100} + x^{98} + x^{97} + x^{93} + x^{92} + x^{90} + x^{88} + x^{87} + x^{85} + x^{84} + x^{83} + x^{81} + x^{80} + x^{79} + x^{77} + x^{76} + x^{74} + x^{72} + x^{71} + x^{65} + x^{64} + x^{63} + x^{59} + x^{58} + x^{57} + x^{51} + x^{50} + x^{48} + x^{47} + x^{41} + x^{40} + x^{39} + x^{35} + x^{34} + x^{32} + x^{31} + x^{29} + x^{28} + x^{27},$$

$$p_6(x) = x^{135} + x^{132} + x^{131} + x^{130} + x^{127} + x^{125} + x^{124} + x^{123} + x^{120} + x^{119} + x^{118} + x^{117} + x^{114} + x^{113} + x^{112} + x^{111} + x^{108} + x^{106} + x^{105} + x^{104} + x^{103} + x^{101} + x^{100} + x^{97} + x^{94} + x^{93} + x^{92} + x^{91} + x^{88} + x^{87} + x^{86} + x^{85} + x^{83} + x^{82} + x^{81} + x^{79} + x^{78} + x^{75} + x^{72} + x^{70} + x^{68} + x^{67} + x^{66} + x^{65} + x^{62} + x^{61} + x^{60} + x^{53} + x^{50} + x^{48} + x^{47} + x^{46} + x^{43} + x^{41} + x^{40} + x^{35} + x^{33} + x^{32} + x^{31} + x^{28} + x^{27} + x^{26} + x^{25} + x^{23} + x^{22} + x^{21} + x^{19} + x^{18},$$

$$p_9(x) = x^{141} + x^{140} + x^{138} + x^{136} + x^{135} + x^{133} + x^{132} + x^{130} + x^{128} + x^{126} + x^{125} + x^{117} + x^{116} + x^{114} + x^{112} + x^{110} + x^{108} + x^{107} + x^{105} + x^{104} + x^{103} + x^{95} + x^{94} + x^{92} + x^{90} + x^{89} + x^{83} + x^{82} + x^{81} + x^{77} + x^{76} + x^{75} + x^{71} + x^{70} + x^{68} + x^{67} + x^{65} + x^{64} + x^{62} + x^{61} + x^{59}$$

$$+ x^{58} + x^{57} + x^{55} + x^{54} + x^{52} + x^{51} + x^{49} + x^{48} + x^{46} + x^{45} + x^{41} + x^{40} + x^{38} + x^{37} + x^{35} + x^{34} + x^{32} + x^{30} + x^{29} + x^{25} + x^{24} + x^{22} + x^{21} + x^{17} + x^{16} + x^{15} + x^{11} + x^{10} + x^{9},$$

$$p_{12}(x) = x^{147} + x^{145} + x^{144} + x^{143} + x^{141} + x^{140} + x^{139} + x^{137} + x^{136} + x^{127} + x^{125} + x^{124} + x^{123} + x^{121} + x^{120} + x^{115} + x^{113} + x^{112} + x^{51} + x^{49} + x^{48} + x^{47} + x^{45} + x^{44} + x^{43} + x^{41} + x^{40} + x^{35} + x^{33} + x^{32} + x^{19} + x^{17} + x^{16} + x^{15} + x^{13} + x^{12} + x^{11} + x^{9} + x^{8} + x^{3} + x + 1,$$

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

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

$$p_0(x) = x^{147} + x^{145} + x^{144} + x^{143} + x^{138} + x^{136} + x^{135} + x^{134} + x^{131} + x^{130} + x^{127} + x^{126} + x^{125} + x^{123} + x^{122} + x^{121} + x^{120} + x^{119} + x^{117} + x^{115} + x^{111} + x^{110} + x^{108} + x^{107} + x^{106} + x^{103} + x^{100} + x^{99} + x^{98} + x^{97} + x^{96} + x^{95} + x^{92} + x^{89} + x^{86} + x^{83} + x^{79} + x^{77} + x^{76} + x^{74} + x^{73} + x^{71} + x^{70} + x^{68} + x^{67} + x^{65} + x^{64} + x^{62} + x^{61} + x^{60} + x^{59} + x^{58} + x^{57} + x^{54} + x^{52} + x^{51} + x^{47} + x^{46} + x^{45} + x^{44} + x^{43} + x^{42} + x^{41} + x^{40} + x^{39},$$

$$p_3(x) = x^{129} + x^{128} + x^{127} + x^{125} + x^{124} + x^{122} + x^{121} + x^{117} + x^{116} + x^{114} + x^{112} + x^{111} + x^{109} + x^{108} + x^{107} + x^{105} + x^{104} + x^{103} + x^{101} + x^{100} + x^{98} + x^{97} + x^{93} + x^{92} + x^{90} + x^{88} + x^{87} + x^{85} + x^{84} + x^{83} + x^{81} + x^{80} + x^{79} + x^{77} + x^{76} + x^{74} + x^{72} + x^{71} + x^{65} + x^{64} + x^{63} + x^{59} + x^{58} + x^{57} + x^{51} + x^{50} + x^{48} + x^{47} + x^{41} + x^{40} + x^{39} + x^{35} + x^{34} + x^{32} + x^{31} + x^{29} + x^{28} + x^{27},$$

$$p_6(x) = x^{135} + x^{132} + x^{131} + x^{130} + x^{127} + x^{125} + x^{124} + x^{123} + x^{120} + x^{119} + x^{118} + x^{117} + x^{114} + x^{113} + x^{112} + x^{111} + x^{108} + x^{106} + x^{105} + x^{104} + x^{103} + x^{101} + x^{100} + x^{97} + x^{94} + x^{93} + x^{92} + x^{91} + x^{88} + x^{87} + x^{86} + x^{85} + x^{83} + x^{82} + x^{81} + x^{79} + x^{78} + x^{75} + x^{72} + x^{70} + x^{68} + x^{67} + x^{66} + x^{65} + x^{62} + x^{61} + x^{60} + x^{53} + x^{50} + x^{48} + x^{47} + x^{46} + x^{43} + x^{41} + x^{40} + x^{35} + x^{33} + x^{32} + x^{31} + x^{28} + x^{27} + x^{26} + x^{25} + x^{23} + x^{22} + x^{21} + x^{19} + x^{18},$$

$$p_9(x) = x^{141} + x^{140} + x^{138} + x^{136} + x^{135} + x^{133} + x^{132} + x^{130} + x^{128} + x^{126} + x^{125} + x^{117} + x^{116} + x^{114} + x^{112} + x^{110} + x^{108} + x^{107} + x^{105} + x^{104} + x^{103} + x^{95} + x^{94} + x^{92} + x^{90} + x^{89} + x^{83} + x^{82} + x^{81} + x^{77} + x^{76} + x^{75} + x^{71} + x^{70} + x^{68} + x^{67} + x^{65} + x^{64} + x^{62} + x^{61} + x^{59} + x^{58} + x^{57} + x^{55} + x^{54} + x^{52} + x^{51} + x^{49} + x^{48} + x^{46} + x^{45} + x^{41} + x^{40} + x^{38} + x^{37} + x^{35} + x^{34} + x^{32} + x^{30} + x^{29} + x^{25} + x^{24} + x^{22}$$

$$
\begin{aligned}
&+ x^{21} + x^{17} + x^{16} + x^{15} + x^{11} + x^{10} + x^{9},\\
p_{12}(x) = {}& x^{147} + x^{145} + x^{144} + x^{143} + x^{141} + x^{140} + x^{139} + x^{137} + x^{136} + x^{127}\\
&+ x^{125} + x^{124} + x^{123} + x^{121} + x^{120} + x^{115} + x^{113} + x^{112} + x^{51} + x^{49}\\
&+ x^{48} + x^{47} + x^{45} + x^{44} + x^{43} + x^{41} + x^{40} + x^{35} + x^{33} + x^{32} + x^{19}\\
&+ x^{17} + x^{16} + x^{15} + x^{13} + x^{12} + x^{11} + x^{9} + x^{8} + x^{3} + x + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) = {}& x^{144} + x^{140} + x^{138} + x^{132} + x^{130} + x^{128} + x^{126} + x^{122} + x^{120} + x^{116}\\
&+ x^{112} + x^{110} + x^{106} + x^{100} + x^{98} + x^{94} + x^{92} + x^{90} + x^{88} + x^{86}\\
&+ x^{78} + x^{76} + x^{60} + x^{56} + x^{54} + x^{52} + x^{48} + x^{44} + x^{42},\\
p_3(x) = {}& x^{140} + x^{138} + x^{136} + x^{132} + x^{130} + x^{120} + x^{114} + x^{112} + x^{110} + x^{90}\\
&+ x^{88} + x^{86} + x^{72} + x^{66} + x^{62} + x^{58} + x^{56} + x^{54} + x^{44} + x^{38} + x^{36}\\
&+ x^{32} + x^{30} + x^{28} + x^{26} + x^{24} + x^{20} + x^{18},\\
p_6(x) = {}& x^{140} + x^{138} + x^{136} + x^{132} + x^{130} + x^{128} + x^{126} + x^{118} + x^{116} + x^{112}\\
&+ x^{110} + x^{106} + x^{104} + x^{96} + x^{92} + x^{88} + x^{86} + x^{84} + x^{78} + x^{76} + x^{70}\\
&+ x^{68} + x^{66} + x^{62} + x^{60} + x^{58} + x^{56} + x^{54} + x^{50} + x^{42} + x^{40} + x^{38}\\
&+ x^{36} + x^{34} + x^{30} + x^{28} + x^{26} + x^{24} + x^{22} + x^{10} + x^{6} + 1,\\
p_9(x) = {}& x^{140} + x^{138} + x^{136} + x^{132} + x^{130} + x^{124} + x^{116} + x^{112} + x^{110} + x^{108}\\
&+ x^{106} + x^{102} + x^{100} + x^{92} + x^{90} + x^{86} + x^{80} + x^{76} + x^{74} + x^{72} + x^{68}\\
&+ x^{66} + x^{64} + x^{58} + x^{56} + x^{50} + x^{46} + x^{44} + x^{40} + x^{38} + x^{32} + x^{30}\\
&+ x^{28} + x^{24} + x^{18} + x^{16} + x^{14} + x^{12} + x^{10} + x^{6},\\
p_{12}(x) = {}& x^{144} + x^{136} + x^{128} + x^{112} + x^{48} + x^{40} + x^{24} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) = {}& x^{147} + x^{145} + x^{144} + x^{141} + x^{138} + x^{137} + x^{135} + x^{134} + x^{130} + x^{127}\\
&+ x^{126} + x^{123} + x^{122} + x^{121} + x^{120} + x^{117} + x^{115} + x^{113} + x^{112}\\
&+ x^{111} + x^{110} + x^{109} + x^{106} + x^{103} + x^{102} + x^{101} + x^{99} + x^{98} + x^{94}\\
&+ x^{90} + x^{89} + x^{87} + x^{83} + x^{81} + x^{78} + x^{75} + x^{74} + x^{71} + x^{70} + x^{69}\\
&+ x^{68} + x^{67} + x^{65} + x^{64} + x^{63} + x^{61} + x^{59} + x^{57} + x^{50} + x^{47} + x^{46}\\
&+ x^{45} + x^{42} + x^{41} + x^{38} + x^{37} + x^{36},\\
p_3(x) = {}& x^{139} + x^{137} + x^{136} + x^{135} + x^{132} + x^{131} + x^{130} + x^{129} + x^{128} + x^{127}\\
&+ x^{123} + x^{122} + x^{121} + x^{118} + x^{115} + x^{114} + x^{113} + x^{112} + x^{108}\\
&+ x^{106} + x^{105} + x^{102} + x^{98} + x^{97} + x^{96} + x^{95} + x^{93} + x^{89} + x^{88} + x^{87}\\
&+ x^{81} + x^{80} + x^{76} + x^{72} + x^{71} + x^{70} + x^{64} + x^{62} + x^{60} + x^{59} + x^{56}\\
&+ x^{54} + x^{52} + x^{48} + x^{47} + x^{46} + x^{45} + x^{43} + x^{42} + x^{41} + x^{40} + x^{39}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{37} + x^{36} + x^{35} + x^{34} + x^{33} + x^{32} + x^{28} + x^{26} + x^{25} + x^{24},\\
p_6(x) = {}& x^{143} + x^{140} + x^{139} + x^{138} + x^{136} + x^{135} + x^{134} + x^{130} + x^{126} + x^{125}\\
&+ x^{124} + x^{122} + x^{121} + x^{120} + x^{117} + x^{116} + x^{114} + x^{111} + x^{110}\\
&+ x^{109} + x^{108} + x^{104} + x^{103} + x^{102} + x^{101} + x^{98} + x^{97} + x^{96} + x^{95}\\
&+ x^{94} + x^{93} + x^{92} + x^{91} + x^{90} + x^{83} + x^{82} + x^{81} + x^{79} + x^{78} + x^{77}\\
&+ x^{76} + x^{75} + x^{72} + x^{71} + x^{65} + x^{64} + x^{63} + x^{62} + x^{59} + x^{58} + x^{57}\\
&+ x^{52} + x^{50} + x^{49} + x^{47} + x^{42} + x^{41} + x^{37} + x^{36} + x^{34} + x^{33} + x^{28}\\
&+ x^{27} + x^{26} + x^{24} + x^{23} + x^{19} + x^{17} + x^{15} + x^{14} + x^{11} + x^{9} + x^{8} + x^{3}\\
&+ x + 1,\\
p_9(x) = {}& x^{139} + x^{137} + x^{136} + x^{127} + x^{125} + x^{124} + x^{43} + x^{41} + x^{40} + x^{31}\\
&+ x^{29} + x^{28} + x^{27} + x^{25} + x^{24} + x^{15} + x^{13} + x^{12},\\
p_{12}(x) = {}& x^{147} + x^{145} + x^{144} + x^{143} + x^{141} + x^{140} + x^{123} + x^{121} + x^{120} + x^{115}\\
&+ x^{113} + x^{112} + x^{51} + x^{49} + x^{48} + x^{47} + x^{45} + x^{44} + x^{35} + x^{33} + x^{32}\\
&+ x^{31} + x^{29} + x^{28} + x^{27} + x^{25} + x^{24} + x^{19} + x^{17} + x^{16} + x^{11} + x^{9}\\
&+ x^{8} + x^{3} + x + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) = {}& x^{156} + x^{150} + x^{149} + x^{147} + x^{145} + x^{144} + x^{143} + x^{139} + x^{138} + x^{137}\\
&+ x^{132} + x^{131} + x^{129} + x^{127} + x^{126} + x^{124} + x^{122} + x^{117} + x^{116}\\
&+ x^{114} + x^{113} + x^{108} + x^{107} + x^{100} + x^{99} + x^{98} + x^{94} + x^{93} + x^{92}\\
&+ x^{90} + x^{89} + x^{88} + x^{83} + x^{81} + x^{79} + x^{77} + x^{76} + x^{73} + x^{72} + x^{69}\\
&+ x^{68} + x^{67} + x^{65} + x^{62} + x^{60} + x^{58} + x^{56} + x^{54} + x^{53} + x^{52} + x^{50}\\
&+ x^{49} + x^{48} + x^{46} + x^{44} + x^{43} + x^{42} + x^{41} + x^{39},\\
p_3(x) = {}& x^{138} + x^{137} + x^{133} + x^{132} + x^{131} + x^{130} + x^{129} + x^{128} + x^{125} + x^{123}\\
&+ x^{122} + x^{121} + x^{117} + x^{116} + x^{115} + x^{112} + x^{108} + x^{106} + x^{105}\\
&+ x^{104} + x^{101} + x^{99} + x^{98} + x^{97} + x^{93} + x^{92} + x^{91} + x^{88} + x^{84} + x^{80}\\
&+ x^{76} + x^{72} + x^{68} + x^{66} + x^{65} + x^{64} + x^{61} + x^{59} + x^{58} + x^{57} + x^{53}\\
&+ x^{52} + x^{51} + x^{48} + x^{44} + x^{40} + x^{36} + x^{34} + x^{33} + x^{32} + x^{29} + x^{27},\\
p_6(x) = {}& x^{144} + x^{142} + x^{140} + x^{138} + x^{134} + x^{132} + x^{124} + x^{120} + x^{118} + x^{116}\\
&+ x^{110} + x^{108} + x^{104} + x^{102} + x^{100} + x^{94} + x^{90} + x^{88} + x^{86} + x^{84}\\
&+ x^{82} + x^{78} + x^{74} + x^{72} + x^{70} + x^{64} + x^{56} + x^{46} + x^{40} + x^{38} + x^{30}\\
&+ x^{28} + x^{26} + x^{18},\\
p_9(x) = {}& x^{150} + x^{149} + x^{148} + x^{147} + x^{145} + x^{144} + x^{142} + x^{141} + x^{139} + x^{137}\\
&+ x^{134} + x^{133} + x^{132} + x^{131} + x^{129} + x^{128} + x^{126} + x^{125} + x^{123}\\
&+ x^{121} + x^{54} + x^{53} + x^{52} + x^{51} + x^{49} + x^{48} + x^{46} + x^{45} + x^{43} + x^{41}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{22} + x^{21} + x^{20} + x^{19} + x^{17} + x^{16} + x^{14} + x^{13} + x^{11} + x^{9},\\
p_{12}(x) &= x^{156} + x^{140} + x^{132} + x^{128} + x^{116} + x^{112} + x^{60} + x^{36} + x^{32} + x^{28} + x^{4}\\
&+ 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{152} + x^{146} + x^{145} + x^{144} + x^{143} + x^{141} + x^{140} + x^{139} + x^{137} + x^{136}\\
&+ x^{134} + x^{133} + x^{132} + x^{128} + x^{126} + x^{125} + x^{124} + x^{123} + x^{122}\\
&+ x^{121} + x^{120} + x^{118} + x^{110} + x^{108} + x^{106} + x^{105} + x^{104} + x^{103}\\
&+ x^{102} + x^{100} + x^{97} + x^{96} + x^{94} + x^{92} + x^{90} + x^{87} + x^{80} + x^{78} + x^{76}\\
&+ x^{75} + x^{73} + x^{71} + x^{70} + x^{69} + x^{67} + x^{66} + x^{63} + x^{62} + x^{61} + x^{60}\\
&+ x^{57} + x^{55} + x^{54} + x^{47} + x^{45} + x^{42} + x^{41} + x^{39},\\
p_3(x) &= x^{134} + x^{133} + x^{129} + x^{128} + x^{127} + x^{124} + x^{122} + x^{121} + x^{120} + x^{118}\\
&+ x^{115} + x^{114} + x^{112} + x^{111} + x^{110} + x^{107} + x^{105} + x^{104} + x^{103}\\
&+ x^{100} + x^{98} + x^{97} + x^{96} + x^{94} + x^{91} + x^{90} + x^{88} + x^{87} + x^{86} + x^{83}\\
&+ x^{81} + x^{80} + x^{79} + x^{78} + x^{77} + x^{76} + x^{74} + x^{71} + x^{70} + x^{68} + x^{67}\\
&+ x^{65} + x^{63} + x^{58} + x^{57} + x^{54} + x^{52} + x^{51} + x^{50} + x^{47} + x^{46} + x^{44}\\
&+ x^{43} + x^{41} + x^{39} + x^{38} + x^{37} + x^{34} + x^{32} + x^{31} + x^{29} + x^{27},\\
p_6(x) &= x^{140} + x^{138} + x^{136} + x^{134} + x^{132} + x^{128} + x^{122} + x^{120} + x^{116} + x^{114}\\
&+ x^{112} + x^{106} + x^{102} + x^{100} + x^{98} + x^{96} + x^{94} + x^{90} + x^{86} + x^{84}\\
&+ x^{82} + x^{76} + x^{68} + x^{60} + x^{56} + x^{54} + x^{52} + x^{48} + x^{42} + x^{38} + x^{32}\\
&+ x^{30} + x^{28} + x^{26} + x^{22} + x^{18},\\
p_9(x) &= x^{146} + x^{145} + x^{144} + x^{143} + x^{141} + x^{140} + x^{136} + x^{134} + x^{133} + x^{131}\\
&+ x^{130} + x^{128} + x^{127} + x^{126} + x^{123} + x^{121} + x^{50} + x^{49} + x^{48} + x^{47}\\
&+ x^{45} + x^{44} + x^{40} + x^{38} + x^{37} + x^{35} + x^{33} + x^{30} + x^{29} + x^{28} + x^{27}\\
&+ x^{25} + x^{24} + x^{22} + x^{21} + x^{19} + x^{18} + x^{16} + x^{15} + x^{14} + x^{11} + x^{9},\\
p_{12}(x) &= x^{152} + x^{144} + x^{140} + x^{128} + x^{124} + x^{120} + x^{112} + x^{56} + x^{48} + x^{44}\\
&+ x^{40} + x^{24} + x^{12} + x^{8} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{147} + x^{145} + x^{144} + x^{141} + x^{139} + x^{138} + x^{136} + x^{134} + x^{132} + x^{131}\\
&+ x^{126} + x^{124} + x^{115} + x^{112} + x^{110} + x^{109} + x^{108} + x^{104} + x^{103}\\
&+ x^{102} + x^{101} + x^{100} + x^{98} + x^{97} + x^{96} + x^{94} + x^{91} + x^{90} + x^{88} + x^{86}\\
&+ x^{82} + x^{81} + x^{79} + x^{78} + x^{77} + x^{76} + x^{66} + x^{63} + x^{61} + x^{59} + x^{58}\\
&+ x^{56} + x^{54} + x^{50} + x^{49} + x^{48} + x^{44} + x^{43} + x^{42},\\
p_3(x) &= x^{139} + x^{137} + x^{136} + x^{135} + x^{132} + x^{130} + x^{127} + x^{125} + x^{123} + x^{121}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{120} + x^{116} + x^{112} + x^{111} + x^{110} + x^{108} + x^{106} + x^{105} + x^{102}\\
&+ x^{101} + x^{97} + x^{95} + x^{94} + x^{93} + x^{92} + x^{91} + x^{90} + x^{88} + x^{86} + x^{81}\\
&+ x^{80} + x^{77} + x^{76} + x^{75} + x^{74} + x^{73} + x^{72} + x^{71} + x^{69} + x^{68} + x^{67}\\
&+ x^{65} + x^{63} + x^{62} + x^{58} + x^{57} + x^{56} + x^{55} + x^{53} + x^{52} + x^{50} + x^{47}\\
&+ x^{44} + x^{42} + x^{37} + x^{35} + x^{33} + x^{31} + x^{30} + x^{28} + x^{27} + x^{26},\\
p_6(x) &= x^{143} + x^{140} + x^{138} + x^{137} + x^{134} + x^{132} + x^{129} + x^{128} + x^{127} + x^{126}\\
&+ x^{122} + x^{120} + x^{118} + x^{117} + x^{115} + x^{111} + x^{110} + x^{108} + x^{107}\\
&+ x^{106} + x^{104} + x^{102} + x^{100} + x^{98} + x^{96} + x^{95} + x^{90} + x^{88} + x^{87}\\
&+ x^{86} + x^{85} + x^{79} + x^{71} + x^{70} + x^{68} + x^{67} + x^{66} + x^{64} + x^{63} + x^{61}\\
&+ x^{60} + x^{59} + x^{58} + x^{57} + x^{55} + x^{51} + x^{46} + x^{42} + x^{41} + x^{37} + x^{36}\\
&+ x^{34} + x^{33} + x^{29} + x^{28} + x^{25} + x^{24} + x^{22} + x^{21} + x^{18} + x^{17} + x^{14}\\
&+ x^{13} + x^{12} + x^{11} + x^{9} + x^{8} + x^{3} + x + 1,\\
p_9(x) &= x^{139} + x^{137} + x^{136} + x^{127} + x^{125} + x^{124} + x^{43} + x^{41} + x^{40} + x^{31}\\
&+ x^{29} + x^{28} + x^{27} + x^{25} + x^{24} + x^{15} + x^{13} + x^{12},\\
p_{12}(x) &= x^{147} + x^{145} + x^{144} + x^{143} + x^{141} + x^{140} + x^{123} + x^{121} + x^{120} + x^{115}\\
&+ x^{113} + x^{112} + x^{51} + x^{49} + x^{48} + x^{47} + x^{45} + x^{44} + x^{35} + x^{33} + x^{32}\\
&+ x^{31} + x^{29} + x^{28} + x^{27} + x^{25} + x^{24} + x^{19} + x^{17} + x^{16} + x^{11} + x^{9}\\
&+ x^{8} + x^{3} + x + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{147} + x^{145} + x^{144} + x^{141} + x^{138} + x^{137} + x^{135} + x^{134} + x^{130} + x^{127}\\
&+ x^{126} + x^{123} + x^{122} + x^{121} + x^{120} + x^{117} + x^{115} + x^{113} + x^{112}\\
&+ x^{111} + x^{110} + x^{109} + x^{106} + x^{103} + x^{102} + x^{101} + x^{99} + x^{98} + x^{94}\\
&+ x^{90} + x^{89} + x^{87} + x^{83} + x^{81} + x^{78} + x^{75} + x^{74} + x^{71} + x^{70} + x^{69}\\
&+ x^{68} + x^{67} + x^{65} + x^{64} + x^{63} + x^{61} + x^{59} + x^{57} + x^{50} + x^{47} + x^{46}\\
&+ x^{45} + x^{42} + x^{41} + x^{38} + x^{37} + x^{36},\\
p_3(x) &= x^{139} + x^{137} + x^{136} + x^{135} + x^{132} + x^{131} + x^{130} + x^{129} + x^{128} + x^{127}\\
&+ x^{123} + x^{122} + x^{121} + x^{118} + x^{115} + x^{114} + x^{113} + x^{112} + x^{108}\\
&+ x^{106} + x^{105} + x^{102} + x^{98} + x^{97} + x^{96} + x^{95} + x^{93} + x^{89} + x^{88} + x^{87}\\
&+ x^{81} + x^{80} + x^{76} + x^{72} + x^{71} + x^{70} + x^{64} + x^{62} + x^{60} + x^{59} + x^{56}\\
&+ x^{54} + x^{52} + x^{48} + x^{47} + x^{46} + x^{45} + x^{43} + x^{42} + x^{41} + x^{40} + x^{39}\\
&+ x^{37} + x^{36} + x^{35} + x^{34} + x^{33} + x^{32} + x^{28} + x^{26} + x^{25} + x^{24},\\
p_6(x) &= x^{143} + x^{140} + x^{139} + x^{138} + x^{136} + x^{135} + x^{134} + x^{130} + x^{126} + x^{125}\\
&+ x^{124} + x^{122} + x^{121} + x^{120} + x^{117} + x^{116} + x^{114} + x^{111} + x^{110}\\
&+ x^{109} + x^{108} + x^{104} + x^{103} + x^{102} + x^{101} + x^{98} + x^{97} + x^{96} + x^{95}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{94} + x^{93} + x^{92} + x^{91} + x^{90} + x^{83} + x^{82} + x^{81} + x^{79} + x^{78} + x^{77}\\
&+ x^{76} + x^{75} + x^{72} + x^{71} + x^{65} + x^{64} + x^{63} + x^{62} + x^{59} + x^{58} + x^{57}\\
&+ x^{52} + x^{50} + x^{49} + x^{47} + x^{42} + x^{41} + x^{37} + x^{36} + x^{34} + x^{33} + x^{28}\\
&+ x^{27} + x^{26} + x^{24} + x^{23} + x^{19} + x^{17} + x^{15} + x^{14} + x^{11} + x^{9} + x^{8} + x^{3}\\
&+ x + 1,\\
p_9(x) &= x^{139} + x^{137} + x^{136} + x^{127} + x^{125} + x^{124} + x^{43} + x^{41} + x^{40} + x^{31}\\
&+ x^{29} + x^{28} + x^{27} + x^{25} + x^{24} + x^{15} + x^{13} + x^{12},\\
p_{12}(x) &= x^{147} + x^{145} + x^{144} + x^{143} + x^{141} + x^{140} + x^{123} + x^{121} + x^{120} + x^{115}\\
&+ x^{113} + x^{112} + x^{51} + x^{49} + x^{48} + x^{47} + x^{45} + x^{44} + x^{35} + x^{33} + x^{32}\\
&+ x^{31} + x^{29} + x^{28} + x^{27} + x^{25} + x^{24} + x^{19} + x^{17} + x^{16} + x^{11} + x^{9}\\
&+ x^{8} + x^{3} + x + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{152} + x^{146} + x^{145} + x^{144} + x^{143} + x^{141} + x^{140} + x^{139} + x^{137} + x^{136}\\
&+ x^{134} + x^{133} + x^{132} + x^{128} + x^{126} + x^{125} + x^{124} + x^{123} + x^{122}\\
&+ x^{121} + x^{120} + x^{118} + x^{110} + x^{108} + x^{106} + x^{105} + x^{104} + x^{103}\\
&+ x^{102} + x^{100} + x^{97} + x^{96} + x^{94} + x^{92} + x^{90} + x^{87} + x^{80} + x^{78} + x^{76}\\
&+ x^{75} + x^{73} + x^{71} + x^{70} + x^{69} + x^{67} + x^{66} + x^{63} + x^{62} + x^{61} + x^{60}\\
&+ x^{57} + x^{55} + x^{54} + x^{47} + x^{45} + x^{42} + x^{41} + x^{39},\\
p_3(x) &= x^{134} + x^{133} + x^{129} + x^{128} + x^{127} + x^{124} + x^{122} + x^{121} + x^{120} + x^{118}\\
&+ x^{115} + x^{114} + x^{112} + x^{111} + x^{110} + x^{107} + x^{105} + x^{104} + x^{103}\\
&+ x^{100} + x^{98} + x^{97} + x^{96} + x^{94} + x^{91} + x^{90} + x^{88} + x^{87} + x^{86} + x^{83}\\
&+ x^{81} + x^{80} + x^{79} + x^{78} + x^{77} + x^{76} + x^{74} + x^{71} + x^{70} + x^{68} + x^{67}\\
&+ x^{65} + x^{63} + x^{58} + x^{57} + x^{54} + x^{52} + x^{51} + x^{50} + x^{47} + x^{46} + x^{44}\\
&+ x^{43} + x^{41} + x^{39} + x^{38} + x^{37} + x^{34} + x^{32} + x^{31} + x^{29} + x^{27},\\
p_6(x) &= x^{140} + x^{138} + x^{136} + x^{134} + x^{132} + x^{128} + x^{122} + x^{120} + x^{116} + x^{114}\\
&+ x^{112} + x^{106} + x^{102} + x^{100} + x^{98} + x^{96} + x^{94} + x^{90} + x^{86} + x^{84}\\
&+ x^{82} + x^{76} + x^{68} + x^{60} + x^{56} + x^{54} + x^{52} + x^{48} + x^{42} + x^{38} + x^{32}\\
&+ x^{30} + x^{28} + x^{26} + x^{22} + x^{18},\\
p_9(x) &= x^{146} + x^{145} + x^{144} + x^{143} + x^{141} + x^{140} + x^{136} + x^{134} + x^{133} + x^{131}\\
&+ x^{130} + x^{128} + x^{127} + x^{126} + x^{123} + x^{121} + x^{50} + x^{49} + x^{48} + x^{47}\\
&+ x^{45} + x^{44} + x^{40} + x^{38} + x^{37} + x^{35} + x^{33} + x^{30} + x^{29} + x^{28} + x^{27}\\
&+ x^{25} + x^{24} + x^{22} + x^{21} + x^{19} + x^{18} + x^{16} + x^{15} + x^{14} + x^{11} + x^{9},\\
p_{12}(x) &= x^{152} + x^{144} + x^{140} + x^{128} + x^{124} + x^{120} + x^{112} + x^{56} + x^{48} + x^{44}\\
&+ x^{40} + x^{24} + x^{12} + x^{8} + 1,
\end{aligned}
$$

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

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

$$\begin{aligned}
p_0(x) &= x^{156} + x^{150} + x^{149} + x^{147} + x^{145} + x^{144} + x^{143} + x^{139} + x^{138} + x^{137} \\
&\quad + x^{132} + x^{131} + x^{129} + x^{127} + x^{126} + x^{124} + x^{122} + x^{117} + x^{116} \\
&\quad + x^{114} + x^{113} + x^{108} + x^{107} + x^{100} + x^{99} + x^{98} + x^{94} + x^{93} + x^{92} \\
&\quad + x^{90} + x^{89} + x^{88} + x^{83} + x^{81} + x^{79} + x^{77} + x^{76} + x^{73} + x^{72} + x^{69} \\
&\quad + x^{68} + x^{67} + x^{65} + x^{62} + x^{60} + x^{58} + x^{56} + x^{54} + x^{53} + x^{52} + x^{50} \\
&\quad + x^{49} + x^{48} + x^{46} + x^{44} + x^{43} + x^{42} + x^{41} + x^{39}, \\
p_3(x) &= x^{138} + x^{137} + x^{133} + x^{132} + x^{131} + x^{130} + x^{129} + x^{128} + x^{125} + x^{123} \\
&\quad + x^{122} + x^{121} + x^{117} + x^{116} + x^{115} + x^{112} + x^{108} + x^{106} + x^{105} \\
&\quad + x^{104} + x^{101} + x^{99} + x^{98} + x^{97} + x^{93} + x^{92} + x^{91} + x^{88} + x^{84} + x^{80} \\
&\quad + x^{76} + x^{72} + x^{68} + x^{66} + x^{65} + x^{64} + x^{61} + x^{59} + x^{58} + x^{57} + x^{53} \\
&\quad + x^{52} + x^{51} + x^{48} + x^{44} + x^{40} + x^{36} + x^{34} + x^{33} + x^{32} + x^{29} + x^{27}, \\
p_6(x) &= x^{144} + x^{142} + x^{140} + x^{138} + x^{134} + x^{132} + x^{124} + x^{120} + x^{118} + x^{116} \\
&\quad + x^{110} + x^{108} + x^{104} + x^{102} + x^{100} + x^{94} + x^{90} + x^{88} + x^{86} + x^{84} \\
&\quad + x^{82} + x^{78} + x^{74} + x^{72} + x^{70} + x^{64} + x^{56} + x^{46} + x^{40} + x^{38} + x^{30} \\
&\quad + x^{28} + x^{26} + x^{18}, \\
p_9(x) &= x^{150} + x^{149} + x^{148} + x^{147} + x^{145} + x^{144} + x^{142} + x^{141} + x^{139} + x^{137} \\
&\quad + x^{134} + x^{133} + x^{132} + x^{131} + x^{129} + x^{128} + x^{126} + x^{125} + x^{123} \\
&\quad + x^{121} + x^{54} + x^{53} + x^{52} + x^{51} + x^{49} + x^{48} + x^{46} + x^{45} + x^{43} + x^{41} \\
&\quad + x^{22} + x^{21} + x^{20} + x^{19} + x^{17} + x^{16} + x^{14} + x^{13} + x^{11} + x^{9}, \\
p_{12}(x) &= x^{156} + x^{140} + x^{132} + x^{128} + x^{116} + x^{112} + x^{60} + x^{36} + x^{32} + x^{28} + x^{4} \\
&\quad + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{147} + x^{145} + x^{144} + x^{141} + x^{139} + x^{138} + x^{136} + x^{134} + x^{132} + x^{131} \\
&\quad + x^{126} + x^{124} + x^{115} + x^{112} + x^{110} + x^{109} + x^{108} + x^{104} + x^{103} \\
&\quad + x^{102} + x^{101} + x^{100} + x^{98} + x^{97} + x^{96} + x^{94} + x^{91} + x^{90} + x^{88} + x^{86} \\
&\quad + x^{82} + x^{81} + x^{79} + x^{78} + x^{77} + x^{76} + x^{66} + x^{63} + x^{61} + x^{59} + x^{58} \\
&\quad + x^{56} + x^{54} + x^{50} + x^{49} + x^{48} + x^{44} + x^{43} + x^{42}, \\
p_3(x) &= x^{139} + x^{137} + x^{136} + x^{135} + x^{132} + x^{130} + x^{127} + x^{125} + x^{123} + x^{121} \\
&\quad + x^{120} + x^{116} + x^{112} + x^{111} + x^{110} + x^{108} + x^{106} + x^{105} + x^{102} \\
&\quad + x^{101} + x^{97} + x^{95} + x^{94} + x^{93} + x^{92} + x^{91} + x^{90} + x^{88} + x^{86} + x^{81} \\
&\quad + x^{80} + x^{77} + x^{76} + x^{75} + x^{74} + x^{73} + x^{72} + x^{71} + x^{69} + x^{68} + x^{67} \\
&\quad + x^{65} + x^{63} + x^{62} + x^{58} + x^{57} + x^{56} + x^{55} + x^{53} + x^{52} + x^{50} + x^{47}
\end{aligned}$$

$$
\begin{aligned}
&+ x^{44} + x^{42} + x^{37} + x^{35} + x^{33} + x^{31} + x^{30} + x^{28} + x^{27} + x^{26},\\
p_6(x) = {} & x^{143} + x^{140} + x^{138} + x^{137} + x^{134} + x^{132} + x^{129} + x^{128} + x^{127} + x^{126}\\
&+ x^{122} + x^{120} + x^{118} + x^{117} + x^{115} + x^{111} + x^{110} + x^{108} + x^{107}\\
&+ x^{106} + x^{104} + x^{102} + x^{100} + x^{98} + x^{96} + x^{95} + x^{90} + x^{88} + x^{87}\\
&+ x^{86} + x^{85} + x^{79} + x^{71} + x^{70} + x^{68} + x^{67} + x^{66} + x^{64} + x^{63} + x^{61}\\
&+ x^{60} + x^{59} + x^{58} + x^{57} + x^{55} + x^{51} + x^{46} + x^{42} + x^{41} + x^{37} + x^{36}\\
&+ x^{34} + x^{33} + x^{29} + x^{28} + x^{25} + x^{24} + x^{22} + x^{21} + x^{18} + x^{17} + x^{14}\\
&+ x^{13} + x^{12} + x^{11} + x^{9} + x^{8} + x^{3} + x + 1,\\
p_9(x) = {} & x^{139} + x^{137} + x^{136} + x^{127} + x^{125} + x^{124} + x^{43} + x^{41} + x^{40} + x^{31}\\
&+ x^{29} + x^{28} + x^{27} + x^{25} + x^{24} + x^{15} + x^{13} + x^{12},\\
p_{12}(x) = {} & x^{147} + x^{145} + x^{144} + x^{143} + x^{141} + x^{140} + x^{123} + x^{121} + x^{120} + x^{115}\\
&+ x^{113} + x^{112} + x^{51} + x^{49} + x^{48} + x^{47} + x^{45} + x^{44} + x^{35} + x^{33} + x^{32}\\
&+ x^{31} + x^{29} + x^{28} + x^{27} + x^{25} + x^{24} + x^{19} + x^{17} + x^{16} + x^{11} + x^{9}\\
&+ x^{8} + x^{3} + x + 1,
\end{aligned}
$$

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

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

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

n	$\Lambda(n)$	n	$\Lambda(n)$	n	$\Lambda(n)$	n	$\Lambda(n)$
0	[1, 2]	753	[1312, 1313]	1506	[2225, 1090]	2259	[198, 1735]
1	[3, 4]	754	[1314, 1315]	1507	[1059, 925]	2260	[1858, 433]
2	[5, 6]	755	[1316, 1317]	1508	[2226, 318]	2261	[2798, 1648]
3	[7, 8]	756	[1318, 1319]	1509	[1120, 2227]	2262	[562, 2609]
4	[9, 10]	757	[1320, 1299]	1510	[1978, 1961]	2263	[1380, 2799]
5	[11, 12]	758	[1321, 1322]	1511	[2228, 1248]	2264	[640, 2787]
6	[13, 14]	759	[1323, 1324]	1512	[2229, 2058]	2265	[2800, 1405]
7	[15, 16]	760	[1325, 1326]	1513	[2230, 2231]	2266	[451, 2651]
8	[17, 18]	761	[1327, 1328]	1514	[2232, 2020]	2267	[2693, 1892]
9	[19, 20]	762	[600, 549]	1515	[909, 1183]	2268	[416, 1572]
10	[21, 22]	763	[1329, 670]	1516	[301, 940]	2269	[2652, 1585]
11	[23, 24]	764	[496, 1330]	1517	[2233, 2234]	2270	[2770, 2801]
12	[6, 25]	765	[1331, 1332]	1518	[2235, 2236]	2271	[2754, 1527]
13	[26, 27]	766	[1286, 508]	1519	[2015, 2026]	2272	[2722, 1424]
14	[28, 26]	767	[1333, 1334]	1520	[1263, 2237]	2273	[1375, 151]
15	[29, 30]	768	[1335, 1336]	1521	[2238, 2239]	2274	[1511, 576]
16	[31, 32]	769	[1337, 1338]	1522	[2143, 2240]	2275	[1718, 1430]
17	[33, 34]	770	[1339, 1340]	1523	[1112, 2223]	2276	[1683, 2652]
18	[35, 36]	771	[1341, 1342]	1524	[57, 2241]	2277	[455, 2653]
19	[10, 37]	772	[1343, 1344]	1525	[818, 2242]	2278	[522, 2781]
20	[38, 39]	773	[572, 1345]	1526	[1207, 1999]	2279	[2802, 1406]

21	[40, 41]	774	[1346, 1347]	1527	[2243, 1242]	2280	[2803, 710]
22	[42, 43]	775	[1348, 1349]	1528	[2244, 843]	2281	[2767, 463]
23	[44, 45]	776	[1350, 1351]	1529	[345, 2245]	2282	[173, 1911]
24	[46, 47]	777	[491, 400]	1530	[1250, 2246]	2283	[510, 1832]
25	[48, 49]	778	[1352, 498]	1531	[2247, 2248]	2284	[2775, 1556]
26	[50, 51]	779	[1353, 1354]	1532	[2249, 2250]	2285	[2804, 1579]
27	[52, 53]	780	[1355, 1356]	1533	[2251, 1170]	2286	[2574, 2805]
28	[54, 55]	781	[1357, 1358]	1534	[729, 2252]	2287	[2806, 202]
29	[56, 57]	782	[1359, 1360]	1535	[924, 1060]	2288	[1747, 2807]
30	[58, 59]	783	[1361, 1362]	1536	[747, 1034]	2289	[674, 526]
31	[60, 61]	784	[1363, 1364]	1537	[2253, 2254]	2290	[2808, 2809]
32	[62, 63]	785	[1365, 1366]	1538	[2255, 2256]	2291	[1795, 1355]
33	[64, 65]	786	[1367, 1368]	1539	[2257, 2258]	2292	[1618, 1486]
34	[66, 67]	787	[1369, 1370]	1540	[87, 219]	2293	[2810, 2723]
35	[68, 69]	788	[1371, 1372]	1541	[2259, 2260]	2294	[1353, 128]
36	[70, 71]	789	[1373, 1374]	1542	[2261, 1188]	2295	[1500, 1885]
37	[72, 73]	790	[1375, 416]	1543	[768, 2200]	2296	[1298, 2811]
38	[74, 75]	791	[1376, 685]	1544	[2262, 2263]	2297	[2812, 173]
39	[76, 77]	792	[1377, 1378]	1545	[2264, 2265]	2298	[1668, 1359]
40	[78, 79]	793	[1379, 488]	1546	[2266, 2267]	2299	[634, 2813]
41	[80, 81]	794	[1380, 1381]	1547	[2111, 2112]	2300	[34, 2674]
42	[82, 83]	795	[1382, 1383]	1548	[1093, 2268]	2301	[550, 1307]
43	[84, 85]	796	[1384, 1385]	1549	[375, 958]	2302	[1932, 1705]
44	[86, 87]	797	[117, 1386]	1550	[260, 386]	2303	[722, 2814]
45	[88, 89]	798	[1387, 1388]	1551	[2216, 341]	2304	[2815, 2816]
46	[90, 91]	799	[1389, 576]	1552	[2269, 2270]	2305	[1771, 13]
47	[92, 93]	800	[1390, 1391]	1553	[1146, 884]	2306	[1807, 1312]
48	[94, 95]	801	[189, 32]	1554	[1992, 2271]	2307	[2817, 2818]
49	[96, 97]	802	[1392, 1393]	1555	[2272, 2273]	2308	[10, 522]
50	[98, 99]	803	[629, 574]	1556	[2274, 383]	2309	[2727, 2819]
51	[100, 101]	804	[152, 1394]	1557	[732, 753]	2310	[1854, 1470]
52	[102, 103]	805	[129, 1395]	1558	[894, 1253]	2311	[1508, 2820]
53	[104, 105]	806	[1326, 1396]	1559	[2215, 2275]	2312	[2807, 2821]
54	[106, 77]	807	[538, 1397]	1560	[1170, 942]	2313	[2803, 1581]
55	[107, 108]	808	[1398, 1399]	1561	[2012, 768]	2314	[552, 2813]
56	[109, 110]	809	[1400, 542]	1562	[2276, 351]	2315	[2822, 2823]
57	[111, 112]	810	[1401, 630]	1563	[2277, 2278]	2316	[182, 2824]
58	[113, 114]	811	[1402, 137]	1564	[1248, 798]	2317	[2641, 1948]
59	[115, 116]	812	[1403, 1404]	1565	[2279, 2280]	2318	[1884, 2647]
60	[117, 118]	813	[1405, 1406]	1566	[2281, 1983]	2319	[2825, 1709]
61	[119, 120]	814	[1407, 1408]	1567	[2186, 2186]	2320	[1597, 2795]
62	[121, 122]	815	[1409, 1410]	1568	[2282, 2283]	2321	[2826, 694]
63	[123, 124]	816	[1411, 139]	1569	[2284, 924]	2322	[643, 1399]
64	[125, 126]	817	[1412, 1413]	1570	[2165, 1088]	2323	[2690, 2827]

65	[127, 128]	818	[1414, 1415]	1571	[2285, 936]	2324	[2828, 451]
66	[129, 130]	819	[1416, 614]	1572	[2017, 2174]	2325	[2829, 2830]
67	[131, 132]	820	[1417, 1418]	1573	[257, 2286]	2326	[2715, 475]
68	[133, 134]	821	[1419, 1367]	1574	[2248, 2021]	2327	[555, 684]
69	[135, 136]	822	[1420, 1421]	1575	[25, 2111]	2328	[583, 2638]
70	[137, 138]	823	[1422, 1423]	1576	[2287, 104]	2329	[2831, 629]
71	[139, 140]	824	[1424, 110]	1577	[1971, 2288]	2330	[2800, 2802]
72	[141, 142]	825	[1425, 1426]	1578	[2174, 2227]	2331	[1439, 1901]
73	[143, 144]	826	[671, 1427]	1579	[281, 2289]	2332	[2832, 1767]
74	[145, 146]	827	[1428, 1429]	1580	[2290, 2291]	2333	[2833, 1491]
75	[147, 148]	828	[1430, 1431]	1581	[2292, 2293]	2334	[2605, 1550]
76	[149, 150]	829	[1432, 183]	1582	[2294, 360]	2335	[2834, 1414]
77	[151, 152]	830	[1322, 1433]	1583	[2295, 2296]	2336	[1900, 1440]
78	[153, 154]	831	[166, 1434]	1584	[2297, 2298]	2337	[1875, 1851]
79	[155, 156]	832	[1435, 159]	1585	[2299, 2300]	2338	[1868, 1695]
80	[157, 158]	833	[1436, 1437]	1586	[959, 2301]	2339	[2650, 2835]
81	[159, 160]	834	[175, 1438]	1587	[2302, 2303]	2340	[139, 617]
82	[161, 162]	835	[1439, 1440]	1588	[2304, 2305]	2341	[1911, 130]
83	[163, 164]	836	[188, 1441]	1589	[2306, 732]	2342	[2720, 2836]
84	[165, 164]	837	[1442, 1443]	1590	[2307, 2308]	2343	[428, 1273]
85	[166, 167]	838	[1444, 1445]	1591	[2240, 2309]	2344	[1839, 1783]
86	[168, 169]	839	[1446, 1447]	1592	[2235, 950]	2345	[31, 190]
87	[170, 171]	840	[1448, 1449]	1593	[851, 2307]	2346	[1594, 2731]
88	[172, 163]	841	[1450, 1451]	1594	[2310, 2077]	2347	[2725, 590]
89	[149, 173]	842	[1452, 1453]	1595	[2311, 2312]	2348	[644, 2837]
90	[174, 175]	843	[724, 1454]	1596	[2313, 2314]	2349	[1481, 2838]
91	[176, 177]	844	[642, 1398]	1597	[2098, 820]	2350	[1392, 1787]
92	[178, 176]	845	[1455, 1456]	1598	[22, 2019]	2351	[2839, 481]
93	[179, 180]	846	[1457, 196]	1599	[2315, 2316]	2352	[563, 2610]
94	[181, 182]	847	[1458, 1459]	1600	[2317, 2318]	2353	[2840, 1512]
95	[183, 184]	848	[1460, 10]	1601	[2236, 951]	2354	[2841, 439]
96	[185, 186]	849	[1461, 1462]	1602	[2319, 61]	2355	[2842, 2843]
97	[187, 188]	850	[1463, 1464]	1603	[2320, 5]	2356	[1708, 2591]
98	[189, 190]	851	[643, 1465]	1604	[106, 2042]	2357	[1748, 2844]
99	[191, 192]	852	[8, 517]	1605	[2078, 2240]	2358	[1809, 1376]
100	[193, 194]	853	[1466, 1467]	1606	[923, 2321]	2359	[2845, 2846]
101	[165, 195]	854	[1468, 498]	1607	[1058, 2322]	2360	[2847, 2848]
102	[196, 197]	855	[1469, 1470]	1608	[901, 2136]	2361	[1843, 448]
103	[198, 199]	856	[1471, 626]	1609	[28, 1247]	2362	[1822, 508]
104	[200, 201]	857	[1472, 1473]	1610	[2323, 282]	2363	[1363, 2849]
105	[202, 203]	858	[1310, 1474]	1611	[2173, 973]	2364	[2850, 2851]
106	[204, 205]	859	[1475, 1476]	1612	[2302, 2252]	2365	[2852, 136]
107	[206, 207]	860	[1477, 511]	1613	[767, 2013]	2366	[524, 1638]
108	[208, 186]	861	[1478, 1479]	1614	[1995, 299]	2367	[1379, 188]

109	[209, 210]	862	[1480, 1481]	1615	[2324, 1992]	2368	[2853, 1413]
110	[211, 212]	863	[131, 1402]	1616	[976, 2325]	2369	[2854, 505]
111	[213, 214]	864	[719, 1482]	1617	[2326, 1262]	2370	[2769, 2855]
112	[215, 216]	865	[1483, 1365]	1618	[2327, 1218]	2371	[2779, 1877]
113	[217, 218]	866	[1326, 1484]	1619	[311, 2328]	2372	[480, 1480]
114	[219, 220]	867	[1451, 1485]	1620	[2329, 1030]	2373	[615, 1287]
115	[221, 222]	868	[718, 1486]	1621	[2330, 2331]	2374	[2567, 2812]
116	[223, 224]	869	[1487, 1369]	1622	[2270, 2332]	2375	[2856, 2857]
117	[225, 226]	870	[1488, 149]	1623	[2333, 2334]	2376	[2823, 2858]
118	[227, 228]	871	[1489, 1490]	1624	[1109, 338]	2377	[1843, 1552]
119	[229, 230]	872	[1491, 565]	1625	[2335, 2336]	2378	[2859, 1363]
120	[231, 232]	873	[635, 582]	1626	[1998, 2337]	2379	[2860, 2861]
121	[233, 234]	874	[1492, 1485]	1627	[2338, 2339]	2380	[618, 203]
122	[235, 6]	875	[1493, 1494]	1628	[816, 70]	2381	[1284, 2766]
123	[236, 64]	876	[1495, 1496]	1629	[2340, 2341]	2382	[1936, 2588]
124	[237, 238]	877	[1497, 1442]	1630	[2342, 2343]	2383	[2568, 1783]
125	[239, 240]	878	[1498, 1405]	1631	[2184, 2242]	2384	[2862, 1301]
126	[241, 242]	879	[1499, 421]	1632	[2344, 2345]	2385	[1435, 1446]
127	[243, 244]	880	[1500, 158]	1633	[1025, 2346]	2386	[2794, 1568]
128	[245, 246]	881	[1501, 1411]	1634	[2347, 2348]	2387	[1362, 645]
129	[247, 248]	882	[1502, 531]	1635	[2095, 854]	2388	[2667, 2863]
130	[249, 250]	883	[1503, 544]	1636	[2349, 1018]	2389	[1423, 2850]
131	[251, 252]	884	[618, 1504]	1637	[1239, 2350]	2390	[1509, 2864]
132	[5, 253]	885	[1505, 38]	1638	[2351, 21]	2391	[41, 2561]
133	[254, 255]	886	[515, 1506]	1639	[1017, 860]	2392	[1472, 2865]
134	[73, 256]	887	[1507, 1508]	1640	[2236, 1025]	2393	[2615, 167]
135	[257, 258]	888	[669, 1381]	1641	[901, 2352]	2394	[2866, 1736]
136	[259, 260]	889	[1509, 1510]	1642	[951, 2346]	2395	[2867, 2868]
137	[261, 262]	890	[1511, 30]	1643	[2353, 2142]	2396	[2737, 2868]
138	[253, 263]	891	[1512, 1359]	1644	[2354, 342]	2397	[2869, 1917]
139	[264, 265]	892	[509, 1361]	1645	[2300, 962]	2398	[1468, 1537]
140	[266, 267]	893	[1513, 1514]	1646	[2135, 944]	2399	[2870, 1576]
141	[268, 269]	894	[1515, 1305]	1647	[394, 1232]	2400	[462, 2768]
142	[270, 271]	895	[1516, 1517]	1648	[2200, 1120]	2401	[2756, 2871]
143	[272, 273]	896	[1518, 1519]	1649	[1244, 101]	2402	[1923, 1810]
144	[274, 275]	897	[1520, 1521]	1650	[837, 2355]	2403	[1643, 444]
145	[276, 277]	898	[1522, 1402]	1651	[1095, 885]	2404	[1372, 2872]
146	[278, 279]	899	[570, 1523]	1652	[1058, 2245]	2405	[1945, 1894]
147	[280, 281]	900	[1524, 1525]	1653	[2356, 2357]	2406	[2612, 2873]
148	[282, 283]	901	[1526, 519]	1654	[1197, 2211]	2407	[2765, 1606]
149	[284, 247]	902	[1527, 1528]	1655	[2358, 960]	2408	[2649, 2736]
150	[285, 286]	903	[1529, 1495]	1656	[2359, 2287]	2409	[501, 680]
151	[287, 288]	904	[1530, 1531]	1657	[2360, 2361]	2410	[2869, 1567]
152	[289, 290]	905	[1532, 1533]	1658	[2362, 787]	2411	[2581, 1897]

153	[291, 292]	906	[397, 1534]	1659	[2083, 2363]	2412	[1556, 2806]
154	[293, 294]	907	[1535, 1536]	1660	[2364, 2306]	2413	[2874, 2875]
155	[295, 296]	908	[1537, 698]	1661	[2365, 2366]	2414	[1676, 1946]
156	[297, 298]	909	[720, 1538]	1662	[2367, 2368]	2415	[447, 1425]
157	[299, 300]	910	[130, 1539]	1663	[1049, 2369]	2416	[2716, 2560]
158	[301, 302]	911	[45, 1540]	1664	[2370, 20]	2417	[2846, 2876]
159	[303, 304]	912	[1541, 1542]	1665	[2319, 1163]	2418	[1596, 1943]
160	[305, 306]	913	[1543, 1459]	1666	[2371, 1202]	2419	[2839, 1480]
161	[307, 308]	914	[1544, 1545]	1667	[2372, 1237]	2420	[2625, 2877]
162	[309, 292]	915	[1546, 1547]	1668	[2373, 2374]	2421	[442, 2777]
163	[310, 311]	916	[1306, 1540]	1669	[938, 221]	2422	[2876, 2878]
164	[312, 313]	917	[1548, 1549]	1670	[928, 2375]	2423	[2879, 1835]
165	[314, 315]	918	[1550, 1551]	1671	[2376, 757]	2424	[2870, 1275]
166	[316, 317]	919	[1552, 1553]	1672	[2377, 2378]	2425	[172, 165]
167	[318, 319]	920	[1554, 397]	1673	[1052, 1974]	2426	[2585, 2880]
168	[320, 321]	921	[1555, 1556]	1674	[1018, 913]	2427	[2776, 443]
169	[322, 323]	922	[631, 1557]	1675	[846, 2379]	2428	[2719, 1636]
170	[324, 216]	923	[1558, 712]	1676	[2380, 1965]	2429	[2665, 2873]
171	[90, 325]	924	[124, 1559]	1677	[912, 1019]	2430	[2881, 2882]
172	[326, 327]	925	[1556, 479]	1678	[2381, 2382]	2431	[1861, 1436]
173	[328, 329]	926	[1560, 1561]	1679	[2355, 2383]	2432	[1625, 178]
174	[330, 331]	927	[1562, 1563]	1680	[926, 2029]	2433	[1362, 2837]
175	[332, 333]	928	[1564, 1565]	1681	[2384, 2110]	2434	[482, 1318]
176	[334, 335]	929	[1566, 1567]	1682	[2385, 838]	2435	[1621, 429]
177	[336, 337]	930	[1568, 1569]	1683	[1196, 2386]	2436	[1816, 2883]
178	[338, 339]	931	[1570, 1571]	1684	[906, 2031]	2437	[550, 503]
179	[340, 341]	932	[531, 575]	1685	[1029, 2387]	2438	[2841, 2884]
180	[342, 343]	933	[1572, 1573]	1686	[350, 65]	2439	[2885, 2886]
181	[344, 345]	934	[1574, 1575]	1687	[2068, 2388]	2440	[451, 1819]
182	[346, 347]	935	[1576, 52]	1688	[772, 2389]	2441	[1896, 2807]
183	[348, 349]	936	[1577, 1578]	1689	[820, 2390]	2442	[2867, 2738]
184	[236, 350]	937	[1579, 1580]	1690	[1964, 1087]	2443	[2813, 582]
185	[351, 352]	938	[1358, 36]	1691	[2209, 2169]	2444	[1289, 581]
186	[353, 321]	939	[1581, 1582]	1692	[2391, 2392]	2445	[36, 718]
187	[354, 355]	940	[1583, 1584]	1693	[2175, 1219]	2446	[1947, 2642]
188	[356, 357]	941	[455, 1585]	1694	[359, 299]	2447	[2887, 1610]
189	[358, 359]	942	[1586, 1587]	1695	[2393, 800]	2448	[2666, 506]
190	[360, 361]	943	[704, 1588]	1696	[2370, 2394]	2449	[1273, 2753]
191	[362, 363]	944	[1589, 1590]	1697	[2395, 2396]	2450	[2742, 2888]
192	[364, 365]	945	[30, 577]	1698	[2397, 967]	2451	[404, 2889]
193	[366, 367]	946	[1402, 1591]	1699	[2398, 907]	2452	[1274, 1576]
194	[368, 369]	947	[1393, 1532]	1700	[2111, 2164]	2453	[1733, 1547]
195	[370, 371]	948	[471, 1592]	1701	[1984, 796]	2454	[2703, 627]
196	[372, 373]	949	[1448, 1593]	1702	[2399, 934]	2455	[504, 2890]

197	[374, 375]	950	[1494, 1594]	1703	[1178, 2334]	2456	[499, 699]
198	[376, 377]	951	[483, 1595]	1704	[2400, 2261]	2457	[1590, 687]
199	[378, 240]	952	[1596, 1550]	1705	[1985, 797]	2458	[1661, 2756]
200	[379, 380]	953	[1597, 592]	1706	[956, 2343]	2459	[2699, 1898]
201	[381, 382]	954	[37, 1598]	1707	[2286, 340]	2460	[1304, 2589]
202	[383, 384]	955	[1571, 1477]	1708	[1098, 1096]	2461	[686, 1660]
203	[320, 385]	956	[1599, 1600]	1709	[2401, 814]	2462	[2782, 2891]
204	[386, 387]	957	[1601, 1602]	1710	[389, 2018]	2463	[1340, 1386]
205	[388, 389]	958	[1603, 1604]	1711	[2358, 2301]	2464	[543, 1880]
206	[390, 391]	959	[1464, 1605]	1712	[2402, 2353]	2465	[2892, 1803]
207	[392, 393]	960	[1422, 1606]	1713	[778, 2403]	2466	[2893, 1541]
208	[394, 395]	961	[1607, 1608]	1714	[2159, 108]	2467	[2750, 588]
209	[396, 397]	962	[1609, 1610]	1715	[2404, 2353]	2468	[1451, 2894]
210	[398, 399]	963	[1611, 695]	1716	[321, 2011]	2469	[1787, 1710]
211	[110, 400]	964	[1612, 1613]	1717	[2405, 2406]	2470	[2887, 2895]
212	[164, 401]	965	[714, 1614]	1718	[2407, 2147]	2471	[1600, 2607]
213	[402, 403]	966	[1615, 1616]	1719	[379, 2408]	2472	[1949, 50]
214	[404, 405]	967	[1617, 1618]	1720	[2409, 2410]	2473	[1579, 628]
215	[406, 407]	968	[195, 1619]	1721	[2119, 2411]	2474	[1933, 2835]
216	[408, 409]	969	[1620, 1621]	1722	[2412, 1157]	2475	[135, 1663]
217	[410, 411]	970	[1622, 1623]	1723	[975, 17]	2476	[136, 2605]
218	[412, 413]	971	[150, 129]	1724	[744, 2413]	2477	[398, 1860]
219	[169, 414]	972	[1624, 1625]	1725	[2414, 1102]	2478	[2896, 2891]
220	[415, 416]	973	[1626, 1627]	1726	[64, 2415]	2479	[1550, 1944]
221	[417, 418]	974	[1562, 122]	1727	[2416, 231]	2480	[1582, 494]
222	[419, 420]	975	[1628, 35]	1728	[2132, 2342]	2481	[2684, 2897]
223	[421, 422]	976	[1629, 1630]	1729	[1158, 2417]	2482	[2898, 2899]
224	[423, 424]	977	[1631, 1632]	1730	[1236, 2418]	2483	[1450, 1492]
225	[425, 426]	978	[567, 1633]	1731	[964, 2419]	2484	[477, 2745]
226	[427, 205]	979	[639, 1634]	1732	[1083, 2006]	2485	[1909, 1684]
227	[428, 429]	980	[1569, 550]	1733	[2420, 846]	2486	[179, 2900]
228	[430, 431]	981	[1635, 1636]	1734	[1199, 1004]	2487	[2901, 2902]
229	[432, 433]	982	[1637, 446]	1735	[2421, 376]	2488	[1424, 491]
230	[434, 435]	983	[466, 1638]	1736	[2422, 2423]	2489	[2903, 2744]
231	[436, 437]	984	[1639, 1640]	1737	[326, 740]	2490	[1609, 2895]
232	[438, 439]	985	[1641, 430]	1738	[748, 2424]	2491	[669, 2799]
233	[440, 441]	986	[1642, 1317]	1739	[1216, 2425]	2492	[1700, 679]
234	[442, 443]	987	[1643, 1425]	1740	[2279, 2348]	2493	[2796, 466]
235	[444, 445]	988	[1644, 1645]	1741	[2426, 2304]	2494	[2693, 2731]
236	[446, 447]	989	[517, 1646]	1742	[2427, 2428]	2495	[1341, 2855]
237	[448, 449]	990	[122, 1647]	1743	[840, 1248]	2496	[1338, 2576]
238	[450, 451]	991	[1648, 623]	1744	[2429, 2430]	2497	[1779, 2849]
239	[126, 452]	992	[1291, 511]	1745	[2090, 2431]	2498	[1694, 1869]
240	[453, 454]	993	[1649, 1650]	1746	[2155, 1221]	2499	[1795, 1487]

241	[435, 455]	994	[1495, 1623]	1747	[2423, 2432]	2500	[2674, 1925]
242	[456, 457]	995	[1651, 1652]	1748	[2433, 353]	2501	[2609, 2733]
243	[458, 459]	996	[1653, 1654]	1749	[2434, 2435]	2502	[2904, 2905]
244	[402, 460]	997	[1655, 434]	1750	[2436, 1068]	2503	[2906, 1560]
245	[450, 461]	998	[610, 1656]	1751	[2412, 2359]	2504	[2907, 2908]
246	[462, 463]	999	[1657, 1658]	1752	[1128, 2364]	2505	[2575, 2647]
247	[464, 465]	1000	[1659, 1660]	1753	[2437, 2438]	2506	[2909, 703]
248	[466, 467]	1001	[194, 1661]	1754	[2439, 2440]	2507	[1358, 1617]
249	[468, 469]	1002	[1493, 1662]	1755	[2441, 769]	2508	[2691, 2830]
250	[470, 471]	1003	[1663, 1596]	1756	[2375, 2442]	2509	[2910, 457]
251	[472, 473]	1004	[545, 174]	1757	[961, 2443]	2510	[1498, 2802]
252	[474, 475]	1005	[587, 1664]	1758	[742, 370]	2511	[1879, 1771]
253	[476, 477]	1006	[1665, 714]	1759	[1103, 2444]	2512	[665, 2911]
254	[478, 479]	1007	[1666, 1416]	1760	[216, 1994]	2513	[685, 1659]
255	[480, 481]	1008	[1667, 1668]	1761	[2379, 366]	2514	[2873, 2586]
256	[482, 483]	1009	[1669, 1670]	1762	[754, 2100]	2515	[1306, 696]
257	[484, 485]	1010	[1671, 1672]	1763	[221, 2445]	2516	[1570, 1311]
258	[486, 487]	1011	[600, 1569]	1764	[818, 2401]	2517	[134, 1396]
259	[187, 488]	1012	[1673, 1674]	1765	[228, 1135]	2518	[1750, 1918]
260	[489, 490]	1013	[1675, 1676]	1766	[2028, 74]	2519	[1635, 2720]
261	[491, 492]	1014	[1356, 1677]	1767	[2446, 1009]	2520	[1488, 2812]
262	[493, 494]	1015	[583, 1678]	1768	[795, 2352]	2521	[2912, 1417]
263	[12, 495]	1016	[1343, 1328]	1769	[769, 2312]	2522	[554, 1938]
264	[496, 497]	1017	[1679, 1680]	1770	[2447, 2448]	2523	[478, 2806]
265	[498, 499]	1018	[1681, 580]	1771	[2449, 2450]	2524	[2854, 2890]
266	[500, 501]	1019	[1682, 1683]	1772	[1167, 885]	2525	[1464, 2872]
267	[502, 503]	1020	[578, 1684]	1773	[2451, 2276]	2526	[1365, 178]
268	[504, 505]	1021	[1685, 1686]	1774	[2281, 2452]	2527	[2708, 1457]
269	[506, 507]	1022	[1366, 1687]	1775	[215, 1050]	2528	[2752, 2672]
270	[508, 509]	1023	[1688, 1689]	1776	[2123, 2403]	2529	[2874, 2913]
271	[206, 510]	1024	[1690, 518]	1777	[2453, 2359]	2530	[421, 1833]
272	[511, 512]	1025	[1691, 543]	1778	[2454, 2455]	2531	[2560, 110]
273	[513, 514]	1026	[1692, 1693]	1779	[2456, 1059]	2532	[2779, 473]
274	[515, 516]	1027	[1694, 1695]	1780	[2457, 2458]	2533	[493, 2914]
275	[517, 518]	1028	[1696, 1510]	1781	[994, 2034]	2534	[582, 1332]
276	[519, 520]	1029	[1697, 1698]	1782	[1995, 887]	2535	[2797, 1571]
277	[406, 183]	1030	[1699, 1581]	1783	[2459, 2118]	2536	[1869, 2915]
278	[521, 522]	1031	[1700, 1701]	1784	[2045, 2282]	2537	[1489, 1479]
279	[523, 524]	1032	[1391, 148]	1785	[1112, 1980]	2538	[544, 2916]
280	[525, 526]	1033	[1702, 703]	1786	[2460, 934]	2539	[2611, 1318]
281	[527, 528]	1034	[1703, 1704]	1787	[2461, 2251]	2540	[1606, 2850]
282	[529, 530]	1035	[1304, 1705]	1788	[2462, 2158]	2541	[1492, 2894]
283	[531, 532]	1036	[1706, 1707]	1789	[814, 2290]	2542	[607, 1800]
284	[523, 466]	1037	[1708, 1709]	1790	[2463, 1984]	2543	[2594, 2667]

285	[533, 534]	1038	[1568, 549]	1791	[2464, 68]	2544	[122, 1906]
286	[535, 536]	1039	[1710, 1711]	1792	[2079, 2465]	2545	[2745, 441]
287	[537, 538]	1040	[1712, 446]	1793	[2042, 971]	2546	[1332, 1678]
288	[539, 540]	1041	[727, 1713]	1794	[2466, 2052]	2547	[2762, 159]
289	[541, 542]	1042	[1714, 1715]	1795	[2467, 2468]	2548	[2917, 2913]
290	[543, 544]	1043	[1716, 1523]	1796	[1952, 2000]	2549	[611, 546]
291	[545, 546]	1044	[110, 492]	1797	[791, 2268]	2550	[2853, 2603]
292	[547, 548]	1045	[400, 578]	1798	[1021, 2469]	2551	[2802, 2918]
293	[549, 550]	1046	[1717, 1656]	1799	[1055, 2470]	2552	[1502, 574]
294	[551, 552]	1047	[556, 1718]	1800	[1071, 2471]	2553	[2753, 2919]
295	[553, 554]	1048	[208, 1719]	1801	[731, 2107]	2554	[1880, 2916]
296	[555, 556]	1049	[1720, 1721]	1802	[2472, 28]	2555	[619, 2888]
297	[557, 537]	1050	[1709, 1722]	1803	[2473, 2425]	2556	[2829, 2692]
298	[558, 559]	1051	[1723, 1724]	1804	[2397, 849]	2557	[1758, 165]
299	[560, 561]	1052	[1725, 1726]	1805	[836, 855]	2558	[2920, 2921]
300	[562, 563]	1053	[473, 1727]	1806	[2474, 350]	2559	[313, 1243]
301	[564, 565]	1054	[1728, 1287]	1807	[2475, 1998]	2560	[2922, 2923]
302	[566, 567]	1055	[1668, 1729]	1808	[2476, 2333]	2561	[2228, 816]
303	[568, 569]	1056	[635, 1331]	1809	[815, 2291]	2562	[2924, 2300]
304	[570, 571]	1057	[1622, 1496]	1810	[2176, 2477]	2563	[2070, 2469]
305	[572, 573]	1058	[1730, 1731]	1811	[1184, 741]	2564	[1003, 1200]
306	[574, 575]	1059	[1732, 404]	1812	[2431, 2478]	2565	[1974, 2925]
307	[576, 577]	1060	[1733, 1734]	1813	[62, 2479]	2566	[94, 2315]
308	[578, 579]	1061	[202, 1504]	1814	[2275, 827]	2567	[84, 930]
309	[580, 581]	1062	[452, 1735]	1815	[1253, 1034]	2568	[2299, 961]
310	[582, 583]	1063	[683, 556]	1816	[2480, 314]	2569	[2357, 796]
311	[584, 193]	1064	[1736, 1737]	1817	[385, 762]	2570	[1013, 2176]
312	[585, 586]	1065	[1710, 1533]	1818	[1241, 1980]	2571	[2486, 2553]
313	[47, 587]	1066	[1738, 124]	1819	[2185, 2185]	2572	[757, 2029]
314	[588, 589]	1067	[1739, 399]	1820	[2481, 2026]	2573	[1133, 1958]
315	[484, 590]	1068	[1740, 1741]	1821	[956, 2482]	2574	[2309, 897]
316	[591, 592]	1069	[1512, 1729]	1822	[2225, 2073]	2575	[819, 2099]
317	[593, 594]	1070	[1742, 1743]	1823	[1148, 2483]	2576	[2031, 2444]
318	[595, 596]	1071	[684, 1718]	1824	[2484, 2112]	2577	[1008, 2926]
319	[597, 598]	1072	[1352, 1537]	1825	[2388, 2485]	2578	[1010, 1091]
320	[599, 600]	1073	[627, 1580]	1826	[1076, 2218]	2579	[808, 2066]
321	[601, 602]	1074	[1673, 1744]	1827	[2172, 2025]	2580	[213, 2927]
322	[603, 604]	1075	[1745, 460]	1828	[2332, 1094]	2581	[319, 792]
323	[605, 606]	1076	[1545, 1746]	1829	[2486, 68]	2582	[1218, 2928]
324	[607, 608]	1077	[1747, 1748]	1830	[1068, 2487]	2583	[1180, 2546]
325	[609, 610]	1078	[1749, 1750]	1831	[2488, 776]	2584	[1095, 2360]
326	[611, 174]	1079	[1751, 610]	1832	[1239, 2485]	2585	[2929, 879]
327	[612, 613]	1080	[1752, 1659]	1833	[2489, 1202]	2586	[2930, 95]
328	[614, 615]	1081	[1546, 1734]	1834	[2195, 2012]	2587	[2481, 955]

329	[616, 617]	1082	[1474, 715]	1835	[2490, 2335]	2588	[2931, 2932]
330	[479, 618]	1083	[1749, 1753]	1836	[2491, 2263]	2589	[2128, 2376]
331	[619, 620]	1084	[181, 1707]	1837	[1215, 853]	2590	[996, 2095]
332	[621, 622]	1085	[1754, 1755]	1838	[2033, 995]	2591	[2933, 2934]
333	[623, 624]	1086	[185, 1719]	1839	[2386, 2492]	2592	[1096, 2925]
334	[625, 626]	1087	[1756, 1757]	1840	[993, 2493]	2593	[76, 2042]
335	[627, 628]	1088	[1758, 163]	1841	[1093, 1085]	2594	[2297, 2086]
336	[629, 531]	1089	[1759, 1760]	1842	[360, 825]	2595	[2935, 985]
337	[630, 631]	1090	[1761, 1762]	1843	[2494, 2495]	2596	[2936, 2937]
338	[632, 633]	1091	[1670, 1763]	1844	[770, 2496]	2597	[2938, 2939]
339	[634, 635]	1092	[589, 1397]	1845	[1215, 2095]	2598	[2257, 2339]
340	[636, 637]	1093	[1764, 1765]	1846	[2217, 2311]	2599	[344, 1058]
341	[487, 616]	1094	[1766, 1505]	1847	[2497, 964]	2600	[2015, 955]
342	[638, 639]	1095	[1767, 1768]	1848	[2498, 2051]	2601	[752, 965]
343	[640, 641]	1096	[1724, 8]	1849	[1241, 2223]	2602	[946, 2150]
344	[642, 643]	1097	[1329, 1517]	1850	[2499, 2500]	2603	[1954, 2428]
345	[465, 440]	1098	[1769, 1770]	1851	[1177, 2333]	2604	[2399, 2472]
346	[644, 645]	1099	[1771, 143]	1852	[1246, 2501]	2605	[258, 2216]
347	[646, 647]	1100	[594, 1772]	1853	[2429, 1269]	2606	[2921, 892]
348	[648, 649]	1101	[1773, 1774]	1854	[845, 2502]	2607	[276, 2542]
349	[650, 162]	1102	[1775, 1289]	1855	[2026, 1017]	2608	[1101, 1167]
350	[651, 652]	1103	[1776, 1777]	1856	[2384, 2116]	2609	[1110, 2940]
351	[653, 654]	1104	[474, 1558]	1857	[2261, 1172]	2610	[1269, 2941]
352	[655, 656]	1105	[1588, 469]	1858	[2503, 2376]	2611	[2441, 2311]
353	[657, 658]	1106	[1637, 1778]	1859	[2504, 821]	2612	[758, 2030]
354	[659, 660]	1107	[1779, 1364]	1860	[2505, 2151]	2613	[2248, 2527]
355	[661, 662]	1108	[1517, 513]	1861	[2506, 2507]	2614	[1017, 2103]
356	[663, 664]	1109	[551, 634]	1862	[1117, 1014]	2615	[1189, 893]
357	[665, 666]	1110	[1780, 1781]	1863	[2242, 1118]	2616	[2942, 2135]
358	[407, 667]	1111	[1782, 1281]	1864	[2508, 939]	2617	[2464, 2553]
359	[668, 669]	1112	[1783, 1784]	1865	[891, 743]	2618	[2943, 2944]
360	[670, 671]	1113	[1785, 1786]	1866	[2509, 2479]	2619	[966, 926]
361	[672, 673]	1114	[1787, 1532]	1867	[1223, 2244]	2620	[2945, 2467]
362	[674, 675]	1115	[1788, 1789]	1868	[1036, 1256]	2621	[906, 1103]
363	[676, 677]	1116	[1790, 1791]	1869	[222, 2510]	2622	[2007, 2236]
364	[678, 679]	1117	[1792, 1793]	1870	[2511, 2304]	2623	[828, 2946]
365	[680, 615]	1118	[1794, 1795]	1871	[2421, 920]	2624	[216, 358]
366	[681, 682]	1119	[1796, 1797]	1872	[1113, 957]	2625	[218, 86]
367	[683, 684]	1120	[1798, 1799]	1873	[2512, 2071]	2626	[1140, 2275]
368	[685, 686]	1121	[1690, 1646]	1874	[1085, 2513]	2627	[2474, 64]
369	[631, 687]	1122	[120, 1800]	1875	[2514, 2515]	2628	[2372, 2418]
370	[688, 689]	1123	[1801, 1560]	1876	[2516, 2517]	2629	[2463, 2357]
371	[564, 690]	1124	[1802, 13]	1877	[1172, 991]	2630	[1171, 1188]
372	[691, 692]	1125	[676, 1803]	1878	[2329, 2387]	2631	[1081, 255]

373	[693, 422]	1126	[1804, 1805]	1879	[935, 26]	2632	[917, 2466]
374	[694, 533]	1127	[1806, 1345]	1880	[2154, 237]	2633	[2947, 2948]
375	[695, 535]	1128	[156, 1807]	1881	[2156, 2518]	2634	[336, 282]
376	[696, 697]	1129	[1808, 1622]	1882	[2043, 733]	2635	[1992, 2440]
377	[698, 699]	1130	[1659, 1780]	1883	[2351, 389]	2636	[836, 2328]
378	[700, 701]	1131	[1809, 1810]	1884	[2142, 2487]	2637	[2266, 2182]
379	[646, 702]	1132	[1400, 1811]	1885	[2018, 2519]	2638	[1052, 1096]
380	[703, 207]	1133	[1812, 1472]	1886	[2402, 2436]	2639	[2949, 738]
381	[704, 468]	1134	[1813, 1814]	1887	[2520, 2521]	2640	[2420, 2502]
382	[705, 706]	1135	[1815, 723]	1888	[2511, 2253]	2641	[104, 2950]
383	[707, 708]	1136	[532, 1816]	1889	[107, 2160]	2642	[2089, 355]
384	[576, 709]	1137	[1817, 634]	1890	[2522, 2523]	2643	[2400, 1171]
385	[710, 493]	1138	[123, 1725]	1891	[2137, 2515]	2644	[887, 300]
386	[488, 711]	1139	[468, 1818]	1892	[2524, 2525]	2645	[2153, 2081]
387	[712, 713]	1140	[461, 1819]	1893	[2077, 2143]	2646	[82, 2410]
388	[714, 715]	1141	[1820, 1821]	1894	[2379, 102]	2647	[59, 356]
389	[716, 717]	1142	[475, 425]	1895	[2526, 1076]	2648	[2099, 2951]
390	[718, 719]	1143	[1822, 659]	1896	[2498, 23]	2649	[2453, 1157]
391	[720, 721]	1144	[127, 1354]	1897	[307, 1209]	2650	[2536, 911]
392	[722, 723]	1145	[121, 1563]	1898	[2388, 2350]	2651	[1122, 830]
393	[174, 724]	1146	[1823, 180]	1899	[2527, 845]	2652	[2952, 1029]
394	[456, 725]	1147	[1824, 554]	1900	[2029, 2049]	2653	[2386, 943]
395	[726, 727]	1148	[1825, 1826]	1901	[862, 2466]	2654	[309, 330]
396	[728, 729]	1149	[1827, 1760]	1902	[2528, 774]	2655	[2439, 2271]
397	[730, 731]	1150	[1828, 120]	1903	[302, 977]	2656	[2251, 1196]
398	[732, 78]	1151	[1829, 1830]	1904	[2529, 2530]	2657	[2272, 1156]
399	[733, 734]	1152	[1831, 693]	1905	[2531, 2532]	2658	[2953, 1265]
400	[735, 736]	1153	[207, 1832]	1906	[351, 2050]	2659	[2144, 967]
401	[737, 738]	1154	[615, 1629]	1907	[1990, 2037]	2660	[2954, 2955]
402	[739, 740]	1155	[693, 1833]	1908	[2342, 2482]	2661	[263, 2484]
403	[741, 742]	1156	[589, 1834]	1909	[2533, 2534]	2662	[2362, 2046]
404	[743, 744]	1157	[1835, 1836]	1910	[2300, 2443]	2663	[4, 852]
405	[745, 746]	1158	[1837, 1838]	1911	[2535, 2481]	2664	[2167, 91]
406	[747, 748]	1159	[1618, 719]	1912	[939, 2445]	2665	[2956, 1221]
407	[749, 750]	1160	[446, 1643]	1913	[1978, 271]	2666	[374, 957]
408	[751, 752]	1161	[1742, 1762]	1914	[2268, 1086]	2667	[2957, 2958]
409	[753, 754]	1162	[1839, 1756]	1915	[1032, 864]	2668	[2311, 770]
410	[755, 756]	1163	[519, 1300]	1916	[2536, 2537]	2669	[2209, 2493]
411	[757, 758]	1164	[1606, 1657]	1917	[829, 1123]	2670	[282, 1268]
412	[759, 760]	1165	[703, 510]	1918	[2484, 2164]	2671	[1117, 2210]
413	[761, 217]	1166	[1840, 1841]	1919	[1185, 742]	2672	[2016, 2193]
414	[321, 762]	1167	[1842, 1843]	1920	[2538, 2539]	2673	[2959, 2053]
415	[763, 764]	1168	[1563, 1647]	1921	[741, 2090]	2674	[2960, 2961]
416	[765, 766]	1169	[1844, 643]	1922	[2315, 2161]	2675	[1007, 348]

417	[767, 768]	1170	[1660, 1845]	1923	[2540, 1128]	2676	[2962, 2238]
418	[769, 770]	1171	[1695, 1846]	1924	[1174, 1100]	2677	[2051, 2536]
419	[771, 279]	1172	[1847, 1848]	1925	[1208, 308]	2678	[2956, 2156]
420	[772, 773]	1173	[655, 594]	1926	[2541, 1238]	2679	[2963, 2470]
421	[774, 775]	1174	[1849, 1766]	1927	[2231, 1973]	2680	[1155, 2273]
422	[776, 777]	1175	[1850, 470]	1928	[827, 903]	2681	[2526, 1967]
423	[778, 779]	1176	[1590, 1557]	1929	[2476, 1178]	2682	[2149, 2173]
424	[780, 781]	1177	[1651, 1851]	1930	[742, 2431]	2683	[2293, 2964]
425	[782, 783]	1178	[433, 1852]	1931	[1201, 2542]	2684	[2965, 1258]
426	[784, 785]	1179	[1853, 563]	1932	[842, 2543]	2685	[853, 2096]
427	[786, 787]	1180	[159, 1447]	1933	[2460, 2472]	2686	[796, 2966]
428	[788, 789]	1181	[1854, 638]	1934	[755, 2231]	2687	[2296, 976]
429	[790, 791]	1182	[1855, 1856]	1935	[2347, 2280]	2688	[2514, 2138]
430	[792, 793]	1183	[1857, 472]	1936	[1987, 1116]	2689	[2376, 926]
431	[794, 795]	1184	[1858, 1859]	1937	[2544, 996]	2690	[2404, 2436]
432	[796, 797]	1185	[1860, 1861]	1938	[2112, 2545]	2691	[1198, 753]
433	[798, 799]	1186	[1369, 1677]	1939	[1962, 2546]	2692	[2090, 370]
434	[800, 801]	1187	[1862, 1449]	1940	[863, 1033]	2693	[2521, 2967]
435	[802, 803]	1188	[1863, 621]	1941	[2547, 2548]	2694	[2357, 1985]
436	[804, 805]	1189	[1864, 1865]	1942	[1103, 2549]	2695	[1178, 2968]
437	[806, 23]	1190	[441, 454]	1943	[2550, 2551]	2696	[2969, 1979]
438	[219, 807]	1191	[544, 1866]	1944	[2552, 2483]	2697	[1994, 359]
439	[808, 809]	1192	[1778, 1643]	1945	[2553, 2554]	2698	[1959, 2288]
440	[810, 811]	1193	[1867, 1812]	1946	[2427, 1955]	2699	[355, 2355]
441	[812, 813]	1194	[671, 514]	1947	[2555, 1129]	2700	[2008, 2970]
442	[814, 815]	1195	[1868, 1869]	1948	[2556, 2088]	2701	[22, 2519]
443	[816, 798]	1196	[1870, 704]	1949	[2557, 100]	2702	[2924, 961]
444	[817, 818]	1197	[1871, 1872]	1950	[2377, 275]	2703	[2531, 2948]
445	[819, 820]	1198	[1873, 1874]	1951	[2558, 1721]	2704	[1157, 2287]
446	[821, 822]	1199	[1875, 1652]	1952	[1471, 2559]	2705	[1075, 1967]
447	[823, 824]	1200	[580, 1290]	1953	[2560, 491]	2706	[313, 2189]
448	[825, 826]	1201	[119, 607]	1954	[1537, 499]	2707	[2076, 2430]
449	[827, 828]	1202	[1591, 1876]	1955	[1436, 2561]	2708	[1152, 372]
450	[829, 830]	1203	[1877, 1878]	1956	[1477, 141]	2709	[2489, 1151]
451	[831, 832]	1204	[1621, 1273]	1957	[2562, 516]	2710	[2296, 17]
452	[833, 834]	1205	[1879, 1802]	1958	[1687, 2563]	2711	[2099, 2390]
453	[835, 836]	1206	[1880, 1866]	1959	[1801, 1382]	2712	[2949, 877]
454	[354, 837]	1207	[1881, 1882]	1960	[1753, 2564]	2713	[847, 2971]
455	[838, 839]	1208	[1817, 552]	1961	[2565, 2566]	2714	[2356, 1984]
456	[840, 816]	1209	[1883, 1393]	1962	[2567, 149]	2715	[892, 782]
457	[841, 842]	1210	[1884, 1697]	1963	[2568, 1756]	2716	[1114, 904]
458	[843, 844]	1211	[157, 1885]	1964	[2569, 2570]	2717	[2945, 842]
459	[845, 846]	1212	[574, 532]	1965	[690, 2571]	2718	[2163, 2521]
460	[847, 848]	1213	[207, 1886]	1966	[2572, 1545]	2719	[227, 1134]

461	[849, 850]	1214	[1887, 1662]	1967	[2573, 1675]	2720	[2972, 2973]
462	[851, 852]	1215	[1636, 1888]	1968	[178, 1687]	2721	[2416, 224]
463	[853, 854]	1216	[1889, 721]	1969	[1876, 2574]	2722	[341, 2121]
464	[311, 855]	1217	[1521, 1890]	1970	[2575, 1697]	2723	[760, 865]
465	[850, 856]	1218	[656, 1891]	1971	[1322, 2576]	2724	[25, 2484]
466	[857, 858]	1219	[1892, 1893]	1972	[1702, 206]	2725	[2268, 2513]
467	[859, 860]	1220	[1676, 1894]	1973	[2577, 2578]	2726	[319, 1175]
468	[861, 862]	1221	[1385, 1895]	1974	[2579, 2580]	2727	[2502, 2129]
469	[863, 864]	1222	[1896, 1748]	1975	[1806, 573]	2728	[991, 893]
470	[865, 866]	1223	[546, 724]	1976	[2581, 606]	2729	[2930, 2315]
471	[867, 868]	1224	[605, 1897]	1977	[719, 2582]	2730	[2417, 2950]
472	[869, 870]	1225	[1714, 1898]	1978	[2583, 2584]	2731	[2212, 1198]
473	[871, 872]	1226	[1899, 458]	1979	[2585, 2586]	2732	[2177, 2389]
474	[873, 874]	1227	[1728, 1629]	1980	[1395, 2587]	2733	[2230, 756]
475	[875, 876]	1228	[1900, 1901]	1981	[1327, 1344]	2734	[985, 2928]
476	[737, 877]	1229	[1902, 1368]	1982	[1632, 2588]	2735	[1982, 2452]
477	[878, 812]	1230	[1903, 557]	1983	[1932, 2589]	2736	[2156, 1222]
478	[879, 880]	1231	[424, 558]	1984	[2590, 117]	2737	[2078, 2027]
479	[881, 882]	1232	[1904, 1905]	1985	[2591, 2592]	2738	[2122, 338]
480	[883, 884]	1233	[1563, 1906]	1986	[1761, 1743]	2739	[95, 2316]
481	[885, 886]	1234	[1540, 1907]	1987	[2593, 1792]	2740	[2974, 365]
482	[887, 888]	1235	[1862, 1593]	1988	[2594, 506]	2741	[2975, 2976]
483	[889, 890]	1236	[1474, 1614]	1989	[625, 2559]	2742	[2085, 2298]
484	[891, 892]	1237	[1908, 586]	1990	[1538, 1530]	2743	[2004, 2471]
485	[893, 894]	1238	[492, 1909]	1991	[2595, 1285]	2744	[1150, 2384]
486	[895, 896]	1239	[1910, 599]	1992	[2596, 2597]	2745	[877, 354]
487	[897, 898]	1240	[1911, 1395]	1993	[2598, 2599]	2746	[1124, 235]
488	[899, 900]	1241	[1912, 1903]	1994	[2600, 560]	2747	[2323, 337]
489	[794, 901]	1242	[1913, 1914]	1995	[409, 2601]	2748	[77, 2043]
490	[902, 903]	1243	[1738, 1725]	1996	[2602, 1902]	2749	[752, 2419]
491	[904, 905]	1244	[1915, 1916]	1997	[1412, 2603]	2750	[2445, 2977]
492	[210, 906]	1245	[1566, 1917]	1998	[673, 2604]	2751	[2120, 2978]
493	[907, 908]	1246	[1753, 1918]	1999	[1663, 2605]	2752	[2921, 743]
494	[909, 910]	1247	[1919, 1920]	2000	[1721, 2606]	2753	[789, 2979]
495	[24, 911]	1248	[1921, 1922]	2001	[1486, 2582]	2754	[2417, 105]
496	[912, 913]	1249	[1923, 1376]	2002	[1654, 2607]	2755	[2381, 246]
497	[914, 915]	1250	[660, 1924]	2003	[2597, 1583]	2756	[2980, 2229]
498	[916, 917]	1251	[1443, 1925]	2004	[1642, 2608]	2757	[841, 2467]
499	[918, 919]	1252	[1531, 1926]	2005	[2609, 2610]	2758	[2981, 1244]
500	[342, 777]	1253	[1514, 1927]	2006	[1707, 1929]	2759	[2527, 2420]
501	[920, 921]	1254	[1928, 641]	2007	[2611, 483]	2760	[2020, 2527]
502	[922, 923]	1255	[182, 1929]	2008	[2612, 2585]	2761	[2462, 2191]
503	[924, 925]	1256	[1340, 118]	2009	[1521, 2613]	2762	[1990, 2168]
504	[926, 758]	1257	[1736, 1930]	2010	[204, 2614]	2763	[2087, 2982]

505	[927, 395]	1258	[1931, 1932]	2011	[2615, 1434]	2764	[2333, 2968]
506	[775, 928]	1259	[1933, 1934]	2012	[1283, 2616]	2765	[1167, 2360]
507	[929, 930]	1260	[1935, 1936]	2013	[2617, 2618]	2766	[895, 2276]
508	[361, 931]	1261	[1937, 1938]	2014	[513, 1427]	2767	[2164, 2545]
509	[932, 933]	1262	[1418, 1939]	2015	[2619, 1679]	2768	[2983, 1134]
510	[934, 935]	1263	[1940, 1941]	2016	[147, 2620]	2769	[761, 1231]
511	[936, 937]	1264	[1745, 403]	2017	[2621, 2622]	2770	[2984, 2422]
512	[938, 939]	1265	[1458, 1942]	2018	[481, 2623]	2771	[4, 2307]
513	[940, 730]	1266	[1943, 1944]	2019	[41, 1437]	2772	[791, 1085]
514	[316, 941]	1267	[1945, 1946]	2020	[2624, 2625]	2773	[1050, 1994]
515	[942, 943]	1268	[1947, 1948]	2021	[2626, 2627]	2774	[19, 2394]
516	[944, 792]	1269	[1941, 1949]	2022	[1739, 1860]	2775	[2058, 881]
517	[16, 945]	1270	[1950, 1771]	2023	[1717, 2628]	2776	[2947, 2532]
518	[946, 947]	1271	[432, 1859]	2024	[616, 140]	2777	[2054, 2241]
519	[948, 949]	1272	[1951, 1952]	2025	[1882, 2629]	2778	[729, 2303]
520	[950, 951]	1273	[224, 1953]	2026	[2630, 2631]	2779	[2985, 2329]
521	[952, 953]	1274	[1954, 1955]	2027	[2632, 2633]	2780	[2080, 2154]
522	[20, 954]	1275	[1956, 1957]	2028	[2634, 147]	2781	[2986, 940]
523	[955, 859]	1276	[1023, 1958]	2029	[1616, 2635]	2782	[2556, 2982]
524	[834, 956]	1277	[1959, 1960]	2030	[1299, 520]	2783	[2143, 2027]
525	[957, 958]	1278	[1231, 297]	2031	[399, 40]	2784	[2426, 2253]
526	[959, 960]	1279	[270, 1961]	2032	[2636, 2637]	2785	[2051, 24]
527	[961, 962]	1280	[1255, 1037]	2033	[1844, 1398]	2786	[2520, 225]
528	[386, 963]	1281	[1099, 317]	2034	[136, 1596]	2787	[340, 2120]
529	[964, 965]	1282	[1962, 1181]	2035	[1332, 2638]	2788	[2231, 1993]
530	[966, 757]	1283	[1963, 1964]	2036	[2639, 2640]	2789	[2488, 342]
531	[967, 968]	1284	[1965, 1966]	2037	[472, 1877]	2790	[2321, 963]
532	[969, 970]	1285	[1967, 1968]	2038	[1423, 1657]	2791	[2398, 2003]
533	[971, 804]	1286	[944, 1175]	2039	[2641, 2642]	2792	[2324, 2439]
534	[972, 243]	1287	[1203, 1969]	2040	[1926, 2613]	2793	[1165, 2282]
535	[973, 974]	1288	[1057, 345]	2041	[1770, 405]	2794	[903, 2987]
536	[975, 976]	1289	[1166, 1970]	2042	[2643, 2644]	2795	[2540, 1197]
537	[977, 978]	1290	[1971, 1960]	2043	[2645, 2646]	2796	[2988, 2927]
538	[979, 980]	1291	[1972, 270]	2044	[2647, 2648]	2797	[2201, 2193]
539	[337, 283]	1292	[756, 1973]	2045	[2649, 2566]	2798	[2117, 1119]
540	[981, 982]	1293	[1974, 1097]	2046	[1401, 1589]	2799	[2989, 2971]
541	[983, 984]	1294	[1013, 1219]	2047	[2650, 1934]	2800	[2552, 1149]
542	[985, 986]	1295	[988, 361]	2048	[461, 2651]	2801	[2555, 2244]
543	[987, 988]	1296	[750, 1975]	2049	[1828, 607]	2802	[2990, 2991]
544	[989, 990]	1297	[100, 1245]	2050	[2652, 2653]	2803	[1025, 1074]
545	[991, 332]	1298	[1976, 58]	2051	[2654, 2655]	2804	[1118, 2290]
546	[992, 993]	1299	[1977, 1978]	2052	[2656, 1682]	2805	[983, 2435]
547	[994, 995]	1300	[1204, 1979]	2053	[1729, 2657]	2806	[2992, 320]
548	[996, 853]	1301	[1980, 1981]	2054	[1393, 1710]	2807	[2059, 2993]

549	[997, 998]	1302	[1982, 1983]	2055	[1824, 1937]	2808	[2430, 2941]
550	[999, 1000]	1303	[1984, 1985]	2056	[2658, 613]	2809	[2262, 2994]
551	[381, 1001]	1304	[1986, 1987]	2057	[1814, 1552]	2810	[2038, 306]
552	[395, 1002]	1305	[1988, 1989]	2058	[2659, 1502]	2811	[2963, 1056]
553	[1003, 1004]	1306	[1183, 1990]	2059	[2660, 2661]	2812	[2394, 2995]
554	[1005, 1006]	1307	[1991, 1992]	2060	[2662, 2596]	2813	[2996, 1053]
555	[1007, 1008]	1308	[99, 267]	2061	[554, 2663]	2814	[2332, 1101]
556	[1009, 1010]	1309	[756, 1993]	2062	[575, 648]	2815	[1041, 1259]
557	[1011, 979]	1310	[1994, 1995]	2063	[2623, 2664]	2816	[2423, 244]
558	[1012, 1013]	1311	[1996, 1997]	2064	[2665, 2585]	2817	[1046, 2970]
559	[781, 1014]	1312	[298, 287]	2065	[1460, 521]	2818	[1207, 2337]
560	[1015, 1016]	1313	[1998, 1999]	2066	[1366, 176]	2819	[2184, 2401]
561	[955, 1017]	1314	[2000, 2001]	2067	[2666, 2667]	2820	[2997, 1171]
562	[1018, 1019]	1315	[2002, 907]	2068	[2668, 2669]	2821	[23, 2536]
563	[1020, 1021]	1316	[2002, 2003]	2069	[1883, 1787]	2822	[2338, 2258]
564	[1022, 1023]	1317	[2004, 1072]	2070	[590, 474]	2823	[387, 1113]
565	[1024, 1005]	1318	[958, 1996]	2071	[2670, 2671]	2824	[345, 2322]
566	[950, 1025]	1319	[2005, 2006]	2072	[603, 2672]	2825	[245, 2382]
567	[1026, 1027]	1320	[2007, 950]	2073	[2673, 1487]	2826	[77, 971]
568	[364, 1028]	1321	[2008, 1047]	2074	[2674, 2675]	2827	[2451, 896]
569	[1029, 1030]	1322	[2009, 2010]	2075	[549, 502]	2828	[2186, 2185]
570	[1031, 382]	1323	[353, 385]	2076	[610, 2628]	2829	[2473, 1217]
571	[1032, 1033]	1324	[385, 2011]	2077	[721, 2676]	2830	[739, 327]
572	[1034, 1035]	1325	[2012, 2013]	2078	[2677, 2678]	2831	[820, 2951]
573	[1036, 1037]	1326	[2014, 2015]	2079	[2679, 2680]	2832	[1179, 795]
574	[1038, 1039]	1327	[2016, 948]	2080	[1814, 448]	2833	[278, 2998]
575	[1040, 1041]	1328	[768, 2017]	2081	[2681, 1284]	2834	[2222, 2408]
576	[1042, 1043]	1329	[2018, 2019]	2082	[2682, 1363]	2835	[2430, 1270]
577	[57, 1044]	1330	[2020, 2021]	2083	[2683, 44]	2836	[1134, 2180]
578	[212, 1045]	1331	[2022, 2023]	2084	[1899, 2684]	2837	[2953, 230]
579	[1046, 1047]	1332	[2024, 1136]	2085	[427, 2614]	2838	[759, 1119]
580	[1048, 1049]	1333	[2025, 241]	2086	[2685, 2686]	2839	[902, 828]
581	[1050, 358]	1334	[2026, 859]	2087	[35, 1617]	2840	[2359, 1158]
582	[1051, 1052]	1335	[2027, 2028]	2088	[678, 1701]	2841	[2999, 2286]
583	[1053, 1054]	1336	[2029, 2030]	2089	[2687, 2688]	2842	[2509, 63]
584	[1055, 1056]	1337	[1102, 2031]	2090	[1859, 2689]	2843	[2354, 776]
585	[1057, 1058]	1338	[910, 2032]	2091	[1909, 579]	2844	[1192, 2048]
586	[1059, 1060]	1339	[2033, 2034]	2092	[2690, 1826]	2845	[862, 1234]
587	[1061, 1062]	1340	[2035, 2036]	2093	[1486, 1482]	2846	[1973, 3000]
588	[1063, 1064]	1341	[2032, 2037]	2094	[2691, 2692]	2847	[2522, 915]
589	[1065, 869]	1342	[2038, 2039]	2095	[1662, 2693]	2848	[2434, 984]
590	[1066, 1067]	1343	[1087, 2040]	2096	[1654, 2694]	2849	[2173, 241]
591	[1068, 1069]	1344	[2041, 764]	2097	[1751, 1717]	2850	[3001, 2117]
592	[815, 1070]	1345	[359, 887]	2098	[650, 2695]	2851	[2321, 387]

593	[1071, 1072]	1346	[2042, 2043]	2099	[2696, 2697]	2852	[288, 220]
594	[333, 747]	1347	[2044, 881]	2100	[1759, 2698]	2853	[1985, 2966]
595	[1073, 910]	1348	[2045, 1166]	2101	[1855, 112]	2854	[2491, 2994]
596	[951, 1074]	1349	[786, 2046]	2102	[2699, 1715]	2855	[1231, 218]
597	[1075, 1076]	1350	[2047, 2048]	2103	[2658, 2700]	2856	[305, 2039]
598	[1077, 1078]	1351	[758, 2049]	2104	[1889, 1538]	2857	[2999, 258]
599	[1079, 997]	1352	[1108, 2050]	2105	[534, 436]	2858	[2988, 214]
600	[1080, 999]	1353	[806, 2051]	2106	[440, 453]	2859	[2031, 2549]
601	[1081, 1082]	1354	[1098, 1974]	2107	[1632, 1863]	2860	[318, 944]
602	[1083, 1084]	1355	[2052, 912]	2108	[2701, 2702]	2861	[2974, 1028]
603	[1085, 1086]	1356	[2053, 780]	2109	[2703, 1579]	2862	[914, 2523]
604	[1087, 1088]	1357	[2054, 1044]	2110	[120, 608]	2863	[957, 285]
605	[1089, 1090]	1358	[2055, 1260]	2111	[2704, 2705]	2864	[2508, 221]
606	[1091, 1008]	1359	[2056, 2057]	2112	[2706, 121]	2865	[2320, 235]
607	[1092, 1093]	1360	[2058, 2059]	2113	[2707, 497]	2866	[2989, 848]
608	[1094, 1095]	1361	[2060, 2061]	2114	[593, 656]	2867	[3002, 3003]
609	[1096, 1097]	1362	[933, 2062]	2115	[2662, 2708]	2868	[99, 2199]
610	[919, 1098]	1363	[2063, 2064]	2116	[1432, 407]	2869	[2021, 2420]
611	[1099, 941]	1364	[2065, 2066]	2117	[1476, 1692]	2870	[2129, 102]
612	[1100, 1101]	1365	[2067, 2068]	2118	[2709, 2710]	2871	[243, 2432]
613	[1102, 1103]	1366	[2069, 2070]	2119	[2711, 2712]	2872	[3002, 252]
614	[1104, 1105]	1367	[2071, 2072]	2120	[2713, 2714]	2873	[382, 3004]
615	[1106, 1107]	1368	[1089, 2073]	2121	[2715, 1558]	2874	[2312, 3005]
616	[896, 1108]	1369	[2074, 2075]	2122	[30, 709]	2875	[2170, 920]
617	[1109, 1110]	1370	[2076, 1269]	2123	[1600, 2694]	2876	[1234, 2349]
618	[1111, 1112]	1371	[2077, 2078]	2124	[1361, 644]	2877	[358, 1995]
619	[1113, 375]	1372	[1126, 2079]	2125	[2716, 1424]	2878	[771, 2998]
620	[1114, 1115]	1373	[2005, 1084]	2126	[1503, 1880]	2879	[1077, 2501]
621	[1116, 1117]	1374	[2080, 2081]	2127	[1569, 502]	2880	[1221, 2518]
622	[1118, 815]	1375	[2013, 2017]	2128	[1338, 1433]	2881	[1076, 1968]
623	[1119, 1026]	1376	[2082, 2083]	2129	[1456, 198]	2882	[2021, 845]
624	[1120, 1121]	1377	[378, 2084]	2130	[2717, 2718]	2883	[2497, 752]
625	[1122, 1123]	1378	[2085, 2086]	2131	[2719, 2720]	2884	[2025, 973]
626	[1124, 5]	1379	[2087, 2088]	2132	[2721, 428]	2885	[350, 2415]
627	[1125, 1126]	1380	[738, 2089]	2133	[2722, 2560]	2886	[1034, 2424]
628	[1127, 1128]	1381	[1185, 2090]	2134	[2707, 1330]	2887	[274, 2378]
629	[1129, 969]	1382	[2091, 2092]	2135	[2723, 1850]	2888	[341, 2978]
630	[1130, 1131]	1383	[254, 1082]	2136	[2724, 1753]	2889	[2312, 2496]
631	[1132, 1133]	1384	[1258, 1160]	2137	[1950, 1802]	2890	[1108, 352]
632	[1134, 1135]	1385	[2093, 2094]	2138	[1478, 1490]	2891	[251, 3003]
633	[1136, 1137]	1386	[2095, 2096]	2139	[1661, 436]	2892	[2290, 1070]
634	[1138, 1051]	1387	[1023, 2097]	2140	[2725, 485]	2893	[2997, 2261]
635	[1001, 1139]	1388	[2098, 2099]	2141	[1367, 2726]	2894	[2165, 2040]
636	[223, 231]	1389	[79, 2100]	2142	[1810, 1752]	2895	[1021, 2101]

637	[1140, 1141]	1390	[2070, 2101]	2143	[1470, 2727]	2896	[2089, 837]
638	[1142, 1143]	1391	[900, 2102]	2144	[163, 195]	2897	[2181, 2267]
639	[1144, 1145]	1392	[859, 2103]	2145	[1280, 2728]	2898	[388, 21]
640	[1146, 1147]	1393	[250, 2104]	2146	[1391, 2620]	2899	[2969, 1205]
641	[1148, 1149]	1394	[288, 807]	2147	[540, 2673]	2900	[2371, 1151]
642	[1150, 746]	1395	[286, 2105]	2148	[1665, 1474]	2901	[2983, 228]
643	[1151, 1152]	1396	[763, 2106]	2149	[1682, 435]	2902	[2503, 966]
644	[1153, 1154]	1397	[978, 2107]	2150	[111, 1856]	2903	[1101, 1095]
645	[1100, 1094]	1398	[2108, 2109]	2151	[2729, 2730]	2904	[1991, 2439]
646	[1155, 1156]	1399	[746, 2110]	2152	[154, 1451]	2905	[2148, 1264]
647	[1157, 1158]	1400	[263, 2111]	2153	[2562, 1506]	2906	[2196, 2012]
648	[968, 1159]	1401	[2112, 2113]	2154	[2731, 2732]	2907	[2986, 302]
649	[1041, 1160]	1402	[2114, 2115]	2155	[563, 2733]	2908	[942, 2492]
650	[1091, 348]	1403	[746, 2116]	2156	[2734, 1380]	2909	[24, 2537]
651	[1161, 1162]	1404	[2117, 760]	2157	[1491, 690]	2910	[754, 2152]
652	[60, 1163]	1405	[2118, 2119]	2158	[2735, 458]	2911	[2000, 2964]
653	[750, 1164]	1406	[2120, 2121]	2159	[2565, 2736]	2912	[2065, 809]
654	[1165, 1166]	1407	[2122, 1110]	2160	[1752, 686]	2913	[239, 2084]
655	[1094, 1167]	1408	[2123, 779]	2161	[1706, 182]	2914	[2293, 2001]
656	[1168, 1169]	1409	[2124, 2125]	2162	[2737, 2738]	2915	[299, 888]
657	[269, 1170]	1410	[1993, 2126]	2163	[1446, 160]	2916	[988, 825]
658	[1171, 1172]	1411	[2127, 266]	2164	[49, 2739]	2917	[745, 2384]
659	[1173, 1174]	1412	[2128, 966]	2165	[2740, 2741]	2918	[1182, 904]
660	[1175, 1176]	1413	[2129, 366]	2166	[546, 175]	2919	[2409, 83]
661	[1177, 1178]	1414	[2130, 2130]	2167	[2742, 620]	2920	[3006, 509]
662	[1179, 901]	1415	[1031, 1001]	2168	[2743, 2744]	2921	[2901, 2686]
663	[776, 343]	1416	[2131, 2132]	2169	[511, 142]	2922	[2859, 1779]
664	[1180, 1181]	1417	[1969, 2133]	2170	[498, 698]	2923	[1887, 1494]
665	[1182, 1115]	1418	[2134, 239]	2171	[2745, 453]	2924	[3007, 647]
666	[1073, 1183]	1419	[2135, 319]	2172	[1543, 1942]	2925	[1770, 2889]
667	[748, 1035]	1420	[795, 2136]	2173	[2746, 1562]	2926	[1416, 680]
668	[1184, 1185]	1421	[883, 1147]	2174	[2618, 1945]	2927	[1516, 670]
669	[1186, 1187]	1422	[2137, 2138]	2175	[2747, 2748]	2928	[684, 2577]
670	[1188, 1189]	1423	[2139, 2140]	2176	[2749, 2595]	2929	[1696, 2864]
671	[1190, 1191]	1424	[2081, 735]	2177	[2741, 2750]	2930	[1707, 2824]
672	[1192, 1193]	1425	[822, 2141]	2178	[2751, 666]	2931	[415, 151]
673	[1194, 1195]	1426	[2142, 1069]	2179	[2752, 604]	2932	[501, 614]
674	[929, 85]	1427	[1189, 332]	2180	[429, 2753]	2933	[538, 1834]
675	[269, 1196]	1428	[2036, 2143]	2181	[2754, 1812]	2934	[161, 2695]
676	[1127, 1197]	1429	[2144, 849]	2182	[2755, 1674]	2935	[452, 199]
677	[1198, 78]	1430	[2145, 2146]	2183	[534, 2756]	2936	[1389, 30]
678	[1199, 1200]	1431	[2147, 1164]	2184	[2757, 1794]	2937	[1782, 2728]
679	[1201, 277]	1432	[2148, 785]	2185	[2758, 2759]	2938	[1469, 638]
680	[1202, 1203]	1433	[2149, 2025]	2186	[2760, 2758]	2939	[2741, 557]

681	[1204, 1205]	1434	[1235, 2150]	2187	[176, 2563]	2940	[3007, 702]
682	[1206, 1207]	1435	[1230, 217]	2188	[499, 2761]	2941	[2873, 2880]
683	[1208, 1209]	1436	[2151, 2044]	2189	[1943, 1551]	2942	[2771, 1589]
684	[1210, 1211]	1437	[79, 2152]	2190	[2762, 1446]	2943	[447, 444]
685	[1212, 1213]	1438	[2153, 2154]	2191	[441, 2763]	2944	[2910, 725]
686	[1214, 1215]	1439	[2155, 2156]	2192	[1594, 1892]	2945	[1827, 2698]
687	[1216, 1217]	1440	[2157, 2158]	2193	[2764, 1450]	2946	[1528, 1473]
688	[1218, 986]	1441	[2159, 2160]	2194	[132, 1591]	2947	[438, 2884]
689	[751, 964]	1442	[2062, 1007]	2195	[1937, 2663]	2948	[2903, 3008]
690	[1219, 1220]	1443	[1141, 902]	2196	[2572, 1335]	2949	[1902, 2726]
691	[1221, 1222]	1444	[95, 2161]	2197	[429, 1796]	2950	[553, 1937]
692	[1223, 1129]	1445	[1133, 2097]	2198	[1687, 177]	2951	[614, 1728]
693	[1224, 1225]	1446	[2162, 303]	2199	[2765, 1423]	2952	[2917, 2875]
694	[1226, 972]	1447	[217, 297]	2200	[2616, 1690]	2953	[1920, 1737]
695	[1227, 975]	1448	[2163, 225]	2201	[1522, 132]	2954	[1532, 1711]
696	[1228, 1229]	1449	[2164, 2113]	2202	[1588, 1818]	2955	[1924, 644]
697	[1230, 1231]	1450	[1252, 2165]	2203	[686, 1780]	2956	[2724, 1750]
698	[1232, 1233]	1451	[292, 2166]	2204	[1555, 478]	2957	[2892, 677]
699	[917, 1234]	1452	[2167, 325]	2205	[2595, 2766]	2958	[2751, 2911]
700	[1235, 947]	1453	[2032, 2168]	2206	[2767, 2768]	2959	[2673, 1355]
701	[939, 222]	1454	[993, 2169]	2207	[2769, 1342]	2960	[2755, 1744]
702	[1236, 1237]	1455	[2170, 376]	2208	[612, 2700]	2961	[521, 37]
703	[1238, 1239]	1456	[2171, 378]	2209	[1275, 2770]	2962	[2813, 1331]
704	[1240, 1241]	1457	[963, 374]	2210	[2771, 630]	2963	[2685, 2902]
705	[1242, 1243]	1458	[2041, 2106]	2211	[2772, 1873]	2964	[2909, 206]
706	[1244, 1245]	1459	[2172, 2173]	2212	[2773, 2774]	2965	[1528, 2865]
707	[1246, 1078]	1460	[2174, 1121]	2213	[522, 1598]	2966	[2825, 2591]
708	[935, 1247]	1461	[2175, 2176]	2214	[1544, 1335]	2967	[2812, 150]
709	[1248, 70]	1462	[2036, 2078]	2215	[1867, 1527]	2968	[585, 2792]
710	[1045, 1249]	1463	[2177, 773]	2216	[485, 2715]	2969	[1639, 2899]
711	[355, 1250]	1464	[2178, 2179]	2217	[1750, 2564]	2970	[1316, 2608]
712	[1251, 1252]	1465	[324, 1050]	2218	[541, 1811]	2971	[1398, 1465]
713	[1253, 748]	1466	[228, 2180]	2219	[609, 1717]	2972	[698, 2761]
714	[1254, 788]	1467	[2047, 1193]	2220	[2775, 478]	2973	[2828, 461]
715	[1255, 1256]	1468	[927, 1232]	2221	[2776, 2777]	2974	[633, 1588]
716	[1257, 741]	1469	[2181, 2182]	2222	[552, 635]	2975	[2735, 2684]
717	[1258, 1259]	1470	[2183, 2184]	2223	[2778, 2779]	2976	[2852, 1663]
718	[1260, 1261]	1471	[2185, 2186]	2224	[1903, 2750]	2977	[1582, 2914]
719	[1262, 1142]	1472	[2187, 2188]	2225	[154, 1492]	2978	[2907, 2702]
720	[837, 1250]	1473	[1242, 2189]	2226	[1356, 1370]	2979	[1372, 1605]
721	[1247, 1263]	1474	[1115, 2190]	2227	[2682, 1779]	2980	[510, 1886]
722	[784, 1264]	1475	[2157, 2191]	2228	[132, 137]	2981	[1926, 1890]
723	[229, 1265]	1476	[2192, 2175]	2229	[138, 2660]	2982	[633, 468]
724	[1266, 1267]	1477	[2193, 2194]	2230	[556, 2577]	2983	[2898, 1640]

725	[337, 1268]	1478	[2195, 767]	2231	[2780, 1503]	2984	[453, 2763]
726	[1269, 1270]	1479	[2196, 767]	2232	[37, 2781]	2985	[1924, 1362]
727	[27, 1271]	1480	[2197, 759]	2233	[45, 696]	2986	[2896, 2783]
728	[1272, 1273]	1481	[2198, 2063]	2234	[2782, 2783]	2987	[1712, 1778]
729	[1274, 1275]	1482	[1257, 1185]	2235	[524, 467]	2988	[1625, 1366]
730	[565, 1276]	1483	[266, 2199]	2236	[2784, 2785]	2989	[434, 1683]
731	[1277, 651]	1484	[2013, 2200]	2237	[1920, 1930]	2990	[1716, 571]
732	[1278, 155]	1485	[2201, 948]	2238	[1410, 2786]	2991	[525, 675]
733	[1279, 191]	1486	[2202, 2203]	2239	[1331, 583]	2992	[1699, 710]
734	[1280, 1281]	1487	[2204, 2205]	2240	[2676, 1520]	2993	[1825, 2827]
735	[1282, 1283]	1488	[375, 285]	2241	[1928, 2787]	2994	[1853, 2609]
736	[1284, 1285]	1489	[978, 2206]	2242	[2788, 1409]	2995	[2790, 2596]
737	[1286, 659]	1490	[731, 2206]	2243	[2605, 1943]	2996	[680, 1728]
738	[1287, 1288]	1491	[852, 2207]	2244	[2578, 2789]	2997	[1936, 1863]
739	[1289, 1290]	1492	[2208, 2209]	2245	[9, 521]	2998	[141, 512]
740	[1291, 141]	1493	[781, 2210]	2246	[1443, 2675]	2999	[1405, 2918]
741	[1292, 1293]	1494	[2211, 2212]	2247	[2790, 2708]	3000	[1823, 2900]
742	[1294, 564]	1495	[2213, 2214]	2248	[682, 2791]	3001	[1815, 2814]
743	[1295, 1296]	1496	[291, 330]	2249	[1908, 2792]	3002	[2743, 3008]
744	[1297, 1298]	1497	[2215, 1141]	2250	[1802, 143]	3003	[2701, 2908]
745	[1299, 1300]	1498	[2216, 2120]	2251	[2793, 2794]	3004	[2804, 627]
746	[1301, 1302]	1499	[2147, 1975]	2252	[1273, 1796]	3005	[2906, 1382]
747	[1303, 1304]	1500	[2217, 769]	2253	[2588, 1904]	3006	[3009, 2060]
748	[1305, 1306]	1501	[1967, 2218]	2254	[591, 2795]	3007	[2044, 2059]
749	[502, 1307]	1502	[2219, 2220]	2255	[2796, 524]	3008	[770, 3005]
750	[1308, 1309]	1503	[2003, 2221]	2256	[2797, 1311]	3009	[1, 554]
751	[1310, 714]	1504	[2222, 380]	2257	[134, 1484]		
752	[1311, 1291]	1505	[2223, 2224]	2258	[1778, 447]		

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	502	1	1004	0	1506	1	2008	1	2510	0
1	0	503	0	1005	0	1507	1	2009	0	2511	0
2	0	504	1	1006	1	1508	1	2010	1	2512	1
3	0	505	0	1007	0	1509	0	2011	1	2513	1
4	0	506	1	1008	1	1510	0	2012	0	2514	0
5	0	507	0	1009	0	1511	0	2013	0	2515	0
6	1	508	1	1010	1	1512	0	2014	1	2516	1
7	0	509	0	1011	0	1513	0	2015	0	2517	0
8	1	510	1	1012	1	1514	1	2016	1	2518	1
9	0	511	0	1013	0	1515	0	2017	1	2519	1
10	0	512	0	1014	1	1516	0	2018	1	2520	0
11	0	513	1	1015	0	1517	1	2019	0	2521	1
12	1	514	0	1016	0	1518	1	2020	0	2522	0

13	1	515	0	1017	0	1519	0	2021	1	2523	1
14	1	516	0	1018	1	1520	1	2022	1	2524	0
15	0	517	0	1019	0	1521	0	2023	0	2525	0
16	0	518	1	1020	1	1522	0	2024	1	2526	0
17	1	519	0	1021	0	1523	1	2025	1	2527	0
18	1	520	0	1022	0	1524	0	2026	1	2528	1
19	0	521	1	1023	0	1525	1	2027	1	2529	0
20	0	522	0	1024	1	1526	1	2028	0	2530	1
21	0	523	0	1025	1	1527	0	2029	0	2531	1
22	0	524	1	1026	0	1528	1	2030	1	2532	0
23	0	525	1	1027	0	1529	1	2031	1	2533	0
24	1	526	0	1028	1	1530	1	2032	0	2534	0
25	0	527	0	1029	0	1531	0	2033	1	2535	0
26	1	528	1	1030	0	1532	0	2034	0	2536	0
27	0	529	0	1031	1	1533	0	2035	1	2537	0
28	1	530	0	1032	0	1534	1	2036	1	2538	0
29	0	531	0	1033	0	1535	0	2037	1	2539	0
30	1	532	1	1034	0	1536	0	2038	1	2540	0
31	0	533	0	1035	1	1537	1	2039	0	2541	1
32	1	534	0	1036	1	1538	1	2040	1	2542	1
33	1	535	0	1037	0	1539	0	2041	0	2543	1
34	1	536	0	1038	1	1540	1	2042	1	2544	1
35	1	537	0	1039	1	1541	0	2043	1	2545	0
36	1	538	0	1040	0	1542	0	2044	1	2546	1
37	1	539	1	1041	0	1543	1	2045	1	2547	1
38	0	540	1	1042	0	1544	1	2046	1	2548	1
39	0	541	0	1043	0	1545	0	2047	0	2549	1
40	0	542	1	1044	0	1546	0	2048	1	2550	0
41	0	543	0	1045	1	1547	1	2049	0	2551	0
42	0	544	0	1046	0	1548	1	2050	1	2552	1
43	1	545	0	1047	0	1549	0	2051	1	2553	0
44	0	546	0	1048	1	1550	1	2052	0	2554	1
45	1	547	0	1049	1	1551	0	2053	1	2555	1
46	1	548	0	1050	1	1552	1	2054	1	2556	0
47	1	549	1	1051	0	1553	0	2055	0	2557	0
48	0	550	0	1052	1	1554	1	2056	0	2558	0
49	0	551	0	1053	0	1555	1	2057	0	2559	1
50	1	552	1	1054	0	1556	0	2058	0	2560	1
51	1	553	1	1055	1	1557	0	2059	0	2561	0
52	0	554	0	1056	1	1558	0	2060	1	2562	1
53	0	555	0	1057	1	1559	0	2061	0	2563	1
54	1	556	0	1058	0	1560	1	2062	0	2564	1
55	1	557	0	1059	1	1561	0	2063	0	2565	0
56	0	558	1	1060	1	1562	0	2064	0	2566	0

57	0	559	1	1061	0	1563	0	2065	1	2567	1
58	1	560	0	1062	1	1564	1	2066	0	2568	0
59	1	561	0	1063	1	1565	0	2067	0	2569	1
60	0	562	1	1064	1	1566	0	2068	1	2570	0
61	1	563	1	1065	1	1567	0	2069	0	2571	1
62	1	564	0	1066	1	1568	1	2070	1	2572	0
63	0	565	1	1067	1	1569	0	2071	0	2573	1
64	1	566	0	1068	0	1570	1	2072	0	2574	1
65	0	567	0	1069	0	1571	0	2073	0	2575	0
66	1	568	0	1070	0	1572	1	2074	0	2576	1
67	1	569	0	1071	1	1573	0	2075	1	2577	1
68	1	570	1	1072	1	1574	1	2076	1	2578	1
69	0	571	0	1073	1	1575	0	2077	0	2579	0
70	1	572	0	1074	1	1576	0	2078	1	2580	0
71	0	573	1	1075	1	1577	0	2079	0	2581	1
72	1	574	1	1076	0	1578	1	2080	0	2582	0
73	0	575	0	1077	1	1579	0	2081	0	2583	0
74	0	576	0	1078	1	1580	0	2082	0	2584	1
75	1	577	0	1079	0	1581	0	2083	1	2585	1
76	0	578	1	1080	0	1582	1	2084	0	2586	1
77	0	579	0	1081	0	1583	1	2085	0	2587	1
78	0	580	1	1082	0	1584	1	2086	0	2588	1
79	1	581	1	1083	1	1585	0	2087	1	2589	1
80	0	582	0	1084	0	1586	0	2088	0	2590	0
81	0	583	0	1085	0	1587	0	2089	1	2591	0
82	0	584	1	1086	0	1588	0	2090	1	2592	1
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94	0	596	0	1098	0	1600	0	2102	1	2604	0
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97	0	599	0	1101	1	1603	1	2105	0	2607	0
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99	0	601	0	1103	0	1605	1	2107	1	2609	0
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103	0	605	0	1107	1	1609	1	2111	1	2613	1
104	0	606	1	1108	1	1610	1	2112	1	2614	0
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109	0	611	1	1113	1	1615	0	2117	0	2619	0
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116	1	618	1	1120	0	1622	1	2124	1	2626	1
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166	0	668	0	1170	1	1672	1	2174	1	2676	0
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171	1	673	0	1175	1	1677	0	2179	1	2681	0
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174	1	676	1	1178	0	1680	1	2182	0	2684	1
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177	0	679	1	1181	0	1683	0	2185	1	2687	1
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193	1	695	0	1197	1	1699	0	2201	0	2703	1
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221	1	723	1	1225	0	1727	0	2229	0	2731	1
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252	1	754	0	1256	1	1758	0	2260	0	2762	1
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269	1	771	0	1273	1	1775	0	2277	0	2779	0
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272	0	774	1	1276	0	1778	1	2280	1	2782	0
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294	0	796	1	1298	1	1800	1	2302	0	2804	0
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361	1	863	1	1365	0	1867	0	2369	0	2871	0
362	0	864	1	1366	0	1868	1	2370	1	2872	0
363	1	865	1	1367	0	1869	0	2371	0	2873	0
364	0	866	1	1368	0	1870	0	2372	1	2874	0

365	0	867	0	1369	0	1871	1	2373	1	2875	0
366	1	868	1	1370	1	1872	1	2374	1	2876	1
367	1	869	1	1371	0	1873	1	2375	0	2877	1
368	1	870	0	1372	1	1874	0	2376	1	2878	0
369	1	871	0	1373	0	1875	0	2377	1	2879	1
370	0	872	1	1374	0	1876	1	2378	1	2880	0
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373	0	875	1	1377	0	1879	0	2381	0	2883	1
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379	0	881	1	1383	1	1885	1	2387	1	2889	0
380	0	882	1	1384	1	1886	0	2388	0	2890	1
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383	0	885	1	1387	0	1889	1	2391	0	2893	0
384	0	886	0	1388	1	1890	0	2392	0	2894	1
385	1	887	1	1389	1	1891	1	2393	1	2895	0
386	1	888	0	1390	1	1892	0	2394	1	2896	1
387	1	889	0	1391	0	1893	0	2395	0	2897	1
388	1	890	0	1392	1	1894	1	2396	1	2898	1
389	1	891	0	1393	1	1895	0	2397	1	2899	0
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392	0	894	0	1396	1	1898	0	2400	1	2902	0
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395	1	897	1	1399	0	1901	0	2403	0	2905	1
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412	1	914	1	1416	0	1918	0	2420	1	2922	1
413	1	915	0	1417	1	1919	0	2421	1	2923	0
414	0	916	0	1418	1	1920	0	2422	1	2924	1
415	1	917	1	1419	0	1921	1	2423	1	2925	0
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446	0	948	0	1450	0	1952	1	2454	1	2956	0
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494	0	996	0	1498	0	2000	0	2502	1	3004	0
495	1	997	1	1499	1	2001	0	2503	0	3005	0
496	0	998	1	1500	1	2002	1	2504	1	3006	0

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498	0	1000	1	1502	1	2004	0	2506	1	3008	1
499	1	1001	1	1503	1	2005	0	2507	0	3009	0
500	1	1002	1	1504	1	2006	1	2508	1		
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