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

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

1. Introduction

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

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

as the limit of the finite continued fractions

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

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

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

admits a continued fraction expansion of form (1.1).

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

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

that we shall denote

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

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

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

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

$$\begin{aligned}
p_0(z)&=z^{21}+z^{20}+z^{18}+z^{16}+z^{14}+z^{10}+z^9+z^7+z^5+1,\\
p_1(z)&=z^{25}+z^{21}+z^{19}+z^{18}+z^{13}+z^{11}+z^6+z^4+z^3+z^2,\\
p_2(z)&=z^{28}+z^{24}+z^{22}+z^{20}+z^{18}+z^{14}+z^8+z^6+z^4+1,\\
p_3(z)&=z^{25}+z^{21}+z^{19}+z^{18}+z^{13}+z^{11}+z^6+z^4+z^3+z^2,\\
p_4(z)&=z^{22}+z^{21}+z^{20}+z^{12}+z^{10}+z^9+z^7+z^6+z^5+z^4+1,
\end{aligned}$$

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

$$\begin{aligned}
p_0(z)&=z^{21}+z^{20}+z^{18}+z^{14}+z^{12}+z^{10}+z^9+z^8+z^7+z^5+1,\\
p_1(z)&=z^{25}+z^{21}+z^{19}+z^{18}+z^{13}+z^{11}+z^6+z^4+z^3+z^2,\\
p_2(z)&=z^{28}+z^{24}+z^{22}+z^{20}+z^{18}+z^{14}+z^8+z^6+z^4+1,\\
p_3(z)&=z^{25}+z^{21}+z^{19}+z^{18}+z^{13}+z^{11}+z^6+z^4+z^3+z^2,\\
p_4(z)&=z^{22}+z^{21}+z^{20}+z^{16}+z^{10}+z^9+z^8+z^7+z^6+z^5+z^4+1.
\end{aligned}$$

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.*

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

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

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

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

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

$$\begin{aligned}
T[:14u] &= T[:7u] + x^uT[:6u] + x^{2u}T[:5u] + x^{6u}T[:u] + x^uT[:7u] + x^{2u}T[:6u] \\
&+ x^{3u}T[:5u] + x^{7u}T[:u] + x^{3u}T[:7u] + x^{4u}T[:6u] + x^{5u}T[:5u] \\
&+ x^{9u}T[:u] + x^{4u}T[:7u] + x^{5u}T[:6u] + x^{6u}T[:5u] + x^{10u}T[:u] \\
&+ x^{7u}T[:7u] + x^{8u}T[:6u] + x^{13u}T[:u] + x^{10u}T[:4u] + x^{11u}T[:3u] \\
&+ (x^{7u} + x^{8u} + x^{10u} + x^{11u}).
\end{aligned}$$

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

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

$$
\begin{aligned}
&\quad + x^{4u}T[6u\!:\!7u] + T[10u\!:\!11u],\\
x^1 1u &= x^{11u}T[:u] + x^{10u}T[u\!:\!2u] + x^{8u}T[3u\!:\!4u] + x^{7u}T[4u\!:\!5u]\\
&\quad + T[11u\!:\!12u],\\
0 &= x^{11u}T[u\!:\!2u] + x^{10u}T[2u\!:\!3u] + x^{8u}T[4u\!:\!5u] + x^{7u}T[5u\!:\!6u]\\
&\quad + T[12u\!:\!13u],\\
0 &= x^{13u}T[:u] + x^{11u}T[2u\!:\!3u] + x^{10u}T[3u\!:\!4u] + x^{8u}T[5u\!:\!6u]\\
&\quad + x^{7u}T[6u\!:\!7u] + T[13u\!:\!14u],
\end{aligned}
$$

which can be rewritten as

$$0 = T[[1w]_2] + T[[101w]_2] + T[[110w]_2] + T[[111w]_2], \tag{2.7}$$

$$0 = T[[w]_2] + T[[1w]_2] + T[[10w]_2] + T[[101w]_2] + T[[1000w]_2], \tag{2.8}$$

$$\begin{aligned}0 &= T[[w]_2] + T[[1w]_2] + T[[10w]_2] + T[[11w]_2] + T[[110w]_2]\\ &\quad + T[[1001w]_2],\end{aligned} \tag{2.9}$$

$$\begin{aligned}0 &= T[[10w]_2] + T[[11w]_2] + T[[100w]_2] + T[[101w]_2] + T[[110w]_2]\\ &\quad + T[[1010w]_2],\end{aligned} \tag{2.10}$$

$$0 = T[[w]_2] + T[[1w]_2] + T[[11w]_2] + T[[100w]_2] + T[[1011w]_2], \tag{2.11}$$

$$0 = T[[1w]_2] + T[[10w]_2] + T[[100w]_2] + T[[101w]_2] + T[[1100w]_2], \tag{2.12}$$

$$\begin{aligned}0 &= T[[w]_2] + T[[10w]_2] + T[[11w]_2] + T[[101w]_2] + T[[110w]_2]\\ &\quad + T[[1101w]_2],\end{aligned} \tag{2.13}$$

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

$$1 = T[[1w]_2] + T[[101w]_2] + T[[110w]_2] + T[[111w]_2], \tag{2.14}$$

$$1 = T[[w]_2] + T[[1w]_2] + T[[10w]_2] + T[[101w]_2] + T[[1000w]_2], \tag{2.15}$$

$$\begin{aligned}0 &= T[[w]_2] + T[[1w]_2] + T[[10w]_2] + T[[11w]_2] + T[[110w]_2]\\ &\quad + T[[1001w]_2],\end{aligned} \tag{2.16}$$

$$\begin{aligned}1 &= T[[10w]_2] + T[[11w]_2] + T[[100w]_2] + T[[101w]_2] + T[[110w]_2]\\ &\quad + T[[1010w]_2],\end{aligned} \tag{2.17}$$

$$1 = T[[w]_2] + T[[1w]_2] + T[[11w]_2] + T[[100w]_2] + T[[1011w]_2], \tag{2.18}$$

$$0 = T[[1w]_2] + T[[10w]_2] + T[[100w]_2] + T[[101w]_2] + T[[1100w]_2], \tag{2.19}$$

$$\begin{aligned}0 &= T[[w]_2] + T[[10w]_2] + T[[11w]_2] + T[[101w]_2] + T[[110w]_2]\\ &\quad + T[[1101w]_2],\end{aligned} \tag{2.20}$$

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

First we calculate an 2-automaton that generates T from its minimal polynomial and its first terms. This automaton has 4173 states; its transition function and output function can be found in the annex. Let $A(s,w)$ denote the state reached after reading w from right to left starting from the state s, and τ the output function. Define

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

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

$$0 = \tau(A(s,1)) + \tau(A(s,101)) + \tau(A(s,110)) + \tau(A(s,111)), \tag{2.21}$$

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

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

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

for $s = A(i, 0^{2k})$. We find that $(A(i, 0^{50}), E_{50}) = (A(i, 0^{22}), E_{22})$, so that we only have to verify that identities (2.21) through (2.34) hold for $2 \le k \le 25$, which turns out to be true. □

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

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

$$M_{2k} = M^e[:7u] + x^u M^e[:6u] + x^{2u} M^e[:5u] + x^{6u} M^e[:u] + x^{7u} R^e,$$
$$W_{2k} = W^e[:7u] + x^u W^e[:6u] + x^{2u} W^e[:5u] + x^{6u} W^e[:u] + x^{7u} R^e.$$

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

$$M_{2k+1} = M^o[:7u] + x^u M^o[:6u] + x^{2u} M^o[:5u] + x^{6u} M^o[:u] + x^{7u} R^o,$$
$$W_{2k+1} = W^o[:7u] + x^u W^o[:6u] + x^{2u} W^o[:5u] + x^{6u} W^o[:u] + x^{7u} R^o.$$

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

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

We give the proof of

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Define

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

where

$$\begin{aligned}
q_0(x) &= x^{28} + x^{23} + x^{21} + x^{19} + x^{18} + x^{14} + x^{12} + x^{10} + x^8 + x^7,\\
q_1(x) &= x^{26} + x^{25} + x^{24} + x^{22} + x^{17} + x^{15} + x^{10} + x^9 + x^7 + x^3,\\
q_2(x) &= x^{28} + x^{24} + x^{22} + x^{20} + x^{14} + x^{10} + x^8 + x^6 + x^4 + 1,\\
q_3(x) &= x^{26} + x^{25} + x^{24} + x^{22} + x^{17} + x^{15} + x^{10} + x^9 + x^7 + x^3,\\
q_4(x) &= x^{28} + x^{24} + x^{23} + x^{22} + x^{21} + x^{19} + x^{18} + x^{16} + x^8 + x^7 + x^6.
\end{aligned}$$

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 $\mathrm{CF}(a,b) = f(1/z)$. □

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

$$\begin{aligned}
p_0(x) = {} & x^{144} + x^{142} + x^{136} + x^{134} + x^{122} + x^{118} + x^{106} + x^{104} + x^{100} + x^{96}\\
& + x^{92} + x^{90} + x^{88} + x^{86} + x^{84} + x^{80} + x^{78} + x^{76} + x^{74} + x^{70} + x^{64}\\
& + x^{62} + x^{60} + x^{52} + x^{50} + x^{38} + x^{36},\\
p_3(x) = {} & x^{140} + x^{134} + x^{130} + x^{128} + x^{122} + x^{120} + x^{118} + x^{116} + x^{114} + x^{112}\\
& + x^{104} + x^{102} + x^{100} + x^{98} + x^{92} + x^{90} + x^{88} + x^{86} + x^{82} + x^{78} + x^{72}\\
& + x^{66} + x^{64} + x^{62} + x^{54} + x^{40} + x^{36} + x^{34} + x^{32} + x^{24} + x^{22} + x^{20},\\
p_6(x) = {} & x^{136} + x^{130} + x^{124} + x^{122} + x^{118} + x^{114} + x^{110} + x^{108} + x^{104} + x^{100}\\
& + x^{92} + x^{86} + x^{84} + x^{82} + x^{74} + x^{70} + x^{68} + x^{60} + x^{56} + x^{54} + x^{52}\\
& + x^{44} + x^{38} + x^{36} + x^{32} + x^{30} + x^{28} + x^{24} + x^{22} + x^{20} + x^{18} + 1,\\
p_9(x) = {} & x^{140} + x^{136} + x^{130} + x^{128} + x^{124} + x^{116} + x^{114} + x^{112} + x^{108} + x^{104}\\
& + x^{102} + x^{98} + x^{94} + x^{90} + x^{86} + x^{84} + x^{82} + x^{74} + x^{72} + x^{70} + x^{68}\\
& + x^{66} + x^{62} + x^{60} + x^{58} + x^{56} + x^{54} + x^{52} + x^{50} + x^{44} + x^{38} + x^{28}
\end{aligned}$$

$$\begin{aligned}
&\quad + x^{26} + x^{6},\\
p_{12}(x) &= x^{144} + x^{142} + x^{134} + x^{126} + x^{118} + x^{110} + x^{102} + x^{96} + x^{16} + x^{14}\\
&\quad + x^{6} + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{147} + x^{143} + x^{142} + x^{140} + x^{139} + x^{131} + x^{129} + x^{128} + x^{127} + x^{125}\\
&\quad + x^{124} + x^{123} + x^{121} + x^{118} + x^{117} + x^{114} + x^{111} + x^{107} + x^{105}\\
&\quad + x^{103} + x^{102} + x^{100} + x^{98} + x^{97} + x^{96} + x^{95} + x^{92} + x^{91} + x^{90} + x^{88}\\
&\quad + x^{83} + x^{80} + x^{77} + x^{76} + x^{75} + x^{74} + x^{73} + x^{72} + x^{71} + x^{68} + x^{67}\\
&\quad + x^{65} + x^{63} + x^{62} + x^{60} + x^{58} + x^{57} + x^{55} + x^{53} + x^{52} + x^{50} + x^{45}\\
&\quad + 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^{115}\\
&\quad + x^{113} + x^{112} + x^{110} + x^{108} + x^{107} + x^{105} + x^{104} + x^{102} + x^{101}\\
&\quad + x^{99} + x^{98} + x^{97} + x^{91} + x^{90} + x^{89} + x^{85} + x^{84} + x^{83} + x^{79} + x^{78}\\
&\quad + x^{77} + x^{75} + x^{74} + x^{72} + x^{70} + x^{68} + x^{66} + x^{65} + x^{63} + x^{62} + x^{61}\\
&\quad + x^{55} + x^{54} + x^{52} + x^{51} + x^{45} + x^{44} + x^{42} + x^{41} + x^{39} + x^{38} + x^{36}\\
&\quad + x^{34} + x^{32} + x^{31} + x^{29} + x^{28} + x^{27},\\
p_6(x) &= x^{135} + x^{133} + x^{130} + x^{126} + x^{125} + x^{124} + x^{123} + x^{121} + x^{119} + x^{118}\\
&\quad + x^{113} + x^{108} + x^{107} + x^{106} + x^{99} + x^{97} + x^{94} + x^{91} + x^{90} + x^{88}\\
&\quad + x^{87} + x^{86} + x^{85} + x^{83} + x^{81} + x^{80} + x^{77} + x^{73} + x^{72} + x^{70} + x^{69}\\
&\quad + x^{68} + x^{67} + x^{63} + x^{62} + x^{60} + x^{59} + x^{58} + x^{57} + x^{55} + x^{53} + x^{52}\\
&\quad + x^{51} + x^{46} + x^{45} + x^{44} + x^{43} + x^{41} + x^{39} + x^{38} + x^{35} + x^{31} + x^{30}\\
&\quad + x^{29} + x^{28} + x^{27} + x^{26} + x^{25} + x^{24} + x^{23} + x^{22} + x^{20} + x^{19} + x^{18},\\
p_9(x) &= x^{141} + x^{140} + x^{138} + x^{137} + x^{125} + x^{124} + x^{123} + x^{117} + x^{116} + x^{115}\\
&\quad + x^{111} + x^{110} + x^{108} + x^{106} + x^{105} + x^{101} + x^{100} + x^{98} + x^{97} + x^{91}\\
&\quad + x^{90} + x^{89} + x^{81} + x^{80} + x^{79} + x^{73} + x^{72} + x^{71} + x^{67} + x^{66} + x^{64}\\
&\quad + x^{62} + x^{60} + x^{58} + x^{57} + x^{53} + x^{52} + x^{50} + x^{49} + x^{47} + x^{46} + x^{44}\\
&\quad + x^{43} + x^{39} + x^{38} + x^{36} + x^{35} + x^{27} + x^{26} + x^{25} + x^{23} + x^{22} + x^{20}\\
&\quad + x^{18} + x^{16} + x^{14} + x^{13} + x^{11} + x^{10} + x^{9},\\
p_{12}(x) &= x^{147} + x^{142} + x^{141} + x^{140} + x^{127} + x^{123} + x^{122} + x^{121} + x^{120} + x^{119}\\
&\quad + x^{118} + x^{117} + x^{116} + x^{115} + x^{114} + x^{113} + x^{112} + x^{110} + x^{109}\\
&\quad + x^{108} + x^{99} + x^{95} + x^{94} + x^{93} + x^{92} + x^{91} + x^{90} + x^{89} + x^{88} + x^{87}\\
&\quad + x^{86} + x^{85} + x^{84} + x^{83} + x^{82} + x^{81} + x^{80} + x^{79} + x^{78} + x^{77} + x^{76}\\
&\quad + x^{75} + x^{74} + x^{73} + x^{72} + x^{71} + x^{70} + x^{69} + x^{68} + x^{67} + x^{66} + x^{65}\\
&\quad + x^{64} + x^{63} + x^{62} + x^{61} + x^{60} + x^{59} + x^{58} + x^{57} + x^{56} + x^{55} + x^{54}
\end{aligned}$$

$$+ x^{53} + x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{47} + x^{46} + x^{45} + x^{44} + x^{43}$$
$$+ x^{42} + x^{41} + x^{40} + x^{39} + x^{38} + x^{37} + x^{36} + x^{35} + x^{34} + x^{33} + x^{32}$$
$$+ x^{31} + x^{30} + x^{29} + x^{28} + x^{27} + x^{26} + x^{25} + x^{24} + x^{23} + x^{22} + x^{21}$$
$$+ x^{20} + x^{18} + x^{17} + x^{16} + x^{15} + x^{11} + x^{10} + x^{9} + x^{8} + x^{7} + x^{6} + x^{5}$$
$$+ x^{4} + x^{2} + x + 1,$$

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

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

$$\begin{aligned}
p_0(x) &= x^{147} + x^{143} + x^{142} + x^{140} + x^{139} + x^{131} + x^{129} + x^{128} + x^{127} + x^{125} \\
&\quad + x^{124} + x^{123} + x^{121} + x^{118} + x^{117} + x^{114} + x^{111} + x^{107} + x^{105} \\
&\quad + x^{103} + x^{102} + x^{100} + x^{98} + x^{97} + x^{96} + x^{95} + x^{92} + x^{91} + x^{90} + x^{88} \\
&\quad + x^{83} + x^{80} + x^{77} + x^{76} + x^{75} + x^{74} + x^{73} + x^{72} + x^{71} + x^{68} + x^{67} \\
&\quad + x^{65} + x^{63} + x^{62} + x^{60} + x^{58} + x^{57} + x^{55} + x^{53} + x^{52} + x^{50} + x^{45} \\
&\quad + 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^{115} \\
&\quad + x^{113} + x^{112} + x^{110} + x^{108} + x^{107} + x^{105} + x^{104} + x^{102} + x^{101} \\
&\quad + x^{99} + x^{98} + x^{97} + x^{91} + x^{90} + x^{89} + x^{85} + x^{84} + x^{83} + x^{79} + x^{78} \\
&\quad + x^{77} + x^{75} + x^{74} + x^{72} + x^{70} + x^{68} + x^{66} + x^{65} + x^{63} + x^{62} + x^{61} \\
&\quad + x^{55} + x^{54} + x^{52} + x^{51} + x^{45} + x^{44} + x^{42} + x^{41} + x^{39} + x^{38} + x^{36} \\
&\quad + x^{34} + x^{32} + x^{31} + x^{29} + x^{28} + x^{27}, \\
p_6(x) &= x^{135} + x^{133} + x^{130} + x^{126} + x^{125} + x^{124} + x^{123} + x^{121} + x^{119} + x^{118} \\
&\quad + x^{113} + x^{108} + x^{107} + x^{106} + x^{99} + x^{97} + x^{94} + x^{91} + x^{90} + x^{88} \\
&\quad + x^{87} + x^{86} + x^{85} + x^{83} + x^{81} + x^{80} + x^{77} + x^{73} + x^{72} + x^{70} + x^{69} \\
&\quad + x^{68} + x^{67} + x^{63} + x^{62} + x^{60} + x^{59} + x^{58} + x^{57} + x^{55} + x^{53} + x^{52} \\
&\quad + x^{51} + x^{46} + x^{45} + x^{44} + x^{43} + x^{41} + x^{39} + x^{38} + x^{35} + x^{31} + x^{30} \\
&\quad + x^{29} + x^{28} + x^{27} + x^{26} + x^{25} + x^{24} + x^{23} + x^{22} + x^{20} + x^{19} + x^{18}, \\
p_9(x) &= x^{141} + x^{140} + x^{138} + x^{137} + x^{125} + x^{124} + x^{123} + x^{117} + x^{116} + x^{115} \\
&\quad + x^{111} + x^{110} + x^{108} + x^{106} + x^{105} + x^{101} + x^{100} + x^{98} + x^{97} + x^{91} \\
&\quad + x^{90} + x^{89} + x^{81} + x^{80} + x^{79} + x^{73} + x^{72} + x^{71} + x^{67} + x^{66} + x^{64} \\
&\quad + x^{62} + x^{60} + x^{58} + x^{57} + x^{53} + x^{52} + x^{50} + x^{49} + x^{47} + x^{46} + x^{44} \\
&\quad + x^{43} + x^{39} + x^{38} + x^{36} + x^{35} + x^{27} + x^{26} + x^{25} + x^{23} + x^{22} + x^{20} \\
&\quad + x^{18} + x^{16} + x^{14} + x^{13} + x^{11} + x^{10} + x^{9}, \\
p_{12}(x) &= x^{147} + x^{142} + x^{141} + x^{140} + x^{127} + x^{123} + x^{122} + x^{121} + x^{120} + x^{119} \\
&\quad + x^{118} + x^{117} + x^{116} + x^{115} + x^{114} + x^{113} + x^{112} + x^{110} + x^{109} \\
&\quad + x^{108} + x^{99} + x^{95} + x^{94} + x^{93} + x^{92} + x^{91} + x^{90} + x^{89} + x^{88} + x^{87} \\
&\quad + x^{86} + x^{85} + x^{84} + x^{83} + x^{82} + x^{81} + x^{80} + x^{79} + x^{78} + x^{77} + x^{76}
\end{aligned}$$

$$
\begin{aligned}
&+x^{75}+x^{74}+x^{73}+x^{72}+x^{71}+x^{70}+x^{69}+x^{68}+x^{67}+x^{66}+x^{65}\\
&+x^{64}+x^{63}+x^{62}+x^{61}+x^{60}+x^{59}+x^{58}+x^{57}+x^{56}+x^{55}+x^{54}\\
&+x^{53}+x^{52}+x^{51}+x^{50}+x^{49}+x^{48}+x^{47}+x^{46}+x^{45}+x^{44}+x^{43}\\
&+x^{42}+x^{41}+x^{40}+x^{39}+x^{38}+x^{37}+x^{36}+x^{35}+x^{34}+x^{33}+x^{32}\\
&+x^{31}+x^{30}+x^{29}+x^{28}+x^{27}+x^{26}+x^{25}+x^{24}+x^{23}+x^{22}+x^{21}\\
&+x^{20}+x^{18}+x^{17}+x^{16}+x^{15}+x^{11}+x^{10}+x^{9}+x^{8}+x^{7}+x^{6}+x^{5}\\
&+x^{4}+x^{2}+x+1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{150}+x^{148}+x^{146}+x^{144}+x^{142}+x^{136}+x^{132}+x^{130}+x^{128}+x^{126}\\
&\quad+x^{110}+x^{98}+x^{96}+x^{90}+x^{86}+x^{72}+x^{66}+x^{62}+x^{60}+x^{56}+x^{52}\\
&\quad+x^{50}+x^{48}+x^{46}+x^{42},\\
p_3(x) &= x^{146}+x^{142}+x^{140}+x^{136}+x^{134}+x^{132}+x^{128}+x^{126}+x^{120}+x^{118}\\
&\quad+x^{108}+x^{102}+x^{100}+x^{96}+x^{94}+x^{90}+x^{88}+x^{86}+x^{84}+x^{82}+x^{80}\\
&\quad+x^{78}+x^{76}+x^{72}+x^{70}+x^{66}+x^{60}+x^{58}+x^{54}+x^{52}+x^{50}+x^{46}\\
&\quad+x^{44}+x^{38}+x^{36}+x^{34}+x^{32}+x^{30}+x^{22}+x^{18},\\
p_6(x) &= x^{140}+x^{136}+x^{134}+x^{132}+x^{130}+x^{128}+x^{120}+x^{118}+x^{116}+x^{112}\\
&\quad+x^{106}+x^{104}+x^{102}+x^{92}+x^{84}+x^{80}+x^{78}+x^{74}+x^{68}+x^{66}+x^{64}\\
&\quad+x^{60}+x^{58}+x^{54}+x^{52}+x^{50}+x^{44}+x^{36}+x^{32}+x^{28}+x^{24}+x^{20}\\
&\quad+x^{16}+x^{14}+x^{12}+x^{10}+x^{8}+x^{4}+x^{2}+1,\\
p_9(x) &= x^{146}+x^{128}+x^{124}+x^{122}+x^{118}+x^{116}+x^{108}+x^{106}+x^{104}+x^{92}\\
&\quad+x^{82}+x^{76}+x^{70}+x^{68}+x^{62}+x^{56}+x^{54}+x^{52}+x^{50}+x^{48}+x^{44}\\
&\quad+x^{40}+x^{38}+x^{36}+x^{32}+x^{26}+x^{24}+x^{16}+x^{14}+x^{10}+x^{8}+x^{6},\\
p_{12}(x) &= x^{150}+x^{148}+x^{146}+x^{144}+x^{142}+x^{140}+x^{138}+x^{136}+x^{110}+x^{108}\\
&\quad+x^{106}+x^{104}+x^{102}+x^{100}+x^{98}+x^{96}+x^{94}+x^{92}+x^{90}+x^{88}\\
&\quad+x^{78}+x^{76}+x^{74}+x^{72}+x^{62}+x^{60}+x^{58}+x^{56}+x^{46}+x^{44}+x^{42}\\
&\quad+x^{40}+x^{30}+x^{28}+x^{26}+x^{24}+x^{22}+x^{20}+x^{18}+x^{16}+x^{6}+x^{4}+x^{2}\\
&\quad+1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{150}+x^{148}+x^{146}+x^{144}+x^{140}+x^{136}+x^{132}+x^{130}+x^{128}+x^{120}\\
&\quad+x^{118}+x^{116}+x^{112}+x^{106}+x^{104}+x^{100}+x^{96}+x^{90}+x^{86}+x^{84}\\
&\quad+x^{82}+x^{80}+x^{72}+x^{66}+x^{64}+x^{60}+x^{58}+x^{54}+x^{44}+x^{42}+x^{36},\\
p_3(x) &= x^{146}+x^{142}+x^{140}+x^{138}+x^{136}+x^{134}+x^{130}+x^{126}+x^{116}+x^{104}\\
&\quad+x^{102}+x^{96}+x^{88}+x^{84}+x^{82}+x^{80}+x^{64}+x^{48}+x^{38}+x^{30}+x^{24}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{20},\\
p_6(x) &= x^{142} + x^{138} + x^{136} + x^{132} + x^{130} + x^{128} + x^{126} + x^{124} + x^{118} + x^{116}\\
&+ x^{114} + x^{110} + x^{104} + x^{98} + x^{96} + x^{90} + x^{80} + x^{78} + x^{62} + x^{60} + x^{58}\\
&+ x^{56} + x^{54} + x^{52} + x^{50} + x^{46} + x^{42} + x^{40} + x^{32} + x^{30} + x^{22} + x^{10}\\
&+ x^{8} + x^{4} + x^{2} + 1,\\
p_9(x) &= x^{146} + x^{128} + x^{124} + x^{122} + x^{118} + x^{116} + x^{108} + x^{106} + x^{104} + x^{92}\\
&+ x^{82} + x^{76} + x^{70} + x^{68} + x^{62} + x^{56} + x^{54} + x^{52} + x^{50} + x^{48} + x^{44}\\
&+ x^{40} + x^{38} + x^{36} + x^{32} + x^{26} + x^{24} + x^{16} + x^{14} + x^{10} + x^{8} + x^{6},\\
p_{12}(x) &= x^{150} + x^{148} + x^{146} + x^{144} + x^{142} + x^{140} + x^{138} + x^{136} + x^{110} + x^{108}\\
&+ x^{106} + x^{104} + x^{102} + x^{100} + x^{98} + x^{96} + x^{94} + x^{92} + x^{90} + x^{88}\\
&+ x^{78} + x^{76} + x^{74} + x^{72} + x^{62} + x^{60} + x^{58} + x^{56} + x^{46} + x^{44} + x^{42}\\
&+ x^{40} + x^{30} + x^{28} + x^{26} + x^{24} + x^{22} + x^{20} + x^{18} + x^{16} + x^{6} + x^{4} + x^{2}\\
&+ 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{147} + x^{143} + x^{142} + x^{140} + x^{139} + x^{135} + x^{133} + x^{131} + x^{130} + x^{129}\\
&+ x^{128} + x^{127} + x^{126} + x^{123} + x^{119} + x^{118} + x^{116} + x^{115} + x^{109}\\
&+ x^{108} + x^{103} + x^{97} + x^{95} + x^{93} + x^{92} + x^{90} + x^{89} + x^{87} + x^{85} + x^{84}\\
&+ x^{83} + x^{80} + x^{78} + x^{77} + x^{76} + x^{75} + x^{72} + x^{71} + x^{68} + x^{67} + x^{63}\\
&+ x^{59} + x^{56} + x^{54} + x^{53} + x^{52} + x^{50} + x^{48} + x^{46} + x^{44} + x^{41} + x^{40}\\
&+ x^{39},\\
p_3(x) &= x^{129} + x^{128} + x^{127} + x^{125} + x^{124} + x^{122} + x^{121} + x^{117} + x^{116} + x^{115}\\
&+ x^{113} + x^{112} + x^{110} + x^{108} + x^{107} + x^{105} + x^{104} + x^{102} + x^{101}\\
&+ x^{99} + x^{98} + x^{97} + x^{91} + x^{90} + x^{89} + x^{85} + x^{84} + x^{83} + x^{79} + x^{78}\\
&+ x^{77} + x^{75} + x^{74} + x^{72} + x^{70} + x^{68} + x^{66} + x^{65} + x^{63} + x^{62} + x^{61}\\
&+ x^{55} + x^{54} + x^{52} + x^{51} + x^{45} + x^{44} + x^{42} + x^{41} + x^{39} + x^{38} + x^{36}\\
&+ x^{34} + x^{32} + x^{31} + x^{29} + x^{28} + x^{27},\\
p_6(x) &= x^{135} + x^{133} + x^{130} + x^{126} + x^{125} + x^{124} + x^{123} + x^{121} + x^{119} + x^{118}\\
&+ x^{113} + x^{108} + x^{107} + x^{106} + x^{99} + x^{97} + x^{94} + x^{91} + x^{90} + x^{88}\\
&+ x^{87} + x^{86} + x^{85} + x^{83} + x^{81} + x^{80} + x^{77} + x^{73} + x^{72} + x^{70} + x^{69}\\
&+ x^{68} + x^{67} + x^{63} + x^{62} + x^{60} + x^{59} + x^{58} + x^{57} + x^{55} + x^{53} + x^{52}\\
&+ x^{51} + x^{46} + x^{45} + x^{44} + x^{43} + x^{41} + x^{39} + x^{38} + x^{35} + x^{31} + x^{30}\\
&+ x^{29} + x^{28} + x^{27} + x^{26} + x^{25} + x^{24} + x^{23} + x^{22} + x^{20} + x^{19} + x^{18},\\
p_9(x) &= x^{141} + x^{140} + x^{138} + x^{137} + x^{125} + x^{124} + x^{123} + x^{117} + x^{116} + x^{115}\\
&+ x^{111} + x^{110} + x^{108} + x^{106} + x^{105} + x^{101} + x^{100} + x^{98} + x^{97} + x^{91}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{90} + x^{89} + x^{81} + x^{80} + x^{79} + x^{73} + x^{72} + x^{71} + x^{67} + x^{66} + x^{64} \\
&+ x^{62} + x^{60} + x^{58} + x^{57} + x^{53} + x^{52} + x^{50} + x^{49} + x^{47} + x^{46} + x^{44} \\
&+ x^{43} + x^{39} + x^{38} + x^{36} + x^{35} + x^{27} + x^{26} + x^{25} + x^{23} + x^{22} + x^{20} \\
&+ x^{18} + x^{16} + x^{14} + x^{13} + x^{11} + x^{10} + x^{9}, \\
p_{12}(x) = {}& x^{147} + x^{142} + x^{141} + x^{140} + x^{127} + x^{123} + x^{122} + x^{121} + x^{120} + x^{119} \\
&+ x^{118} + x^{117} + x^{116} + x^{115} + x^{114} + x^{113} + x^{112} + x^{110} + x^{109} \\
&+ x^{108} + x^{99} + x^{95} + x^{94} + x^{93} + x^{92} + x^{91} + x^{90} + x^{89} + x^{88} + x^{87} \\
&+ x^{86} + x^{85} + x^{84} + x^{83} + x^{82} + x^{81} + x^{80} + x^{79} + x^{78} + x^{77} + x^{76} \\
&+ x^{75} + x^{74} + x^{73} + x^{72} + x^{71} + x^{70} + x^{69} + x^{68} + x^{67} + x^{66} + x^{65} \\
&+ x^{64} + x^{63} + x^{62} + x^{61} + x^{60} + x^{59} + x^{58} + x^{57} + x^{56} + x^{55} + x^{54} \\
&+ x^{53} + x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{47} + x^{46} + x^{45} + x^{44} + x^{43} \\
&+ x^{42} + x^{41} + x^{40} + x^{39} + x^{38} + x^{37} + x^{36} + x^{35} + x^{34} + x^{33} + x^{32} \\
&+ x^{31} + x^{30} + x^{29} + x^{28} + x^{27} + x^{26} + x^{25} + x^{24} + x^{23} + x^{22} + x^{21} \\
&+ x^{20} + x^{18} + x^{17} + x^{16} + x^{15} + x^{11} + x^{10} + x^{9} + x^{8} + x^{7} + x^{6} + x^{5} \\
&+ x^{4} + x^{2} + x + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) = {}& x^{147} + x^{143} + x^{142} + x^{140} + x^{139} + x^{135} + x^{133} + x^{131} + x^{130} + x^{129} \\
&+ x^{128} + x^{127} + x^{126} + x^{123} + x^{119} + x^{118} + x^{116} + x^{115} + x^{109} \\
&+ x^{108} + x^{103} + x^{97} + x^{95} + x^{93} + x^{92} + x^{90} + x^{89} + x^{87} + x^{85} + x^{84} \\
&+ x^{83} + x^{80} + x^{78} + x^{77} + x^{76} + x^{75} + x^{72} + x^{71} + x^{68} + x^{67} + x^{63} \\
&+ x^{59} + x^{56} + x^{54} + x^{53} + x^{52} + x^{50} + x^{48} + x^{46} + x^{44} + x^{41} + x^{40} \\
&+ x^{39}, \\
p_3(x) = {}& x^{129} + x^{128} + x^{127} + x^{125} + x^{124} + x^{122} + x^{121} + x^{117} + x^{116} + x^{115} \\
&+ x^{113} + x^{112} + x^{110} + x^{108} + x^{107} + x^{105} + x^{104} + x^{102} + x^{101} \\
&+ x^{99} + x^{98} + x^{97} + x^{91} + x^{90} + x^{89} + x^{85} + x^{84} + x^{83} + x^{79} + x^{78} \\
&+ x^{77} + x^{75} + x^{74} + x^{72} + x^{70} + x^{68} + x^{66} + x^{65} + x^{63} + x^{62} + x^{61} \\
&+ x^{55} + x^{54} + x^{52} + x^{51} + x^{45} + x^{44} + x^{42} + x^{41} + x^{39} + x^{38} + x^{36} \\
&+ x^{34} + x^{32} + x^{31} + x^{29} + x^{28} + x^{27}, \\
p_6(x) = {}& x^{135} + x^{133} + x^{130} + x^{126} + x^{125} + x^{124} + x^{123} + x^{121} + x^{119} + x^{118} \\
&+ x^{113} + x^{108} + x^{107} + x^{106} + x^{99} + x^{97} + x^{94} + x^{91} + x^{90} + x^{88} \\
&+ x^{87} + x^{86} + x^{85} + x^{83} + x^{81} + x^{80} + x^{77} + x^{73} + x^{72} + x^{70} + x^{69} \\
&+ x^{68} + x^{67} + x^{63} + x^{62} + x^{60} + x^{59} + x^{58} + x^{57} + x^{55} + x^{53} + x^{52} \\
&+ x^{51} + x^{46} + x^{45} + x^{44} + x^{43} + x^{41} + x^{39} + x^{38} + x^{35} + x^{31} + x^{30} \\
&+ x^{29} + x^{28} + x^{27} + x^{26} + x^{25} + x^{24} + x^{23} + x^{22} + x^{20} + x^{19} + x^{18},
\end{aligned}
$$

$$\begin{aligned}
p_9(x) &= x^{141} + x^{140} + x^{138} + x^{137} + x^{125} + x^{124} + x^{123} + x^{117} + x^{116} + x^{115} \\
&\quad + x^{111} + x^{110} + x^{108} + x^{106} + x^{105} + x^{101} + x^{100} + x^{98} + x^{97} + x^{91} \\
&\quad + x^{90} + x^{89} + x^{81} + x^{80} + x^{79} + x^{73} + x^{72} + x^{71} + x^{67} + x^{66} + x^{64} \\
&\quad + x^{62} + x^{60} + x^{58} + x^{57} + x^{53} + x^{52} + x^{50} + x^{49} + x^{47} + x^{46} + x^{44} \\
&\quad + x^{43} + x^{39} + x^{38} + x^{36} + x^{35} + x^{27} + x^{26} + x^{25} + x^{23} + x^{22} + x^{20} \\
&\quad + x^{18} + x^{16} + x^{14} + x^{13} + x^{11} + x^{10} + x^{9}, \\
p_{12}(x) &= x^{147} + x^{142} + x^{141} + x^{140} + x^{127} + x^{123} + x^{122} + x^{121} + x^{120} + x^{119} \\
&\quad + x^{118} + x^{117} + x^{116} + x^{115} + x^{114} + x^{113} + x^{112} + x^{110} + x^{109} \\
&\quad + x^{108} + x^{99} + x^{95} + x^{94} + x^{93} + x^{92} + x^{91} + x^{90} + x^{89} + x^{88} + x^{87} \\
&\quad + x^{86} + x^{85} + x^{84} + x^{83} + x^{82} + x^{81} + x^{80} + x^{79} + x^{78} + x^{77} + x^{76} \\
&\quad + x^{75} + x^{74} + x^{73} + x^{72} + x^{71} + x^{70} + x^{69} + x^{68} + x^{67} + x^{66} + x^{65} \\
&\quad + x^{64} + x^{63} + x^{62} + x^{61} + x^{60} + x^{59} + x^{58} + x^{57} + x^{56} + x^{55} + x^{54} \\
&\quad + x^{53} + x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{47} + x^{46} + x^{45} + x^{44} + x^{43} \\
&\quad + x^{42} + x^{41} + x^{40} + x^{39} + x^{38} + x^{37} + x^{36} + x^{35} + x^{34} + x^{33} + x^{32} \\
&\quad + x^{31} + x^{30} + x^{29} + x^{28} + x^{27} + x^{26} + x^{25} + x^{24} + x^{23} + x^{22} + x^{21} \\
&\quad + x^{20} + x^{18} + x^{17} + x^{16} + x^{15} + x^{11} + x^{10} + x^{9} + x^{8} + x^{7} + x^{6} + x^{5} \\
&\quad + x^{4} + x^{2} + x + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{144} + x^{142} + x^{132} + x^{130} + x^{126} + x^{118} + x^{114} + x^{106} + x^{102} + x^{100} \\
&\quad + x^{98} + x^{92} + x^{90} + x^{74} + x^{72} + x^{68} + x^{66} + x^{62} + x^{60} + x^{58} + x^{52} \\
&\quad + x^{48} + x^{46} + x^{44} + x^{42}, \\
p_3(x) &= x^{140} + x^{134} + x^{132} + x^{130} + x^{126} + x^{124} + x^{120} + x^{116} + x^{114} + x^{108} \\
&\quad + x^{106} + x^{104} + x^{98} + x^{96} + x^{94} + x^{92} + x^{86} + x^{80} + x^{78} + x^{74} + x^{68} \\
&\quad + x^{58} + x^{56} + x^{54} + x^{52} + x^{50} + x^{48} + x^{46} + x^{42} + x^{40} + x^{36} + x^{34} \\
&\quad + x^{32} + x^{22} + x^{20} + x^{18}, \\
p_6(x) &= x^{134} + x^{126} + x^{122} + x^{120} + x^{118} + x^{112} + x^{102} + x^{98} + x^{90} + x^{86} \\
&\quad + x^{84} + x^{80} + x^{66} + x^{64} + x^{60} + x^{58} + x^{50} + x^{48} + x^{40} + x^{38} + x^{32} \\
&\quad + x^{30} + x^{26} + x^{22} + x^{20} + x^{18} + x^{12} + 1, \\
p_9(x) &= x^{140} + x^{136} + x^{130} + x^{128} + x^{124} + x^{116} + x^{114} + x^{112} + x^{108} + x^{104} \\
&\quad + x^{102} + x^{98} + x^{94} + x^{90} + x^{86} + x^{84} + x^{82} + x^{74} + x^{72} + x^{70} + x^{68} \\
&\quad + x^{66} + x^{62} + x^{60} + x^{58} + x^{56} + x^{54} + x^{52} + x^{50} + x^{44} + x^{38} + x^{28} \\
&\quad + x^{26} + x^{6}, \\
p_{12}(x) &= x^{144} + x^{142} + x^{134} + x^{126} + x^{118} + x^{110} + x^{102} + x^{96} + x^{16} + x^{14} \\
&\quad + x^{6} + 1,
\end{aligned}$$

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

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

$$
\begin{aligned}
p_0(x) = {} & x^{147}+x^{142}+x^{141}+x^{140}+x^{137}+x^{135}+x^{134}+x^{131}+x^{129}+x^{128}\\
&+x^{127}+x^{126}+x^{125}+x^{120}+x^{116}+x^{113}+x^{102}+x^{100}+x^{99}+x^{98}\\
&+x^{96}+x^{94}+x^{93}+x^{91}+x^{87}+x^{83}+x^{82}+x^{81}+x^{79}+x^{77}+x^{70}\\
&+x^{69}+x^{68}+x^{66}+x^{63}+x^{62}+x^{60}+x^{59}+x^{56}+x^{54}+x^{51}+x^{47}\\
&+x^{45}+x^{44}+x^{43}+x^{41}+x^{39}+x^{37}+x^{36},\\
p_3(x) = {} & x^{139}+x^{135}+x^{134}+x^{133}+x^{132}+x^{131}+x^{130}+x^{128}+x^{127}+x^{124}\\
&+x^{122}+x^{120}+x^{119}+x^{116}+x^{114}+x^{111}+x^{108}+x^{107}+x^{106}\\
&+x^{105}+x^{102}+x^{100}+x^{99}+x^{97}+x^{94}+x^{93}+x^{90}+x^{88}+x^{87}+x^{85}\\
&+x^{84}+x^{82}+x^{81}+x^{80}+x^{77}+x^{76}+x^{75}+x^{74}+x^{73}+x^{71}+x^{70}\\
&+x^{68}+x^{67}+x^{62}+x^{58}+x^{56}+x^{53}+x^{50}+x^{47}+x^{46}+x^{44}+x^{41}\\
&+x^{39}+x^{32}+x^{28}+x^{27}+x^{25}+x^{24},\\
p_6(x) = {} & x^{139}+x^{137}+x^{133}+x^{132}+x^{130}+x^{129}+x^{126}+x^{125}+x^{124}+x^{122}\\
&+x^{119}+x^{118}+x^{116}+x^{115}+x^{113}+x^{112}+x^{108}+x^{107}+x^{106}\\
&+x^{105}+x^{102}+x^{97}+x^{90}+x^{89}+x^{85}+x^{84}+x^{82}+x^{77}+x^{76}+x^{73}\\
&+x^{69}+x^{68}+x^{67}+x^{66}+x^{65}+x^{64}+x^{63}+x^{61}+x^{58}+x^{57}+x^{56}\\
&+x^{54}+x^{53}+x^{52}+x^{51}+x^{50}+x^{49}+x^{48}+x^{47}+x^{46}+x^{44}+x^{42}\\
&+x^{37}+x^{36}+x^{33}+x^{32}+x^{31}+x^{30}+x^{27}+x^{26}+x^{23}+x^{22}+x^{21}\\
&+x^{18}+x^{17}+x^{13}+x^{12}+x^{11}+x^{10}+x^{9}+x^{8}+x^{7}+x^{6}+x^{5}+x^{4}\\
&+x^{2}+x+1,\\
p_9(x) = {} & x^{139}+x^{135}+x^{134}+x^{133}+x^{132}+x^{131}+x^{130}+x^{129}+x^{128}+x^{126}\\
&+x^{125}+x^{124}+x^{107}+x^{103}+x^{102}+x^{101}+x^{100}+x^{99}+x^{98}+x^{97}\\
&+x^{96}+x^{94}+x^{93}+x^{92}+x^{91}+x^{87}+x^{86}+x^{85}+x^{84}+x^{83}+x^{82}\\
&+x^{81}+x^{80}+x^{78}+x^{77}+x^{76}+x^{75}+x^{71}+x^{70}+x^{69}+x^{68}+x^{67}\\
&+x^{66}+x^{65}+x^{64}+x^{62}+x^{61}+x^{60}+x^{59}+x^{55}+x^{54}+x^{53}+x^{52}\\
&+x^{51}+x^{50}+x^{49}+x^{48}+x^{46}+x^{45}+x^{44}+x^{43}+x^{39}+x^{38}+x^{37}\\
&+x^{36}+x^{35}+x^{34}+x^{33}+x^{32}+x^{30}+x^{29}+x^{28}+x^{27}+x^{23}+x^{22}\\
&+x^{21}+x^{20}+x^{19}+x^{18}+x^{17}+x^{16}+x^{14}+x^{13}+x^{12},\\
p_{12}(x) = {} & x^{147}+x^{142}+x^{141}+x^{140}+x^{139}+x^{135}+x^{134}+x^{133}+x^{132}+x^{131}\\
&+x^{130}+x^{129}+x^{128}+x^{127}+x^{126}+x^{125}+x^{124}+x^{123}+x^{122}\\
&+x^{121}+x^{120}+x^{119}+x^{118}+x^{117}+x^{116}+x^{115}+x^{114}+x^{113}\\
&+x^{112}+x^{110}+x^{109}+x^{108}+x^{107}+x^{103}+x^{102}+x^{101}+x^{100}\\
&+x^{98}+x^{97}+x^{96}+x^{95}+x^{90}+x^{89}+x^{88}+x^{79}+x^{74}+x^{73}+x^{72}\\
&+x^{63}+x^{58}+x^{57}+x^{56}+x^{47}+x^{42}+x^{41}+x^{40}+x^{31}+x^{26}+x^{25}
\end{aligned}
$$

$$+ x^{24} + x^{19} + x^{15} + x^{14} + x^{13} + x^{12} + x^{11} + x^{10} + x^{9} + x^{8} + x^{7} + x^{6} + x^{5} + x^{4} + x^{2} + x + 1,$$

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

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

$$\begin{aligned}
p_0(x) = {} & x^{156} + x^{150} + x^{148} + x^{147} + x^{142} + x^{140} + x^{139} + x^{138} + x^{137} + x^{135} \\
& + x^{133} + x^{132} + x^{131} + x^{130} + x^{129} + x^{128} + x^{127} + x^{121} + x^{118} \\
& + x^{113} + x^{112} + x^{110} + x^{108} + x^{105} + x^{103} + x^{101} + x^{99} + x^{98} + x^{97} \\
& + x^{95} + x^{90} + x^{88} + x^{87} + x^{83} + x^{82} + x^{78} + x^{74} + x^{73} + x^{72} + x^{70} \\
& + x^{68} + x^{66} + x^{65} + x^{63} + x^{62} + x^{61} + x^{59} + x^{58} + x^{56} + x^{54} + x^{53} \\
& + x^{52} + x^{50} + x^{47} + x^{46} + x^{39}, \\
p_3(x) = {} & x^{138} + x^{137} + x^{136} + x^{134} + x^{132} + x^{131} + x^{130} + x^{129} + x^{126} + x^{119} \\
& + x^{118} + x^{117} + x^{116} + x^{113} + x^{111} + x^{110} + x^{107} + x^{103} + x^{102} \\
& + x^{101} + x^{100} + x^{97} + x^{95} + x^{94} + x^{91} + x^{90} + x^{89} + x^{88} + x^{87} + x^{85} \\
& + x^{83} + x^{82} + x^{79} + x^{75} + x^{74} + x^{73} + x^{72} + x^{70} + x^{68} + x^{67} + x^{64} \\
& + x^{60} + x^{59} + x^{58} + x^{57} + x^{55} + x^{53} + x^{52} + x^{50} + x^{48} + x^{46} + x^{45} \\
& + x^{41} + x^{40} + x^{37} + x^{34} + x^{31} + x^{27}, \\
p_6(x) = {} & x^{144} + x^{142} + x^{140} + x^{136} + x^{132} + x^{130} + x^{128} + x^{126} + x^{120} + x^{108} \\
& + x^{104} + x^{98} + x^{94} + x^{90} + x^{80} + x^{78} + x^{74} + x^{72} + x^{70} + x^{68} + x^{66} \\
& + x^{64} + x^{54} + x^{50} + x^{36} + x^{34} + x^{32} + x^{26} + x^{22} + x^{18}, \\
p_9(x) = {} & x^{150} + x^{149} + x^{147} + x^{146} + x^{145} + x^{144} + x^{143} + x^{141} + x^{140} + x^{134} \\
& + x^{131} + x^{128} + x^{125} + x^{121} + x^{118} + x^{117} + x^{115} + x^{114} + x^{113} \\
& + x^{112} + x^{111} + x^{109} + x^{108} + x^{101} + x^{98} + x^{97} + x^{95} + x^{92} + x^{89} \\
& + x^{85} + x^{82} + x^{81} + x^{79} + x^{76} + x^{73} + x^{69} + x^{66} + x^{65} + x^{63} + x^{60} \\
& + x^{57} + x^{53} + x^{50} + x^{49} + x^{47} + x^{44} + x^{41} + x^{37} + x^{34} + x^{33} + x^{31} \\
& + x^{28} + x^{25} + x^{22} + x^{19} + x^{16} + x^{13} + x^{9}, \\
p_{12}(x) = {} & x^{156} + x^{152} + x^{148} + x^{140} + x^{132} + x^{128} + x^{124} + x^{112} + x^{104} + x^{96} \\
& + x^{84} + x^{68} + x^{52} + x^{36} + x^{28} + x^{24} + x^{8} + x^{4} + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) = {} & x^{152} + x^{146} + x^{143} + x^{140} + x^{138} + x^{136} + x^{134} + x^{133} + x^{131} + x^{130} \\
& + x^{129} + x^{128} + x^{127} + x^{124} + x^{123} + x^{121} + x^{120} + x^{119} + x^{118} \\
& + x^{117} + x^{116} + x^{112} + x^{111} + x^{110} + x^{109} + x^{105} + x^{104} + x^{100} \\
& + x^{99} + x^{96} + x^{95} + x^{93} + x^{92} + x^{90} + x^{89} + x^{88} + x^{87} + x^{85} + x^{84} \\
& + x^{82} + x^{81} + x^{80} + x^{73} + x^{71} + x^{68} + x^{66} + x^{65} + x^{64} + x^{63} + x^{61} \\
& + x^{59} + x^{58} + x^{55} + x^{52} + x^{51} + x^{50} + x^{49} + x^{46} + x^{44} + x^{43} + x^{39},
\end{aligned}$$

$$\begin{aligned}
p_3(x) &= x^{134} + x^{133} + x^{132} + x^{130} + x^{128} + x^{127} + x^{124} + x^{120} + x^{119} + x^{116}\\
&\quad + x^{115} + x^{112} + x^{111} + x^{108} + x^{107} + x^{104} + x^{103} + x^{100} + x^{99} + x^{96}\\
&\quad + x^{95} + x^{92} + x^{91} + x^{88} + x^{87} + x^{86} + x^{85} + x^{83} + x^{82} + x^{75} + x^{70}\\
&\quad + x^{69} + x^{68} + x^{66} + x^{64} + x^{63} + x^{62} + x^{61} + x^{58} + x^{51} + x^{46} + x^{45}\\
&\quad + x^{44} + x^{42} + x^{40} + x^{39} + x^{38} + x^{37} + x^{34} + x^{27},\\
p_6(x) &= x^{140} + x^{138} + x^{136} + x^{130} + x^{126} + x^{124} + x^{120} + x^{114} + x^{110} + x^{106}\\
&\quad + x^{104} + x^{102} + x^{100} + x^{96} + x^{92} + x^{90} + x^{88} + x^{86} + x^{80} + x^{76} + x^{74}\\
&\quad + x^{72} + x^{68} + x^{66} + x^{64} + x^{62} + x^{60} + x^{58} + x^{56} + x^{54} + x^{46} + x^{44}\\
&\quad + x^{38} + x^{32} + x^{26} + x^{18},\\
p_9(x) &= x^{146} + x^{145} + x^{143} + x^{142} + x^{141} + x^{140} + x^{139} + x^{138} + x^{136} + x^{135}\\
&\quad + x^{134} + x^{133} + x^{132} + x^{131} + x^{128} + x^{121} + x^{114} + x^{113} + x^{111}\\
&\quad + x^{110} + x^{109} + x^{108} + x^{107} + x^{106} + x^{104} + x^{103} + x^{102} + x^{101}\\
&\quad + x^{100} + x^{99} + x^{98} + x^{97} + x^{96} + x^{95} + x^{94} + x^{93} + x^{92} + x^{91} + x^{90}\\
&\quad + x^{89} + x^{88} + x^{87} + x^{86} + x^{85} + x^{84} + x^{83} + x^{82} + x^{81} + x^{80} + x^{79}\\
&\quad + x^{78} + x^{77} + x^{76} + x^{75} + x^{74} + x^{73} + x^{72} + x^{71} + x^{70} + x^{69} + x^{68}\\
&\quad + x^{67} + x^{66} + x^{65} + x^{64} + x^{63} + x^{62} + x^{61} + x^{60} + x^{59} + x^{58} + x^{57}\\
&\quad + x^{56} + x^{55} + x^{54} + x^{53} + x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{47} + x^{46}\\
&\quad + x^{45} + x^{44} + x^{43} + x^{42} + x^{41} + x^{40} + x^{39} + x^{38} + x^{37} + x^{36} + x^{35}\\
&\quad + x^{34} + x^{33} + x^{32} + x^{31} + x^{30} + x^{29} + x^{28} + x^{27} + x^{26} + x^{25} + x^{24}\\
&\quad + x^{23} + x^{22} + x^{21} + x^{20} + x^{19} + x^{16} + x^{9},\\
p_{12}(x) &= x^{152} + x^{148} + x^{140} + x^{136} + x^{116} + x^{112} + x^{108} + x^{100} + x^{92} + x^{88}\\
&\quad + x^{84} + x^{80} + x^{76} + x^{72} + x^{68} + x^{64} + x^{60} + x^{56} + x^{52} + x^{48} + x^{44}\\
&\quad + x^{40} + x^{36} + x^{32} + x^{28} + x^{16} + x^{8} + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{147} + x^{142} + x^{141} + x^{140} + x^{139} + x^{137} + x^{135} + x^{132} + x^{131} + x^{125}\\
&\quad + x^{124} + x^{123} + x^{122} + x^{121} + x^{120} + x^{119} + x^{118} + x^{116} + x^{115}\\
&\quad + x^{112} + x^{110} + x^{107} + x^{103} + x^{100} + x^{99} + x^{98} + x^{95} + x^{92} + x^{91}\\
&\quad + x^{89} + x^{87} + x^{86} + x^{84} + x^{83} + x^{79} + x^{77} + x^{72} + x^{70} + x^{69} + x^{68}\\
&\quad + x^{67} + x^{64} + x^{63} + x^{61} + x^{59} + x^{58} + x^{56} + x^{48} + x^{47} + x^{46} + x^{45}\\
&\quad + x^{43} + x^{42},\\
p_3(x) &= x^{139} + x^{135} + x^{134} + x^{133} + x^{132} + x^{130} + x^{128} + x^{126} + x^{121} + x^{120}\\
&\quad + x^{119} + x^{118} + x^{116} + x^{115} + x^{112} + x^{110} + x^{109} + x^{108} + x^{107}\\
&\quad + x^{106} + x^{105} + x^{104} + x^{100} + x^{98} + x^{97} + x^{96} + x^{95} + x^{90} + x^{87}\\
&\quad + x^{86} + x^{85} + x^{84} + x^{81} + x^{75} + x^{72} + x^{71} + x^{70} + x^{68} + x^{63} + x^{60}
\end{aligned}$$

$$
\begin{aligned}
&+ x^{59} + x^{57} + x^{56} + x^{55} + x^{53} + x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{46} \\
&+ x^{45} + x^{44} + x^{42} + x^{41} + x^{39} + x^{38} + x^{37} + x^{36} + x^{33} + x^{32} + x^{29} \\
&+ x^{27} + x^{26}, \\
p_6(x) = {}& x^{137} + x^{134} + x^{133} + x^{130} + x^{128} + x^{123} + x^{122} + x^{121} + x^{119} + x^{116} \\
&+ x^{115} + x^{114} + x^{113} + x^{107} + x^{105} + x^{103} + x^{101} + x^{100} + x^{98} + x^{97} \\
&+ x^{96} + x^{95} + x^{93} + x^{92} + x^{90} + x^{87} + x^{85} + x^{83} + x^{82} + x^{81} + x^{80} \\
&+ x^{76} + x^{75} + x^{72} + x^{69} + x^{68} + x^{66} + x^{65} + x^{64} + x^{63} + x^{62} + x^{61} \\
&+ x^{60} + x^{59} + x^{58} + x^{57} + x^{54} + x^{51} + x^{47} + x^{46} + x^{44} + x^{43} + x^{42} \\
&+ x^{41} + x^{39} + x^{38} + x^{37} + x^{36} + x^{35} + x^{33} + x^{32} + x^{31} + x^{29} + x^{28} \\
&+ x^{27} + x^{26} + x^{23} + x^{22} + x^{18} + x^{16} + x^{14} + x^{11} + x^{10} + x^{9} + x^{8} + x^{7} \\
&+ x^{6} + x^{5} + x^{4} + x^{2} + x + 1, \\
p_9(x) = {}& x^{139} + x^{135} + x^{134} + x^{133} + x^{132} + x^{131} + x^{130} + x^{129} + x^{128} + x^{126} \\
&+ x^{125} + x^{124} + x^{107} + x^{103} + x^{102} + x^{101} + x^{100} + x^{99} + x^{98} + x^{97} \\
&+ x^{96} + x^{94} + x^{93} + x^{92} + x^{91} + x^{87} + x^{86} + x^{85} + x^{84} + x^{83} + x^{82} \\
&+ x^{81} + x^{80} + x^{78} + x^{77} + x^{76} + x^{75} + x^{71} + x^{70} + x^{69} + x^{68} + x^{67} \\
&+ x^{66} + x^{65} + x^{64} + x^{62} + x^{61} + x^{60} + x^{59} + x^{55} + x^{54} + x^{53} + x^{52} \\
&+ x^{51} + x^{50} + x^{49} + x^{48} + x^{46} + x^{45} + x^{44} + x^{43} + x^{39} + x^{38} + x^{37} \\
&+ x^{36} + x^{35} + x^{34} + x^{33} + x^{32} + x^{30} + x^{29} + x^{28} + x^{27} + x^{23} + x^{22} \\
&+ x^{21} + x^{20} + x^{19} + x^{18} + x^{17} + x^{16} + x^{14} + x^{13} + x^{12}, \\
p_{12}(x) = {}& x^{147} + x^{142} + x^{141} + x^{140} + x^{139} + x^{135} + x^{134} + x^{133} + x^{132} + x^{131} \\
&+ x^{130} + x^{129} + x^{128} + x^{127} + x^{126} + x^{125} + x^{124} + x^{123} + x^{122} \\
&+ x^{121} + x^{120} + x^{119} + x^{118} + x^{117} + x^{116} + x^{115} + x^{114} + x^{113} \\
&+ x^{112} + x^{110} + x^{109} + x^{108} + x^{107} + x^{103} + x^{102} + x^{101} + x^{100} \\
&+ x^{98} + x^{97} + x^{96} + x^{95} + x^{90} + x^{89} + x^{88} + x^{79} + x^{74} + x^{73} + x^{72} \\
&+ x^{63} + x^{58} + x^{57} + x^{56} + x^{47} + x^{42} + x^{41} + x^{40} + x^{31} + x^{26} + x^{25} \\
&+ x^{24} + x^{19} + x^{15} + x^{14} + x^{13} + x^{12} + x^{11} + x^{10} + x^{9} + x^{8} + x^{7} + x^{6} \\
&+ x^{5} + x^{4} + x^{2} + x + 1,
\end{aligned}
$$

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

$$
\begin{aligned}
p_0(x) = {}& x^{147} + x^{142} + x^{141} + x^{140} + x^{137} + x^{135} + x^{134} + x^{131} + x^{129} + x^{128} \\
&+ x^{127} + x^{126} + x^{125} + x^{120} + x^{116} + x^{113} + x^{102} + x^{100} + x^{99} + x^{98} \\
&+ x^{96} + x^{94} + x^{93} + x^{91} + x^{87} + x^{83} + x^{82} + x^{81} + x^{79} + x^{77} + x^{70} \\
&+ x^{69} + x^{68} + x^{66} + x^{63} + x^{62} + x^{60} + x^{59} + x^{56} + x^{54} + x^{51} + x^{47} \\
&+ x^{45} + x^{44} + x^{43} + x^{41} + x^{39} + x^{37} + x^{36}, \\
p_3(x) = {}& x^{139} + x^{135} + x^{134} + x^{133} + x^{132} + x^{131} + x^{130} + x^{128} + x^{127} + x^{124}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{122} + x^{120} + x^{119} + x^{116} + x^{114} + x^{111} + x^{108} + x^{107} + x^{106}\\
&+ x^{105} + x^{102} + x^{100} + x^{99} + x^{97} + x^{94} + x^{93} + x^{90} + x^{88} + x^{87} + x^{85}\\
&+ x^{84} + x^{82} + x^{81} + x^{80} + x^{77} + x^{76} + x^{75} + x^{74} + x^{73} + x^{71} + x^{70}\\
&+ x^{68} + x^{67} + x^{62} + x^{58} + x^{56} + x^{53} + x^{50} + x^{47} + x^{46} + x^{44} + x^{41}\\
&+ x^{39} + x^{32} + x^{28} + x^{27} + x^{25} + x^{24},\\
p_6(x) = &\, x^{139} + x^{137} + x^{133} + x^{132} + x^{130} + x^{129} + x^{126} + x^{125} + x^{124} + x^{122}\\
&+ x^{119} + x^{118} + x^{116} + x^{115} + x^{113} + x^{112} + x^{108} + x^{107} + x^{106}\\
&+ x^{105} + x^{102} + x^{97} + x^{90} + x^{89} + x^{85} + x^{84} + x^{82} + x^{77} + x^{76} + x^{73}\\
&+ x^{69} + x^{68} + x^{67} + x^{66} + x^{65} + x^{64} + x^{63} + x^{61} + x^{58} + x^{57} + x^{56}\\
&+ x^{54} + x^{53} + x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{47} + x^{46} + x^{44} + x^{42}\\
&+ x^{37} + x^{36} + x^{33} + x^{32} + x^{31} + x^{30} + x^{27} + x^{26} + x^{23} + x^{22} + x^{21}\\
&+ x^{18} + x^{17} + x^{13} + x^{12} + x^{11} + x^{10} + x^{9} + x^{8} + x^{7} + x^{6} + x^{5} + x^{4}\\
&+ x^{2} + x + 1,\\
p_9(x) = &\, x^{139} + x^{135} + x^{134} + x^{133} + x^{132} + x^{131} + x^{130} + x^{129} + x^{128} + x^{126}\\
&+ x^{125} + x^{124} + x^{107} + x^{103} + x^{102} + x^{101} + x^{100} + x^{99} + x^{98} + x^{97}\\
&+ x^{96} + x^{94} + x^{93} + x^{92} + x^{91} + x^{87} + x^{86} + x^{85} + x^{84} + x^{83} + x^{82}\\
&+ x^{81} + x^{80} + x^{78} + x^{77} + x^{76} + x^{75} + x^{71} + x^{70} + x^{69} + x^{68} + x^{67}\\
&+ x^{66} + x^{65} + x^{64} + x^{62} + x^{61} + x^{60} + x^{59} + x^{55} + x^{54} + x^{53} + x^{52}\\
&+ x^{51} + x^{50} + x^{49} + x^{48} + x^{46} + x^{45} + x^{44} + x^{43} + x^{39} + x^{38} + x^{37}\\
&+ x^{36} + x^{35} + x^{34} + x^{33} + x^{32} + x^{30} + x^{29} + x^{28} + x^{27} + x^{23} + x^{22}\\
&+ x^{21} + x^{20} + x^{19} + x^{18} + x^{17} + x^{16} + x^{14} + x^{13} + x^{12},\\
p_{12}(x) = &\, x^{147} + x^{142} + x^{141} + x^{140} + x^{139} + x^{135} + x^{134} + x^{133} + x^{132} + x^{131}\\
&+ x^{130} + x^{129} + x^{128} + x^{127} + x^{126} + x^{125} + x^{124} + x^{123} + x^{122}\\
&+ x^{121} + x^{120} + x^{119} + x^{118} + x^{117} + x^{116} + x^{115} + x^{114} + x^{113}\\
&+ x^{112} + x^{110} + x^{109} + x^{108} + x^{107} + x^{103} + x^{102} + x^{101} + x^{100}\\
&+ x^{98} + x^{97} + x^{96} + x^{95} + x^{90} + x^{89} + x^{88} + x^{79} + x^{74} + x^{73} + x^{72}\\
&+ x^{63} + x^{58} + x^{57} + x^{56} + x^{47} + x^{42} + x^{41} + x^{40} + x^{31} + x^{26} + x^{25}\\
&+ x^{24} + x^{19} + x^{15} + x^{14} + x^{13} + x^{12} + x^{11} + x^{10} + x^{9} + x^{8} + x^{7} + x^{6}\\
&+ x^{5} + x^{4} + x^{2} + x + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) = &\, x^{152} + x^{146} + x^{143} + x^{140} + x^{138} + x^{136} + x^{134} + x^{133} + x^{131} + x^{130}\\
&+ x^{129} + x^{128} + x^{127} + x^{124} + x^{123} + x^{121} + x^{120} + x^{119} + x^{118}\\
&+ x^{117} + x^{116} + x^{112} + x^{111} + x^{110} + x^{109} + x^{105} + x^{104} + x^{100}\\
&+ x^{99} + x^{96} + x^{95} + x^{93} + x^{92} + x^{90} + x^{89} + x^{88} + x^{87} + x^{85} + x^{84}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{82} + x^{81} + x^{80} + x^{73} + x^{71} + x^{68} + x^{66} + x^{65} + x^{64} + x^{63} + x^{61} \\
&+ x^{59} + x^{58} + x^{55} + x^{52} + x^{51} + x^{50} + x^{49} + x^{46} + x^{44} + x^{43} + x^{39}, \\
p_3(x) &= x^{134} + x^{133} + x^{132} + x^{130} + x^{128} + x^{127} + x^{124} + x^{120} + x^{119} + x^{116} \\
&+ x^{115} + x^{112} + x^{111} + x^{108} + x^{107} + x^{104} + x^{103} + x^{100} + x^{99} + x^{96} \\
&+ x^{95} + x^{92} + x^{91} + x^{88} + x^{87} + x^{86} + x^{85} + x^{83} + x^{82} + x^{75} + x^{70} \\
&+ x^{69} + x^{68} + x^{66} + x^{64} + x^{63} + x^{62} + x^{61} + x^{58} + x^{51} + x^{46} + x^{45} \\
&+ x^{44} + x^{42} + x^{40} + x^{39} + x^{38} + x^{37} + x^{34} + x^{27}, \\
p_6(x) &= x^{140} + x^{138} + x^{136} + x^{130} + x^{126} + x^{124} + x^{120} + x^{114} + x^{110} + x^{106} \\
&+ x^{104} + x^{102} + x^{100} + x^{96} + x^{92} + x^{90} + x^{88} + x^{86} + x^{80} + x^{76} + x^{74} \\
&+ x^{72} + x^{68} + x^{66} + x^{64} + x^{62} + x^{60} + x^{58} + x^{56} + x^{54} + x^{46} + x^{44} \\
&+ x^{38} + x^{32} + x^{26} + x^{18}, \\
p_9(x) &= x^{146} + x^{145} + x^{143} + x^{142} + x^{141} + x^{140} + x^{139} + x^{138} + x^{136} + x^{135} \\
&+ x^{134} + x^{133} + x^{132} + x^{131} + x^{128} + x^{121} + x^{114} + x^{113} + x^{111} \\
&+ x^{110} + x^{109} + x^{108} + x^{107} + x^{106} + x^{104} + x^{103} + x^{102} + x^{101} \\
&+ x^{100} + x^{99} + x^{98} + x^{97} + x^{96} + x^{95} + x^{94} + x^{93} + x^{92} + x^{91} + x^{90} \\
&+ x^{89} + x^{88} + x^{87} + x^{86} + x^{85} + x^{84} + x^{83} + x^{82} + x^{81} + x^{80} + x^{79} \\
&+ x^{78} + x^{77} + x^{76} + x^{75} + x^{74} + x^{73} + x^{72} + x^{71} + x^{70} + x^{69} + x^{68} \\
&+ x^{67} + x^{66} + x^{65} + x^{64} + x^{63} + x^{62} + x^{61} + x^{60} + x^{59} + x^{58} + x^{57} \\
&+ x^{56} + x^{55} + x^{54} + x^{53} + x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{47} + x^{46} \\
&+ x^{45} + x^{44} + x^{43} + x^{42} + x^{41} + x^{40} + x^{39} + x^{38} + x^{37} + x^{36} + x^{35} \\
&+ x^{34} + x^{33} + x^{32} + x^{31} + x^{30} + x^{29} + x^{28} + x^{27} + x^{26} + x^{25} + x^{24} \\
&+ x^{23} + x^{22} + x^{21} + x^{20} + x^{19} + x^{16} + x^{9}, \\
p_{12}(x) &= x^{152} + x^{148} + x^{140} + x^{136} + x^{116} + x^{112} + x^{108} + x^{100} + x^{92} + x^{88} \\
&+ x^{84} + x^{80} + x^{76} + x^{72} + x^{68} + x^{64} + x^{60} + x^{56} + x^{52} + x^{48} + x^{44} \\
&+ x^{40} + x^{36} + x^{32} + x^{28} + x^{16} + x^{8} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{156} + x^{150} + x^{148} + x^{147} + x^{142} + x^{140} + x^{139} + x^{138} + x^{137} + x^{135} \\
&+ x^{133} + x^{132} + x^{131} + x^{130} + x^{129} + x^{128} + x^{127} + x^{121} + x^{118} \\
&+ x^{113} + x^{112} + x^{110} + x^{108} + x^{105} + x^{103} + x^{101} + x^{99} + x^{98} + x^{97} \\
&+ x^{95} + x^{90} + x^{88} + x^{87} + x^{83} + x^{82} + x^{78} + x^{74} + x^{73} + x^{72} + x^{70} \\
&+ x^{68} + x^{66} + x^{65} + x^{63} + x^{62} + x^{61} + x^{59} + x^{58} + x^{56} + x^{54} + x^{53} \\
&+ x^{52} + x^{50} + x^{47} + x^{46} + x^{39}, \\
p_3(x) &= x^{138} + x^{137} + x^{136} + x^{134} + x^{132} + x^{131} + x^{130} + x^{129} + x^{126} + x^{119} \\
&+ x^{118} + x^{117} + x^{116} + x^{113} + x^{111} + x^{110} + x^{107} + x^{103} + x^{102}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{101} + x^{100} + x^{97} + x^{95} + x^{94} + x^{91} + x^{90} + x^{89} + x^{88} + x^{87} + x^{85}\\
&+ x^{83} + x^{82} + x^{79} + x^{75} + x^{74} + x^{73} + x^{72} + x^{70} + x^{68} + x^{67} + x^{64}\\
&+ x^{60} + x^{59} + x^{58} + x^{57} + x^{55} + x^{53} + x^{52} + x^{50} + x^{48} + x^{46} + x^{45}\\
&+ x^{41} + x^{40} + x^{37} + x^{34} + x^{31} + x^{27},\\
p_6(x) &= x^{144} + x^{142} + x^{140} + x^{136} + x^{132} + x^{130} + x^{128} + x^{126} + x^{120} + x^{108}\\
&+ x^{104} + x^{98} + x^{94} + x^{90} + x^{80} + x^{78} + x^{74} + x^{72} + x^{70} + x^{68} + x^{66}\\
&+ x^{64} + x^{54} + x^{50} + x^{36} + x^{34} + x^{32} + x^{26} + x^{22} + x^{18},\\
p_9(x) &= x^{150} + x^{149} + x^{147} + x^{146} + x^{145} + x^{144} + x^{143} + x^{141} + x^{140} + x^{134}\\
&+ x^{131} + x^{128} + x^{125} + x^{121} + x^{118} + x^{117} + x^{115} + x^{114} + x^{113}\\
&+ x^{112} + x^{111} + x^{109} + x^{108} + x^{101} + x^{98} + x^{97} + x^{95} + x^{92} + x^{89}\\
&+ x^{85} + x^{82} + x^{81} + x^{79} + x^{76} + x^{73} + x^{69} + x^{66} + x^{65} + x^{63} + x^{60}\\
&+ x^{57} + x^{53} + x^{50} + x^{49} + x^{47} + x^{44} + x^{41} + x^{37} + x^{34} + x^{33} + x^{31}\\
&+ x^{28} + x^{25} + x^{22} + x^{19} + x^{16} + x^{13} + x^{9},\\
p_{12}(x) &= x^{156} + x^{152} + x^{148} + x^{140} + x^{132} + x^{128} + x^{124} + x^{112} + x^{104} + x^{96}\\
&+ x^{84} + x^{68} + x^{52} + x^{36} + x^{28} + x^{24} + x^{8} + x^{4} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{147} + x^{142} + x^{141} + x^{140} + x^{139} + x^{137} + x^{135} + x^{132} + x^{131} + x^{125}\\
&+ x^{124} + x^{123} + x^{122} + x^{121} + x^{120} + x^{119} + x^{118} + x^{116} + x^{115}\\
&+ x^{112} + x^{110} + x^{107} + x^{103} + x^{100} + x^{99} + x^{98} + x^{95} + x^{92} + x^{91}\\
&+ x^{89} + x^{87} + x^{86} + x^{84} + x^{83} + x^{79} + x^{77} + x^{72} + x^{70} + x^{69} + x^{68}\\
&+ x^{67} + x^{64} + x^{63} + x^{61} + x^{59} + x^{58} + x^{56} + x^{48} + x^{47} + x^{46} + x^{45}\\
&+ x^{43} + x^{42},\\
p_3(x) &= x^{139} + x^{135} + x^{134} + x^{133} + x^{132} + x^{130} + x^{128} + x^{126} + x^{121} + x^{120}\\
&+ x^{119} + x^{118} + x^{116} + x^{115} + x^{112} + x^{110} + x^{109} + x^{108} + x^{107}\\
&+ x^{106} + x^{105} + x^{104} + x^{100} + x^{98} + x^{97} + x^{96} + x^{95} + x^{90} + x^{87}\\
&+ x^{86} + x^{85} + x^{84} + x^{81} + x^{75} + x^{72} + x^{71} + x^{70} + x^{68} + x^{63} + x^{60}\\
&+ x^{59} + x^{57} + x^{56} + x^{55} + x^{53} + x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{46}\\
&+ x^{45} + x^{44} + x^{42} + x^{41} + x^{39} + x^{38} + x^{37} + x^{36} + x^{33} + x^{32} + x^{29}\\
&+ x^{27} + x^{26},\\
p_6(x) &= x^{137} + x^{134} + x^{133} + x^{130} + x^{128} + x^{123} + x^{122} + x^{121} + x^{119} + x^{116}\\
&+ x^{115} + x^{114} + x^{113} + x^{107} + x^{105} + x^{103} + x^{101} + x^{100} + x^{98} + x^{97}\\
&+ x^{96} + x^{95} + x^{93} + x^{92} + x^{90} + x^{87} + x^{85} + x^{83} + x^{82} + x^{81} + x^{80}\\
&+ x^{76} + x^{75} + x^{72} + x^{69} + x^{68} + x^{66} + x^{65} + x^{64} + x^{63} + x^{62} + x^{61}\\
&+ x^{60} + x^{59} + x^{58} + x^{57} + x^{54} + x^{51} + x^{47} + x^{46} + x^{44} + x^{43} + x^{42}
\end{aligned}
$$

$$+ x^{41} + x^{39} + x^{38} + x^{37} + x^{36} + x^{35} + x^{33} + x^{32} + x^{31} + x^{29} + x^{28}$$
$$+ x^{27} + x^{26} + x^{23} + x^{22} + x^{18} + x^{16} + x^{14} + x^{11} + x^{10} + x^{9} + x^{8} + x^{7}$$
$$+ x^{6} + x^{5} + x^{4} + x^{2} + x + 1,$$
$$p_9(x) = x^{139} + x^{135} + x^{134} + x^{133} + x^{132} + x^{131} + x^{130} + x^{129} + x^{128} + x^{126}$$
$$+ x^{125} + x^{124} + x^{107} + x^{103} + x^{102} + x^{101} + x^{100} + x^{99} + x^{98} + x^{97}$$
$$+ x^{96} + x^{94} + x^{93} + x^{92} + x^{91} + x^{87} + x^{86} + x^{85} + x^{84} + x^{83} + x^{82}$$
$$+ x^{81} + x^{80} + x^{78} + x^{77} + x^{76} + x^{75} + x^{71} + x^{70} + x^{69} + x^{68} + x^{67}$$
$$+ x^{66} + x^{65} + x^{64} + x^{62} + x^{61} + x^{60} + x^{59} + x^{55} + x^{54} + x^{53} + x^{52}$$
$$+ x^{51} + x^{50} + x^{49} + x^{48} + x^{46} + x^{45} + x^{44} + x^{43} + x^{39} + x^{38} + x^{37}$$
$$+ x^{36} + x^{35} + x^{34} + x^{33} + x^{32} + x^{30} + x^{29} + x^{28} + x^{27} + x^{23} + x^{22}$$
$$+ x^{21} + x^{20} + x^{19} + x^{18} + x^{17} + x^{16} + x^{14} + x^{13} + x^{12},$$
$$p_{12}(x) = x^{147} + x^{142} + x^{141} + x^{140} + x^{139} + x^{135} + x^{134} + x^{133} + x^{132} + x^{131}$$
$$+ x^{130} + x^{129} + x^{128} + x^{127} + x^{126} + x^{125} + x^{124} + x^{123} + x^{122}$$
$$+ x^{121} + x^{120} + x^{119} + x^{118} + x^{117} + x^{116} + x^{115} + x^{114} + x^{113}$$
$$+ x^{112} + x^{110} + x^{109} + x^{108} + x^{107} + x^{103} + x^{102} + x^{101} + x^{100}$$
$$+ x^{98} + x^{97} + x^{96} + x^{95} + x^{90} + x^{89} + x^{88} + x^{79} + x^{74} + x^{73} + x^{72}$$
$$+ x^{63} + x^{58} + x^{57} + x^{56} + x^{47} + x^{42} + x^{41} + x^{40} + x^{31} + x^{26} + x^{25}$$
$$+ x^{24} + x^{19} + x^{15} + x^{14} + x^{13} + x^{12} + x^{11} + x^{10} + x^{9} + x^{8} + x^{7} + x^{6}$$
$$+ x^{5} + x^{4} + x^{2} + x + 1,$$

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

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

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

n	$\Lambda(n)$	n	$\Lambda(n)$	n	$\Lambda(n)$	n	$\Lambda(n)$
0	[1, 2]	1044	[1580, 778]	2088	[2888, 2146]	3132	[1404, 2195]
1	[3, 4]	1045	[490, 1570]	2089	[411, 2889]	3133	[3661, 1063]
2	[5, 6]	1046	[1690, 1691]	2090	[2714, 2341]	3134	[3662, 2724]
3	[7, 8]	1047	[1692, 1693]	2091	[986, 2759]	3135	[2339, 3663]
4	[9, 10]	1048	[1694, 1695]	2092	[2509, 2890]	3136	[3664, 3665]
5	[11, 12]	1049	[1696, 1697]	2093	[2891, 895]	3137	[2162, 1342]
6	[13, 14]	1050	[1698, 1699]	2094	[88, 2182]	3138	[3516, 2138]
7	[15, 16]	1051	[1700, 13]	2095	[1112, 2892]	3139	[2258, 27]
8	[17, 18]	1052	[1701, 1702]	2096	[2308, 2893]	3140	[1156, 369]
9	[19, 20]	1053	[1703, 1704]	2097	[358, 1022]	3141	[2569, 3666]
10	[21, 22]	1054	[1705, 1706]	2098	[2894, 852]	3142	[2118, 2821]
11	[23, 24]	1055	[156, 1707]	2099	[2895, 2896]	3143	[3667, 3668]
12	[25, 26]	1056	[610, 465]	2100	[909, 2897]	3144	[2746, 2154]
13	[27, 28]	1057	[59, 1629]	2101	[2898, 921]	3145	[858, 1277]
14	[29, 30]	1058	[1708, 1709]	2102	[981, 2899]	3146	[2789, 3669]

15	[31, 32]	1059	[1653, 1710]	2103	[1281, 2900]	3147	[3670, 3605]
16	[33, 34]	1060	[1711, 1712]	2104	[2901, 2902]	3148	[862, 1009]
17	[35, 36]	1061	[1713, 1714]	2105	[2903, 2713]	3149	[841, 2355]
18	[37, 38]	1062	[1715, 1716]	2106	[2904, 426]	3150	[3671, 2383]
19	[39, 8]	1063	[1717, 1718]	2107	[1176, 2905]	3151	[386, 3515]
20	[40, 41]	1064	[1676, 1637]	2108	[2906, 2445]	3152	[2162, 28]
21	[42, 43]	1065	[1608, 1512]	2109	[2907, 882]	3153	[3672, 3673]
22	[44, 45]	1066	[1719, 1720]	2110	[2908, 2818]	3154	[2410, 2158]
23	[46, 47]	1067	[1627, 1721]	2111	[1144, 2744]	3155	[937, 2395]
24	[48, 49]	1068	[1722, 1562]	2112	[311, 1197]	3156	[3674, 3675]
25	[50, 51]	1069	[197, 530]	2113	[2909, 417]	3157	[1152, 2328]
26	[52, 53]	1070	[191, 1723]	2114	[1333, 2910]	3158	[3676, 3677]
27	[54, 55]	1071	[1724, 1725]	2115	[1013, 2911]	3159	[80, 3544]
28	[56, 57]	1072	[508, 1419]	2116	[2912, 2913]	3160	[3678, 2755]
29	[58, 59]	1073	[43, 1726]	2117	[2914, 155]	3161	[3679, 2717]
30	[60, 61]	1074	[1727, 614]	2118	[2089, 226]	3162	[2363, 3626]
31	[62, 63]	1075	[1728, 1729]	2119	[1850, 2915]	3163	[3587, 3680]
32	[64, 65]	1076	[1730, 1731]	2120	[2916, 2917]	3164	[3681, 2416]
33	[66, 67]	1077	[1732, 569]	2121	[1955, 2012]	3165	[24, 2147]
34	[68, 69]	1078	[1733, 1734]	2122	[678, 1757]	3166	[1232, 866]
35	[70, 71]	1079	[529, 572]	2123	[2918, 1812]	3167	[3682, 2145]
36	[72, 73]	1080	[1724, 1735]	2124	[1744, 2919]	3168	[2278, 2884]
37	[74, 75]	1081	[1535, 1505]	2125	[2920, 2015]	3169	[2857, 3683]
38	[76, 77]	1082	[1736, 1737]	2126	[2921, 2922]	3170	[3628, 2124]
39	[78, 79]	1083	[1738, 1496]	2127	[1983, 1858]	3171	[3684, 2847]
40	[80, 81]	1084	[1739, 1740]	2128	[2923, 2924]	3172	[268, 387]
41	[82, 83]	1085	[711, 533]	2129	[2925, 1470]	3173	[3685, 1346]
42	[84, 85]	1086	[1741, 1742]	2130	[1505, 1864]	3174	[411, 2834]
43	[86, 87]	1087	[1743, 1744]	2131	[1675, 2926]	3175	[3686, 349]
44	[88, 89]	1088	[1745, 1746]	2132	[1503, 641]	3176	[101, 3687]
45	[89, 90]	1089	[1747, 1748]	2133	[2927, 2928]	3177	[1405, 2196]
46	[91, 92]	1090	[1749, 1750]	2134	[2929, 2930]	3178	[3688, 2194]
47	[93, 94]	1091	[1751, 1752]	2135	[2931, 2083]	3179	[1041, 2882]
48	[95, 96]	1092	[1753, 1754]	2136	[2932, 235]	3180	[3689, 2534]
49	[97, 98]	1093	[629, 1755]	2137	[1416, 1927]	3181	[2459, 3587]
50	[99, 100]	1094	[1756, 1757]	2138	[704, 2933]	3182	[2505, 1246]
51	[101, 102]	1095	[36, 1758]	2139	[1435, 1944]	3183	[3690, 3691]
52	[103, 104]	1096	[34, 500]	2140	[2934, 781]	3184	[3692, 1152]
53	[105, 106]	1097	[1759, 1760]	2141	[1466, 2081]	3185	[3693, 2771]
54	[107, 108]	1098	[1761, 1488]	2142	[2935, 599]	3186	[3694, 2523]
55	[109, 106]	1099	[1762, 1748]	2143	[1984, 1950]	3187	[1097, 3505]
56	[110, 111]	1100	[1763, 639]	2144	[2936, 1603]	3188	[3695, 1187]
57	[112, 113]	1101	[1764, 1493]	2145	[578, 2937]	3189	[1163, 3696]
58	[114, 115]	1102	[564, 1765]	2146	[228, 1604]	3190	[3697, 3698]

59	[116, 117]	1103	[1766, 1767]	2147	[47, 1471]	3191	[2651, 87]
60	[118, 119]	1104	[1768, 1769]	2148	[1546, 2938]	3192	[1139, 3699]
61	[120, 121]	1105	[1770, 1771]	2149	[1832, 148]	3193	[3700, 836]
62	[122, 123]	1106	[644, 1772]	2150	[2939, 1594]	3194	[855, 3701]
63	[124, 125]	1107	[1773, 1774]	2151	[2940, 1702]	3195	[2572, 3702]
64	[126, 127]	1108	[1775, 1776]	2152	[781, 2941]	3196	[3592, 2526]
65	[128, 129]	1109	[1777, 1778]	2153	[2942, 2943]	3197	[856, 3703]
66	[130, 43]	1110	[1779, 1780]	2154	[210, 2944]	3198	[3704, 964]
67	[131, 132]	1111	[40, 1572]	2155	[2945, 1699]	3199	[2440, 3705]
68	[133, 134]	1112	[762, 1781]	2156	[652, 2946]	3200	[3706, 3511]
69	[135, 136]	1113	[1734, 1782]	2157	[2947, 162]	3201	[3578, 3707]
70	[137, 138]	1114	[529, 817]	2158	[2948, 1706]	3202	[3708, 3709]
71	[47, 139]	1115	[1783, 1784]	2159	[1438, 2949]	3203	[3710, 3495]
72	[140, 141]	1116	[169, 1785]	2160	[2950, 224]	3204	[1078, 1112]
73	[142, 143]	1117	[463, 1786]	2161	[2951, 56]	3205	[2131, 3711]
74	[144, 145]	1118	[1787, 664]	2162	[2952, 204]	3206	[1403, 2358]
75	[146, 147]	1119	[1788, 1515]	2163	[2953, 2954]	3207	[91, 1203]
76	[148, 149]	1120	[1789, 1790]	2164	[1969, 1697]	3208	[2720, 2237]
77	[150, 151]	1121	[1791, 1792]	2165	[2955, 2070]	3209	[2764, 936]
78	[152, 153]	1122	[1766, 1793]	2166	[2956, 1653]	3210	[3712, 3528]
79	[154, 155]	1123	[1794, 685]	2167	[764, 2957]	3211	[3713, 104]
80	[156, 157]	1124	[1795, 1796]	2168	[1642, 2958]	3212	[1094, 2845]
81	[158, 159]	1125	[1797, 1798]	2169	[2959, 2960]	3213	[2371, 965]
82	[160, 161]	1126	[1799, 1800]	2170	[2961, 2962]	3214	[1356, 1276]
83	[162, 163]	1127	[1801, 1802]	2171	[2963, 2964]	3215	[3714, 3565]
84	[164, 165]	1128	[1803, 1804]	2172	[164, 529]	3216	[334, 3715]
85	[166, 167]	1129	[561, 1805]	2173	[2965, 1546]	3217	[3716, 2468]
86	[168, 169]	1130	[1806, 1807]	2174	[577, 2944]	3218	[3717, 2497]
87	[170, 171]	1131	[154, 1545]	2175	[2073, 2078]	3219	[3718, 2248]
88	[172, 173]	1132	[1808, 1809]	2176	[1987, 770]	3220	[3674, 3557]
89	[174, 175]	1133	[1810, 1811]	2177	[2966, 2967]	3221	[1039, 3719]
90	[176, 177]	1134	[1763, 815]	2178	[469, 2001]	3222	[1253, 3720]
91	[178, 179]	1135	[1457, 1812]	2179	[1583, 1648]	3223	[2649, 3721]
92	[180, 181]	1136	[740, 1446]	2180	[1947, 2941]	3224	[3656, 3722]
93	[182, 183]	1137	[1813, 769]	2181	[776, 2968]	3225	[3723, 2329]
94	[184, 185]	1138	[1814, 1815]	2182	[2969, 1754]	3226	[1029, 857]
95	[186, 187]	1139	[1816, 1817]	2183	[2970, 2971]	3227	[260, 3724]
96	[188, 189]	1140	[1726, 1818]	2184	[691, 2972]	3228	[437, 3725]
97	[190, 191]	1141	[1420, 812]	2185	[2973, 809]	3229	[3726, 1012]
98	[192, 193]	1142	[8, 757]	2186	[2086, 2974]	3230	[2312, 3571]
99	[142, 194]	1143	[1819, 1820]	2187	[2975, 820]	3231	[3727, 1091]
100	[195, 196]	1144	[1654, 636]	2188	[1524, 2976]	3232	[2187, 1122]
101	[143, 197]	1145	[1498, 1704]	2189	[504, 507]	3233	[2680, 3728]
102	[198, 199]	1146	[1821, 1822]	2190	[697, 1428]	3234	[3729, 2827]

103	[200, 201]	1147	[487, 599]	2191	[1447, 2977]	3235	[2879, 3730]
104	[202, 203]	1148	[1645, 1823]	2192	[2978, 1721]	3236	[2661, 3731]
105	[204, 205]	1149	[1824, 1531]	2193	[649, 2979]	3237	[3732, 345]
106	[206, 207]	1150	[730, 1825]	2194	[1420, 759]	3238	[3733, 2885]
107	[208, 209]	1151	[1826, 1827]	2195	[1788, 665]	3239	[3734, 2197]
108	[210, 211]	1152	[1489, 204]	2196	[2113, 2980]	3240	[2565, 2774]
109	[212, 159]	1153	[1728, 1828]	2197	[2981, 2982]	3241	[3735, 101]
110	[213, 214]	1154	[1829, 1830]	2198	[1853, 1680]	3242	[3736, 3737]
111	[215, 216]	1155	[1831, 1637]	2199	[179, 1437]	3243	[2146, 3738]
112	[217, 218]	1156	[1832, 695]	2200	[555, 2983]	3244	[920, 3739]
113	[219, 220]	1157	[1833, 1834]	2201	[2984, 2985]	3245	[1388, 3740]
114	[221, 222]	1158	[765, 1835]	2202	[2986, 2987]	3246	[2141, 925]
115	[223, 224]	1159	[1836, 695]	2203	[2988, 766]	3247	[2854, 1248]
116	[225, 226]	1160	[1837, 1838]	2204	[2989, 1749]	3248	[1400, 3503]
117	[227, 228]	1161	[1839, 1561]	2205	[124, 2990]	3249	[1348, 1120]
118	[229, 230]	1162	[1840, 777]	2206	[2991, 163]	3250	[2298, 1195]
119	[231, 232]	1163	[1756, 1459]	2207	[2992, 1905]	3251	[3672, 3573]
120	[233, 234]	1164	[1841, 1842]	2208	[1565, 2993]	3252	[3741, 2212]
121	[235, 222]	1165	[1745, 1843]	2209	[2083, 2994]	3253	[2602, 2656]
122	[236, 237]	1166	[1844, 1845]	2210	[2995, 2996]	3254	[3742, 86]
123	[238, 239]	1167	[1846, 51]	2211	[2997, 2998]	3255	[3743, 922]
124	[240, 241]	1168	[708, 1847]	2212	[1428, 2072]	3256	[1265, 980]
125	[242, 243]	1169	[1848, 1849]	2213	[511, 2999]	3257	[402, 1278]
126	[244, 245]	1170	[1850, 1659]	2214	[3000, 3001]	3258	[3744, 2913]
127	[246, 247]	1171	[1851, 1852]	2215	[1561, 2036]	3259	[2394, 3745]
128	[248, 249]	1172	[1853, 606]	2216	[2081, 2064]	3260	[3746, 1145]
129	[250, 251]	1173	[1814, 1854]	2217	[3002, 3003]	3261	[3747, 2485]
130	[252, 253]	1174	[1855, 1856]	2218	[1738, 1879]	3262	[2512, 1283]
131	[254, 255]	1175	[1857, 1858]	2219	[3004, 1610]	3263	[1401, 2797]
132	[256, 257]	1176	[1859, 1860]	2220	[3005, 2974]	3264	[3748, 861]
133	[258, 259]	1177	[1861, 1862]	2221	[3006, 1491]	3265	[2336, 2680]
134	[260, 261]	1178	[1863, 1539]	2222	[3007, 2976]	3266	[3749, 330]
135	[262, 263]	1179	[1538, 1864]	2223	[1554, 3008]	3267	[2564, 2367]
136	[264, 265]	1180	[1536, 1865]	2224	[658, 3009]	3268	[2641, 3655]
137	[266, 267]	1181	[1866, 769]	2225	[804, 3010]	3269	[3750, 2417]
138	[268, 269]	1182	[1867, 490]	2226	[3011, 3012]	3270	[1214, 2854]
139	[270, 271]	1183	[229, 1868]	2227	[1491, 3013]	3271	[3751, 3752]
140	[272, 273]	1184	[1869, 1870]	2228	[1690, 3014]	3272	[863, 3753]
141	[274, 275]	1185	[1852, 1871]	2229	[3015, 596]	3273	[1298, 3714]
142	[276, 73]	1186	[1872, 1873]	2230	[3016, 1755]	3274	[3754, 3755]
143	[277, 278]	1187	[1874, 1414]	2231	[1949, 1758]	3275	[2868, 2824]
144	[279, 280]	1188	[1875, 1712]	2232	[732, 1860]	3276	[2320, 3756]
145	[281, 282]	1189	[1456, 798]	2233	[2952, 824]	3277	[3757, 3758]
146	[283, 284]	1190	[1791, 1625]	2234	[609, 1644]	3278	[2403, 3759]

147	[285, 286]	1191	[671, 1876]	2235	[682, 2996]	3279	[3760, 2776]
148	[287, 288]	1192	[1877, 1878]	2236	[1486, 1547]	3280	[65, 2446]
149	[289, 290]	1193	[1647, 1584]	2237	[1678, 804]	3281	[2623, 119]
150	[291, 292]	1194	[1685, 216]	2238	[1613, 2982]	3282	[3761, 1191]
151	[293, 294]	1195	[187, 1879]	2239	[3017, 3018]	3283	[2880, 3762]
152	[295, 296]	1196	[1739, 1880]	2240	[3019, 3020]	3284	[3763, 832]
153	[297, 298]	1197	[1881, 1514]	2241	[3021, 3022]	3285	[1270, 3764]
154	[299, 300]	1198	[485, 1882]	2242	[3023, 682]	3286	[3765, 2522]
155	[301, 302]	1199	[1883, 1735]	2243	[1863, 1534]	3287	[1121, 1141]
156	[303, 304]	1200	[1884, 1612]	2244	[1534, 135]	3288	[3766, 390]
157	[305, 306]	1201	[815, 640]	2245	[3024, 3025]	3289	[2560, 2749]
158	[307, 308]	1202	[621, 643]	2246	[3026, 1652]	3290	[435, 3767]
159	[309, 310]	1203	[1671, 1885]	2247	[3027, 563]	3291	[2842, 3768]
160	[311, 312]	1204	[1886, 1887]	2248	[1444, 1823]	3292	[1000, 3769]
161	[313, 314]	1205	[1857, 1888]	2249	[3028, 3029]	3293	[3770, 2495]
162	[315, 316]	1206	[1889, 1475]	2250	[3030, 2924]	3294	[864, 2149]
163	[317, 30]	1207	[1591, 1890]	2251	[1642, 3031]	3295	[369, 268]
164	[318, 319]	1208	[1424, 1891]	2252	[544, 1935]	3296	[1243, 2732]
165	[320, 65]	1209	[1892, 1893]	2253	[3032, 3033]	3297	[390, 3751]
166	[321, 322]	1210	[1894, 1895]	2254	[465, 3034]	3298	[2514, 2628]
167	[323, 324]	1211	[1545, 539]	2255	[3035, 3036]	3299	[3549, 2643]
168	[325, 326]	1212	[1896, 1897]	2256	[182, 1667]	3300	[1223, 2471]
169	[327, 328]	1213	[773, 1898]	2257	[1615, 1825]	3301	[3771, 3772]
170	[329, 330]	1214	[1899, 1900]	2258	[3037, 3038]	3302	[1199, 1326]
171	[331, 332]	1215	[1579, 777]	2259	[3039, 3040]	3303	[265, 3773]
172	[333, 334]	1216	[1901, 183]	2260	[3041, 3042]	3304	[78, 1012]
173	[335, 336]	1217	[1902, 1565]	2261	[2980, 3043]	3305	[3561, 3715]
174	[337, 338]	1218	[467, 1903]	2262	[3044, 3045]	3306	[2632, 2279]
175	[339, 340]	1219	[1904, 1905]	2263	[3046, 3047]	3307	[1149, 1041]
176	[341, 342]	1220	[1906, 1630]	2264	[3048, 1683]	3308	[3718, 1036]
177	[343, 344]	1221	[1907, 1908]	2265	[3028, 1414]	3309	[2325, 2210]
178	[345, 346]	1222	[1909, 1627]	2266	[1686, 1616]	3310	[3774, 2409]
179	[347, 348]	1223	[818, 1910]	2267	[3049, 3050]	3311	[2508, 3604]
180	[349, 350]	1224	[1911, 1912]	2268	[1552, 1574]	3312	[285, 2763]
181	[351, 352]	1225	[1913, 1631]	2269	[3051, 3052]	3313	[16, 3775]
182	[353, 354]	1226	[1914, 1915]	2270	[3053, 3054]	3314	[3776, 1172]
183	[355, 356]	1227	[191, 1916]	2271	[223, 3055]	3315	[2673, 3777]
184	[357, 358]	1228	[1917, 1918]	2272	[3056, 3057]	3316	[2726, 2303]
185	[359, 360]	1229	[1919, 1920]	2273	[3058, 3059]	3317	[3778, 1150]
186	[361, 362]	1230	[635, 1655]	2274	[1864, 506]	3318	[2670, 3779]
187	[363, 364]	1231	[49, 1430]	2275	[180, 1964]	3319	[3780, 3781]
188	[365, 366]	1232	[1921, 1922]	2276	[1486, 2938]	3320	[3782, 3691]
189	[367, 368]	1233	[1923, 657]	2277	[1612, 1478]	3321	[3783, 374]
190	[369, 370]	1234	[1924, 1925]	2278	[1754, 3060]	3322	[3784, 2860]

191	[371, 335]	1235	[1639, 1926]	2279	[3007, 1525]	3323	[1014, 3527]
192	[372, 373]	1236	[1847, 661]	2280	[1960, 1959]	3324	[3785, 3786]
193	[374, 375]	1237	[532, 713]	2281	[3061, 1673]	3325	[3787, 2410]
194	[100, 376]	1238	[710, 711]	2282	[3062, 3063]	3326	[307, 3788]
195	[377, 378]	1239	[706, 710]	2283	[1864, 1536]	3327	[2678, 2828]
196	[378, 379]	1240	[1846, 142]	2284	[1536, 1526]	3328	[3789, 2132]
197	[380, 352]	1241	[1847, 532]	2285	[1537, 668]	3329	[425, 3790]
198	[381, 382]	1242	[531, 712]	2286	[506, 1865]	3330	[3791, 2431]
199	[383, 384]	1243	[51, 194]	2287	[3064, 1539]	3331	[1366, 423]
200	[385, 386]	1244	[231, 1927]	2288	[1992, 3065]	3332	[106, 3642]
201	[387, 388]	1245	[1412, 628]	2289	[1560, 2035]	3333	[2185, 3792]
202	[389, 390]	1246	[1588, 1928]	2290	[1838, 3066]	3334	[434, 3793]
203	[391, 392]	1247	[1929, 1575]	2291	[734, 3067]	3335	[1318, 2439]
204	[393, 394]	1248	[1900, 1930]	2292	[3068, 3069]	3336	[3794, 929]
205	[395, 396]	1249	[1931, 1932]	2293	[207, 3070]	3337	[3795, 2425]
206	[397, 398]	1250	[1566, 581]	2294	[1995, 1975]	3338	[1025, 2809]
207	[399, 298]	1251	[1933, 1934]	2295	[3071, 1507]	3339	[941, 77]
208	[400, 401]	1252	[764, 541]	2296	[3072, 566]	3340	[244, 2868]
209	[402, 403]	1253	[516, 1935]	2297	[1494, 2919]	3341	[408, 3796]
210	[404, 405]	1254	[1936, 560]	2298	[695, 149]	3342	[2389, 2242]
211	[406, 407]	1255	[1937, 1938]	2299	[1449, 1951]	3343	[3797, 3798]
212	[408, 409]	1256	[776, 1939]	2300	[204, 825]	3344	[3799, 415]
213	[410, 411]	1257	[1940, 1884]	2301	[2951, 459]	3345	[434, 310]
214	[412, 413]	1258	[1789, 1941]	2302	[1463, 460]	3346	[2179, 2757]
215	[414, 415]	1259	[1942, 1943]	2303	[3073, 746]	3347	[2235, 2660]
216	[416, 417]	1260	[612, 1944]	2304	[3074, 3075]	3348	[3800, 359]
217	[348, 418]	1261	[608, 772]	2305	[3076, 3077]	3349	[2342, 2324]
218	[419, 420]	1262	[1945, 207]	2306	[3078, 3079]	3350	[3801, 1215]
219	[421, 422]	1263	[1946, 1947]	2307	[3080, 3081]	3351	[415, 345]
220	[423, 424]	1264	[1597, 1948]	2308	[623, 3082]	3352	[3802, 846]
221	[425, 426]	1265	[35, 1949]	2309	[3083, 3084]	3353	[3803, 1359]
222	[427, 428]	1266	[1716, 1950]	2310	[2096, 3085]	3354	[3654, 3804]
223	[429, 430]	1267	[1951, 1952]	2311	[3086, 3087]	3355	[3805, 3806]
224	[431, 432]	1268	[1953, 1954]	2312	[148, 696]	3356	[3807, 2393]
225	[433, 434]	1269	[663, 1955]	2313	[542, 2956]	3357	[829, 1328]
226	[435, 436]	1270	[1657, 1956]	2314	[1961, 3088]	3358	[3808, 3809]
227	[437, 438]	1271	[1957, 1958]	2315	[3089, 1426]	3359	[2886, 3772]
228	[439, 440]	1272	[1959, 1960]	2316	[746, 3077]	3360	[3765, 3810]
229	[441, 442]	1273	[1923, 1961]	2317	[656, 1961]	3361	[2233, 453]
230	[443, 444]	1274	[1838, 1497]	2318	[1621, 2964]	3362	[3796, 2551]
231	[445, 446]	1275	[1962, 1963]	2319	[3090, 3091]	3363	[2181, 1078]
232	[447, 448]	1276	[1964, 1965]	2320	[3092, 3093]	3364	[1079, 2892]
233	[449, 450]	1277	[1966, 131]	2321	[1937, 2930]	3365	[3811, 375]
234	[451, 452]	1278	[1967, 1968]	2322	[3094, 2979]	3366	[370, 269]

235	[453, 454]	1279	[488, 600]	2323	[3095, 1818]	3367	[2658, 3812]
236	[455, 456]	1280	[1821, 131]	2324	[1662, 3096]	3368	[3813, 3719]
237	[457, 458]	1281	[1969, 1970]	2325	[184, 456]	3369	[3814, 2509]
238	[459, 57]	1282	[1971, 1683]	2326	[227, 480]	3370	[3815, 2488]
239	[460, 461]	1283	[1972, 1800]	2327	[1953, 55]	3371	[1401, 1378]
240	[462, 463]	1284	[1964, 1973]	2328	[1541, 767]	3372	[3816, 3817]
241	[464, 465]	1285	[1974, 1975]	2329	[3097, 3059]	3373	[250, 946]
242	[213, 466]	1286	[1976, 1977]	2330	[3098, 3099]	3374	[304, 366]
243	[467, 468]	1287	[595, 1978]	2331	[3100, 3101]	3375	[2375, 991]
244	[469, 470]	1288	[1979, 1980]	2332	[3102, 3103]	3376	[2873, 2897]
245	[471, 466]	1289	[1649, 1981]	2333	[2038, 1710]	3377	[1105, 1288]
246	[472, 473]	1290	[1982, 582]	2334	[3104, 1439]	3378	[2620, 3818]
247	[474, 475]	1291	[1983, 1888]	2335	[3105, 3106]	3379	[3819, 1321]
248	[476, 477]	1292	[779, 548]	2336	[3107, 520]	3380	[2204, 1134]
249	[478, 479]	1293	[1715, 1984]	2337	[48, 1575]	3381	[3820, 2140]
250	[480, 481]	1294	[1985, 1986]	2338	[3011, 3108]	3382	[2507, 3821]
251	[482, 483]	1295	[1866, 1987]	2339	[1703, 2106]	3383	[2164, 2720]
252	[484, 485]	1296	[1988, 1467]	2340	[1521, 3109]	3384	[3822, 3823]
253	[159, 486]	1297	[1989, 1990]	2341	[2988, 1835]	3385	[3824, 2723]
254	[487, 488]	1298	[1667, 1643]	2342	[168, 1734]	3386	[2449, 2491]
255	[489, 490]	1299	[1991, 1992]	2343	[1822, 3110]	3387	[3825, 1302]
256	[491, 492]	1300	[1993, 1994]	2344	[3111, 3112]	3388	[269, 2557]
257	[493, 494]	1301	[1995, 1996]	2345	[3113, 726]	3389	[2216, 3826]
258	[495, 496]	1302	[1997, 1998]	2346	[2040, 477]	3390	[2137, 3827]
259	[497, 498]	1303	[1999, 1877]	2347	[3114, 3115]	3391	[3828, 1159]
260	[499, 500]	1304	[2000, 2001]	2348	[3116, 3117]	3392	[3829, 315]
261	[501, 502]	1305	[2002, 2003]	2349	[3118, 3119]	3393	[266, 2267]
262	[503, 504]	1306	[2004, 1658]	2350	[1730, 792]	3394	[2646, 3830]
263	[505, 506]	1307	[2005, 475]	2351	[2963, 1622]	3395	[3831, 3707]
264	[507, 508]	1308	[2006, 2007]	2352	[1797, 776]	3396	[375, 409]
265	[509, 136]	1309	[2008, 2009]	2353	[3120, 1868]	3397	[3832, 3833]
266	[510, 511]	1310	[2010, 56]	2354	[2916, 3070]	3398	[3834, 2602]
267	[512, 513]	1311	[2011, 1543]	2355	[788, 1729]	3399	[3835, 1146]
268	[514, 515]	1312	[664, 2012]	2356	[123, 1611]	3400	[3547, 3567]
269	[516, 517]	1313	[1972, 618]	2357	[3121, 1887]	3401	[1281, 439]
270	[518, 519]	1314	[1492, 2013]	2358	[2981, 1614]	3402	[1277, 342]
271	[520, 521]	1315	[585, 1714]	2359	[745, 3076]	3403	[2285, 3836]
272	[522, 523]	1316	[2014, 2015]	2360	[1677, 1638]	3404	[331, 983]
273	[524, 525]	1317	[671, 219]	2361	[188, 3122]	3405	[3837, 319]
274	[526, 527]	1318	[2016, 2017]	2362	[3123, 1728]	3406	[2547, 3838]
275	[528, 529]	1319	[687, 188]	2363	[2058, 2017]	3407	[3634, 3839]
276	[530, 531]	1320	[2018, 2019]	2364	[606, 1681]	3408	[3747, 3840]
277	[199, 532]	1321	[2020, 2021]	2365	[1749, 2098]	3409	[1349, 1048]
278	[533, 534]	1322	[1799, 618]	2366	[3110, 1979]	3410	[3610, 3841]

279	[518, 535]	1323	[2022, 2023]	2367	[3124, 545]	3411	[3842, 3843]
280	[536, 537]	1324	[2007, 2024]	2368	[1919, 717]	3412	[2219, 3844]
281	[538, 456]	1325	[2025, 2026]	2369	[3125, 3126]	3413	[3701, 3703]
282	[155, 539]	1326	[2027, 2028]	2370	[3015, 1978]	3414	[3845, 1162]
283	[540, 541]	1327	[2029, 2030]	2371	[44, 1781]	3415	[2528, 3665]
284	[542, 543]	1328	[1852, 2031]	2372	[3127, 3128]	3416	[2860, 2123]
285	[544, 517]	1329	[2032, 141]	2373	[3129, 1600]	3417	[3846, 2262]
286	[545, 546]	1330	[2033, 2034]	2374	[3130, 3131]	3418	[3847, 3756]
287	[547, 548]	1331	[2035, 2036]	2375	[3132, 499]	3419	[2552, 3848]
288	[549, 550]	1332	[1917, 1635]	2376	[3133, 3134]	3420	[3849, 3781]
289	[551, 552]	1333	[1708, 193]	2377	[3135, 473]	3421	[3850, 2404]
290	[553, 554]	1334	[1803, 2037]	2378	[3136, 3137]	3422	[2479, 997]
291	[555, 556]	1335	[2038, 2039]	2379	[1602, 3138]	3423	[3851, 1185]
292	[557, 558]	1336	[2040, 2041]	2380	[3139, 3140]	3424	[423, 1362]
293	[559, 560]	1337	[146, 2042]	2381	[181, 1973]	3425	[922, 3852]
294	[561, 562]	1338	[2043, 483]	2382	[3141, 784]	3426	[3507, 3853]
295	[563, 564]	1339	[736, 2044]	2383	[3142, 3143]	3427	[3854, 3833]
296	[565, 566]	1340	[2045, 2046]	2384	[3144, 1521]	3428	[2534, 1405]
297	[567, 127]	1341	[1737, 2047]	2385	[3080, 1943]	3429	[2205, 3855]
298	[568, 569]	1342	[128, 1749]	2386	[1679, 3145]	3430	[389, 327]
299	[570, 571]	1343	[2048, 796]	2387	[3146, 3147]	3431	[1327, 3856]
300	[165, 572]	1344	[2049, 574]	2388	[3148, 1928]	3432	[3857, 2311]
301	[573, 574]	1345	[2050, 2051]	2389	[3149, 1615]	3433	[3616, 3808]
302	[575, 576]	1346	[2052, 821]	2390	[822, 794]	3434	[3858, 842]
303	[577, 211]	1347	[1414, 2053]	2391	[3150, 3151]	3435	[3753, 2533]
304	[578, 579]	1348	[2054, 1793]	2392	[727, 3152]	3436	[830, 3859]
305	[580, 581]	1349	[1674, 2055]	2393	[2065, 3153]	3437	[2848, 304]
306	[582, 583]	1350	[2056, 2057]	2394	[3154, 1880]	3438	[1145, 2655]
307	[584, 585]	1351	[2058, 2059]	2395	[533, 3155]	3439	[3617, 3809]
308	[586, 587]	1352	[2060, 550]	2396	[3156, 3157]	3440	[2613, 3609]
309	[588, 589]	1353	[2061, 2062]	2397	[559, 3158]	3441	[1310, 3860]
310	[590, 591]	1354	[2007, 1596]	2398	[1429, 3159]	3442	[3861, 3612]
311	[592, 593]	1355	[2020, 2063]	2399	[3160, 795]	3443	[2575, 3862]
312	[465, 594]	1356	[489, 645]	2400	[3161, 3153]	3444	[1011, 3863]
313	[595, 596]	1357	[1467, 2064]	2401	[2010, 459]	3445	[2648, 2520]
314	[597, 177]	1358	[1568, 515]	2402	[549, 3162]	3446	[3864, 3865]
315	[179, 598]	1359	[694, 1920]	2403	[3163, 3164]	3447	[3866, 2826]
316	[599, 600]	1360	[2065, 2066]	2404	[3165, 1844]	3448	[2409, 2157]
317	[601, 602]	1361	[2067, 2068]	2405	[3166, 2062]	3449	[3641, 3867]
318	[603, 604]	1362	[2069, 2070]	2406	[1824, 492]	3450	[3831, 3579]
319	[605, 606]	1363	[2071, 563]	2407	[3167, 3168]	3451	[3566, 3548]
320	[607, 608]	1364	[2072, 558]	2408	[2047, 3079]	3452	[3868, 3624]
321	[609, 589]	1365	[59, 1500]	2409	[3078, 2114]	3453	[2129, 3869]
322	[610, 611]	1366	[2073, 773]	2410	[3169, 705]	3454	[2368, 286]

323	[612, 613]	1367	[2074, 1854]	2411	[1889, 3170]	3455	[1332, 1083]
324	[614, 615]	1368	[2075, 1707]	2412	[3171, 540]	3456	[2585, 3870]
325	[616, 617]	1369	[535, 2076]	2413	[222, 2946]	3457	[3871, 1393]
326	[618, 619]	1370	[1488, 458]	2414	[3172, 36]	3458	[2758, 2674]
327	[570, 620]	1371	[2077, 2078]	2415	[174, 3173]	3459	[943, 2342]
328	[621, 622]	1372	[1464, 2079]	2416	[1411, 1980]	3460	[1117, 2119]
329	[623, 624]	1373	[225, 2080]	2417	[1761, 457]	3461	[2200, 3872]
330	[625, 626]	1374	[2081, 2082]	2418	[1627, 3174]	3462	[3873, 1235]
331	[627, 628]	1375	[2083, 2084]	2419	[3175, 3176]	3463	[3874, 3875]
332	[629, 630]	1376	[2085, 2086]	2420	[1884, 1982]	3464	[3876, 2172]
333	[631, 632]	1377	[1522, 2087]	2421	[821, 3177]	3465	[3700, 2594]
334	[633, 634]	1378	[221, 652]	2422	[639, 816]	3466	[2445, 2837]
335	[635, 636]	1379	[2088, 1666]	2423	[3178, 1663]	3467	[1208, 1247]
336	[637, 638]	1380	[2089, 2080]	2424	[2070, 1528]	3468	[3877, 3878]
337	[639, 640]	1381	[763, 540]	2425	[3179, 2971]	3469	[2868, 2672]
338	[617, 641]	1382	[2090, 2091]	2426	[1496, 2947]	3470	[99, 1339]
339	[642, 643]	1383	[1887, 554]	2427	[3180, 1746]	3471	[3879, 3668]
340	[10, 644]	1384	[1608, 2092]	2428	[3181, 3182]	3472	[3880, 2129]
341	[645, 646]	1385	[473, 2093]	2429	[3183, 1443]	3473	[2594, 837]
342	[647, 571]	1386	[2094, 2095]	2430	[58, 1499]	3474	[3881, 3555]
343	[648, 649]	1387	[611, 594]	2431	[3184, 1862]	3475	[1261, 3520]
344	[650, 651]	1388	[2029, 1956]	2432	[3185, 3186]	3476	[3882, 266]
345	[235, 652]	1389	[2096, 2097]	2433	[3187, 3188]	3477	[3883, 3884]
346	[653, 218]	1390	[1734, 1785]	2434	[3009, 3189]	3478	[2788, 2699]
347	[654, 655]	1391	[129, 2098]	2435	[3037, 1453]	3479	[3885, 1403]
348	[538, 185]	1392	[2099, 2100]	2436	[1836, 148]	3480	[3886, 3635]
349	[656, 657]	1393	[2101, 2102]	2437	[3184, 3156]	3481	[84, 299]
350	[511, 658]	1394	[2103, 1689]	2438	[3190, 3191]	3482	[2665, 301]
351	[659, 660]	1395	[1646, 166]	2439	[1947, 782]	3483	[2408, 3584]
352	[661, 662]	1396	[2104, 2105]	2440	[3192, 3020]	3484	[2900, 440]
353	[663, 664]	1397	[2106, 2107]	2441	[3193, 701]	3485	[1402, 2357]
354	[475, 665]	1398	[1901, 1667]	2442	[2036, 1559]	3486	[829, 3856]
355	[666, 667]	1399	[2108, 2109]	2443	[3194, 493]	3487	[2705, 3887]
356	[668, 669]	1400	[2110, 2111]	2444	[1544, 155]	3488	[2874, 2711]
357	[670, 671]	1401	[672, 2055]	2445	[2989, 129]	3489	[3888, 2588]
358	[672, 673]	1402	[627, 1413]	2446	[464, 611]	3490	[3889, 2113]
359	[674, 675]	1403	[2112, 1774]	2447	[3195, 161]	3491	[1940, 3220]
360	[676, 171]	1404	[1513, 2113]	2448	[1704, 2107]	3492	[1840, 1580]
361	[677, 678]	1405	[2054, 1767]	2449	[206, 2916]	3493	[32, 3890]
362	[679, 680]	1406	[2046, 145]	2450	[3196, 3197]	3494	[3891, 3892]
363	[681, 682]	1407	[2047, 2114]	2451	[1881, 2113]	3495	[3196, 2093]
364	[683, 684]	1408	[2115, 1820]	2452	[3198, 3036]	3496	[456, 3893]
365	[685, 686]	1409	[2116, 2044]	2453	[3199, 3126]	3497	[1719, 3894]
366	[687, 688]	1410	[2117, 2118]	2454	[3200, 3201]	3498	[3895, 2102]

367	[689, 690]	1411	[255, 1279]	2455	[1993, 3202]	3499	[1960, 1960]
368	[691, 692]	1412	[2119, 2120]	2456	[3203, 3204]	3500	[1661, 644]
369	[693, 694]	1413	[1244, 2121]	2457	[3205, 715]	3501	[3896, 1621]
370	[695, 696]	1414	[2122, 1322]	2458	[1892, 739]	3502	[3897, 1977]
371	[697, 138]	1415	[2123, 2124]	2459	[3206, 2028]	3503	[3898, 1693]
372	[698, 699]	1416	[995, 2125]	2460	[3207, 3208]	3504	[3098, 3899]
373	[700, 701]	1417	[2126, 2127]	2461	[3209, 1981]	3505	[3026, 3476]
374	[702, 703]	1418	[2128, 2129]	2462	[605, 1680]	3506	[3090, 3900]
375	[704, 705]	1419	[2130, 1272]	2463	[1762, 3210]	3507	[3466, 2940]
376	[194, 706]	1420	[2131, 2132]	2464	[3211, 3212]	3508	[2088, 3901]
377	[707, 708]	1421	[2133, 2134]	2465	[2932, 221]	3509	[32, 3902]
378	[51, 143]	1422	[2135, 1177]	2466	[2014, 3213]	3510	[3314, 719]
379	[708, 199]	1423	[2136, 1140]	2467	[3214, 800]	3511	[8, 2932]
380	[709, 708]	1424	[1387, 2137]	2468	[3215, 3216]	3512	[3075, 1497]
381	[710, 531]	1425	[2138, 2139]	2469	[3217, 3218]	3513	[631, 1557]
382	[532, 662]	1426	[2140, 2141]	2470	[3219, 3220]	3514	[3903, 3376]
383	[711, 712]	1427	[2142, 2143]	2471	[664, 3200]	3515	[192, 1709]
384	[661, 713]	1428	[70, 2144]	2472	[3113, 3221]	3516	[3373, 3022]
385	[714, 715]	1429	[2145, 992]	2473	[198, 1847]	3517	[3904, 1499]
386	[514, 716]	1430	[2146, 2147]	2474	[804, 1433]	3518	[1515, 1588]
387	[694, 717]	1431	[98, 1070]	2475	[3021, 3222]	3519	[823, 3905]
388	[718, 719]	1432	[2148, 2149]	2476	[477, 3223]	3520	[463, 3906]
389	[720, 721]	1433	[2150, 2151]	2477	[132, 1979]	3521	[212, 1751]
390	[166, 675]	1434	[2141, 2152]	2478	[2012, 3201]	3522	[1677, 3282]
391	[722, 217]	1435	[2153, 359]	2479	[1657, 2030]	3523	[1929, 49]
392	[723, 724]	1436	[2154, 2155]	2480	[2052, 1770]	3524	[140, 3424]
393	[725, 726]	1437	[346, 2156]	2481	[3224, 3225]	3525	[3378, 1450]
394	[196, 195]	1438	[2157, 2158]	2482	[683, 1533]	3526	[1794, 604]
395	[727, 728]	1439	[1043, 2159]	2483	[1585, 3226]	3527	[1487, 457]
396	[515, 559]	1440	[1191, 2160]	2484	[3211, 591]	3528	[3335, 2972]
397	[729, 730]	1441	[2161, 2162]	2485	[2918, 1458]	3529	[1982, 1478]
398	[731, 732]	1442	[2163, 2164]	2486	[1713, 3227]	3530	[3907, 3908]
399	[733, 608]	1443	[81, 2165]	2487	[3228, 1436]	3531	[592, 3892]
400	[734, 735]	1444	[2166, 292]	2488	[3229, 1718]	3532	[3909, 3078]
401	[736, 737]	1445	[2167, 98]	2489	[1989, 1921]	3533	[2923, 3910]
402	[738, 739]	1446	[1007, 2168]	2490	[3230, 1786]	3534	[1558, 3301]
403	[563, 740]	1447	[2169, 2170]	2491	[3231, 3232]	3535	[145, 3033]
404	[741, 742]	1448	[2171, 2172]	2492	[3233, 649]	3536	[3911, 3383]
405	[743, 744]	1449	[2173, 2174]	2493	[3234, 3235]	3537	[2929, 1938]
406	[745, 746]	1450	[2175, 81]	2494	[3236, 3237]	3538	[3190, 60]
407	[747, 748]	1451	[1296, 2176]	2495	[3238, 3119]	3539	[567, 3444]
408	[749, 162]	1452	[903, 2177]	2496	[3239, 785]	3540	[3167, 537]
409	[524, 750]	1453	[1047, 1350]	2497	[46, 1470]	3541	[488, 3252]
410	[751, 752]	1454	[2178, 2179]	2498	[1882, 671]	3542	[492, 1687]

411	[753, 754]	1455	[304, 2180]	2499	[3035, 3240]	3543	[183, 1668]
412	[755, 188]	1456	[2122, 1279]	2500	[3073, 3076]	3544	[824, 205]
413	[756, 694]	1457	[2181, 1111]	2501	[3241, 1897]	3545	[207, 2917]
414	[757, 235]	1458	[2182, 90]	2502	[3242, 3191]	3546	[1783, 3912]
415	[758, 759]	1459	[2183, 2184]	2503	[3243, 721]	3547	[1634, 1918]
416	[760, 761]	1460	[2185, 2186]	2504	[1800, 619]	3548	[3059, 543]
417	[762, 45]	1461	[2187, 898]	2505	[3244, 3179]	3549	[3913, 1915]
418	[763, 764]	1462	[2188, 2189]	2506	[176, 3245]	3550	[1948, 1891]
419	[765, 766]	1463	[2190, 836]	2507	[3246, 3247]	3551	[3907, 3914]
420	[520, 767]	1464	[2191, 379]	2508	[3248, 3249]	3552	[637, 3915]
421	[604, 768]	1465	[2192, 290]	2509	[3250, 1804]	3553	[3916, 3899]
422	[769, 770]	1466	[2193, 2194]	2510	[3102, 1482]	3554	[3157, 1743]
423	[771, 772]	1467	[390, 328]	2511	[3130, 1895]	3555	[3917, 3354]
424	[773, 774]	1468	[2195, 2196]	2512	[2103, 3251]	3556	[1421, 2091]
425	[775, 776]	1469	[2197, 2184]	2513	[599, 3252]	3557	[1760, 3902]
426	[777, 778]	1470	[2198, 1050]	2514	[490, 646]	3558	[1886, 553]
427	[779, 780]	1471	[92, 2199]	2515	[618, 3253]	3559	[2939, 3918]
428	[781, 782]	1472	[2200, 2201]	2516	[3244, 2970]	3560	[1997, 3218]
429	[783, 784]	1473	[1407, 2202]	2517	[3254, 1994]	3561	[478, 703]
430	[785, 786]	1474	[2203, 2204]	2518	[1990, 1922]	3562	[3919, 1523]
431	[787, 788]	1475	[2205, 2206]	2519	[3208, 3065]	3563	[2072, 3388]
432	[789, 790]	1476	[345, 2207]	2520	[471, 214]	3564	[2925, 47]
433	[791, 792]	1477	[2208, 2209]	2521	[3024, 209]	3565	[3076, 3439]
434	[793, 794]	1478	[243, 2210]	2522	[3133, 1796]	3566	[3453, 3909]
435	[795, 796]	1479	[445, 1092]	2523	[3255, 3256]	3567	[1501, 3920]
436	[797, 798]	1480	[2211, 2212]	2524	[1966, 1822]	3568	[155, 3921]
437	[799, 800]	1481	[1143, 2213]	2525	[801, 3257]	3569	[462, 3230]
438	[801, 802]	1482	[2214, 2215]	2526	[3258, 639]	3570	[3066, 1498]
439	[604, 686]	1483	[2216, 2217]	2527	[1741, 3225]	3571	[3922, 1502]
440	[803, 804]	1484	[2218, 1110]	2528	[3259, 3260]	3572	[3274, 1990]
441	[805, 806]	1485	[2219, 2220]	2529	[1795, 3134]	3573	[800, 3018]
442	[807, 166]	1486	[1158, 2221]	2530	[3261, 3262]	3574	[2094, 699]
443	[808, 525]	1487	[897, 1388]	2531	[1879, 2947]	3575	[3460, 3479]
444	[809, 615]	1488	[2222, 913]	2532	[546, 147]	3576	[123, 3923]
445	[810, 624]	1489	[2223, 284]	2533	[2005, 1788]	3577	[3924, 3204]
446	[811, 175]	1490	[2224, 1128]	2534	[611, 3034]	3578	[3925, 3912]
447	[758, 812]	1491	[2225, 2226]	2535	[3068, 1852]	3579	[3926, 3277]
448	[813, 814]	1492	[2227, 2228]	2536	[3062, 3263]	3580	[1913, 1636]
449	[815, 816]	1493	[2229, 2230]	2537	[3264, 748]	3581	[1632, 3001]
450	[165, 817]	1494	[1036, 2231]	2538	[3265, 1738]	3582	[42, 3281]
451	[818, 819]	1495	[2232, 1374]	2539	[3266, 2937]	3583	[3927, 3928]
452	[820, 821]	1496	[1147, 315]	2540	[3267, 3268]	3584	[2041, 3272]
453	[822, 823]	1497	[2233, 2234]	2541	[3105, 203]	3585	[3163, 752]
454	[824, 825]	1498	[111, 2235]	2542	[3269, 3219]	3586	[3004, 123]

455	[826, 827]	1499	[2236, 2237]	2543	[1747, 3210]	3587	[573, 3330]
456	[828, 829]	1500	[2238, 2239]	2544	[1491, 2943]	3588	[136, 1538]
457	[830, 831]	1501	[2240, 886]	2545	[3270, 2022]	3589	[2980, 234]
458	[343, 832]	1502	[2241, 432]	2546	[813, 3271]	3590	[2979, 3929]
459	[833, 834]	1503	[270, 1077]	2547	[3084, 3226]	3591	[1831, 1677]
460	[835, 378]	1504	[2242, 985]	2548	[540, 2957]	3592	[2075, 157]
461	[836, 837]	1505	[2243, 2244]	2549	[477, 3272]	3593	[3311, 1908]
462	[838, 839]	1506	[2245, 2246]	2550	[805, 1873]	3594	[723, 3930]
463	[840, 335]	1507	[241, 1262]	2551	[162, 3273]	3595	[3931, 3179]
464	[841, 842]	1508	[2247, 975]	2552	[3274, 1921]	3596	[1971, 3366]
465	[843, 844]	1509	[2248, 2249]	2553	[1527, 3275]	3597	[1826, 742]
466	[845, 846]	1510	[2250, 2251]	2554	[3276, 3277]	3598	[144, 3032]
467	[847, 848]	1511	[1228, 2252]	2555	[3278, 3279]	3599	[700, 3473]
468	[296, 849]	1512	[2241, 2253]	2556	[1808, 13]	3600	[1906, 1913]
469	[26, 850]	1513	[1262, 2254]	2557	[515, 1936]	3601	[3932, 2068]
470	[851, 852]	1514	[1118, 2255]	2558	[2947, 2991]	3602	[3933, 3934]
471	[853, 854]	1515	[2256, 2257]	2559	[3280, 3109]	3603	[3231, 3349]
472	[855, 856]	1516	[2258, 2162]	2560	[130, 3281]	3604	[1617, 3188]
473	[857, 858]	1517	[2259, 2260]	2561	[1564, 1518]	3605	[3069, 1871]
474	[859, 860]	1518	[1183, 1122]	2562	[1658, 2915]	3606	[1577, 494]
475	[861, 862]	1519	[2261, 2262]	2563	[3056, 602]	3607	[3291, 1769]
476	[320, 863]	1520	[397, 2263]	2564	[1637, 3282]	3608	[668, 507]
477	[864, 865]	1521	[2264, 2265]	2565	[821, 1771]	3609	[1900, 3471]
478	[866, 867]	1522	[2266, 2267]	2566	[3283, 3284]	3610	[3935, 1845]
479	[868, 396]	1523	[2268, 2269]	2567	[1694, 3285]	3611	[473, 3197]
480	[869, 870]	1524	[2270, 2271]	2568	[3286, 565]	3612	[1733, 169]
481	[871, 872]	1525	[2272, 2273]	2569	[674, 167]	3613	[153, 1903]
482	[873, 874]	1526	[2274, 913]	2570	[131, 3110]	3614	[3936, 1932]
483	[875, 876]	1527	[2275, 1356]	2571	[3287, 2097]	3615	[3463, 3230]
484	[877, 878]	1528	[1295, 2276]	2572	[1798, 1939]	3616	[3937, 1701]
485	[879, 880]	1529	[2277, 2278]	2573	[3288, 3289]	3617	[497, 2009]
486	[881, 882]	1530	[941, 1225]	2574	[3234, 3290]	3618	[3165, 3935]
487	[97, 883]	1531	[2279, 2280]	2575	[3291, 3292]	3619	[3389, 690]
488	[400, 884]	1532	[2281, 2125]	2576	[3293, 3294]	3620	[3938, 2998]
489	[885, 886]	1533	[312, 2282]	2577	[3287, 3085]	3621	[3939, 3003]
490	[887, 888]	1534	[2283, 2280]	2578	[2965, 1486]	3622	[3307, 3152]
491	[86, 889]	1535	[2280, 2284]	2579	[2077, 773]	3623	[3938, 3940]
492	[890, 891]	1536	[2244, 911]	2580	[590, 3212]	3624	[3051, 3382]
493	[892, 893]	1537	[2285, 2286]	2581	[2978, 3174]	3625	[3941, 678]
494	[894, 895]	1538	[263, 2189]	2582	[3295, 3296]	3626	[803, 1432]
495	[896, 897]	1539	[2287, 891]	2583	[3297, 3284]	3627	[1452, 3038]
496	[898, 899]	1540	[1204, 2288]	2584	[3298, 496]	3628	[1893, 3401]
497	[900, 76]	1541	[2174, 2141]	2585	[3199, 3299]	3629	[3942, 3943]
498	[901, 902]	1542	[2289, 2290]	2586	[625, 3300]	3630	[1985, 680]

499	[903, 904]	1543	[2291, 1242]	2587	[2036, 3301]	3631	[3149, 730]
500	[905, 906]	1544	[2292, 2293]	2588	[3262, 1691]	3632	[3944, 2967]
501	[907, 908]	1545	[2294, 263]	2589	[2935, 488]	3633	[3029, 2053]
502	[909, 910]	1546	[2295, 255]	2590	[3302, 3093]	3634	[3945, 588]
503	[911, 912]	1547	[2296, 2297]	2591	[1509, 2990]	3635	[3946, 1621]
504	[913, 904]	1548	[385, 2298]	2592	[1829, 3303]	3636	[3947, 3435]
505	[265, 914]	1549	[2299, 876]	2593	[3304, 565]	3637	[3304, 3072]
506	[915, 916]	1550	[2300, 1090]	2594	[482, 3305]	3638	[3206, 3352]
507	[912, 917]	1551	[2301, 2302]	2595	[1450, 1952]	3639	[3059, 2956]
508	[918, 356]	1552	[256, 939]	2596	[3306, 3117]	3640	[3948, 585]
509	[919, 302]	1553	[2257, 2303]	2597	[54, 1954]	3641	[3230, 3906]
510	[920, 921]	1554	[2304, 2305]	2598	[1441, 3307]	3642	[159, 1752]
511	[922, 923]	1555	[2306, 2307]	2599	[3308, 3309]	3643	[3207, 1992]
512	[924, 925]	1556	[2308, 2309]	2600	[1601, 1431]	3644	[3949, 1913]
513	[926, 927]	1557	[2310, 2311]	2601	[3310, 1555]	3645	[3950, 3951]
514	[928, 929]	1558	[2312, 2313]	2602	[808, 750]	3646	[3180, 1843]
515	[930, 931]	1559	[1338, 2314]	2603	[3311, 3312]	3647	[1511, 2092]
516	[932, 75]	1560	[2315, 2316]	2604	[642, 622]	3648	[3952, 3953]
517	[933, 902]	1561	[2317, 1338]	2605	[3075, 3066]	3649	[1753, 3374]
518	[934, 935]	1562	[2318, 2319]	2606	[657, 3088]	3650	[2067, 3954]
519	[936, 937]	1563	[2320, 2321]	2607	[3313, 144]	3651	[3955, 1690]
520	[938, 939]	1564	[2322, 2323]	2608	[3314, 3315]	3652	[3269, 1940]
521	[940, 368]	1565	[944, 2324]	2609	[2060, 3162]	3653	[3258, 815]
522	[900, 941]	1566	[2325, 2326]	2610	[1999, 3316]	3654	[2043, 3305]
523	[836, 942]	1567	[2327, 2328]	2611	[647, 620]	3655	[3956, 3406]
524	[943, 944]	1568	[2329, 1375]	2612	[617, 1504]	3656	[3436, 3957]
525	[945, 448]	1569	[2330, 2331]	2613	[1606, 3145]	3657	[2025, 3958]
526	[401, 99]	1570	[2332, 2333]	2614	[795, 3317]	3658	[3402, 3959]
527	[946, 947]	1571	[1163, 2334]	2615	[3318, 3319]	3659	[3960, 3961]
528	[948, 949]	1572	[2335, 2297]	2616	[3320, 1778]	3660	[3405, 3962]
529	[950, 951]	1573	[2336, 419]	2617	[3321, 3322]	3661	[2927, 3182]
530	[376, 952]	1574	[2302, 238]	2618	[3323, 3324]	3662	[3963, 3391]
531	[953, 937]	1575	[2337, 2338]	2619	[689, 3325]	3663	[3489, 3964]
532	[954, 884]	1576	[2339, 2340]	2620	[3326, 3327]	3664	[1485, 1546]
533	[952, 955]	1577	[2341, 862]	2621	[3328, 732]	3665	[3965, 3101]
534	[956, 957]	1578	[2342, 2343]	2622	[228, 481]	3666	[3178, 3096]
535	[958, 959]	1579	[2344, 999]	2623	[2975, 2052]	3667	[1593, 3918]
536	[960, 923]	1580	[2345, 278]	2624	[3329, 2026]	3668	[219, 3966]
537	[961, 962]	1581	[2346, 373]	2625	[2049, 3330]	3669	[1849, 670]
538	[963, 964]	1582	[990, 2347]	2626	[3331, 1876]	3670	[3443, 819]
539	[300, 965]	1583	[2348, 2349]	2627	[1696, 1970]	3671	[3074, 1838]
540	[966, 967]	1584	[2303, 1025]	2628	[3332, 3289]	3672	[1754, 3967]
541	[968, 969]	1585	[111, 986]	2629	[1505, 505]	3673	[3175, 3968]
542	[970, 971]	1586	[2350, 280]	2630	[3110, 1411]	3674	[1813, 1987]

543	[972, 973]	1587	[2351, 943]	2631	[3331, 219]	3675	[1698, 3969]
544	[974, 975]	1588	[2352, 1284]	2632	[3217, 1998]	3676	[1914, 3970]
545	[934, 976]	1589	[2353, 2354]	2633	[1991, 3208]	3677	[716, 559]
546	[977, 978]	1590	[2355, 2356]	2634	[3333, 1658]	3678	[1460, 153]
547	[979, 980]	1591	[2357, 2358]	2635	[3255, 3137]	3679	[3916, 3099]
548	[981, 982]	1592	[1373, 2359]	2636	[3334, 3335]	3680	[3971, 3972]
549	[983, 984]	1593	[2360, 2361]	2637	[3336, 802]	3681	[2969, 3374]
550	[985, 986]	1594	[2362, 1259]	2638	[3337, 609]	3682	[3139, 3279]
551	[987, 988]	1595	[2363, 2364]	2639	[3058, 542]	3683	[3973, 3151]
552	[989, 990]	1596	[1166, 2365]	2640	[1839, 2035]	3684	[3974, 3335]
553	[991, 992]	1597	[2366, 1105]	2641	[1552, 1427]	3685	[3975, 1870]
554	[993, 994]	1598	[2367, 2368]	2642	[3338, 3339]	3686	[3414, 511]
555	[995, 996]	1599	[2369, 2370]	2643	[3340, 3324]	3687	[3947, 3976]
556	[119, 997]	1600	[2371, 2372]	2644	[1862, 3157]	3688	[3977, 3462]
557	[998, 999]	1601	[1252, 1359]	2645	[138, 2072]	3689	[129, 1750]
558	[1000, 1001]	1602	[2373, 1364]	2646	[709, 198]	3690	[3932, 3954]
559	[1002, 1003]	1603	[1128, 2374]	2647	[197, 710]	3691	[3370, 2021]
560	[251, 947]	1604	[2207, 2156]	2648	[3341, 2108]	3692	[3107, 1541]
561	[1004, 268]	1605	[2375, 2145]	2649	[1688, 3251]	3693	[3950, 201]
562	[946, 1005]	1606	[2330, 2376]	2650	[3342, 1503]	3694	[771, 3978]
563	[1006, 1007]	1607	[2377, 2378]	2651	[1571, 41]	3695	[775, 1798]
564	[1008, 1009]	1608	[866, 2379]	2652	[3343, 2052]	3696	[777, 3979]
565	[1010, 1011]	1609	[2380, 2148]	2653	[3344, 3263]	3697	[1515, 3148]
566	[1012, 1013]	1610	[1394, 2381]	2654	[3343, 820]	3698	[1770, 3177]
567	[1014, 1015]	1611	[2152, 2216]	2655	[3345, 3346]	3699	[3980, 3961]
568	[1016, 874]	1612	[240, 1261]	2656	[1704, 3347]	3700	[1432, 3010]
569	[988, 1017]	1613	[2382, 2383]	2657	[3348, 3349]	3701	[739, 3981]
570	[1018, 1019]	1614	[2384, 2385]	2658	[3233, 3094]	3702	[1800, 3253]
571	[1020, 1021]	1615	[2386, 1182]	2659	[3350, 3087]	3703	[1456, 3982]
572	[319, 439]	1616	[2387, 2388]	2660	[216, 3351]	3704	[3355, 173]
573	[1022, 1023]	1617	[2389, 110]	2661	[2027, 3352]	3705	[3983, 3380]
574	[1024, 1025]	1618	[2390, 322]	2662	[677, 1756]	3706	[760, 2926]
575	[69, 1026]	1619	[2208, 2391]	2663	[3353, 1844]	3707	[3281, 3095]
576	[917, 1027]	1620	[2392, 2393]	2664	[3023, 2995]	3708	[3219, 1884]
577	[1028, 1029]	1621	[2394, 2395]	2665	[507, 575]	3709	[1516, 3984]
578	[1030, 1031]	1622	[2396, 2215]	2666	[3064, 1534]	3710	[484, 1849]
579	[1032, 1021]	1623	[2397, 2398]	2667	[2999, 3009]	3711	[170, 3409]
580	[1033, 1034]	1624	[932, 2399]	2668	[2984, 3354]	3712	[3374, 3967]
581	[1035, 1036]	1625	[1226, 2400]	2669	[1764, 2013]	3713	[1455, 797]
582	[1037, 1038]	1626	[2401, 854]	2670	[3355, 3356]	3714	[1990, 3478]
583	[1039, 1040]	1627	[1296, 2402]	2671	[2012, 3357]	3715	[789, 2987]
584	[1041, 1042]	1628	[2403, 2404]	2672	[1902, 1518]	3716	[3985, 3986]
585	[1043, 1044]	1629	[2405, 1052]	2673	[2022, 3247]	3717	[1488, 3987]
586	[1045, 1046]	1630	[2406, 348]	2674	[1876, 220]	3718	[3172, 1949]

587	[1047, 1048]	1631	[879, 2407]	2675	[3309, 1744]	3719	[3988, 3091]
588	[1049, 1050]	1632	[1386, 2408]	2676	[1474, 3170]	3720	[3008, 1723]
589	[1051, 1052]	1633	[2409, 2410]	2677	[3242, 60]	3721	[1949, 3989]
590	[1053, 1054]	1634	[2411, 2412]	2678	[753, 1885]	3722	[3229, 3990]
591	[1055, 1056]	1635	[259, 2413]	2679	[1984, 3358]	3723	[3963, 2083]
592	[1057, 1058]	1636	[2414, 1094]	2680	[1530, 460]	3724	[60, 3991]
593	[293, 1059]	1637	[449, 22]	2681	[3241, 3359]	3725	[596, 3440]
594	[1060, 1061]	1638	[2415, 2416]	2682	[3360, 3361]	3726	[3936, 3411]
595	[1062, 1063]	1639	[2245, 2417]	2683	[2108, 3362]	3727	[474, 1788]
596	[1064, 288]	1640	[2418, 2419]	2684	[3363, 3364]	3728	[1732, 3400]
597	[1065, 1066]	1641	[2420, 2421]	2685	[2992, 3365]	3729	[3181, 2928]
598	[1067, 872]	1642	[2422, 2423]	2686	[3048, 3366]	3730	[3041, 3992]
599	[1068, 1069]	1643	[2424, 1390]	2687	[1531, 3367]	3731	[3993, 3972]
600	[883, 1070]	1644	[2425, 2239]	2688	[3123, 788]	3732	[1573, 653]
601	[1071, 1072]	1645	[2426, 2409]	2689	[1506, 3368]	3733	[3259, 2954]
602	[450, 1073]	1646	[852, 2427]	2690	[3369, 1608]	3734	[3974, 691]
603	[1074, 1075]	1647	[2428, 2429]	2691	[233, 3043]	3735	[1425, 3994]
604	[1076, 1077]	1648	[2430, 2431]	2692	[3370, 2063]	3736	[1882, 3331]
605	[1078, 1079]	1649	[351, 2432]	2693	[714, 3371]	3737	[1726, 3995]
606	[1080, 1081]	1650	[2433, 2434]	2694	[3124, 3112]	3738	[2936, 3138]
607	[1082, 1083]	1651	[2435, 2203]	2695	[3323, 3372]	3739	[3238, 3996]
608	[1084, 1085]	1652	[2436, 2437]	2696	[712, 3155]	3740	[2101, 3997]
609	[1086, 94]	1653	[2438, 2439]	2697	[3373, 3222]	3741	[1924, 2034]
610	[1087, 1088]	1654	[2440, 2441]	2698	[1498, 2106]	3742	[2942, 3013]
611	[1089, 109]	1655	[2442, 2385]	2699	[3121, 553]	3743	[3341, 3327]
612	[1090, 1091]	1656	[2443, 2444]	2700	[3374, 3060]	3744	[2973, 614]
613	[1092, 1093]	1657	[972, 2445]	2701	[3224, 1742]	3745	[3998, 3397]
614	[1094, 1095]	1658	[863, 2446]	2702	[1822, 132]	3746	[3999, 3345]
615	[1096, 1004]	1659	[2447, 2448]	2703	[3375, 1886]	3747	[3948, 1713]
616	[1097, 1098]	1660	[2449, 2450]	2704	[3039, 3376]	3748	[3337, 588]
617	[92, 1010]	1661	[2451, 2452]	2705	[1948, 3377]	3749	[3220, 1612]
618	[1099, 1100]	1662	[2453, 2454]	2706	[512, 3143]	3750	[4000, 1814]
619	[1101, 1102]	1663	[1105, 2455]	2707	[3378, 1951]	3751	[3361, 757]
620	[353, 1103]	1664	[2227, 2456]	2708	[1529, 3167]	3752	[650, 3128]
621	[1104, 1105]	1665	[2457, 96]	2709	[3379, 3380]	3753	[608, 3978]
622	[1106, 1107]	1666	[2458, 294]	2710	[3000, 1633]	3754	[3094, 2056]
623	[1108, 1109]	1667	[2459, 1026]	2711	[3381, 3382]	3755	[2920, 3213]
624	[1058, 1110]	1668	[354, 1312]	2712	[1899, 3383]	3756	[679, 1986]
625	[1111, 1079]	1669	[2222, 903]	2713	[3384, 724]	3757	[3072, 4001]
626	[1112, 1113]	1670	[2460, 1290]	2714	[3306, 3385]	3758	[4002, 4003]
627	[416, 1114]	1671	[2461, 303]	2715	[788, 1828]	3759	[1717, 3990]
628	[1115, 1116]	1672	[2462, 2236]	2716	[3386, 3387]	3760	[3468, 3142]
629	[1117, 1118]	1673	[2204, 239]	2717	[1946, 781]	3761	[3297, 3390]
630	[1119, 1120]	1674	[944, 2343]	2718	[557, 3388]	3762	[485, 670]

631	[1121, 391]	1675	[2463, 2464]	2719	[3389, 3325]	3763	[3925, 1784]
632	[1122, 899]	1676	[2465, 2466]	2720	[1988, 2081]	3764	[4004, 4005]
633	[1123, 1124]	1677	[2254, 2452]	2721	[607, 771]	3765	[4000, 2074]
634	[1125, 1126]	1678	[2467, 2468]	2722	[3283, 3390]	3766	[39, 3361]
635	[1127, 1128]	1679	[1130, 1193]	2723	[1673, 3045]	3767	[4006, 4007]
636	[874, 1129]	1680	[2469, 1959]	2724	[756, 1919]	3768	[4008, 795]
637	[1130, 1131]	1681	[2470, 2471]	2725	[3391, 2084]	3769	[4009, 1926]
638	[1132, 1133]	1682	[2472, 2473]	2726	[215, 1686]	3770	[3426, 3167]
639	[238, 1134]	1683	[2474, 2144]	2727	[1598, 535]	3771	[3913, 3970]
640	[1135, 1136]	1684	[2475, 2476]	2728	[653, 3392]	3772	[3112, 146]
641	[1137, 1138]	1685	[2477, 2478]	2729	[3393, 3394]	3773	[3952, 4010]
642	[1139, 1140]	1686	[2119, 2255]	2730	[3146, 1772]	3774	[4011, 3457]
643	[1141, 392]	1687	[2479, 2480]	2731	[769, 3395]	3775	[2945, 3969]
644	[20, 1142]	1688	[2481, 2482]	2732	[3396, 3397]	3776	[208, 3025]
645	[1143, 1144]	1689	[2483, 2151]	2733	[3144, 3280]	3777	[1810, 4012]
646	[886, 1145]	1690	[973, 2484]	2734	[3338, 3050]	3778	[654, 3472]
647	[1146, 1046]	1691	[2485, 2486]	2735	[3398, 3399]	3779	[4013, 3084]
648	[1147, 1148]	1692	[2487, 2488]	2736	[1967, 1620]	3780	[3975, 4014]
649	[1149, 1150]	1693	[2489, 870]	2737	[1806, 2019]	3781	[4004, 1912]
650	[1151, 1152]	1694	[2490, 2491]	2738	[472, 3196]	3782	[3326, 2108]
651	[1153, 1154]	1695	[2492, 2493]	2739	[3309, 1494]	3783	[4011, 4015]
652	[1013, 282]	1696	[2494, 2495]	2740	[568, 3400]	3784	[1936, 3158]
653	[1155, 1156]	1697	[2496, 2497]	2741	[739, 3401]	3785	[3179, 4016]
654	[1157, 1158]	1698	[2498, 1316]	2742	[3402, 3403]	3786	[3933, 4017]
655	[1159, 261]	1699	[2353, 2499]	2743	[783, 3404]	3787	[3445, 3005]
656	[1160, 430]	1700	[1297, 2500]	2744	[3405, 3406]	3788	[3188, 4018]
657	[1161, 1144]	1701	[2148, 865]	2745	[3407, 3316]	3789	[1660, 10]
658	[1162, 1163]	1702	[2501, 1117]	2746	[3408, 32]	3790	[3104, 2949]
659	[1164, 1165]	1703	[2502, 2364]	2747	[1787, 1955]	3791	[601, 3057]
660	[1166, 247]	1704	[2234, 454]	2748	[1849, 1882]	3792	[1705, 4019]
661	[1085, 1069]	1705	[2503, 2504]	2749	[676, 3409]	3793	[535, 3454]
662	[1167, 1168]	1706	[2505, 2506]	2750	[3154, 1740]	3794	[1424, 3377]
663	[1169, 1170]	1707	[2507, 2413]	2751	[580, 1567]	3795	[3214, 3017]
664	[1171, 829]	1708	[2508, 2509]	2752	[3017, 3410]	3796	[634, 3346]
665	[1172, 1173]	1709	[2510, 2511]	2753	[1867, 645]	3797	[4020, 2029]
666	[1174, 1175]	1710	[2512, 2513]	2754	[1931, 3411]	3798	[1751, 486]
667	[1176, 1177]	1711	[2514, 2515]	2755	[3046, 2003]	3799	[2110, 1817]
668	[1178, 69]	1712	[2516, 2517]	2756	[3412, 40]	3800	[3342, 617]
669	[1179, 1180]	1713	[28, 2300]	2757	[493, 3413]	3801	[751, 3164]
670	[1181, 421]	1714	[2128, 2518]	2758	[2008, 498]	3802	[457, 3987]
671	[1182, 1095]	1715	[1290, 2519]	2759	[3414, 1605]	3803	[190, 3008]
672	[1183, 898]	1716	[2520, 364]	2760	[669, 508]	3804	[2035, 1558]
673	[1184, 1185]	1717	[2521, 2522]	2761	[3111, 545]	3805	[3129, 4021]
674	[1186, 1187]	1718	[322, 2523]	2762	[1467, 2082]	3806	[4022, 3903]

675	[1188, 1189]	1719	[2524, 944]	2763	[3415, 1780]	3807	[1472, 3322]
676	[1190, 1031]	1720	[1197, 2282]	2764	[3416, 2977]	3808	[3246, 2023]
677	[1191, 1192]	1721	[433, 309]	2765	[1605, 2999]	3809	[1701, 4023]
678	[1193, 1194]	1722	[2307, 1054]	2766	[3302, 3417]	3810	[3100, 4024]
679	[386, 1195]	1723	[370, 387]	2767	[3418, 502]	3811	[3999, 634]
680	[1196, 952]	1724	[2230, 2525]	2768	[3027, 1451]	3812	[10, 3146]
681	[1197, 1198]	1725	[2232, 2329]	2769	[3250, 2037]	3813	[3955, 3262]
682	[1199, 265]	1726	[85, 300]	2770	[3419, 797]	3814	[3308, 1743]
683	[1200, 446]	1727	[1155, 1096]	2771	[3114, 587]	3815	[3092, 3417]
684	[1201, 1202]	1728	[1371, 2526]	2772	[3307, 728]	3816	[1700, 1809]
685	[1203, 1010]	1729	[2527, 2257]	2773	[545, 146]	3817	[4025, 4026]
686	[1075, 324]	1730	[2528, 2529]	2774	[1773, 3420]	3818	[2002, 3047]
687	[1204, 1205]	1731	[2530, 275]	2775	[3336, 3257]	3819	[729, 1615]
688	[1206, 1207]	1732	[2531, 2532]	2776	[3421, 727]	3820	[2953, 3260]
689	[1208, 250]	1733	[2533, 2534]	2777	[1855, 3422]	3821	[4025, 4027]
690	[1209, 1210]	1734	[2535, 2536]	2778	[2995, 3423]	3822	[3891, 593]
691	[966, 1211]	1735	[2210, 2537]	2779	[749, 2991]	3823	[4028, 1720]
692	[1212, 1213]	1736	[2538, 1057]	2780	[1565, 1519]	3824	[3407, 1877]
693	[1214, 1215]	1737	[1082, 1333]	2781	[688, 189]	3825	[503, 668]
694	[1216, 1217]	1738	[1181, 2539]	2782	[2090, 1422]	3826	[688, 3122]
695	[1218, 406]	1739	[2540, 2541]	2783	[137, 1428]	3827	[1514, 2980]
696	[1219, 113]	1740	[316, 2542]	2784	[2032, 3424]	3828	[2016, 2059]
697	[1220, 998]	1741	[1151, 2327]	2785	[1957, 667]	3829	[3071, 3368]
698	[1221, 1222]	1742	[2326, 2537]	2786	[3425, 1886]	3830	[3927, 4029]
699	[1223, 1224]	1743	[1033, 1038]	2787	[3375, 3121]	3831	[648, 3094]
700	[76, 1225]	1744	[2543, 1261]	2788	[811, 3173]	3832	[3935, 4030]
701	[1226, 1227]	1745	[2544, 326]	2789	[3120, 230]	3833	[2955, 1527]
702	[1228, 1229]	1746	[2545, 2546]	2790	[3426, 536]	3834	[1942, 3081]
703	[1230, 1231]	1747	[2380, 864]	2791	[743, 3427]	3835	[526, 4031]
704	[1232, 1233]	1748	[2547, 969]	2792	[1641, 3428]	3836	[2966, 4032]
705	[1234, 1235]	1749	[2548, 931]	2793	[3348, 3232]	3837	[3209, 1650]
706	[73, 953]	1750	[249, 2549]	2794	[3086, 3429]	3838	[4033, 4034]
707	[1236, 383]	1751	[2550, 1126]	2795	[3430, 3431]	3839	[1454, 3427]
708	[957, 1085]	1752	[409, 2551]	2796	[1904, 3365]	3840	[1893, 3981]
709	[394, 1237]	1753	[2301, 2203]	2797	[3298, 3432]	3841	[823, 4035]
710	[1238, 1239]	1754	[2552, 1207]	2798	[3433, 1984]	3842	[3286, 3072]
711	[1240, 959]	1755	[2553, 2554]	2799	[1582, 3067]	3843	[1429, 3189]
712	[1241, 394]	1756	[2555, 971]	2800	[3434, 3435]	3844	[2948, 4019]
713	[1242, 1243]	1757	[2556, 1354]	2801	[633, 3345]	3845	[3941, 1756]
714	[1019, 1244]	1758	[387, 2557]	2802	[3436, 1670]	3846	[3441, 2022]
715	[1245, 1246]	1759	[2558, 2559]	2803	[2931, 3391]	3847	[3228, 179]
716	[1247, 251]	1760	[2429, 951]	2804	[3418, 3437]	3848	[1545, 3921]
717	[1215, 1248]	1761	[2560, 338]	2805	[202, 3106]	3849	[2050, 2100]
718	[1249, 860]	1762	[2179, 2561]	2806	[3438, 1814]	3850	[3911, 1900]

719	[1250, 1251]	1763	[403, 1135]	2807	[181, 1965]	3851	[2099, 2051]
720	[1252, 1253]	1764	[1391, 2562]	2808	[1686, 3351]	3852	[3327, 3362]
721	[1254, 403]	1765	[2563, 2564]	2809	[746, 3439]	3853	[1693, 4036]
722	[361, 1255]	1766	[2369, 2565]	2810	[1978, 3440]	3854	[3135, 3196]
723	[1256, 299]	1767	[2566, 2567]	2811	[3441, 3246]	3855	[3386, 4037]
724	[1257, 1258]	1768	[873, 2568]	2812	[3442, 3285]	3856	[4038, 1790]
725	[1259, 1260]	1769	[269, 388]	2813	[3361, 2932]	3857	[2070, 3275]
726	[1261, 1262]	1770	[2569, 2570]	2814	[3443, 1910]	3858	[522, 2960]
727	[1263, 1264]	1771	[2571, 906]	2815	[2113, 233]	3859	[4039, 3953]
728	[1265, 1266]	1772	[22, 1073]	2816	[126, 3444]	3860	[3118, 3996]
729	[1087, 1267]	1773	[2572, 2573]	2817	[3398, 3186]	3861	[720, 3483]
730	[1268, 880]	1774	[1142, 2574]	2818	[3445, 2086]	3862	[1589, 3300]
731	[1269, 1270]	1775	[2575, 2576]	2819	[1833, 3237]	3863	[4040, 3219]
732	[1271, 1272]	1776	[2577, 2554]	2820	[3446, 3428]	3864	[3061, 3044]
733	[1273, 1274]	1777	[2578, 2164]	2821	[3447, 1890]	3865	[3095, 3995]
734	[1275, 443]	1778	[2579, 2580]	2822	[1445, 3448]	3866	[4041, 2007]
735	[1276, 1277]	1779	[1361, 922]	2823	[158, 1751]	3867	[4028, 3894]
736	[1278, 1135]	1780	[2581, 2582]	2824	[1577, 3413]	3868	[2033, 1925]
737	[1279, 1280]	1781	[2583, 2584]	2825	[3449, 3450]	3869	[3142, 513]
738	[318, 1281]	1782	[2534, 2195]	2826	[2950, 3055]	3870	[4042, 3294]
739	[1282, 1283]	1783	[2585, 2586]	2827	[3451, 181]	3871	[1869, 4014]
740	[441, 1284]	1784	[2421, 2230]	2828	[3369, 1511]	3872	[4043, 3903]
741	[1285, 1286]	1785	[2422, 67]	2829	[3132, 34]	3873	[2997, 3940]
742	[1287, 1288]	1786	[2587, 2558]	2830	[1483, 3452]	3874	[3066, 1703]
743	[1289, 1124]	1787	[275, 2588]	2831	[586, 3115]	3875	[546, 2042]
744	[442, 84]	1788	[2589, 893]	2832	[1423, 1948]	3876	[4044, 40]
745	[1290, 1291]	1789	[2590, 92]	2833	[3451, 1964]	3877	[4041, 1595]
746	[1292, 1156]	1790	[2591, 2592]	2834	[3383, 1930]	3878	[1665, 3901]
747	[1293, 1294]	1791	[974, 2593]	2835	[3453, 1737]	3879	[3084, 1586]
748	[1295, 1296]	1792	[2594, 942]	2836	[3321, 1473]	3880	[4045, 3142]
749	[1297, 1298]	1793	[446, 1093]	2837	[519, 3454]	3881	[1775, 3249]
750	[1299, 1300]	1794	[852, 2595]	2838	[1716, 3358]	3882	[4045, 512]
751	[1301, 1302]	1795	[2596, 2597]	2839	[3446, 1642]	3883	[217, 3392]
752	[1303, 1191]	1796	[117, 2598]	2840	[492, 3367]	3884	[4033, 4046]
753	[1304, 1305]	1797	[2599, 2600]	2841	[657, 3455]	3885	[3931, 2970]
754	[1306, 1307]	1798	[1002, 2601]	2842	[3456, 3457]	3886	[3116, 3385]
755	[1308, 1309]	1799	[1145, 2602]	2843	[1896, 3359]	3887	[3049, 3339]
756	[1310, 1311]	1800	[2199, 1011]	2844	[2115, 3458]	3888	[1798, 2968]
757	[79, 1013]	1801	[2603, 945]	2845	[1874, 3029]	3889	[4047, 449]
758	[1019, 1270]	1802	[2604, 2574]	2846	[3459, 3422]	3890	[3840, 2486]
759	[1103, 1312]	1803	[2225, 2605]	2847	[1548, 3216]	3891	[2844, 4048]
760	[315, 1313]	1804	[1017, 2606]	2848	[2934, 1947]	3892	[2306, 1053]
761	[1314, 1315]	1805	[2607, 2608]	2849	[3460, 2105]	3893	[358, 1317]
762	[1221, 1316]	1806	[1084, 1068]	2850	[3461, 3462]	3894	[3582, 1202]

763	[1317, 1023]	1807	[2458, 1059]	2851	[3281, 1726]	3895	[4049, 1162]
764	[1318, 1319]	1808	[2539, 2609]	2852	[3463, 463]	3896	[1233, 867]
765	[1320, 1321]	1809	[979, 1266]	2853	[519, 2076]	3897	[448, 1219]
766	[1322, 1280]	1810	[2497, 1233]	2854	[3183, 3464]	3898	[2708, 1268]
767	[1323, 1324]	1811	[953, 2394]	2855	[37, 3465]	3899	[4050, 3535]
768	[1325, 1189]	1812	[2610, 2584]	2856	[3466, 1701]	3900	[2727, 434]
769	[1326, 914]	1813	[2611, 2612]	2857	[3205, 3371]	3901	[2818, 2307]
770	[1327, 1328]	1814	[2613, 18]	2858	[3391, 2994]	3902	[63, 3576]
771	[1329, 382]	1815	[2614, 1102]	2859	[738, 1893]	3903	[1342, 3521]
772	[1330, 1331]	1816	[2615, 2616]	2860	[3467, 1484]	3904	[3795, 2238]
773	[1332, 1333]	1817	[2617, 2618]	2861	[3468, 512]	3905	[1407, 4051]
774	[1334, 1335]	1818	[119, 2480]	2862	[747, 3469]	3906	[839, 3843]
775	[1336, 1337]	1819	[427, 412]	2863	[2979, 2057]	3907	[2273, 887]
776	[929, 1338]	1820	[2619, 1383]	2864	[2018, 1807]	3908	[4052, 2252]
777	[1339, 376]	1821	[2620, 2621]	2865	[3393, 3470]	3909	[1273, 2877]
778	[1340, 1341]	1822	[908, 2221]	2866	[2116, 737]	3910	[3708, 452]
779	[27, 1342]	1823	[2622, 2338]	2867	[3194, 1577]	3911	[3877, 4053]
780	[1343, 1315]	1824	[2623, 2479]	2868	[681, 2995]	3912	[3589, 2812]
781	[1344, 911]	1825	[2624, 1061]	2869	[3006, 2942]	3913	[2908, 2306]
782	[1345, 1346]	1826	[1344, 2625]	2870	[3383, 3471]	3914	[1233, 2379]
783	[1347, 1348]	1827	[2545, 2626]	2871	[1819, 3458]	3915	[4054, 4055]
784	[1349, 1350]	1828	[2627, 1173]	2872	[543, 2038]	3916	[401, 4056]
785	[1351, 1352]	1829	[1280, 2628]	2873	[1563, 3472]	3917	[988, 350]
786	[1353, 1354]	1830	[2629, 2222]	2874	[3156, 3308]	3918	[4057, 4058]
787	[859, 1355]	1831	[2630, 2415]	2875	[1879, 749]	3919	[4059, 2344]
788	[1356, 858]	1832	[2631, 1219]	2876	[3193, 3473]	3920	[2509, 2830]
789	[1357, 1358]	1833	[1271, 2632]	2877	[3474, 3108]	3921	[3491, 2815]
790	[1359, 1360]	1834	[2633, 2388]	2878	[3313, 2046]	3922	[4060, 2668]
791	[1361, 960]	1835	[2634, 2635]	2879	[3345, 1609]	3923	[237, 4061]
792	[1056, 1362]	1836	[2636, 2637]	2880	[3029, 1415]	3924	[2172, 1111]
793	[1363, 1364]	1837	[2638, 2233]	2881	[644, 3147]	3925	[4062, 1349]
794	[1365, 285]	1838	[1137, 834]	2882	[3171, 764]	3926	[1157, 908]
795	[1366, 1056]	1839	[2639, 2312]	2883	[3215, 1549]	3927	[4063, 2427]
796	[108, 1367]	1840	[2640, 2641]	2884	[1478, 3475]	3928	[4064, 2449]
797	[1368, 1369]	1841	[2382, 2642]	2885	[1651, 3476]	3929	[3828, 260]
798	[1370, 987]	1842	[1340, 2643]	2886	[2045, 144]	3930	[450, 4065]
799	[1371, 1372]	1843	[1287, 2455]	2887	[1779, 3477]	3931	[3845, 4066]
800	[1373, 1007]	1844	[26, 1243]	2888	[1921, 3478]	3932	[1409, 4067]
801	[1374, 1375]	1845	[2644, 2645]	2889	[1508, 3465]	3933	[4068, 2217]
802	[1376, 1377]	1846	[2646, 2647]	2890	[1743, 1494]	3934	[1085, 3583]
803	[1378, 1379]	1847	[25, 1242]	2891	[2104, 3479]	3935	[2799, 1168]
804	[1380, 1381]	1848	[2648, 363]	2892	[3480, 3290]	3936	[3735, 2750]
805	[1382, 1296]	1849	[2414, 1182]	2893	[3200, 3357]	3937	[1282, 2513]
806	[1250, 1383]	1850	[2649, 2265]	2894	[1481, 3103]	3938	[3805, 4069]

807	[1074, 323]	1851	[2650, 2651]	2895	[733, 771]	3939	[4070, 2298]
808	[1384, 1385]	1852	[2652, 2653]	2896	[1490, 2942]	3940	[2769, 990]
809	[1055, 423]	1853	[2654, 2354]	2897	[3327, 2109]	3941	[3734, 2183]
810	[1386, 1376]	1854	[2655, 2656]	2898	[741, 1827]	3942	[4071, 1118]
811	[1387, 1388]	1855	[1384, 2657]	2899	[3481, 3482]	3943	[918, 3502]
812	[1389, 1390]	1856	[2658, 2659]	2900	[3266, 579]	3944	[4072, 1309]
813	[1391, 353]	1857	[2660, 977]	2901	[3243, 3483]	3945	[114, 4073]
814	[1392, 1393]	1858	[2433, 2374]	2902	[3262, 3014]	3946	[4052, 1229]
815	[1394, 1395]	1859	[2661, 1027]	2903	[1692, 3484]	3947	[876, 1088]
816	[1396, 1397]	1860	[2492, 1116]	2904	[1872, 806]	3948	[3538, 260]
817	[1398, 1399]	1861	[2662, 2663]	2905	[579, 3485]	3949	[2487, 4074]
818	[1400, 1401]	1862	[2664, 2325]	2906	[791, 1731]	3950	[3714, 4075]
819	[1402, 1403]	1863	[2665, 919]	2907	[2048, 3317]	3951	[4076, 3769]
820	[1404, 1405]	1864	[2629, 2274]	2908	[3019, 3486]	3952	[4077, 1291]
821	[1347, 1119]	1865	[2666, 831]	2909	[9, 1661]	3953	[4078, 23]
822	[1406, 1407]	1866	[1171, 1327]	2910	[1737, 3078]	3954	[3604, 2890]
823	[1408, 976]	1867	[2667, 2668]	2911	[3447, 1592]	3955	[2558, 4079]
824	[1409, 955]	1868	[2669, 436]	2912	[3487, 3488]	3956	[4080, 949]
825	[978, 1231]	1869	[2670, 2671]	2913	[3489, 2962]	3957	[4081, 2863]
826	[1410, 1411]	1870	[120, 258]	2914	[3490, 3491]	3958	[1382, 2276]
827	[1412, 1413]	1871	[118, 2479]	2915	[2805, 849]	3959	[911, 3638]
828	[1414, 1415]	1872	[245, 2672]	2916	[3492, 848]	3960	[4082, 2349]
829	[1416, 232]	1873	[2673, 2674]	2917	[2717, 3493]	3961	[2438, 1319]
830	[1417, 1418]	1874	[2675, 2123]	2918	[3494, 3495]	3962	[3712, 4083]
831	[575, 1419]	1875	[896, 1387]	2919	[2210, 3496]	3963	[2277, 2883]
832	[620, 1420]	1876	[2676, 1298]	2920	[312, 1198]	3964	[3846, 3594]
833	[1421, 1422]	1877	[2677, 1352]	2921	[1090, 3497]	3965	[4084, 1119]
834	[1423, 1424]	1878	[2678, 2679]	2922	[3491, 3498]	3966	[274, 3888]
835	[1425, 660]	1879	[2680, 420]	2923	[1301, 3499]	3967	[2689, 2143]
836	[1426, 1427]	1880	[2681, 1307]	2924	[1114, 3500]	3968	[276, 2764]
837	[1428, 557]	1881	[2682, 2504]	2925	[2790, 3501]	3969	[1111, 1112]
838	[658, 1429]	1882	[363, 2683]	2926	[273, 982]	3970	[1334, 4058]
839	[1430, 1431]	1883	[2684, 2685]	2927	[355, 3502]	3971	[4085, 2207]
840	[1432, 1433]	1884	[2664, 243]	2928	[3503, 1378]	3972	[4086, 2862]
841	[1434, 123]	1885	[1313, 2542]	2929	[3504, 3505]	3973	[4087, 1365]
842	[1435, 613]	1886	[2686, 1044]	2930	[1395, 3506]	3974	[1125, 3541]
843	[1436, 1437]	1887	[2411, 2687]	2931	[3507, 3508]	3975	[2603, 447]
844	[1438, 1439]	1888	[2688, 2138]	2932	[16, 3509]	3976	[4088, 3652]
845	[1440, 785]	1889	[2689, 2690]	2933	[1195, 3510]	3977	[3783, 3811]
846	[1441, 727]	1890	[2276, 2402]	2934	[4, 3511]	3978	[1083, 2910]
847	[1442, 1443]	1891	[2691, 2626]	2935	[2337, 3512]	3979	[2641, 3804]
848	[1444, 1445]	1892	[948, 2692]	2936	[3513, 1407]	3980	[4089, 2429]
849	[564, 1446]	1893	[2445, 2484]	2937	[2562, 1103]	3981	[2481, 1399]
850	[1447, 1448]	1894	[2693, 2694]	2938	[3514, 83]	3982	[2180, 4090]

851	[1449, 1450]	1895	[1229, 2695]	2939	[2743, 2622]	3983	[4091, 1049]
852	[1451, 740]	1896	[850, 2696]	2940	[1380, 2840]	3984	[4092, 4093]
853	[1452, 1453]	1897	[2268, 2314]	2941	[3511, 340]	3985	[2153, 2611]
854	[1454, 744]	1898	[2697, 2698]	2942	[2298, 3515]	3986	[300, 2372]
855	[1455, 1456]	1899	[2699, 2700]	2943	[3516, 2779]	3987	[1388, 3827]
856	[1457, 1458]	1900	[2701, 1217]	2944	[3517, 2273]	3988	[4094, 2331]
857	[678, 1459]	1901	[1020, 2702]	2945	[3518, 89]	3989	[4076, 1001]
858	[807, 674]	1902	[2703, 2565]	2946	[454, 3519]	3990	[4095, 1146]
859	[1460, 467]	1903	[2704, 2448]	2947	[2539, 422]	3991	[3698, 4096]
860	[1461, 1462]	1904	[2705, 2706]	2948	[3520, 2254]	3992	[1178, 2459]
861	[1463, 1464]	1905	[2707, 2511]	2949	[28, 3521]	3993	[4097, 438]
862	[793, 823]	1906	[2708, 879]	2950	[3522, 2725]	3994	[2807, 3863]
863	[56, 1465]	1907	[372, 2709]	2951	[2631, 112]	3995	[3546, 3812]
864	[1466, 1467]	1908	[2710, 2711]	2952	[3523, 978]	3996	[2446, 2533]
865	[34, 1468]	1909	[2712, 411]	2953	[3524, 1084]	3997	[1343, 4098]
866	[785, 1469]	1910	[1031, 2713]	2954	[3525, 2333]	3998	[4099, 308]
867	[1470, 1471]	1911	[2714, 861]	2955	[3526, 3527]	3999	[2443, 2179]
868	[1472, 1473]	1912	[2715, 2716]	2956	[2827, 2679]	4000	[2770, 4100]
869	[1474, 1475]	1913	[2717, 2155]	2957	[2847, 3528]	4001	[4101, 3509]
870	[1476, 228]	1914	[2615, 2718]	2958	[2421, 3529]	4002	[4102, 2573]
871	[1477, 552]	1915	[2697, 1259]	2959	[2808, 3530]	4003	[2287, 4103]
872	[1478, 583]	1916	[2474, 71]	2960	[2878, 2400]	4004	[2133, 1294]
873	[1479, 556]	1917	[991, 2436]	2961	[3531, 1170]	4005	[4104, 4105]
874	[1430, 1480]	1918	[2719, 306]	2962	[2370, 2774]	4006	[247, 2793]
875	[1481, 1482]	1919	[2462, 2720]	2963	[3524, 957]	4007	[1272, 2279]
876	[1483, 1484]	1920	[2721, 321]	2964	[1229, 3532]	4008	[4106, 108]
877	[1485, 1486]	1921	[20, 2604]	2965	[2739, 2296]	4009	[3614, 2664]
878	[1487, 1488]	1922	[2722, 2723]	2966	[1107, 1205]	4010	[4107, 2804]
879	[1489, 824]	1923	[2724, 2725]	2967	[3533, 266]	4011	[4062, 1047]
880	[1490, 1491]	1924	[2256, 2726]	2968	[3534, 3535]	4012	[1240, 4108]
881	[1492, 1493]	1925	[2727, 309]	2969	[3536, 3537]	4013	[4109, 405]
882	[1494, 1495]	1926	[2728, 2729]	2970	[3538, 1159]	4014	[3698, 314]
883	[187, 1496]	1927	[2730, 1300]	2971	[3539, 3540]	4015	[328, 3752]
884	[195, 195]	1928	[1351, 2731]	2972	[3541, 2572]	4016	[4066, 1163]
885	[1497, 1498]	1929	[23, 2146]	2973	[348, 3542]	4017	[954, 401]
886	[702, 479]	1930	[2700, 927]	2974	[2782, 421]	4018	[833, 1138]
887	[1499, 1500]	1931	[850, 2732]	2975	[1277, 2569]	4019	[3503, 2797]
888	[1501, 1502]	1932	[2733, 2558]	2976	[3543, 407]	4020	[1123, 4110]
889	[1503, 1504]	1933	[2129, 2734]	2977	[3544, 2165]	4021	[2814, 3498]
890	[1417, 134]	1934	[394, 2735]	2978	[1006, 2359]	4022	[4111, 303]
891	[136, 1505]	1935	[975, 2736]	2979	[1148, 316]	4023	[2513, 4112]
892	[1506, 1507]	1936	[929, 2268]	2980	[2254, 3545]	4024	[4113, 1180]
893	[1508, 38]	1937	[2737, 110]	2981	[2564, 1365]	4025	[2639, 1358]
894	[1509, 125]	1938	[2738, 2449]	2982	[2568, 1129]	4026	[884, 4056]

895	[614, 1510]	1939	[2600, 2739]	2983	[3546, 2659]	4027	[4114, 3636]
896	[1511, 1512]	1940	[1152, 2740]	2984	[3547, 3548]	4028	[4115, 1385]
897	[1513, 1514]	1941	[2741, 2742]	2985	[3549, 1341]	4029	[2381, 3506]
898	[475, 1515]	1942	[2743, 2337]	2986	[3550, 3551]	4030	[1359, 3720]
899	[1516, 1517]	1943	[2213, 2744]	2987	[2644, 3552]	4031	[2607, 3677]
900	[1518, 1519]	1944	[2745, 2567]	2988	[3553, 1049]	4032	[992, 2437]
901	[1520, 1521]	1945	[2746, 2717]	2989	[3554, 3555]	4033	[413, 3621]
902	[1522, 1523]	1946	[2747, 2748]	2990	[3556, 3557]	4034	[957, 1068]
903	[1524, 1525]	1947	[1285, 916]	2991	[2463, 2853]	4035	[3784, 2675]
904	[506, 1526]	1948	[337, 2749]	2992	[2762, 887]	4036	[2386, 1094]
905	[1527, 1528]	1949	[2750, 102]	2993	[2565, 3558]	4037	[1026, 3680]
906	[571, 1420]	1950	[2751, 2752]	2994	[3559, 962]	4038	[4116, 3501]
907	[1529, 536]	1951	[2753, 2334]	2995	[3560, 2284]	4039	[4117, 3617]
908	[1530, 1464]	1952	[2174, 924]	2996	[2813, 2851]	4040	[4118, 2664]
909	[491, 1531]	1953	[2754, 2755]	2997	[333, 3561]	4041	[3615, 4119]
910	[1532, 1533]	1954	[2756, 2319]	2998	[2475, 3562]	4042	[4120, 847]
911	[1534, 509]	1955	[2611, 360]	2999	[2895, 3540]	4043	[4121, 1305]
912	[135, 1535]	1956	[2444, 2757]	3000	[1108, 3563]	4044	[2739, 2335]
913	[505, 1536]	1957	[2546, 2758]	3001	[2397, 1210]	4045	[2699, 926]
914	[508, 576]	1958	[2235, 2759]	3002	[3564, 3565]	4046	[381, 2817]
915	[1537, 504]	1959	[1959, 1959]	3003	[3566, 3567]	4047	[4122, 165]
916	[504, 669]	1960	[2760, 1081]	3004	[2820, 3568]	4048	[3474, 3012]
917	[509, 1535]	1961	[2761, 888]	3005	[3569, 109]	4049	[1669, 3957]
918	[1538, 505]	1962	[2762, 2761]	3006	[3570, 2441]	4050	[1520, 3280]
919	[1539, 135]	1963	[2368, 2763]	3007	[332, 984]	4051	[145, 4123]
920	[1540, 1541]	1964	[2764, 953]	3008	[1358, 3571]	4052	[1736, 3909]
921	[1542, 1543]	1965	[350, 2606]	3009	[3572, 2687]	4053	[3484, 4036]
922	[1544, 1545]	1966	[2173, 2140]	3010	[2468, 3573]	4054	[2970, 4016]
923	[1532, 684]	1967	[987, 349]	3011	[3574, 249]	4055	[1933, 4124]
924	[1546, 1547]	1968	[2765, 336]	3012	[2408, 1377]	4056	[3416, 1448]
925	[755, 688]	1969	[2766, 847]	3013	[1128, 2434]	4057	[3187, 1618]
926	[1548, 1549]	1970	[1319, 2767]	3014	[3575, 3576]	4058	[4125, 1805]
927	[553, 1550]	1971	[2768, 2769]	3015	[2638, 2597]	4059	[1518, 2993]
928	[1551, 1552]	1972	[2770, 2771]	3016	[2901, 3577]	4060	[3318, 1802]
929	[1553, 786]	1973	[2772, 2773]	3017	[2276, 2176]	4061	[456, 4126]
930	[1554, 191]	1974	[2774, 2775]	3018	[1276, 341]	4062	[3977, 4127]
931	[150, 1555]	1975	[2250, 2776]	3019	[1104, 1287]	4063	[1619, 1968]
932	[1556, 1557]	1976	[2777, 2637]	3020	[3578, 3579]	4064	[1844, 4030]
933	[1558, 1559]	1977	[2778, 2598]	3021	[2548, 3580]	4065	[3276, 4128]
934	[1560, 1561]	1978	[94, 406]	3022	[3581, 2645]	4066	[1442, 3464]
935	[1470, 139]	1979	[2579, 1369]	3023	[3582, 2813]	4067	[4129, 3928]
936	[52, 1562]	1980	[924, 2152]	3024	[1068, 3583]	4068	[3097, 542]
937	[143, 706]	1981	[2688, 2779]	3025	[1376, 3584]	4069	[3917, 2985]
938	[1563, 655]	1982	[2248, 2231]	3026	[3585, 3537]	4070	[3265, 187]

939	[1564, 1565]	1983	[2780, 2781]	3027	[861, 1008]	4071	[1945, 2916]
940	[1566, 1567]	1984	[2782, 2539]	3028	[3586, 2170]	4072	[3430, 3450]
941	[1568, 716]	1985	[2783, 2605]	3029	[1368, 2580]	4073	[3316, 1878]
942	[1569, 638]	1986	[2784, 1239]	3030	[3587, 3588]	4074	[3353, 3935]
943	[645, 1570]	1987	[2785, 2274]	3031	[3589, 3590]	4075	[4130, 3908]
944	[1571, 1572]	1988	[2786, 2454]	3032	[3591, 428]	4076	[1862, 3308]
945	[1573, 217]	1989	[2787, 2788]	3033	[3592, 1372]	4077	[3016, 630]
946	[1426, 1574]	1990	[2789, 2653]	3034	[842, 2356]	4078	[682, 3423]
947	[1575, 1430]	1991	[2790, 2791]	3035	[3593, 358]	4079	[2961, 3964]
948	[1576, 1577]	1992	[2792, 117]	3036	[2261, 3594]	4080	[2000, 470]
949	[1578, 1462]	1993	[2365, 2793]	3037	[68, 2459]	4081	[722, 653]
950	[1579, 1580]	1994	[1114, 2794]	3038	[3595, 983]	4082	[3945, 609]
951	[1581, 1511]	1995	[2795, 2796]	3039	[2686, 2159]	4083	[3295, 4131]
952	[196, 196]	1996	[1096, 369]	3040	[303, 365]	4084	[1851, 3069]
953	[531, 533]	1997	[2797, 1379]	3041	[1307, 353]	4085	[495, 3432]
954	[50, 142]	1998	[2439, 2767]	3042	[913, 2177]	4086	[3030, 3910]
955	[706, 530]	1999	[2798, 2678]	3043	[417, 3500]	4087	[693, 1919]
956	[530, 711]	2000	[2799, 2800]	3044	[3596, 2381]	4088	[1682, 4031]
957	[194, 197]	2001	[2801, 2549]	3045	[116, 2778]	4089	[3433, 1716]
958	[1582, 735]	2002	[2802, 1255]	3046	[3597, 419]	4090	[579, 4132]
959	[712, 534]	2003	[2803, 2804]	3047	[870, 23]	4091	[3408, 1760]
960	[1583, 1584]	2004	[295, 2805]	3048	[3598, 3599]	4092	[565, 4001]
961	[1585, 1586]	2005	[2806, 1172]	3049	[3600, 76]	4093	[4006, 4133]
962	[652, 1587]	2006	[1010, 2807]	3050	[2190, 2594]	4094	[1759, 32]
963	[665, 1588]	2007	[985, 2235]	3051	[3601, 2621]	4095	[3261, 1690]
964	[1589, 626]	2008	[2808, 2809]	3052	[305, 3602]	4096	[3148, 4134]
965	[571, 758]	2009	[2593, 2736]	3053	[3494, 3603]	4097	[2921, 3986]
966	[730, 1590]	2010	[2636, 2810]	3054	[2470, 1224]	4098	[4002, 4135]
967	[1591, 1592]	2011	[2694, 2218]	3055	[3604, 2830]	4099	[1841, 3268]
968	[1593, 1594]	2012	[1170, 2748]	3056	[2632, 2283]	4100	[1618, 4018]
969	[1595, 1596]	2013	[2811, 2812]	3057	[1257, 3605]	4101	[3278, 3140]
970	[33, 499]	2014	[1201, 2813]	3058	[2798, 2827]	4102	[528, 165]
971	[1597, 1424]	2015	[2814, 2815]	3059	[1131, 1194]	4103	[3971, 4136]
972	[1598, 519]	2016	[2816, 2390]	3060	[2203, 238]	4104	[3329, 3958]
973	[459, 1465]	2017	[2591, 1397]	3061	[1216, 3606]	4105	[3942, 4137]
974	[1599, 1600]	2018	[1329, 2817]	3062	[3607, 2478]	4106	[3438, 2074]
975	[1601, 1480]	2019	[2818, 1053]	3063	[1245, 2506]	4107	[1859, 4138]
976	[1602, 1603]	2020	[2819, 1268]	3064	[3499, 3608]	4108	[3396, 4139]
977	[480, 1604]	2021	[2149, 2639]	3065	[1203, 2199]	4109	[1540, 520]
978	[1605, 658]	2022	[2820, 2821]	3066	[17, 3609]	4110	[3965, 4024]
979	[1606, 1607]	2023	[2816, 321]	3067	[3610, 2378]	4111	[603, 685]
980	[1581, 1608]	2024	[2807, 2822]	3068	[247, 3611]	4112	[1683, 4140]
981	[634, 1609]	2025	[453, 2823]	3069	[3612, 2604]	4113	[666, 1958]
982	[1610, 1611]	2026	[245, 2824]	3070	[2406, 3613]	4114	[199, 661]

983	[1612, 582]	2027	[2825, 2826]	3071	[3614, 242]	4115	[4020, 1657]
984	[1613, 1614]	2028	[428, 413]	3072	[3615, 1100]	4116	[3236, 1834]
985	[1615, 1590]	2029	[2827, 2828]	3073	[3616, 3617]	4117	[3363, 3054]
986	[1476, 480]	2030	[2829, 2148]	3074	[1062, 3618]	4118	[152, 467]
987	[216, 1616]	2031	[2651, 889]	3075	[2242, 111]	4119	[460, 2079]
988	[1553, 1469]	2032	[2830, 2831]	3076	[3613, 418]	4120	[178, 1436]
989	[1617, 1618]	2033	[1172, 2832]	3077	[3619, 2752]	4121	[1576, 493]
990	[1619, 1620]	2034	[2833, 2834]	3078	[1057, 2218]	4122	[4141, 1398]
991	[685, 768]	2035	[2835, 2601]	3079	[3620, 1331]	4123	[857, 1276]
992	[499, 1468]	2036	[840, 2765]	3080	[2360, 3621]	4124	[1236, 4142]
993	[1621, 1622]	2037	[2836, 2773]	3081	[3622, 2618]	4125	[4143, 4144]
994	[1445, 1623]	2038	[1194, 1211]	3082	[3623, 3624]	4126	[827, 4145]
995	[1624, 1625]	2039	[973, 2837]	3083	[3625, 1029]	4127	[3515, 3510]
996	[1626, 1627]	2040	[950, 2838]	3084	[2502, 3626]	4128	[4146, 4147]
997	[1628, 1517]	2041	[2839, 2840]	3085	[827, 2517]	4129	[4148, 323]
998	[1499, 1629]	2042	[2710, 2841]	3086	[3627, 1311]	4130	[4149, 2706]
999	[1630, 1631]	2043	[2842, 2532]	3087	[3628, 3629]	4131	[4150, 2750]
1000	[1632, 1633]	2044	[2843, 2635]	3088	[430, 1274]	4132	[1031, 4151]
1001	[49, 1601]	2045	[79, 281]	3089	[3536, 3630]	4133	[4152, 3648]
1002	[1634, 1635]	2046	[2275, 857]	3090	[3631, 1131]	4134	[2257, 1024]
1003	[1630, 1636]	2047	[2844, 2290]	3091	[2833, 2889]	4135	[2283, 3560]
1004	[1637, 1638]	2048	[1182, 2845]	3092	[3560, 3632]	4136	[865, 2639]
1005	[1639, 1640]	2049	[2846, 2847]	3093	[2370, 3558]	4137	[69, 3587]
1006	[1641, 1642]	2050	[1162, 2753]	3094	[1263, 1367]	4138	[1270, 2121]
1007	[183, 1643]	2051	[2848, 365]	3095	[3633, 2293]	4139	[1284, 84]
1008	[588, 1644]	2052	[66, 2423]	3096	[2691, 2546]	4140	[2769, 4153]
1009	[1464, 461]	2053	[2849, 2206]	3097	[3634, 3635]	4141	[4154, 2108]
1010	[1645, 1445]	2054	[2850, 2323]	3098	[2472, 3636]	4142	[1722, 53]
1011	[1646, 674]	2055	[1202, 2851]	3099	[3637, 2739]	4143	[3141, 3404]
1012	[1647, 1648]	2056	[2852, 2853]	3100	[342, 2570]	4144	[4130, 3914]
1013	[153, 468]	2057	[1150, 1042]	3101	[3638, 917]	4145	[1411, 4155]
1014	[1649, 1650]	2058	[2854, 2855]	3102	[887, 3639]	4146	[3903, 3040]
1015	[1651, 1652]	2059	[2741, 1136]	3103	[2252, 3532]	4147	[3481, 4156]
1016	[543, 1653]	2060	[2856, 2271]	3104	[3640, 2541]	4148	[1962, 3488]
1017	[1654, 1655]	2061	[2857, 2858]	3105	[3641, 3642]	4149	[3089, 1552]
1018	[1656, 1657]	2062	[2859, 2860]	3106	[3643, 1107]	4150	[707, 198]
1019	[1658, 1659]	2063	[2861, 2862]	3107	[1308, 1323]	4151	[1673, 4157]
1020	[1660, 1661]	2064	[2194, 2863]	3108	[1254, 1278]	4152	[669, 575]
1021	[1662, 1663]	2065	[2864, 398]	3109	[2154, 3493]	4153	[1451, 564]
1022	[1664, 814]	2066	[2483, 2865]	3110	[2140, 924]	4154	[4158, 2907]
1023	[1665, 1666]	2067	[393, 2866]	3111	[3644, 2781]	4155	[2118, 3568]
1024	[1667, 1668]	2068	[431, 2253]	3112	[2367, 285]	4156	[3499, 4159]
1025	[510, 1605]	2069	[2867, 2868]	3113	[3645, 3646]	4157	[2236, 4160]
1026	[1539, 509]	2070	[279, 2869]	3114	[3647, 1019]	4158	[4161, 1494]

1027	[1535, 1538]	2071	[2589, 2870]	3115	[3595, 332]	4159	[3897, 4162]
1028	[1669, 1670]	2072	[2871, 2641]	3116	[1071, 3648]	4160	[1680, 4163]
1029	[1671, 754]	2073	[2872, 1334]	3117	[3649, 2699]	4161	[4164, 2232]
1030	[1672, 1673]	2074	[2597, 453]	3118	[3650, 2520]	4162	[4165, 2724]
1031	[1674, 673]	2075	[2873, 910]	3119	[3651, 3652]	4163	[1079, 1113]
1032	[1675, 761]	2076	[2874, 2841]	3120	[1008, 3653]	4164	[4166, 2081]
1033	[1676, 1677]	2077	[2875, 2876]	3121	[1342, 2300]	4165	[732, 4138]
1034	[1678, 1432]	2078	[430, 2877]	3122	[1309, 1324]	4166	[4167, 2881]
1035	[1679, 1607]	2079	[2878, 1227]	3123	[2806, 2627]	4167	[4168, 1982]
1036	[1436, 598]	2080	[2879, 444]	3124	[2759, 977]	4168	[4169, 1037]
1037	[547, 780]	2081	[2880, 2536]	3125	[1127, 2433]	4169	[4170, 1680]
1038	[1680, 1681]	2082	[2881, 1290]	3126	[3654, 3655]	4170	[4171, 2470]
1039	[1682, 527]	2083	[1150, 2882]	3127	[3656, 2663]	4171	[4172, 664]
1040	[1683, 1684]	2084	[2883, 2884]	3128	[3657, 3658]	4172	[3, 3706]
1041	[1685, 1686]	2085	[877, 2885]	3129	[2850, 3659]		
1042	[1531, 1687]	2086	[848, 844]	3130	[2518, 2734]		
1043	[1688, 1689]	2087	[2886, 2887]	3131	[2396, 3660]		

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	696	0	1392	1	2088	1	2784	0	3480	0
1	0	697	0	1393	0	2089	0	2785	1	3481	0
2	0	698	0	1394	1	2090	1	2786	1	3482	0
3	0	699	1	1395	1	2091	0	2787	0	3483	0
4	0	700	0	1396	0	2092	1	2788	1	3484	1
5	0	701	0	1397	0	2093	0	2789	0	3485	1
6	1	702	1	1398	1	2094	1	2790	1	3486	0
7	0	703	1	1399	1	2095	0	2791	0	3487	0
8	1	704	1	1400	1	2096	0	2792	0	3488	1
9	0	705	0	1401	1	2097	1	2793	0	3489	0
10	0	706	0	1402	1	2098	1	2794	0	3490	0
11	0	707	0	1403	1	2099	1	2795	1	3491	1
12	0	708	0	1404	0	2100	1	2796	0	3492	0
13	1	709	1	1405	0	2101	0	2797	0	3493	1
14	1	710	1	1406	0	2102	0	2798	0	3494	0
15	0	711	1	1407	0	2103	1	2799	0	3495	0
16	1	712	0	1408	0	2104	0	2800	1	3496	1
17	1	713	0	1409	0	2105	1	2801	1	3497	0
18	1	714	1	1410	0	2106	0	2802	0	3498	1
19	0	715	0	1411	0	2107	0	2803	1	3499	1
20	1	716	0	1412	0	2108	1	2804	1	3500	1
21	0	717	1	1413	1	2109	1	2805	1	3501	1
22	1	718	0	1414	1	2110	1	2806	0	3502	1
23	0	719	0	1415	0	2111	0	2807	0	3503	0

24	1	720	1	1416	0	2112	1	2808	0	3504	0
25	0	721	1	1417	0	2113	0	2809	1	3505	0
26	1	722	1	1418	1	2114	1	2810	0	3506	0
27	1	723	1	1419	0	2115	0	2811	1	3507	1
28	1	724	1	1420	0	2116	0	2812	1	3508	1
29	1	725	1	1421	0	2117	0	2813	0	3509	1
30	1	726	1	1422	1	2118	0	2814	0	3510	1
31	0	727	1	1423	1	2119	0	2815	0	3511	1
32	1	728	1	1424	1	2120	0	2816	1	3512	0
33	1	729	1	1425	1	2121	1	2817	1	3513	1
34	1	730	0	1426	0	2122	1	2818	0	3514	0
35	1	731	0	1427	1	2123	0	2819	1	3515	0
36	1	732	1	1428	1	2124	1	2820	1	3516	1
37	1	733	1	1429	0	2125	0	2821	1	3517	0
38	0	734	1	1430	0	2126	0	2822	1	3518	0
39	0	735	1	1431	0	2127	0	2823	1	3519	0
40	1	736	1	1432	1	2128	1	2824	1	3520	1
41	1	737	1	1433	1	2129	1	2825	0	3521	0
42	0	738	0	1434	0	2130	0	2826	0	3522	0
43	1	739	0	1435	1	2131	0	2827	1	3523	0
44	1	740	1	1436	0	2132	1	2828	0	3524	1
45	0	741	0	1437	0	2133	0	2829	0	3525	1
46	0	742	1	1438	1	2134	0	2830	0	3526	1
47	0	743	0	1439	0	2135	1	2831	0	3527	0
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49	0	745	1	1441	0	2137	0	2833	1	3529	1
50	0	746	1	1442	1	2138	1	2834	1	3530	0
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52	1	748	0	1444	1	2140	0	2836	1	3532	1
53	1	749	0	1445	1	2141	0	2837	1	3533	1
54	1	750	1	1446	0	2142	1	2838	0	3534	0
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56	1	752	0	1448	1	2144	1	2840	0	3536	1
57	1	753	0	1449	0	2145	0	2841	0	3537	0
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73	0	769	0	1465	0	2161	0	2857	0	3553	1
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75	0	771	0	1467	1	2163	1	2859	0	3555	1
76	0	772	1	1468	1	2164	1	2860	1	3556	0
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79	0	775	1	1471	0	2167	1	2863	0	3559	1
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83	1	779	1	1475	0	2171	1	2867	0	3563	1
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87	0	783	1	1479	1	2175	0	2871	1	3567	1
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91	0	787	1	1483	0	2179	0	2875	1	3571	0
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115	1	811	1	1507	0	2203	1	2899	0	3595	0
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127	0	823	0	1519	0	2215	0	2911	1	3607	0
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167	0	863	1	1559	0	2255	1	2951	0	3647	1
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313	1	1009	0	1705	0	2401	1	3097	1	3793	0
314	0	1010	0	1706	1	2402	0	3098	0	3794	1
315	1	1011	1	1707	0	2403	0	3099	0	3795	0
316	0	1012	1	1708	1	2404	1	3100	1	3796	0
317	0	1013	0	1709	0	2405	1	3101	1	3797	1
318	0	1014	0	1710	1	2406	0	3102	0	3798	1
319	0	1015	1	1711	0	2407	1	3103	1	3799	1
320	0	1016	0	1712	1	2408	0	3104	0	3800	0
321	1	1017	0	1713	1	2409	1	3105	0	3801	1
322	1	1018	0	1714	1	2410	0	3106	0	3802	0
323	0	1019	1	1715	1	2411	0	3107	0	3803	0
324	0	1020	1	1716	0	2412	0	3108	1	3804	1
325	1	1021	0	1717	0	2413	1	3109	0	3805	0
326	0	1022	0	1718	1	2414	0	3110	0	3806	0
327	0	1023	0	1719	0	2415	0	3111	1	3807	0
328	1	1024	1	1720	1	2416	0	3112	0	3808	0
329	0	1025	1	1721	1	2417	1	3113	0	3809	1
330	1	1026	1	1722	0	2418	1	3114	1	3810	1
331	1	1027	1	1723	1	2419	0	3115	0	3811	0

332	1	1028	1	1724	0	2420	0	3116	0	3812	0
333	1	1029	1	1725	1	2421	1	3117	0	3813	1
334	1	1030	0	1726	1	2422	0	3118	1	3814	0
335	1	1031	0	1727	0	2423	1	3119	1	3815	0
336	1	1032	0	1728	1	2424	1	3120	0	3816	0
337	0	1033	1	1729	1	2425	1	3121	0	3817	0
338	0	1034	0	1730	0	2426	0	3122	0	3818	0
339	0	1035	1	1731	0	2427	1	3123	0	3819	1
340	0	1036	0	1732	1	2428	1	3124	0	3820	1
341	1	1037	0	1733	0	2429	0	3125	1	3821	0
342	1	1038	1	1734	1	2430	1	3126	0	3822	0
343	0	1039	0	1735	0	2431	0	3127	0	3823	1
344	1	1040	0	1736	0	2432	0	3128	0	3824	1
345	0	1041	1	1737	0	2433	1	3129	0	3825	0
346	0	1042	1	1738	0	2434	1	3130	0	3826	0
347	1	1043	0	1739	1	2435	1	3131	1	3827	1
348	1	1044	0	1740	0	2436	1	3132	0	3828	1
349	0	1045	0	1741	1	2437	0	3133	0	3829	1
350	1	1046	0	1742	1	2438	0	3134	0	3830	0
351	0	1047	1	1743	1	2439	0	3135	1	3831	0
352	1	1048	0	1744	1	2440	0	3136	1	3832	0
353	0	1049	0	1745	0	2441	1	3137	0	3833	1
354	0	1050	1	1746	0	2442	1	3138	1	3834	1
355	0	1051	0	1747	1	2443	0	3139	1	3835	1
356	0	1052	1	1748	1	2444	1	3140	0	3836	0
357	0	1053	1	1749	0	2445	1	3141	0	3837	1
358	1	1054	0	1750	0	2446	0	3142	0	3838	1
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360	1	1056	1	1752	1	2448	1	3144	0	3840	1
361	1	1057	1	1753	0	2449	1	3145	0	3841	0
362	0	1058	1	1754	1	2450	0	3146	0	3842	1
363	1	1059	0	1755	0	2451	1	3147	0	3843	0
364	0	1060	0	1756	0	2452	0	3148	1	3844	1
365	1	1061	1	1757	1	2453	0	3149	0	3845	0
366	1	1062	1	1758	1	2454	1	3150	1	3846	1
367	1	1063	0	1759	1	2455	0	3151	0	3847	1
368	0	1064	1	1760	0	2456	1	3152	0	3848	1
369	0	1065	0	1761	1	2457	0	3153	1	3849	0
370	1	1066	0	1762	0	2458	1	3154	0	3850	1
371	0	1067	1	1763	0	2459	1	3155	1	3851	1
372	0	1068	0	1764	1	2460	0	3156	1	3852	0
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375	1	1071	0	1767	0	2463	0	3159	1	3855	1

376	0	1072	1	1768	1	2464	0	3160	1	3856	0
377	0	1073	1	1769	0	2465	1	3161	1	3857	1
378	1	1074	0	1770	0	2466	1	3162	0	3858	1
379	0	1075	1	1771	1	2467	0	3163	0	3859	1
380	1	1076	0	1772	1	2468	0	3164	1	3860	1
381	1	1077	1	1773	0	2469	1	3165	1	3861	1
382	0	1078	0	1774	1	2470	0	3166	1	3862	0
383	1	1079	1	1775	0	2471	0	3167	1	3863	0
384	1	1080	0	1776	1	2472	0	3168	1	3864	1
385	1	1081	1	1777	0	2473	1	3169	0	3865	0
386	0	1082	0	1778	1	2474	0	3170	1	3866	1
387	1	1083	0	1779	1	2475	0	3171	0	3867	1
388	0	1084	1	1780	0	2476	0	3172	0	3868	1
389	1	1085	1	1781	1	2477	1	3173	1	3869	0
390	1	1086	1	1782	1	2478	0	3174	0	3870	0
391	1	1087	1	1783	0	2479	0	3175	0	3871	0
392	1	1088	0	1784	1	2480	1	3176	1	3872	1
393	1	1089	1	1785	0	2481	0	3177	0	3873	1
394	1	1090	0	1786	1	2482	0	3178	1	3874	1
395	1	1091	1	1787	1	2483	0	3179	1	3875	1
396	1	1092	0	1788	1	2484	0	3180	1	3876	0
397	1	1093	1	1789	1	2485	0	3181	1	3877	1
398	0	1094	0	1790	1	2486	1	3182	1	3878	0
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400	1	1096	1	1792	1	2488	1	3184	0	3880	0
401	1	1097	1	1793	1	2489	0	3185	0	3881	0
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404	0	1100	0	1796	1	2492	1	3188	1	3884	1
405	0	1101	1	1797	0	2493	1	3189	0	3885	0
406	1	1102	0	1798	0	2494	0	3190	0	3886	0
407	1	1103	1	1799	0	2495	0	3191	0	3887	0
408	0	1104	1	1800	1	2496	0	3192	0	3888	0
409	1	1105	0	1801	1	2497	0	3193	1	3889	0
410	1	1106	1	1802	0	2498	1	3194	0	3890	1
411	0	1107	0	1803	0	2499	1	3195	0	3891	0
412	0	1108	0	1804	0	2500	0	3196	0	3892	1
413	1	1109	0	1805	1	2501	1	3197	1	3893	1
414	0	1110	1	1806	1	2502	1	3198	0	3894	0
415	1	1111	1	1807	1	2503	0	3199	0	3895	1
416	1	1112	0	1808	1	2504	1	3200	1	3896	1
417	0	1113	1	1809	0	2505	1	3201	1	3897	1
418	1	1114	1	1810	0	2506	1	3202	0	3898	0
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420	0	1116	0	1812	0	2508	1	3204	0	3900	0
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422	0	1118	1	1814	0	2510	0	3206	1	3902	0
423	0	1119	1	1815	0	2511	0	3207	0	3903	0
424	1	1120	1	1816	0	2512	1	3208	1	3904	0
425	1	1121	1	1817	1	2513	0	3209	1	3905	0
426	1	1122	1	1818	1	2514	0	3210	0	3906	0
427	1	1123	1	1819	1	2515	0	3211	0	3907	0
428	1	1124	1	1820	1	2516	1	3212	0	3908	0
429	1	1125	0	1821	1	2517	1	3213	1	3909	1
430	0	1126	0	1822	1	2518	0	3214	0	3910	0
431	1	1127	1	1823	0	2519	1	3215	0	3911	1
432	1	1128	0	1824	0	2520	0	3216	1	3912	0
433	1	1129	1	1825	1	2521	0	3217	1	3913	1
434	1	1130	1	1826	1	2522	0	3218	1	3914	1
435	0	1131	0	1827	0	2523	0	3219	0	3915	0
436	0	1132	1	1828	0	2524	0	3220	1	3916	1
437	1	1133	0	1829	1	2525	0	3221	0	3917	1
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446	1	1142	1	1838	1	2534	1	3230	0	3926	1
447	1	1143	1	1839	0	2535	1	3231	1	3927	0
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460	1	1156	0	1852	1	2548	0	3244	1	3940	1
461	0	1157	1	1853	1	2549	0	3245	1	3941	0
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466	1	1162	0	1858	1	2554	0	3250	1	3946	0
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470	0	1166	1	1862	0	2558	1	3254	1	3950	0
471	0	1167	1	1863	0	2559	0	3255	0	3951	0
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474	1	1170	0	1866	0	2562	1	3258	1	3954	0
475	0	1171	0	1867	1	2563	1	3259	0	3955	1
476	0	1172	1	1868	1	2564	1	3260	0	3956	0
477	0	1173	0	1869	0	2565	1	3261	0	3957	1
478	0	1174	0	1870	1	2566	0	3262	1	3958	1
479	0	1175	1	1871	1	2567	0	3263	1	3959	0
480	1	1176	0	1872	0	2568	1	3264	0	3960	1
481	0	1177	1	1873	1	2569	0	3265	0	3961	0
482	1	1178	0	1874	0	2570	0	3266	1	3962	0
483	1	1179	1	1875	1	2571	1	3267	1	3963	0
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485	1	1181	0	1877	1	2573	0	3269	1	3965	0
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487	0	1183	1	1879	1	2575	0	3271	0	3967	0
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506	1	1202	1	1898	1	2594	1	3290	0	3986	0
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508	1	1204	1	1900	0	2596	1	3292	1	3988	1
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511	1	1207	0	1903	1	2599	0	3295	0	3991	0
512	1	1208	1	1904	0	2600	1	3296	1	3992	0
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518	1	1214	0	1910	0	2606	0	3302	1	3998	0
519	1	1215	1	1911	1	2607	1	3303	1	3999	0
520	0	1216	1	1912	0	2608	1	3304	0	4000	1
521	0	1217	0	1913	1	2609	1	3305	0	4001	0
522	1	1218	1	1914	0	2610	0	3306	1	4002	1
523	0	1219	0	1915	1	2611	1	3307	0	4003	1
524	1	1220	0	1916	0	2612	0	3308	0	4004	0
525	0	1221	0	1917	1	2613	0	3309	0	4005	1
526	1	1222	0	1918	0	2614	0	3310	1	4006	1
527	0	1223	1	1919	0	2615	0	3311	1	4007	0
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530	0	1226	0	1922	0	2618	0	3314	1	4010	0
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532	0	1228	1	1924	0	2620	1	3316	0	4012	1
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534	0	1230	1	1926	0	2622	0	3318	0	4014	0
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536	0	1232	1	1928	0	2624	1	3320	1	4016	1
537	0	1233	1	1929	0	2625	1	3321	1	4017	0
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540	0	1236	0	1932	0	2628	1	3324	1	4020	1
541	0	1237	0	1933	1	2629	0	3325	0	4021	0
542	1	1238	1	1934	1	2630	0	3326	1	4022	0
543	0	1239	0	1935	1	2631	0	3327	0	4023	0
544	1	1240	1	1936	1	2632	1	3328	1	4024	0
545	1	1241	0	1937	1	2633	1	3329	1	4025	0
546	1	1242	0	1938	0	2634	1	3330	0	4026	0
547	0	1243	1	1939	1	2635	0	3331	0	4027	1
548	0	1244	1	1940	1	2636	1	3332	1	4028	1
549	0	1245	0	1941	0	2637	1	3333	1	4029	0
550	1	1246	0	1942	1	2638	0	3334	1	4030	1
551	1	1247	0	1943	1	2639	0	3335	1	4031	1

552	0	1248	0	1944	1	2640	0	3336	1	4032	0
553	1	1249	0	1945	0	2641	1	3337	0	4033	1
554	0	1250	0	1946	1	2642	1	3338	1	4034	0
555	0	1251	1	1947	0	2643	1	3339	1	4035	1
556	1	1252	1	1948	0	2644	0	3340	1	4036	1
557	0	1253	0	1949	0	2645	0	3341	0	4037	1
558	1	1254	1	1950	1	2646	1	3342	0	4038	0
559	0	1255	1	1951	1	2647	1	3343	1	4039	1
560	1	1256	1	1952	1	2648	0	3344	1	4040	0
561	1	1257	1	1953	0	2649	0	3345	1	4041	1
562	0	1258	1	1954	1	2650	0	3346	0	4042	0
563	0	1259	1	1955	1	2651	0	3347	1	4043	1
564	0	1260	0	1956	1	2652	1	3348	0	4044	0
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567	0	1263	1	1959	0	2655	1	3351	1	4047	0
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569	1	1265	1	1961	1	2657	0	3353	0	4049	1
570	0	1266	0	1962	1	2658	1	3354	0	4050	1
571	1	1267	1	1963	0	2659	1	3355	0	4051	1
572	0	1268	0	1964	1	2660	1	3356	0	4052	0
573	0	1269	0	1965	1	2661	0	3357	0	4053	1
574	1	1270	0	1966	0	2662	1	3358	0	4054	0
575	0	1271	1	1967	1	2663	0	3359	0	4055	1
576	1	1272	0	1968	0	2664	0	3360	1	4056	1
577	1	1273	1	1969	1	2665	0	3361	0	4057	1
578	0	1274	1	1970	1	2666	1	3362	0	4058	0
579	0	1275	1	1971	0	2667	1	3363	1	4059	1
580	1	1276	1	1972	1	2668	0	3364	1	4060	0
581	1	1277	0	1973	0	2669	1	3365	0	4061	1
582	0	1278	1	1974	0	2670	0	3366	1	4062	1
583	0	1279	1	1975	0	2671	0	3367	1	4063	0
584	1	1280	1	1976	0	2672	0	3368	1	4064	1
585	0	1281	1	1977	0	2673	1	3369	0	4065	0
586	0	1282	0	1978	0	2674	1	3370	0	4066	1
587	1	1283	1	1979	1	2675	0	3371	1	4067	1
588	0	1284	1	1980	1	2676	1	3372	0	4068	1
589	0	1285	0	1981	0	2677	1	3373	1	4069	1
590	1	1286	0	1982	1	2678	0	3374	0	4070	0
591	1	1287	1	1983	0	2679	1	3375	0	4071	0
592	1	1288	1	1984	1	2680	1	3376	0	4072	1
593	0	1289	0	1985	1	2681	1	3377	0	4073	0
594	0	1290	1	1986	0	2682	1	3378	1	4074	0
595	1	1291	0	1987	1	2683	1	3379	1	4075	1

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606	0	1302	0	1998	0	2694	0	3390	0	4086	0
607	0	1303	0	1999	0	2695	0	3391	1	4087	0
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613	0	1309	0	2005	0	2701	0	3397	0	4093	1
614	0	1310	1	2006	0	2702	1	3398	1	4094	1
615	1	1311	0	2007	1	2703	0	3399	1	4095	0
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619	1	1315	0	2011	0	2707	1	3403	1	4099	0
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693	0	1389	0	2085	1	2781	0	3477	1		
694	1	1390	1	2086	1	2782	1	3478	1		
695	1	1391	1	2087	0	2783	1	3479	0		

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