PROOF OF THE CONTINUED FRACTION CONJECTURE FOR $(a,b) = (z^6 + z^4 + z^3 + 1, z + 1)$

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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 $(a,b) = (z^6 + z^4 + z^3 + 1, z + 1)$.

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 $(a,b)=(z^6+z^4+z^3+1, z+1)$, the two power series* $\mathrm{CF}(a,b)$ *and* $\mathrm{CF}(b,a)$ *are algebraic over* $\mathbb{F}_2(z)$*, with minimal polynomials of the form*

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

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

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

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

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

2. Proof

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

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

By the basic properties of continued fractions, we have

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

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

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

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

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

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

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

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

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

for some positive integer d_n. Hence,

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

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

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

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

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

of the vector

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

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

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

Lemma 2.1. *We have*

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

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

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

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

Proof. We give the proof of the identity

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

the proofs of the others being similar.

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

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

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

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

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

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

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

Define

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

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

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

$$+ x^{4u}W^e[:7u] + x^{5u}W^e[:6u] + x^{7u}W^e[:4u] + x^{8u}W^e[:6u]$$
$$+ x^{9u}W^e[:5u] + x^{13u}W^e[:u] + (x^{7u} + x^{8u} + x^{9u} + x^{11u})R^e.$$

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

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

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 $u = 2^{2k}$,

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

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

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

which can be rewritten as

$$0 = T[[w]_2] + T[[100w]_2] + T[[110w]_2] + T[[111w]_2], \tag{2.7}$$

$$\begin{aligned}
0 &= T[[w]_2] + T[[1w]_2] + T[[100w]_2] + T[[101w]_2] + T[[110w]_2] \\
&\quad + T[[1000w]_2],
\end{aligned} \tag{2.8}$$

$$0 = T[[w]_2] + T[[1w]_2] + T[[10w]_2] + T[[100w]_2] + T[[101w]_2]$$

$$+ T[[1001w]_2], \tag{2.9}$$

$$\begin{aligned} 0 &= T[[1w]_2] + T[[10w]_2] + T[[11w]_2] + T[[101w]_2] + T[[110w]_2] \\ &\quad + T[[1010w]_2], \end{aligned} \tag{2.10}$$

$$0 = T[[10w]_2] + T[[11w]_2] + T[[1011w]_2], \tag{2.11}$$

$$0 = T[[11w]_2] + T[[100w]_2] + T[[1100w]_2], \tag{2.12}$$

$$0 = T[[w]_2] + T[[100w]_2] + T[[101w]_2] + T[[1101w]_2], \tag{2.13}$$

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

$$1 = T[[w]_2] + T[[100w]_2] + T[[110w]_2] + T[[111w]_2], \tag{2.14}$$

$$\begin{aligned} 1 &= T[[w]_2] + T[[1w]_2] + T[[100w]_2] + T[[101w]_2] + T[[110w]_2] \\ &\quad + T[[1000w]_2], \end{aligned} \tag{2.15}$$

$$\begin{aligned} 1 &= T[[w]_2] + T[[1w]_2] + T[[10w]_2] + T[[100w]_2] + T[[101w]_2] \\ &\quad + T[[1001w]_2], \end{aligned} \tag{2.16}$$

$$\begin{aligned} 0 &= T[[1w]_2] + T[[10w]_2] + T[[11w]_2] + T[[101w]_2] + T[[110w]_2] \\ &\quad + T[[1010w]_2], \end{aligned} \tag{2.17}$$

$$1 = T[[10w]_2] + T[[11w]_2] + T[[1011w]_2], \tag{2.18}$$

$$0 = T[[11w]_2] + T[[100w]_2] + T[[1100w]_2], \tag{2.19}$$

$$0 = T[[w]_2] + T[[100w]_2] + T[[101w]_2] + T[[1101w]_2], \tag{2.20}$$

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

First we calculate an 2-automaton that generates T from its minimal polynomial and its first terms. This automaton has 4025 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

$$0 = \tau(A(s,\epsilon)) + \tau(A(s,100)) + \tau(A(s,110)) + \tau(A(s,111)), \tag{2.21}$$

$$\begin{aligned} 0 &= \tau(A(s,\epsilon)) + \tau(A(s,1)) + \tau(A(s,100)) + \tau(A(s,101)) \\ &\quad + \tau(A(s,110)) + \tau(A(s,1000)), \end{aligned} \tag{2.22}$$

$$\begin{aligned} 0 &= \tau(A(s,\epsilon)) + \tau(A(s,1)) + \tau(A(s,10)) + \tau(A(s,100)) \\ &\quad + \tau(A(s,101)) + \tau(A(s,1001)), \end{aligned} \tag{2.23}$$

$$\begin{aligned} 0 &= \tau(A(s,1)) + \tau(A(s,10)) + \tau(A(s,11)) + \tau(A(s,101)) \\ &\quad + \tau(A(s,110)) + \tau(A(s,1010)), \end{aligned} \tag{2.24}$$

$$0 = \tau(A(s,10)) + \tau(A(s,11)) + \tau(A(s,1011)), \tag{2.25}$$

$$0 = \tau(A(s,11)) + \tau(A(s,100)) + \tau(A(s,1100)), \tag{2.26}$$

$$0 = \tau(A(s,\epsilon)) + \tau(A(s,100)) + \tau(A(s,101)) + \tau(A(s,1101)), \tag{2.27}$$

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

$$1 = \tau(A(s,\epsilon)) + \tau(A(s,100)) + \tau(A(s,110)) + \tau(A(s,111)), \tag{2.28}$$

$$1 = \tau(A(s,\epsilon)) + \tau(A(s,1)) + \tau(A(s,100)) + \tau(A(s,101))$$

$$+ \tau(A(s,110)) + \tau(A(s,1000)), \tag{2.29}$$

$$\begin{aligned} 1 = \tau(A(s,\epsilon)) + \tau(A(s,1)) + \tau(A(s,10)) + \tau(A(s,100)) \\ + \tau(A(s,101)) + \tau(A(s,1001)), \end{aligned} \tag{2.30}$$

$$\begin{aligned} 0 = \tau(A(s,1)) + \tau(A(s,10)) + \tau(A(s,11)) + \tau(A(s,101)) \\ + \tau(A(s,110)) + \tau(A(s,1010)), \end{aligned} \tag{2.31}$$

$$1 = \tau(A(s,10)) + \tau(A(s,11)) + \tau(A(s,1011)), \tag{2.32}$$

$$0 = \tau(A(s,11)) + \tau(A(s,100)) + \tau(A(s,1100)), \tag{2.33}$$

$$0 = \tau(A(s,\epsilon)) + \tau(A(s,100)) + \tau(A(s,101)) + \tau(A(s,1101)), \tag{2.34}$$

for $s = A(i, 0^{2k})$. We find that $(A(i, 0^{72}), E_{72}) = (A(i, 0^{16}), E_{16})$, so that we only have to verify that identities (2.21) through (2.34) hold for $2 \le k \le 36$, 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 $u = 2^{2k-1}$,*

$$M_{2k} = M^e[:7u] + x^u M^e[:6u] + x^{3u} M^e[:4u] + x^{7u} R^e,$$
$$W_{2k} = W^e[:7u] + x^u W^e[:6u] + x^{3u} W^e[:4u] + x^{7u} R^e.$$

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

$$M_{2k+1} = M^o[:7u] + x^u M^o[:6u] + x^{3u} M^o[:4u] + x^{7u} R^o,$$
$$W_{2k+1} = W^o[:7u] + x^u W^o[:6u] + x^{3u} W^o[:4u] + x^{7u} R^o.$$

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 $n \ge 2$, 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

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

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

$$W^e[:14v] M^e[:14v] + x^{2v} W^e[:12v] M^e[:12v] + x^{6v} W^e[:8v] M^e[:8v].$$

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

$$X := x^v,$$

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

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

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

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

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

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

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

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

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

Define

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

where

$$\begin{aligned}q_0(x) &= x^{22} + x^{21} + x^{16} + x^{13} + x^{12} + x^{11} + x^{10} + x^8 + x^7,\\ q_1(x) &= x^{21} + x^{20} + x^{14} + x^9 + x^8 + x^6 + x^4 + x^3 + x^2 + x,\\ q_2(x) &= x^{22} + x^{18} + x^{16} + x^{14} + x^4 + 1,\\ q_3(x) &= x^{21} + x^{20} + x^{14} + x^9 + x^8 + x^6 + x^4 + x^3 + x^2 + x,\\ q_4(x) &= x^{22} + x^{21} + x^{20} + x^{18} + x^{13} + x^{11} + x^{10} + x^8 + x^7 + x^4 + x^2.\end{aligned}$$

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

3. Annexe

All 16 polynomials are of the form

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

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

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

$$\begin{aligned} p_0(x) &= x^{102} + x^{92} + x^{90} + x^{86} + x^{84} + x^{82} + x^{80} + x^{74} + x^{68} + x^{66} + x^{64} \\ &\quad + x^{62} + x^{60} + x^{58} + x^{54} + x^{46} + x^{42} + x^{24} + x^{22} + x^{20} + x^{16} + x^{14} \\ &\quad + x^{12}, \\ p_3(x) &= x^{100} + x^{98} + x^{90} + x^{88} + x^{86} + x^{84} + x^{82} + x^{80} + x^{76} + x^{72} + x^{70} \\ &\quad + x^{60} + x^{58} + x^{54} + x^{52} + x^{50} + x^{48} + x^{46} + x^{44} + x^{42} + x^{40} + x^{38} \\ &\quad + x^{34} + x^{32} + x^{24} + x^{20} + x^{18} + x^{14} + x^{12} + x^{8}, \\ p_6(x) &= x^{100} + x^{94} + x^{90} + x^{88} + x^{86} + x^{78} + x^{70} + x^{68} + x^{66} + x^{54} + x^{52} \\ &\quad + x^{48} + x^{46} + x^{42} + x^{36} + x^{34} + x^{32} + x^{26} + x^{24} + x^{20} + x^{18} + x^{16} \\ &\quad + x^{12} + 1, \\ p_9(x) &= x^{100} + x^{98} + x^{96} + x^{94} + x^{92} + x^{84} + x^{82} + x^{76} + x^{72} + x^{62} + x^{58} \\ &\quad + x^{52} + x^{48} + x^{46} + x^{42} + x^{40} + x^{32} + x^{30} + x^{28} + x^{26} + x^{24} + x^{20} \\ &\quad + x^{14} + x^{6} + x^{4} + x^{2}, \\ p_{12}(x) &= x^{102} + x^{100} + x^{96} + x^{94} + x^{90} + x^{84} + x^{82} + x^{80} + x^{70} + x^{68} + x^{64} \\ &\quad + x^{62} + x^{58} + x^{52} + x^{50} + x^{48} + x^{22} + x^{20} + x^{16} + x^{14} + x^{10} + x^{4} \\ &\quad + x^{2} + 1, \end{aligned}$$

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

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

$$\begin{aligned} p_0(x) &= x^{117} + x^{116} + x^{115} + x^{114} + x^{112} + x^{111} + x^{106} + x^{105} + x^{104} + x^{103} \\ &\quad + x^{102} + x^{101} + x^{100} + x^{98} + x^{93} + x^{91} + x^{89} + x^{86} + x^{85} + x^{83} + x^{81} \\ &\quad + x^{79} + x^{74} + x^{73} + x^{72} + x^{70} + x^{66} + x^{65} + x^{62} + x^{61} + x^{58} + x^{56} \\ &\quad + x^{55} + x^{54} + x^{52} + x^{50} + x^{49} + x^{48} + x^{47} + x^{46} + x^{40} + x^{37} + x^{35} \\ &\quad + x^{34} + x^{33} + x^{32} + x^{31} + x^{29} + x^{27}, \\ p_3(x) &= x^{108} + x^{106} + x^{105} + x^{104} + x^{103} + x^{101} + x^{100} + x^{97} + x^{96} + x^{93} \\ &\quad + x^{92} + x^{90} + x^{89} + x^{87} + x^{86} + x^{84} + x^{83} + x^{81} + x^{80} + x^{78} + x^{77} \\ &\quad + x^{75} + x^{70} + x^{68} + x^{67} + x^{66} + x^{65} + x^{63} + x^{58} + x^{56} + x^{55} + x^{54} \\ &\quad + x^{53} + x^{52} + x^{51} + x^{49} + x^{44} + x^{42} + x^{41} + x^{40} + x^{39} + x^{37} + x^{36} \\ &\quad + x^{33} + x^{32} + x^{29} + x^{24} + x^{22} + x^{21} + x^{20} + x^{19} + x^{18} + x^{17} + x^{16} \\ &\quad + x^{15} + x^{14} + x^{13} + x^{12} + x^{11} + x^{9}, \\ p_6(x) &= x^{111} + x^{110} + x^{108} + x^{106} + x^{105} + x^{104} + x^{103} + x^{102} + x^{100} + x^{99} \\ &\quad + x^{96} + x^{92} + x^{91} + x^{88} + x^{87} + x^{86} + x^{85} + x^{84} + x^{82} + x^{81} + x^{79} \end{aligned}$$

$$
\begin{aligned}
&+x^{77}+x^{75}+x^{73}+x^{71}+x^{69}+x^{66}+x^{65}+x^{64}+x^{53}+x^{52}+x^{51}\\
&+x^{46}+x^{44}+x^{41}+x^{39}+x^{38}+x^{35}+x^{34}+x^{32}+x^{31}+x^{28}+x^{27}\\
&+x^{26}+x^{25}+x^{24}+x^{23}+x^{21}+x^{20}+x^{19}+x^{18}+x^{16}+x^{15}+x^{13}\\
&+x^{11}+x^{8}+x^{7}+x^{6},\\
p_9(x)={}&x^{114}+x^{111}+x^{110}+x^{108}+x^{107}+x^{105}+x^{102}+x^{99}+x^{98}+x^{96}\\
&+x^{95}+x^{93}+x^{92}+x^{89}+x^{88}+x^{86}+x^{85}+x^{84}+x^{83}+x^{81}+x^{80}\\
&+x^{78}+x^{77}+x^{75}+x^{74}+x^{71}+x^{70}+x^{67}+x^{62}+x^{59}+x^{58}+x^{56}\\
&+x^{55}+x^{54}+x^{53}+x^{51}+x^{48}+x^{46}+x^{45}+x^{44}+x^{43}+x^{42}+x^{41}\\
&+x^{40}+x^{39}+x^{37}+x^{32}+x^{30}+x^{29}+x^{27}+x^{18}+x^{16}+x^{15}+x^{13}\\
&+x^{6}+x^{3},\\
p_{12}(x)={}&x^{117}+x^{116}+x^{115}+x^{113}+x^{112}+x^{109}+x^{108}+x^{107}+x^{103}+x^{99}\\
&+x^{95}+x^{93}+x^{92}+x^{77}+x^{76}+x^{75}+x^{71}+x^{67}+x^{63}+x^{61}+x^{60}\\
&+x^{53}+x^{52}+x^{51}+x^{49}+x^{48}+x^{37}+x^{36}+x^{35}+x^{33}+x^{32}+x^{29}\\
&+x^{28}+x^{27}+x^{23}+x^{19}+x^{15}+x^{13}+x^{12}+x^{5}+x^{4}+x^{3}+x+1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x)={}&x^{117}+x^{116}+x^{115}+x^{114}+x^{112}+x^{111}+x^{106}+x^{105}+x^{104}+x^{103}\\
&+x^{102}+x^{101}+x^{100}+x^{98}+x^{93}+x^{91}+x^{89}+x^{86}+x^{85}+x^{83}+x^{81}\\
&+x^{79}+x^{74}+x^{73}+x^{72}+x^{70}+x^{66}+x^{65}+x^{62}+x^{61}+x^{58}+x^{56}\\
&+x^{55}+x^{54}+x^{52}+x^{50}+x^{49}+x^{48}+x^{47}+x^{46}+x^{40}+x^{37}+x^{35}\\
&+x^{34}+x^{33}+x^{32}+x^{31}+x^{29}+x^{27},\\
p_3(x)={}&x^{108}+x^{106}+x^{105}+x^{104}+x^{103}+x^{101}+x^{100}+x^{97}+x^{96}+x^{93}\\
&+x^{92}+x^{90}+x^{89}+x^{87}+x^{86}+x^{84}+x^{83}+x^{81}+x^{80}+x^{78}+x^{77}\\
&+x^{75}+x^{70}+x^{68}+x^{67}+x^{66}+x^{65}+x^{63}+x^{58}+x^{56}+x^{55}+x^{54}\\
&+x^{53}+x^{52}+x^{51}+x^{49}+x^{44}+x^{42}+x^{41}+x^{40}+x^{39}+x^{37}+x^{36}\\
&+x^{33}+x^{32}+x^{29}+x^{24}+x^{22}+x^{21}+x^{20}+x^{19}+x^{18}+x^{17}+x^{16}\\
&+x^{15}+x^{14}+x^{13}+x^{12}+x^{11}+x^{9},\\
p_6(x)={}&x^{111}+x^{110}+x^{108}+x^{106}+x^{105}+x^{104}+x^{103}+x^{102}+x^{100}+x^{99}\\
&+x^{96}+x^{92}+x^{91}+x^{88}+x^{87}+x^{86}+x^{85}+x^{84}+x^{82}+x^{81}+x^{79}\\
&+x^{77}+x^{75}+x^{73}+x^{71}+x^{69}+x^{66}+x^{65}+x^{64}+x^{53}+x^{52}+x^{51}\\
&+x^{46}+x^{44}+x^{41}+x^{39}+x^{38}+x^{35}+x^{34}+x^{32}+x^{31}+x^{28}+x^{27}\\
&+x^{26}+x^{25}+x^{24}+x^{23}+x^{21}+x^{20}+x^{19}+x^{18}+x^{16}+x^{15}+x^{13}\\
&+x^{11}+x^{8}+x^{7}+x^{6},\\
p_9(x)={}&x^{114}+x^{111}+x^{110}+x^{108}+x^{107}+x^{105}+x^{102}+x^{99}+x^{98}+x^{96}\\
&+x^{95}+x^{93}+x^{92}+x^{89}+x^{88}+x^{86}+x^{85}+x^{84}+x^{83}+x^{81}+x^{80}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{78} + x^{77} + x^{75} + x^{74} + x^{71} + x^{70} + x^{67} + x^{62} + x^{59} + x^{58} + x^{56}\\
&+ x^{55} + x^{54} + x^{53} + x^{51} + x^{48} + x^{46} + x^{45} + x^{44} + x^{43} + x^{42} + x^{41}\\
&+ x^{40} + x^{39} + x^{37} + x^{32} + x^{30} + x^{29} + x^{27} + x^{18} + x^{16} + x^{15} + x^{13}\\
&+ x^{6} + x^{3},\\
p_{12}(x) = {}& x^{117} + x^{116} + x^{115} + x^{113} + x^{112} + x^{109} + x^{108} + x^{107} + x^{103} + x^{99}\\
&+ x^{95} + x^{93} + x^{92} + x^{77} + x^{76} + x^{75} + x^{71} + x^{67} + x^{63} + x^{61} + x^{60}\\
&+ x^{53} + x^{52} + x^{51} + x^{49} + x^{48} + x^{37} + x^{36} + x^{35} + x^{33} + x^{32} + x^{29}\\
&+ x^{28} + x^{27} + x^{23} + x^{19} + x^{15} + x^{13} + x^{12} + x^{5} + x^{4} + x^{3} + x + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) = {}& x^{132} + x^{130} + x^{128} + x^{126} + x^{120} + x^{116} + x^{114} + x^{112} + x^{108} + x^{102}\\
&+ x^{100} + x^{98} + x^{94} + x^{92} + x^{84} + x^{82} + x^{76} + x^{74} + x^{70} + x^{68} + x^{66}\\
&+ x^{60} + x^{54} + x^{50} + x^{46} + x^{44} + x^{42},\\
p_3(x) = {}& x^{130} + x^{122} + x^{120} + x^{116} + x^{112} + x^{108} + x^{106} + x^{104} + x^{100} + x^{98}\\
&+ x^{92} + x^{88} + x^{86} + x^{82} + x^{74} + x^{68} + x^{62} + x^{58} + x^{56} + x^{54} + x^{48}\\
&+ x^{46} + x^{44} + x^{36} + x^{22} + x^{20} + x^{10} + x^{6},\\
p_6(x) = {}& x^{130} + x^{126} + x^{122} + x^{120} + x^{118} + x^{112} + x^{110} + x^{108} + x^{102} + x^{100}\\
&+ x^{96} + x^{88} + x^{86} + x^{82} + x^{78} + x^{76} + x^{72} + x^{70} + x^{62} + x^{48} + x^{38}\\
&+ x^{36} + x^{34} + x^{32} + x^{26} + x^{24} + x^{22} + x^{20} + x^{14} + x^{12} + x^{8} + x^{6} + x^{2}\\
&+ 1,\\
p_9(x) = {}& x^{130} + x^{124} + x^{120} + x^{116} + x^{114} + x^{112} + x^{108} + x^{100} + x^{98} + x^{94}\\
&+ x^{88} + x^{82} + x^{78} + x^{76} + x^{72} + x^{70} + x^{68} + x^{66} + x^{62} + x^{52} + x^{48}\\
&+ x^{44} + x^{42} + x^{40} + x^{36} + x^{34} + x^{24} + x^{22} + x^{16} + x^{12} + x^{6} + x^{2},\\
p_{12}(x) = {}& x^{132} + x^{128} + x^{108} + x^{104} + x^{84} + x^{80} + x^{76} + x^{72} + x^{68} + x^{64} + x^{28}\\
&+ x^{24} + x^{20} + x^{16} + x^{4} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) = {}& x^{132} + x^{130} + x^{126} + x^{122} + x^{116} + x^{114} + x^{112} + x^{106} + x^{104} + x^{100}\\
&+ x^{98} + x^{92} + x^{90} + x^{84} + x^{82} + x^{76} + x^{62} + x^{60} + x^{54} + x^{52} + x^{50}\\
&+ x^{42} + x^{40} + x^{38} + x^{34} + x^{32} + x^{30} + x^{24} + x^{22} + x^{20} + x^{12},\\
p_3(x) = {}& x^{130} + x^{126} + x^{124} + x^{122} + x^{120} + x^{118} + x^{114} + x^{112} + x^{108} + x^{106}\\
&+ x^{98} + x^{96} + x^{90} + x^{86} + x^{84} + x^{82} + x^{70} + x^{66} + x^{64} + x^{58} + x^{56}\\
&+ x^{52} + x^{48} + x^{42} + x^{36} + x^{32} + x^{30} + x^{24} + x^{22} + x^{16} + x^{12} + x^{8},\\
p_6(x) = {}& x^{130} + x^{128} + x^{124} + x^{122} + x^{120} + x^{116} + x^{114} + x^{112} + x^{110} + x^{108}\\
&+ x^{102} + x^{100} + x^{90} + x^{88} + x^{86} + x^{82} + x^{80} + x^{78} + x^{76} + x^{74} + x^{72}
\end{aligned}
$$

$$
\begin{aligned}
&+ x^{68} + x^{66} + x^{64} + x^{60} + x^{56} + x^{54} + x^{52} + x^{48} + x^{46} + x^{44} + x^{42}\\
&+ x^{38} + x^{36} + x^{34} + x^{30} + x^{28} + x^{26} + x^{24} + x^{22} + x^{20} + x^{16} + x^{14}\\
&+ x^{12} + x^{10} + x^{4} + x^{2} + 1,\\
p_9(x) &= x^{130} + x^{124} + x^{120} + x^{116} + x^{114} + x^{112} + x^{108} + x^{100} + x^{98} + x^{94}\\
&+ x^{88} + x^{82} + x^{78} + x^{76} + x^{72} + x^{70} + x^{68} + x^{66} + x^{62} + x^{52} + x^{48}\\
&+ x^{44} + x^{42} + x^{40} + x^{36} + x^{34} + x^{24} + x^{22} + x^{16} + x^{12} + x^{6} + x^{2},\\
p_{12}(x) &= x^{132} + x^{128} + x^{108} + x^{104} + x^{84} + x^{80} + x^{76} + x^{72} + x^{68} + x^{64} + x^{28}\\
&+ x^{24} + x^{20} + x^{16} + x^{4} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{117} + x^{116} + x^{115} + x^{114} + x^{112} + x^{110} + x^{108} + x^{107} + x^{106} + x^{104}\\
&+ x^{101} + x^{100} + x^{96} + x^{94} + x^{93} + x^{91} + x^{90} + x^{89} + x^{85} + x^{84} + x^{80}\\
&+ x^{78} + x^{77} + x^{76} + x^{75} + x^{71} + x^{69} + x^{65} + x^{63} + x^{62} + x^{61} + x^{60}\\
&+ x^{59} + x^{58} + x^{50} + x^{49} + x^{48} + x^{47} + x^{46} + x^{43} + x^{40} + x^{38} + x^{37}\\
&+ x^{34} + x^{33} + x^{26} + x^{25} + x^{24} + x^{23} + x^{21} + x^{20} + x^{19} + x^{18},\\
p_3(x) &= x^{108} + x^{106} + x^{105} + x^{104} + x^{103} + x^{101} + x^{100} + x^{97} + x^{96} + x^{93}\\
&+ x^{92} + x^{90} + x^{89} + x^{87} + x^{86} + x^{84} + x^{83} + x^{81} + x^{80} + x^{78} + x^{77}\\
&+ x^{75} + x^{70} + x^{68} + x^{67} + x^{66} + x^{65} + x^{63} + x^{58} + x^{56} + x^{55} + x^{54}\\
&+ x^{53} + x^{52} + x^{51} + x^{49} + x^{44} + x^{42} + x^{41} + x^{40} + x^{39} + x^{37} + x^{36}\\
&+ x^{33} + x^{32} + x^{29} + x^{24} + x^{22} + x^{21} + x^{20} + x^{19} + x^{18} + x^{17} + x^{16}\\
&+ x^{15} + x^{14} + x^{13} + x^{12} + x^{11} + x^{9},\\
p_6(x) &= x^{111} + x^{110} + x^{108} + x^{106} + x^{105} + x^{104} + x^{103} + x^{102} + x^{100} + x^{99}\\
&+ x^{96} + x^{92} + x^{91} + x^{88} + x^{87} + x^{86} + x^{85} + x^{84} + x^{82} + x^{81} + x^{79}\\
&+ x^{77} + x^{75} + x^{73} + x^{71} + x^{69} + x^{66} + x^{65} + x^{64} + x^{53} + x^{52} + x^{51}\\
&+ x^{46} + x^{44} + x^{41} + x^{39} + x^{38} + x^{35} + x^{34} + x^{32} + x^{31} + x^{28} + x^{27}\\
&+ x^{26} + x^{25} + x^{24} + x^{23} + x^{21} + x^{20} + x^{19} + x^{18} + x^{16} + x^{15} + x^{13}\\
&+ x^{11} + x^{8} + x^{7} + x^{6},\\
p_9(x) &= x^{114} + x^{111} + x^{110} + x^{108} + x^{107} + x^{105} + x^{102} + x^{99} + x^{98} + x^{96}\\
&+ x^{95} + x^{93} + x^{92} + x^{89} + x^{88} + x^{86} + x^{85} + x^{84} + x^{83} + x^{81} + x^{80}\\
&+ x^{78} + x^{77} + x^{75} + x^{74} + x^{71} + x^{70} + x^{67} + x^{62} + x^{59} + x^{58} + x^{56}\\
&+ x^{55} + x^{54} + x^{53} + x^{51} + x^{48} + x^{46} + x^{45} + x^{44} + x^{43} + x^{42} + x^{41}\\
&+ x^{40} + x^{39} + x^{37} + x^{32} + x^{30} + x^{29} + x^{27} + x^{18} + x^{16} + x^{15} + x^{13}\\
&+ x^{6} + x^{3},\\
p_{12}(x) &= x^{117} + x^{116} + x^{115} + x^{113} + x^{112} + x^{109} + x^{108} + x^{107} + x^{103} + x^{99}\\
&+ x^{95} + x^{93} + x^{92} + x^{77} + x^{76} + x^{75} + x^{71} + x^{67} + x^{63} + x^{61} + x^{60}
\end{aligned}
$$

$$+ x^{53} + x^{52} + x^{51} + x^{49} + x^{48} + x^{37} + x^{36} + x^{35} + x^{33} + x^{32} + x^{29} + x^{28} + x^{27} + x^{23} + x^{19} + x^{15} + x^{13} + x^{12} + x^{5} + x^{4} + x^{3} + x + 1,$$

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

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

$$\begin{aligned}
p_0(x) = {} & x^{117} + x^{116} + x^{115} + x^{114} + x^{112} + x^{110} + x^{108} + x^{107} + x^{106} + x^{104} \\
& + x^{101} + x^{100} + x^{96} + x^{94} + x^{93} + x^{91} + x^{90} + x^{89} + x^{85} + x^{84} + x^{80} \\
& + x^{78} + x^{77} + x^{76} + x^{75} + x^{71} + x^{69} + x^{65} + x^{63} + x^{62} + x^{61} + x^{60} \\
& + x^{59} + x^{58} + x^{50} + x^{49} + x^{48} + x^{47} + x^{46} + x^{43} + x^{40} + x^{38} + x^{37} \\
& + x^{34} + x^{33} + x^{26} + x^{25} + x^{24} + x^{23} + x^{21} + x^{20} + x^{19} + x^{18}, \\
p_3(x) = {} & x^{108} + x^{106} + x^{105} + x^{104} + x^{103} + x^{101} + x^{100} + x^{97} + x^{96} + x^{93} \\
& + x^{92} + x^{90} + x^{89} + x^{87} + x^{86} + x^{84} + x^{83} + x^{81} + x^{80} + x^{78} + x^{77} \\
& + x^{75} + x^{70} + x^{68} + x^{67} + x^{66} + x^{65} + x^{63} + x^{58} + x^{56} + x^{55} + x^{54} \\
& + x^{53} + x^{52} + x^{51} + x^{49} + x^{44} + x^{42} + x^{41} + x^{40} + x^{39} + x^{37} + x^{36} \\
& + x^{33} + x^{32} + x^{29} + x^{24} + x^{22} + x^{21} + x^{20} + x^{19} + x^{18} + x^{17} + x^{16} \\
& + x^{15} + x^{14} + x^{13} + x^{12} + x^{11} + x^{9}, \\
p_6(x) = {} & x^{111} + x^{110} + x^{108} + x^{106} + x^{105} + x^{104} + x^{103} + x^{102} + x^{100} + x^{99} \\
& + x^{96} + x^{92} + x^{91} + x^{88} + x^{87} + x^{86} + x^{85} + x^{84} + x^{82} + x^{81} + x^{79} \\
& + x^{77} + x^{75} + x^{73} + x^{71} + x^{69} + x^{66} + x^{65} + x^{64} + x^{53} + x^{52} + x^{51} \\
& + x^{46} + x^{44} + x^{41} + x^{39} + x^{38} + x^{35} + x^{34} + x^{32} + x^{31} + x^{28} + x^{27} \\
& + x^{26} + x^{25} + x^{24} + x^{23} + x^{21} + x^{20} + x^{19} + x^{18} + x^{16} + x^{15} + x^{13} \\
& + x^{11} + x^{8} + x^{7} + x^{6}, \\
p_9(x) = {} & x^{114} + x^{111} + x^{110} + x^{108} + x^{107} + x^{105} + x^{102} + x^{99} + x^{98} + x^{96} \\
& + x^{95} + x^{93} + x^{92} + x^{89} + x^{88} + x^{86} + x^{85} + x^{84} + x^{83} + x^{81} + x^{80} \\
& + x^{78} + x^{77} + x^{75} + x^{74} + x^{71} + x^{70} + x^{67} + x^{62} + x^{59} + x^{58} + x^{56} \\
& + x^{55} + x^{54} + x^{53} + x^{51} + x^{48} + x^{46} + x^{45} + x^{44} + x^{43} + x^{42} + x^{41} \\
& + x^{40} + x^{39} + x^{37} + x^{32} + x^{30} + x^{29} + x^{27} + x^{18} + x^{16} + x^{15} + x^{13} \\
& + x^{6} + x^{3}, \\
p_{12}(x) = {} & x^{117} + x^{116} + x^{115} + x^{113} + x^{112} + x^{109} + x^{108} + x^{107} + x^{103} + x^{99} \\
& + x^{95} + x^{93} + x^{92} + x^{77} + x^{76} + x^{75} + x^{71} + x^{67} + x^{63} + x^{61} + x^{60} \\
& + x^{53} + x^{52} + x^{51} + x^{49} + x^{48} + x^{37} + x^{36} + x^{35} + x^{33} + x^{32} + x^{29} \\
& + x^{28} + x^{27} + x^{23} + x^{19} + x^{15} + x^{13} + x^{12} + x^{5} + x^{4} + x^{3} + x + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) = {} & x^{102} + x^{98} + x^{96} + x^{94} + x^{90} + x^{82} + x^{80} + x^{76} + x^{74} + x^{70} + x^{64} \\
& + x^{62} + x^{60} + x^{52} + x^{48} + x^{34} + x^{32} + x^{30} + x^{28} + x^{26} + x^{24},
\end{aligned}$$

$$\begin{aligned}
p_3(x) &= x^{100} + x^{98} + x^{96} + x^{86} + x^{84} + x^{80} + x^{76} + x^{72} + x^{70} + x^{68} + x^{64} \\
&\quad + x^{62} + x^{60} + x^{54} + x^{52} + x^{50} + x^{46} + x^{44} + x^{38} + x^{36} + x^{30} + x^{28} \\
&\quad + x^{26} + x^{24} + x^{22} + x^{20} + x^{18} + x^{14} + x^{8} + x^{6}, \\
p_6(x) &= x^{100} + x^{98} + x^{80} + x^{78} + x^{68} + x^{66} + x^{62} + x^{60} + x^{56} + x^{54} + x^{52} \\
&\quad + x^{50} + x^{48} + x^{40} + x^{36} + x^{34} + x^{28} + x^{18} + x^{16} + x^{14} + x^{12} + x^{10} \\
&\quad + x^{4} + 1, \\
p_9(x) &= x^{100} + x^{98} + x^{96} + x^{94} + x^{92} + x^{84} + x^{82} + x^{76} + x^{72} + x^{62} + x^{58} \\
&\quad + x^{52} + x^{48} + x^{46} + x^{42} + x^{40} + x^{32} + x^{30} + x^{28} + x^{26} + x^{24} + x^{20} \\
&\quad + x^{14} + x^{6} + x^{4} + x^{2}, \\
p_{12}(x) &= x^{102} + x^{100} + x^{96} + x^{94} + x^{90} + x^{84} + x^{82} + x^{80} + x^{70} + x^{68} + x^{64} \\
&\quad + x^{62} + x^{58} + x^{52} + x^{50} + x^{48} + x^{22} + x^{20} + x^{16} + x^{14} + x^{10} + x^{4} \\
&\quad + x^{2} + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{117} + x^{116} + x^{114} + x^{110} + x^{109} + x^{100} + x^{97} + x^{96} + x^{95} + x^{94} \\
&\quad + x^{92} + x^{91} + x^{90} + x^{84} + x^{83} + x^{82} + x^{81} + x^{79} + x^{75} + x^{74} + x^{72} \\
&\quad + x^{70} + x^{69} + x^{67} + x^{65} + x^{64} + x^{62} + x^{61} + x^{59} + x^{57} + x^{53} + x^{50} \\
&\quad + x^{49} + x^{45} + x^{44} + x^{43} + x^{36} + x^{34} + x^{33} + x^{32} + x^{31} + x^{27} + x^{25} \\
&\quad + x^{24} + x^{23} + x^{22} + x^{21} + x^{17} + x^{14} + x^{13} + x^{12}, \\
p_3(x) &= x^{113} + x^{112} + x^{110} + x^{106} + x^{104} + x^{102} + x^{100} + x^{99} + x^{97} + x^{96} \\
&\quad + x^{94} + x^{93} + x^{92} + x^{91} + x^{90} + x^{89} + x^{88} + x^{83} + x^{80} + x^{77} + x^{76} \\
&\quad + x^{75} + x^{64} + x^{63} + x^{61} + x^{59} + x^{58} + x^{57} + x^{56} + x^{55} + x^{53} + x^{52} \\
&\quad + x^{51} + x^{47} + x^{45} + x^{42} + x^{41} + x^{40} + x^{39} + x^{36} + x^{34} + x^{33} + x^{28} \\
&\quad + x^{26} + x^{24} + x^{23} + x^{22} + x^{21} + x^{20} + x^{18} + x^{17} + x^{15} + x^{12} + x^{10} \\
&\quad + x^{9} + x^{8}, \\
p_6(x) &= x^{115} + x^{114} + x^{113} + x^{112} + x^{110} + x^{108} + x^{107} + x^{105} + x^{101} + x^{99} \\
&\quad + x^{98} + x^{97} + x^{96} + x^{95} + x^{92} + x^{91} + x^{86} + x^{83} + x^{81} + x^{79} + x^{78} \\
&\quad + x^{76} + x^{71} + x^{69} + x^{68} + x^{66} + x^{64} + x^{63} + x^{62} + x^{61} + x^{59} + x^{57} \\
&\quad + x^{55} + x^{52} + x^{51} + x^{50} + x^{49} + x^{47} + x^{46} + x^{45} + x^{44} + x^{42} + x^{41} \\
&\quad + x^{39} + x^{38} + x^{34} + x^{31} + x^{30} + x^{27} + x^{26} + x^{25} + x^{23} + x^{22} + x^{20} \\
&\quad + x^{18} + x^{17} + x^{16} + x^{15} + x^{14} + x^{12} + x^{11} + x^{8} + x^{6} + x^{3} + x + 1, \\
p_9(x) &= x^{113} + x^{112} + x^{111} + x^{107} + x^{103} + x^{101} + x^{100} + x^{97} + x^{96} + x^{95} \\
&\quad + x^{91} + x^{87} + x^{85} + x^{84} + x^{81} + x^{80} + x^{79} + x^{75} + x^{71} + x^{69} + x^{68} \\
&\quad + x^{65} + x^{64} + x^{63} + x^{59} + x^{55} + x^{53} + x^{52} + x^{33} + x^{32} + x^{31} + x^{27} \\
&\quad + x^{23} + x^{21} + x^{20} + x^{17} + x^{16} + x^{15} + x^{11} + x^{7} + x^{5} + x^{4},
\end{aligned}$$

$$\begin{aligned}p_{12}(x) &= x^{117}+x^{116}+x^{115}+x^{111}+x^{109}+x^{108}+x^{101}+x^{100}+x^{99}+x^{97}\\ &\quad+x^{96}+x^{93}+x^{92}+x^{91}+x^{87}+x^{85}+x^{84}+x^{81}+x^{80}+x^{79}+x^{77}\\ &\quad+x^{76}+x^{69}+x^{68}+x^{67}+x^{65}+x^{64}+x^{61}+x^{60}+x^{59}+x^{55}+x^{51}\\ &\quad+x^{49}+x^{48}+x^{37}+x^{36}+x^{35}+x^{31}+x^{29}+x^{28}+x^{21}+x^{20}+x^{19}\\ &\quad+x^{17}+x^{16}+x^{13}+x^{12}+x^{11}+x^{7}+x^{3}+x+1,\end{aligned}$$

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

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

$$\begin{aligned}p_0(x) &= x^{132}+x^{129}+x^{126}+x^{124}+x^{123}+x^{122}+x^{119}+x^{116}+x^{114}+x^{113}\\ &\quad+x^{112}+x^{109}+x^{107}+x^{106}+x^{105}+x^{104}+x^{103}+x^{102}+x^{101}\\ &\quad+x^{100}+x^{94}+x^{93}+x^{92}+x^{91}+x^{87}+x^{85}+x^{81}+x^{80}+x^{78}+x^{74}\\ &\quad+x^{71}+x^{70}+x^{65}+x^{63}+x^{60}+x^{59}+x^{57}+x^{56}+x^{50}+x^{49}+x^{47}\\ &\quad+x^{45}+x^{43}+x^{41}+x^{40}+x^{36}+x^{29}+x^{28}+x^{27},\\ p_3(x) &= x^{123}+x^{122}+x^{117}+x^{115}+x^{114}+x^{113}+x^{112}+x^{111}+x^{109}+x^{108}\\ &\quad+x^{107}+x^{106}+x^{105}+x^{104}+x^{103}+x^{101}+x^{99}+x^{96}+x^{92}+x^{91}\\ &\quad+x^{89}+x^{88}+x^{87}+x^{86}+x^{85}+x^{84}+x^{83}+x^{81}+x^{78}+x^{76}+x^{73}\\ &\quad+x^{72}+x^{70}+x^{66}+x^{63}+x^{60}+x^{56}+x^{54}+x^{53}+x^{52}+x^{48}+x^{47}\\ &\quad+x^{45}+x^{44}+x^{41}+x^{40}+x^{39}+x^{35}+x^{33}+x^{31}+x^{26}+x^{25}+x^{24}\\ &\quad+x^{23}+x^{22}+x^{17}+x^{16}+x^{14}+x^{12}+x^{11}+x^{10}+x^{9},\\ p_6(x) &= x^{126}+x^{124}+x^{122}+x^{120}+x^{112}+x^{108}+x^{102}+x^{100}+x^{96}+x^{90}\\ &\quad+x^{82}+x^{78}+x^{76}+x^{68}+x^{66}+x^{64}+x^{62}+x^{56}+x^{52}+x^{48}+x^{46}\\ &\quad+x^{36}+x^{32}+x^{28}+x^{24}+x^{16}+x^{8}+x^{6},\\ p_9(x) &= x^{129}+x^{128}+x^{127}+x^{126}+x^{123}+x^{121}+x^{119}+x^{118}+x^{117}+x^{115}\\ &\quad+x^{114}+x^{113}+x^{110}+x^{109}+x^{108}+x^{107}+x^{106}+x^{99}+x^{96}+x^{95}\\ &\quad+x^{89}+x^{88}+x^{87}+x^{86}+x^{85}+x^{84}+x^{82}+x^{81}+x^{78}+x^{77}+x^{76}\\ &\quad+x^{75}+x^{74}+x^{67}+x^{65}+x^{62}+x^{59}+x^{56}+x^{52}+x^{51}+x^{49}+x^{48}\\ &\quad+x^{47}+x^{46}+x^{43}+x^{41}+x^{39}+x^{38}+x^{37}+x^{35}+x^{34}+x^{33}+x^{30}\\ &\quad+x^{29}+x^{28}+x^{27}+x^{26}+x^{19}+x^{17}+x^{14}+x^{11}+x^{8}+x^{4}+x^{3},\\ p_{12}(x) &= x^{132}+x^{120}+x^{112}+x^{108}+x^{100}+x^{96}+x^{88}+x^{76}+x^{64}+x^{52}+x^{48}\\ &\quad+x^{40}+x^{32}+x^{28}+x^{16}+1,\end{aligned}$$

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

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

$$\begin{aligned}p_0(x) &= x^{112}+x^{109}+x^{108}+x^{105}+x^{104}+x^{103}+x^{102}+x^{100}+x^{96}+x^{95}\\ &\quad+x^{94}+x^{92}+x^{91}+x^{90}+x^{89}+x^{87}+x^{86}+x^{82}+x^{80}+x^{77}+x^{75}\\ &\quad+x^{74}+x^{73}+x^{66}+x^{65}+x^{64}+x^{63}+x^{62}+x^{60}+x^{59}+x^{57}+x^{55}\\ &\quad+x^{54}+x^{53}+x^{52}+x^{51}+x^{45}+x^{44}+x^{43}+x^{42}+x^{41}+x^{39}+x^{37}\end{aligned}$$

$$
\begin{aligned}
&+ x^{35} + x^{34} + x^{33} + x^{32} + x^{30} + x^{28} + x^{25} + x^{22} + x^{21} + x^{18},\\
p_3(x) &= x^{103} + x^{102} + x^{99} + x^{98} + x^{97} + x^{95} + x^{94} + x^{92} + x^{91} + x^{86} + x^{85}\\
&+ x^{82} + x^{81} + x^{79} + x^{77} + x^{75} + x^{70} + x^{69} + x^{68} + x^{60} + x^{58} + x^{57}\\
&+ x^{55} + x^{53} + x^{52} + x^{51} + x^{50} + x^{49} + x^{39} + x^{38} + x^{35} + x^{34} + x^{33}\\
&+ x^{31} + x^{30} + x^{28} + x^{27} + x^{23} + x^{21} + x^{19} + x^{15} + x^{13} + x^{12} + x^{11}\\
&+ x^{10} + x^{9},\\
p_6(x) &= x^{106} + x^{104} + x^{98} + x^{96} + x^{94} + x^{90} + x^{88} + x^{86} + x^{80} + x^{78} + x^{76}\\
&+ x^{74} + x^{72} + x^{70} + x^{68} + x^{66} + x^{64} + x^{48} + x^{44} + x^{42} + x^{38} + x^{30}\\
&+ x^{28} + x^{26} + x^{20} + x^{14} + x^{12} + x^{10} + x^{8} + x^{6},\\
p_9(x) &= x^{109} + x^{108} + x^{107} + x^{106} + x^{105} + x^{104} + x^{102} + x^{101} + x^{98} + x^{97}\\
&+ x^{96} + x^{95} + x^{94} + x^{87} + x^{84} + x^{83} + x^{77} + x^{76} + x^{75} + x^{74} + x^{73}\\
&+ x^{72} + x^{70} + x^{69} + x^{66} + x^{65} + x^{64} + x^{63} + x^{62} + x^{55} + x^{52} + x^{51}\\
&+ x^{29} + x^{28} + x^{27} + x^{26} + x^{25} + x^{24} + x^{22} + x^{21} + x^{18} + x^{17} + x^{16}\\
&+ x^{15} + x^{14} + x^{7} + x^{4} + x^{3},\\
p_{12}(x) &= x^{112} + x^{108} + x^{96} + x^{88} + x^{84} + x^{76} + x^{64} + x^{56} + x^{52} + x^{48} + x^{32}\\
&+ x^{28} + x^{16} + x^{8} + x^{4} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{117} + x^{116} + x^{114} + x^{113} + x^{112} + x^{109} + x^{108} + x^{105} + x^{104} + x^{102}\\
&+ x^{101} + x^{100} + x^{99} + x^{98} + x^{93} + x^{92} + x^{88} + x^{87} + x^{84} + x^{82} + x^{80}\\
&+ x^{79} + x^{78} + x^{75} + x^{74} + x^{73} + x^{71} + x^{70} + x^{68} + x^{67} + x^{66} + x^{64}\\
&+ x^{60} + x^{58} + x^{56} + x^{55} + x^{54} + x^{53} + x^{52} + x^{51} + x^{50} + x^{45} + x^{42}\\
&+ x^{40} + x^{36} + x^{35} + x^{33},\\
p_3(x) &= x^{113} + x^{112} + x^{110} + x^{109} + x^{108} + x^{105} + x^{104} + x^{100} + x^{97} + x^{96}\\
&+ x^{95} + x^{94} + x^{93} + x^{92} + x^{91} + x^{89} + x^{84} + x^{83} + x^{82} + x^{80} + x^{78}\\
&+ x^{77} + x^{74} + x^{71} + x^{70} + x^{68} + x^{67} + x^{62} + x^{61} + x^{57} + x^{52} + x^{51}\\
&+ x^{50} + x^{49} + x^{48} + x^{47} + x^{44} + x^{40} + x^{39} + x^{38} + x^{36} + x^{35} + x^{34}\\
&+ x^{33} + x^{31} + x^{29} + x^{26} + x^{25} + x^{23} + x^{20} + x^{19} + x^{18} + x^{13} + x^{12},\\
p_6(x) &= x^{115} + x^{114} + x^{109} + x^{108} + x^{107} + x^{106} + x^{104} + x^{103} + x^{102} + x^{101}\\
&+ x^{100} + x^{98} + x^{96} + x^{91} + x^{89} + x^{87} + x^{85} + x^{84} + x^{83} + x^{82} + x^{81}\\
&+ x^{80} + x^{79} + x^{78} + x^{77} + x^{76} + x^{73} + x^{71} + x^{69} + x^{65} + x^{63} + x^{62}\\
&+ x^{60} + x^{56} + x^{55} + x^{52} + x^{51} + x^{50} + x^{48} + x^{47} + x^{44} + x^{43} + x^{42}\\
&+ x^{39} + x^{37} + x^{36} + x^{35} + x^{33} + x^{31} + x^{30} + x^{29} + x^{25} + x^{23} + x^{22}\\
&+ x^{21} + x^{16} + x^{14} + x^{13} + x^{12} + x^{9} + x^{8} + x^{5} + x^{4} + x^{3} + x + 1,\\
p_9(x) &= x^{113} + x^{112} + x^{111} + x^{107} + x^{103} + x^{101} + x^{100} + x^{97} + x^{96} + x^{95}
\end{aligned}
$$

$$+ x^{91} + x^{87} + x^{85} + x^{84} + x^{81} + x^{80} + x^{79} + x^{75} + x^{71} + x^{69} + x^{68} + x^{65} + x^{64} + x^{63} + x^{59} + x^{55} + x^{53} + x^{52} + x^{33} + x^{32} + x^{31} + x^{27} + x^{23} + x^{21} + x^{20} + x^{17} + x^{16} + x^{15} + x^{11} + x^{7} + x^{5} + x^{4},$$

$$p_{12}(x) = x^{117} + x^{116} + x^{115} + x^{111} + x^{109} + x^{108} + x^{101} + x^{100} + x^{99} + x^{97} + x^{96} + x^{93} + x^{92} + x^{91} + x^{87} + x^{85} + x^{84} + x^{81} + x^{80} + x^{79} + x^{77} + x^{76} + x^{69} + x^{68} + x^{67} + x^{65} + x^{64} + x^{61} + x^{60} + x^{59} + x^{55} + x^{51} + x^{49} + x^{48} + x^{37} + x^{36} + x^{35} + x^{31} + x^{29} + x^{28} + x^{21} + x^{20} + x^{19} + x^{17} + x^{16} + x^{13} + x^{12} + x^{11} + x^{7} + x^{3} + x + 1,$$

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

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

$$p_0(x) = x^{117} + x^{116} + x^{114} + x^{110} + x^{109} + x^{100} + x^{97} + x^{96} + x^{95} + x^{94} + x^{92} + x^{91} + x^{90} + x^{84} + x^{83} + x^{82} + x^{81} + x^{79} + x^{75} + x^{74} + x^{72} + x^{70} + x^{69} + x^{67} + x^{65} + x^{64} + x^{62} + x^{61} + x^{59} + x^{57} + x^{53} + x^{50} + x^{49} + x^{45} + x^{44} + x^{43} + x^{36} + x^{34} + x^{33} + x^{32} + x^{31} + x^{27} + x^{25} + x^{24} + x^{23} + x^{22} + x^{21} + x^{17} + x^{14} + x^{13} + x^{12},$$

$$p_3(x) = x^{113} + x^{112} + x^{110} + x^{106} + x^{104} + x^{102} + x^{100} + x^{99} + x^{97} + x^{96} + x^{94} + x^{93} + x^{92} + x^{91} + x^{90} + x^{89} + x^{88} + x^{83} + x^{80} + x^{77} + x^{76} + x^{75} + x^{64} + x^{63} + x^{61} + x^{59} + x^{58} + x^{57} + x^{56} + x^{55} + x^{53} + x^{52} + x^{51} + x^{47} + x^{45} + x^{42} + x^{41} + x^{40} + x^{39} + x^{36} + x^{34} + x^{33} + x^{28} + x^{26} + x^{24} + x^{23} + x^{22} + x^{21} + x^{20} + x^{18} + x^{17} + x^{15} + x^{12} + x^{10} + x^{9} + x^{8},$$

$$p_6(x) = x^{115} + x^{114} + x^{113} + x^{112} + x^{110} + x^{108} + x^{107} + x^{105} + x^{101} + x^{99} + x^{98} + x^{97} + x^{96} + x^{95} + x^{92} + x^{91} + x^{86} + x^{83} + x^{81} + x^{79} + x^{78} + x^{76} + x^{71} + x^{69} + x^{68} + x^{66} + x^{64} + x^{63} + x^{62} + x^{61} + x^{59} + x^{57} + x^{55} + x^{52} + x^{51} + x^{50} + x^{49} + x^{47} + x^{46} + x^{45} + x^{44} + x^{42} + x^{41} + x^{39} + x^{38} + x^{34} + x^{31} + x^{30} + x^{27} + x^{26} + x^{25} + x^{23} + x^{22} + x^{20} + x^{18} + x^{17} + x^{16} + x^{15} + x^{14} + x^{12} + x^{11} + x^{8} + x^{6} + x^{3} + x + 1,$$

$$p_9(x) = x^{113} + x^{112} + x^{111} + x^{107} + x^{103} + x^{101} + x^{100} + x^{97} + x^{96} + x^{95} + x^{91} + x^{87} + x^{85} + x^{84} + x^{81} + x^{80} + x^{79} + x^{75} + x^{71} + x^{69} + x^{68} + x^{65} + x^{64} + x^{63} + x^{59} + x^{55} + x^{53} + x^{52} + x^{33} + x^{32} + x^{31} + x^{27} + x^{23} + x^{21} + x^{20} + x^{17} + x^{16} + x^{15} + x^{11} + x^{7} + x^{5} + x^{4},$$

$$p_{12}(x) = x^{117} + x^{116} + x^{115} + x^{111} + x^{109} + x^{108} + x^{101} + x^{100} + x^{99} + x^{97} + x^{96} + x^{93} + x^{92} + x^{91} + x^{87} + x^{85} + x^{84} + x^{81} + x^{80} + x^{79} + x^{77} + x^{76} + x^{69} + x^{68} + x^{67} + x^{65} + x^{64} + x^{61} + x^{60} + x^{59} + x^{55} + x^{51} + x^{49} + x^{48} + x^{37} + x^{36} + x^{35} + x^{31} + x^{29} + x^{28} + x^{21} + x^{20} + x^{19}$$

$$+ x^{17} + x^{16} + x^{13} + x^{12} + x^{11} + x^{7} + x^{3} + x + 1,$$

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

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

$$\begin{aligned}
p_0(x) &= x^{112} + x^{109} + x^{108} + x^{105} + x^{104} + x^{103} + x^{102} + x^{100} + x^{96} + x^{95} \\
&\quad + x^{94} + x^{92} + x^{91} + x^{90} + x^{89} + x^{87} + x^{86} + x^{82} + x^{80} + x^{77} + x^{75} \\
&\quad + x^{74} + x^{73} + x^{66} + x^{65} + x^{64} + x^{63} + x^{62} + x^{60} + x^{59} + x^{57} + x^{55} \\
&\quad + x^{54} + x^{53} + x^{52} + x^{51} + x^{45} + x^{44} + x^{43} + x^{42} + x^{41} + x^{39} + x^{37} \\
&\quad + x^{35} + x^{34} + x^{33} + x^{32} + x^{30} + x^{28} + x^{25} + x^{22} + x^{21} + x^{18}, \\
p_3(x) &= x^{103} + x^{102} + x^{99} + x^{98} + x^{97} + x^{95} + x^{94} + x^{92} + x^{91} + x^{86} + x^{85} \\
&\quad + x^{82} + x^{81} + x^{79} + x^{77} + x^{75} + x^{70} + x^{69} + x^{68} + x^{60} + x^{58} + x^{57} \\
&\quad + x^{55} + x^{53} + x^{52} + x^{51} + x^{50} + x^{49} + x^{39} + x^{38} + x^{35} + x^{34} + x^{33} \\
&\quad + x^{31} + x^{30} + x^{28} + x^{27} + x^{23} + x^{21} + x^{19} + x^{15} + x^{13} + x^{12} + x^{11} \\
&\quad + x^{10} + x^{9}, \\
p_6(x) &= x^{106} + x^{104} + x^{98} + x^{96} + x^{94} + x^{90} + x^{88} + x^{86} + x^{80} + x^{78} + x^{76} \\
&\quad + x^{74} + x^{72} + x^{70} + x^{68} + x^{66} + x^{64} + x^{48} + x^{44} + x^{42} + x^{38} + x^{30} \\
&\quad + x^{28} + x^{26} + x^{20} + x^{14} + x^{12} + x^{10} + x^{8} + x^{6}, \\
p_9(x) &= x^{109} + x^{108} + x^{107} + x^{106} + x^{105} + x^{104} + x^{102} + x^{101} + x^{98} + x^{97} \\
&\quad + x^{96} + x^{95} + x^{94} + x^{87} + x^{84} + x^{83} + x^{77} + x^{76} + x^{75} + x^{74} + x^{73} \\
&\quad + x^{72} + x^{70} + x^{69} + x^{66} + x^{65} + x^{64} + x^{63} + x^{62} + x^{55} + x^{52} + x^{51} \\
&\quad + x^{29} + x^{28} + x^{27} + x^{26} + x^{25} + x^{24} + x^{22} + x^{21} + x^{18} + x^{17} + x^{16} \\
&\quad + x^{15} + x^{14} + x^{7} + x^{4} + x^{3}, \\
p_{12}(x) &= x^{112} + x^{108} + x^{96} + x^{88} + x^{84} + x^{76} + x^{64} + x^{56} + x^{52} + x^{48} + x^{32} \\
&\quad + x^{28} + x^{16} + x^{8} + x^{4} + 1,
\end{aligned}$$

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

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

$$\begin{aligned}
p_0(x) &= x^{132} + x^{129} + x^{126} + x^{124} + x^{123} + x^{122} + x^{119} + x^{116} + x^{114} + x^{113} \\
&\quad + x^{112} + x^{109} + x^{107} + x^{106} + x^{105} + x^{104} + x^{103} + x^{102} + x^{101} \\
&\quad + x^{100} + x^{94} + x^{93} + x^{92} + x^{91} + x^{87} + x^{85} + x^{81} + x^{80} + x^{78} + x^{74} \\
&\quad + x^{71} + x^{70} + x^{65} + x^{63} + x^{60} + x^{59} + x^{57} + x^{56} + x^{50} + x^{49} + x^{47} \\
&\quad + x^{45} + x^{43} + x^{41} + x^{40} + x^{36} + x^{29} + x^{28} + x^{27}, \\
p_3(x) &= x^{123} + x^{122} + x^{117} + x^{115} + x^{114} + x^{113} + x^{112} + x^{111} + x^{109} + x^{108} \\
&\quad + x^{107} + x^{106} + x^{105} + x^{104} + x^{103} + x^{101} + x^{99} + x^{96} + x^{92} + x^{91} \\
&\quad + x^{89} + x^{88} + x^{87} + x^{86} + x^{85} + x^{84} + x^{83} + x^{81} + x^{78} + x^{76} + x^{73} \\
&\quad + x^{72} + x^{70} + x^{66} + x^{63} + x^{60} + x^{56} + x^{54} + x^{53} + x^{52} + x^{48} + x^{47} \\
&\quad + x^{45} + x^{44} + x^{41} + x^{40} + x^{39} + x^{35} + x^{33} + x^{31} + x^{26} + x^{25} + x^{24}
\end{aligned}$$

$$
\begin{aligned}
&+ x^{23} + x^{22} + x^{17} + x^{16} + x^{14} + x^{12} + x^{11} + x^{10} + x^{9},\\
p_6(x) &= x^{126} + x^{124} + x^{122} + x^{120} + x^{112} + x^{108} + x^{102} + x^{100} + x^{96} + x^{90}\\
&+ x^{82} + x^{78} + x^{76} + x^{68} + x^{66} + x^{64} + x^{62} + x^{56} + x^{52} + x^{48} + x^{46}\\
&+ x^{36} + x^{32} + x^{28} + x^{24} + x^{16} + x^{8} + x^{6},\\
p_9(x) &= x^{129} + x^{128} + x^{127} + x^{126} + x^{123} + x^{121} + x^{119} + x^{118} + x^{117} + x^{115}\\
&+ x^{114} + x^{113} + x^{110} + x^{109} + x^{108} + x^{107} + x^{106} + x^{99} + x^{96} + x^{95}\\
&+ x^{89} + x^{88} + x^{87} + x^{86} + x^{85} + x^{84} + x^{82} + x^{81} + x^{78} + x^{77} + x^{76}\\
&+ x^{75} + x^{74} + x^{67} + x^{65} + x^{62} + x^{59} + x^{56} + x^{52} + x^{51} + x^{49} + x^{48}\\
&+ x^{47} + x^{46} + x^{43} + x^{41} + x^{39} + x^{38} + x^{37} + x^{35} + x^{34} + x^{33} + x^{30}\\
&+ x^{29} + x^{28} + x^{27} + x^{26} + x^{19} + x^{17} + x^{14} + x^{11} + x^{8} + x^{4} + x^{3},\\
p_{12}(x) &= x^{132} + x^{120} + x^{112} + x^{108} + x^{100} + x^{96} + x^{88} + x^{76} + x^{64} + x^{52} + x^{48}\\
&+ x^{40} + x^{32} + x^{28} + x^{16} + 1,
\end{aligned}
$$

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

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

$$
\begin{aligned}
p_0(x) &= x^{117} + x^{116} + x^{114} + x^{113} + x^{112} + x^{109} + x^{108} + x^{105} + x^{104} + x^{102}\\
&+ x^{101} + x^{100} + x^{99} + x^{98} + x^{93} + x^{92} + x^{88} + x^{87} + x^{84} + x^{82} + x^{80}\\
&+ x^{79} + x^{78} + x^{75} + x^{74} + x^{73} + x^{71} + x^{70} + x^{68} + x^{67} + x^{66} + x^{64}\\
&+ x^{60} + x^{58} + x^{56} + x^{55} + x^{54} + x^{53} + x^{52} + x^{51} + x^{50} + x^{45} + x^{42}\\
&+ x^{40} + x^{36} + x^{35} + x^{33},\\
p_3(x) &= x^{113} + x^{112} + x^{110} + x^{109} + x^{108} + x^{105} + x^{104} + x^{100} + x^{97} + x^{96}\\
&+ x^{95} + x^{94} + x^{93} + x^{92} + x^{91} + x^{89} + x^{84} + x^{83} + x^{82} + x^{80} + x^{78}\\
&+ x^{77} + x^{74} + x^{71} + x^{70} + x^{68} + x^{67} + x^{62} + x^{61} + x^{57} + x^{52} + x^{51}\\
&+ x^{50} + x^{49} + x^{48} + x^{47} + x^{44} + x^{40} + x^{39} + x^{38} + x^{36} + x^{35} + x^{34}\\
&+ x^{33} + x^{31} + x^{29} + x^{26} + x^{25} + x^{23} + x^{20} + x^{19} + x^{18} + x^{13} + x^{12},\\
p_6(x) &= x^{115} + x^{114} + x^{109} + x^{108} + x^{107} + x^{106} + x^{104} + x^{103} + x^{102} + x^{101}\\
&+ x^{100} + x^{98} + x^{96} + x^{91} + x^{89} + x^{87} + x^{85} + x^{84} + x^{83} + x^{82} + x^{81}\\
&+ x^{80} + x^{79} + x^{78} + x^{77} + x^{76} + x^{73} + x^{71} + x^{69} + x^{65} + x^{63} + x^{62}\\
&+ x^{60} + x^{56} + x^{55} + x^{52} + x^{51} + x^{50} + x^{48} + x^{47} + x^{44} + x^{43} + x^{42}\\
&+ x^{39} + x^{37} + x^{36} + x^{35} + x^{33} + x^{31} + x^{30} + x^{29} + x^{25} + x^{23} + x^{22}\\
&+ x^{21} + x^{16} + x^{14} + x^{13} + x^{12} + x^{9} + x^{8} + x^{5} + x^{4} + x^{3} + x + 1,\\
p_9(x) &= x^{113} + x^{112} + x^{111} + x^{107} + x^{103} + x^{101} + x^{100} + x^{97} + x^{96} + x^{95}\\
&+ x^{91} + x^{87} + x^{85} + x^{84} + x^{81} + x^{80} + x^{79} + x^{75} + x^{71} + x^{69} + x^{68}\\
&+ x^{65} + x^{64} + x^{63} + x^{59} + x^{55} + x^{53} + x^{52} + x^{33} + x^{32} + x^{31} + x^{27}\\
&+ x^{23} + x^{21} + x^{20} + x^{17} + x^{16} + x^{15} + x^{11} + x^{7} + x^{5} + x^{4},\\
p_{12}(x) &= x^{117} + x^{116} + x^{115} + x^{111} + x^{109} + x^{108} + x^{101} + x^{100} + x^{99} + x^{97}
\end{aligned}
$$

$$+ x^{96} + x^{93} + x^{92} + x^{91} + x^{87} + x^{85} + x^{84} + x^{81} + x^{80} + x^{79} + x^{77}$$
$$+ x^{76} + x^{69} + x^{68} + x^{67} + x^{65} + x^{64} + x^{61} + x^{60} + x^{59} + x^{55} + x^{51}$$
$$+ x^{49} + x^{48} + x^{37} + x^{36} + x^{35} + x^{31} + x^{29} + x^{28} + x^{21} + x^{20} + x^{19}$$
$$+ x^{17} + x^{16} + x^{13} + x^{12} + x^{11} + x^{7} + x^{3} + x + 1,$$

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

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]	1007	[1750, 1751]	2014	[2630, 330]	3021	[3686, 855]
1	[3, 4]	1008	[1608, 1752]	2015	[2605, 1481]	3022	[686, 715]
2	[5, 6]	1009	[163, 1753]	2016	[3006, 3007]	3023	[3740, 3741]
3	[7, 8]	1010	[1754, 1755]	2017	[3008, 1127]	3024	[2341, 3742]
4	[9, 10]	1011	[787, 1756]	2018	[3009, 3010]	3025	[182, 3679]
5	[11, 12]	1012	[1757, 1758]	2019	[2602, 1474]	3026	[3407, 3743]
6	[13, 14]	1013	[1759, 1760]	2020	[3011, 3012]	3027	[3350, 1684]
7	[15, 16]	1014	[717, 1761]	2021	[3013, 3014]	3028	[3403, 3744]
8	[17, 18]	1015	[231, 1762]	2022	[2499, 3015]	3029	[192, 3536]
9	[19, 20]	1016	[1763, 1764]	2023	[3016, 1253]	3030	[3463, 2374]
10	[21, 22]	1017	[1765, 1766]	2024	[3017, 2847]	3031	[207, 3706]
11	[23, 24]	1018	[1767, 1768]	2025	[3018, 3019]	3032	[3745, 45]
12	[25, 26]	1019	[1769, 817]	2026	[952, 1368]	3033	[3708, 1802]
13	[27, 28]	1020	[1770, 1771]	2027	[3020, 3021]	3034	[32, 3746]
14	[29, 30]	1021	[1772, 1546]	2028	[2794, 3022]	3035	[3608, 3604]
15	[31, 32]	1022	[1773, 1548]	2029	[3023, 3024]	3036	[2127, 1680]
16	[33, 34]	1023	[1736, 230]	2030	[3025, 3026]	3037	[3747, 1997]
17	[35, 36]	1024	[1774, 1775]	2031	[3027, 3028]	3038	[3544, 1823]
18	[37, 38]	1025	[1776, 1777]	2032	[98, 3029]	3039	[3605, 2357]
19	[39, 40]	1026	[620, 704]	2033	[3030, 3031]	3040	[2396, 3435]
20	[41, 42]	1027	[1778, 1779]	2034	[3032, 3033]	3041	[1966, 3748]
21	[43, 44]	1028	[1780, 1781]	2035	[16, 3034]	3042	[3619, 669]
22	[45, 46]	1029	[1782, 1783]	2036	[2761, 3035]	3043	[3574, 2423]
23	[47, 48]	1030	[819, 623]	2037	[2763, 2505]	3044	[2293, 814]
24	[49, 50]	1031	[1784, 1785]	2038	[352, 3036]	3045	[731, 3374]
25	[51, 52]	1032	[1786, 552]	2039	[1496, 3037]	3046	[3749, 3750]
26	[53, 54]	1033	[1787, 1541]	2040	[3038, 1085]	3047	[1920, 2093]
27	[55, 56]	1034	[1650, 1788]	2041	[3039, 3040]	3048	[1573, 3735]
28	[57, 58]	1035	[1789, 1790]	2042	[2921, 3041]	3049	[1679, 3352]
29	[59, 60]	1036	[58, 1791]	2043	[3042, 3043]	3050	[1981, 3452]
30	[61, 62]	1037	[793, 1605]	2044	[3044, 3045]	3051	[2279, 1640]
31	[63, 64]	1038	[1792, 1793]	2045	[3046, 3047]	3052	[2116, 643]
32	[65, 66]	1039	[1794, 481]	2046	[3048, 3013]	3053	[3653, 820]
33	[67, 68]	1040	[723, 1795]	2047	[441, 3049]	3054	[3613, 3692]

34	[69, 70]	1041	[1796, 1797]	2048	[1313, 3000]	3055	[2301, 3715]
35	[71, 72]	1042	[1798, 1799]	2049	[1161, 3050]	3056	[239, 3751]
36	[73, 74]	1043	[1800, 1731]	2050	[3051, 941]	3057	[581, 3603]
37	[75, 76]	1044	[1801, 1692]	2051	[3052, 2925]	3058	[3634, 3475]
38	[77, 78]	1045	[694, 625]	2052	[2472, 2892]	3059	[3714, 854]
39	[79, 80]	1046	[565, 627]	2053	[3053, 3054]	3060	[3752, 1923]
40	[81, 82]	1047	[1802, 1652]	2054	[3055, 3056]	3061	[2133, 1774]
41	[83, 84]	1048	[1803, 1804]	2055	[1510, 1261]	3062	[3721, 1860]
42	[85, 86]	1049	[1805, 865]	2056	[3057, 2691]	3063	[1594, 3674]
43	[87, 88]	1050	[1806, 1807]	2057	[3058, 94]	3064	[3753, 3754]
44	[89, 90]	1051	[1808, 1809]	2058	[3059, 2724]	3065	[3755, 3720]
45	[91, 92]	1052	[744, 737]	2059	[1459, 2810]	3066	[3325, 2321]
46	[76, 93]	1053	[1810, 1811]	2060	[3060, 3061]	3067	[203, 724]
47	[94, 23]	1054	[1812, 1813]	2061	[2567, 3062]	3068	[3756, 1709]
48	[95, 96]	1055	[1814, 1815]	2062	[3063, 3064]	3069	[2395, 3757]
49	[97, 98]	1056	[1816, 1817]	2063	[3065, 2984]	3070	[3566, 2444]
50	[99, 100]	1057	[1818, 1819]	2064	[2446, 3066]	3071	[3758, 2435]
51	[101, 102]	1058	[1820, 853]	2065	[3067, 376]	3072	[3759, 3760]
52	[103, 104]	1059	[1821, 1822]	2066	[2546, 3068]	3073	[3761, 3500]
53	[105, 106]	1060	[1823, 1824]	2067	[3069, 3070]	3074	[2385, 3762]
54	[107, 108]	1061	[1825, 1826]	2068	[3071, 2994]	3075	[860, 867]
55	[109, 110]	1062	[1827, 1828]	2069	[3072, 3073]	3076	[2057, 3763]
56	[111, 5]	1063	[1829, 1830]	2070	[2948, 2903]	3077	[1973, 3764]
57	[112, 113]	1064	[1831, 1832]	2071	[96, 3074]	3078	[2258, 3332]
58	[114, 115]	1065	[1833, 847]	2072	[3075, 2815]	3079	[3514, 2276]
59	[116, 117]	1066	[1834, 1663]	2073	[1091, 3076]	3080	[791, 138]
60	[118, 119]	1067	[1835, 1836]	2074	[906, 2860]	3081	[3436, 1876]
61	[120, 121]	1068	[1837, 1838]	2075	[1157, 3077]	3082	[3657, 1969]
62	[122, 123]	1069	[1824, 1839]	2076	[3078, 3003]	3083	[42, 1636]
63	[124, 125]	1070	[1840, 1841]	2077	[2869, 3079]	3084	[740, 3572]
64	[126, 127]	1071	[1842, 1703]	2078	[3080, 2989]	3085	[2088, 2208]
65	[128, 129]	1072	[1843, 1844]	2079	[3010, 3081]	3086	[3760, 3765]
66	[130, 131]	1073	[1822, 1845]	2080	[2687, 1230]	3087	[3704, 2311]
67	[132, 133]	1074	[1846, 1847]	2081	[3082, 2647]	3088	[1683, 2014]
68	[134, 135]	1075	[1848, 1849]	2082	[2617, 2909]	3089	[840, 3387]
69	[136, 137]	1076	[1850, 1851]	2083	[1233, 1505]	3090	[3766, 3767]
70	[138, 139]	1077	[1712, 1852]	2084	[3083, 2819]	3091	[733, 3484]
71	[140, 141]	1078	[1853, 1854]	2085	[2596, 2603]	3092	[3768, 3655]
72	[142, 143]	1079	[662, 1727]	2086	[3084, 1150]	3093	[3659, 2285]
73	[144, 145]	1080	[1855, 837]	2087	[1268, 3071]	3094	[3607, 3769]
74	[146, 147]	1081	[1856, 1857]	2088	[2519, 3085]	3095	[3516, 3380]
75	[148, 149]	1082	[1858, 1859]	2089	[3077, 3086]	3096	[3586, 1675]
76	[150, 151]	1083	[1860, 1861]	2090	[3087, 2930]	3097	[3419, 711]
77	[152, 153]	1084	[1862, 1863]	2091	[2979, 1513]	3098	[2410, 2286]

78	[154, 155]	1085	[1864, 1865]	2092	[3088, 3089]	3099	[3360, 1747]
79	[156, 157]	1086	[1866, 1867]	2093	[414, 3090]	3100	[1637, 806]
80	[158, 159]	1087	[1868, 1869]	2094	[2926, 2708]	3101	[780, 3770]
81	[160, 161]	1088	[1870, 1871]	2095	[2672, 306]	3102	[3771, 3520]
82	[162, 163]	1089	[1752, 1872]	2096	[3091, 1277]	3103	[3772, 3773]
83	[164, 165]	1090	[1873, 189]	2097	[301, 3092]	3104	[3774, 3725]
84	[166, 167]	1091	[1874, 1875]	2098	[3093, 2554]	3105	[3775, 2294]
85	[168, 169]	1092	[1876, 1877]	2099	[2570, 3094]	3106	[3501, 3668]
86	[170, 171]	1093	[1878, 1879]	2100	[3095, 109]	3107	[3776, 2340]
87	[172, 173]	1094	[1880, 1881]	2101	[2736, 3096]	3108	[3777, 1586]
88	[174, 175]	1095	[1882, 726]	2102	[3097, 368]	3109	[3778, 3569]
89	[176, 177]	1096	[1883, 1884]	2103	[2531, 3098]	3110	[3779, 1596]
90	[178, 179]	1097	[1885, 1886]	2104	[2474, 3099]	3111	[3628, 2042]
91	[180, 181]	1098	[577, 695]	2105	[121, 3055]	3112	[225, 760]
92	[175, 182]	1099	[1887, 1800]	2106	[2918, 3100]	3113	[1771, 3446]
93	[183, 184]	1100	[1888, 1889]	2107	[3101, 3102]	3114	[534, 3780]
94	[185, 186]	1101	[738, 1890]	2108	[2968, 2681]	3115	[3781, 3517]
95	[187, 188]	1102	[1891, 1892]	2109	[2694, 2689]	3116	[2287, 540]
96	[189, 190]	1103	[1893, 1894]	2110	[3103, 2585]	3117	[1861, 824]
97	[191, 192]	1104	[654, 1672]	2111	[3104, 2995]	3118	[1942, 3437]
98	[193, 194]	1105	[1895, 1896]	2112	[3105, 1273]	3119	[3412, 1558]
99	[195, 196]	1106	[1897, 1748]	2113	[1171, 2755]	3120	[678, 2072]
100	[12, 197]	1107	[1898, 1899]	2114	[3034, 3106]	3121	[3782, 3599]
101	[198, 199]	1108	[1900, 1901]	2115	[3004, 1536]	3122	[3734, 3673]
102	[200, 201]	1109	[1902, 1903]	2116	[331, 3107]	3123	[2206, 2223]
103	[202, 203]	1110	[1685, 1904]	2117	[3108, 1190]	3124	[3783, 3784]
104	[204, 205]	1111	[1905, 218]	2118	[3109, 3110]	3125	[3729, 3727]
105	[206, 207]	1112	[1906, 1907]	2119	[2665, 3111]	3126	[3773, 3502]
106	[208, 209]	1113	[1908, 1909]	2120	[115, 3112]	3127	[2105, 3522]
107	[210, 211]	1114	[1910, 1911]	2121	[3113, 3114]	3128	[3785, 3712]
108	[212, 213]	1115	[1912, 1913]	2122	[2577, 2950]	3129	[1597, 3786]
109	[214, 215]	1116	[1879, 1914]	2123	[2920, 3115]	3130	[3763, 3554]
110	[216, 217]	1117	[243, 1644]	2124	[898, 2697]	3131	[2075, 1835]
111	[218, 219]	1118	[1915, 1916]	2125	[2470, 1312]	3132	[594, 1976]
112	[220, 221]	1119	[1865, 1917]	2126	[1258, 3091]	3133	[3540, 3543]
113	[222, 223]	1120	[1918, 13]	2127	[3116, 3117]	3134	[3784, 3461]
114	[224, 225]	1121	[1919, 1920]	2128	[3118, 2664]	3135	[3592, 130]
115	[226, 227]	1122	[1921, 1922]	2129	[3119, 3120]	3136	[3754, 3372]
116	[228, 229]	1123	[1923, 1862]	2130	[1498, 1166]	3137	[501, 517]
117	[230, 231]	1124	[1924, 1925]	2131	[3049, 1458]	3138	[2138, 735]
118	[232, 233]	1125	[1926, 1927]	2132	[2983, 1170]	3139	[684, 2353]
119	[234, 235]	1126	[676, 1928]	2133	[3121, 2750]	3140	[766, 3593]
120	[236, 237]	1127	[1929, 1930]	2134	[3122, 1235]	3141	[237, 3677]
121	[238, 239]	1128	[1931, 1932]	2135	[2959, 2866]	3142	[3787, 3788]

122	[240, 241]	1129	[1933, 1934]	2136	[1520, 3123]	3143	[2001, 3541]
123	[242, 243]	1130	[1935, 1926]	2137	[3124, 334]	3144	[2003, 831]
124	[244, 245]	1131	[872, 839]	2138	[460, 3125]	3145	[3789, 804]
125	[246, 247]	1132	[141, 1936]	2139	[3073, 2629]	3146	[3724, 2417]
126	[248, 249]	1133	[229, 1937]	2140	[3126, 2631]	3147	[1704, 3790]
127	[250, 251]	1134	[1938, 1939]	2141	[3127, 2649]	3148	[62, 1591]
128	[252, 253]	1135	[509, 1940]	2142	[3128, 907]	3149	[2037, 2424]
129	[254, 255]	1136	[1941, 1942]	2143	[3129, 3130]	3150	[3765, 3347]
130	[256, 257]	1137	[528, 1943]	2144	[999, 1122]	3151	[3489, 3596]
131	[258, 259]	1138	[1944, 635]	2145	[3131, 3132]	3152	[3678, 2278]
132	[260, 261]	1139	[1922, 1945]	2146	[1471, 2795]	3153	[3691, 2082]
133	[262, 263]	1140	[1946, 1944]	2147	[3133, 2932]	3154	[874, 1805]
134	[264, 265]	1141	[1947, 1948]	2148	[3134, 3018]	3155	[3651, 1980]
135	[266, 267]	1142	[1949, 1950]	2149	[3135, 293]	3156	[2031, 718]
136	[268, 269]	1143	[1951, 1952]	2150	[3136, 99]	3157	[2249, 3791]
137	[270, 271]	1144	[1953, 1954]	2151	[3137, 266]	3158	[2015, 3579]
138	[272, 273]	1145	[1955, 1956]	2152	[3138, 1532]	3159	[2250, 2070]
139	[274, 275]	1146	[1957, 212]	2153	[3139, 3140]	3160	[1901, 3792]
140	[276, 277]	1147	[1958, 222]	2154	[2635, 1538]	3161	[3511, 2431]
141	[278, 279]	1148	[1959, 1960]	2155	[3111, 3141]	3162	[2143, 3718]
142	[280, 281]	1149	[1961, 1962]	2156	[2576, 2963]	3163	[3744, 3747]
143	[282, 283]	1150	[1963, 671]	2157	[2591, 1470]	3164	[3770, 3469]
144	[284, 285]	1151	[1964, 673]	2158	[2993, 3142]	3165	[3546, 1656]
145	[26, 286]	1152	[1965, 1966]	2159	[3143, 3144]	3166	[3363, 3793]
146	[287, 288]	1153	[1967, 1968]	2160	[3029, 2769]	3167	[1987, 3581]
147	[289, 290]	1154	[1969, 1816]	2161	[3145, 421]	3168	[14, 1959]
148	[291, 292]	1155	[1970, 1971]	2162	[1331, 2484]	3169	[3794, 1961]
149	[293, 294]	1156	[1972, 1973]	2163	[3146, 2598]	3170	[1768, 3795]
150	[295, 296]	1157	[1974, 1975]	2164	[2729, 2848]	3171	[1760, 3728]
151	[297, 101]	1158	[1976, 1977]	2165	[275, 1449]	3172	[3630, 3568]
152	[298, 299]	1159	[1978, 1979]	2166	[354, 278]	3173	[1845, 742]
153	[300, 301]	1160	[1980, 1981]	2167	[1200, 1411]	3174	[3666, 2349]
154	[302, 303]	1161	[1811, 1982]	2168	[3147, 2883]	3175	[3642, 3680]
155	[304, 305]	1162	[1983, 1984]	2169	[2704, 3148]	3176	[2202, 3783]
156	[306, 307]	1163	[1985, 1986]	2170	[3149, 3150]	3177	[2398, 1947]
157	[308, 309]	1164	[190, 1987]	2171	[3151, 2845]	3178	[608, 2345]
158	[310, 311]	1165	[1988, 1989]	2172	[3152, 3105]	3179	[497, 2038]
159	[312, 313]	1166	[1990, 1991]	2173	[3153, 931]	3180	[3575, 3598]
160	[314, 315]	1167	[1992, 1993]	2174	[914, 3154]	3181	[3796, 3753]
161	[316, 317]	1168	[1994, 1978]	2175	[3155, 2463]	3182	[3483, 3797]
162	[318, 319]	1169	[1995, 1996]	2176	[2808, 998]	3183	[3748, 796]
163	[320, 321]	1170	[1997, 1998]	2177	[2722, 3156]	3184	[3798, 2007]
164	[322, 323]	1171	[1999, 2000]	2178	[1356, 3157]	3185	[622, 2355]
165	[324, 325]	1172	[753, 2001]	2179	[325, 351]	3186	[1764, 2101]

166	[326, 327]	1173	[2002, 2003]	2180	[2645, 3158]	3187	[221, 2128]
167	[328, 329]	1174	[2004, 873]	2181	[1358, 921]	3188	[3716, 1729]
168	[330, 331]	1175	[2005, 2006]	2182	[3157, 3159]	3189	[3799, 1733]
169	[332, 333]	1176	[2007, 1588]	2183	[3160, 3053]	3190	[3800, 3531]
170	[334, 335]	1177	[2008, 2009]	2184	[3161, 1523]	3191	[1948, 3450]
171	[336, 337]	1178	[2010, 2011]	2185	[3162, 2999]	3192	[3741, 2407]
172	[338, 339]	1179	[2012, 2013]	2186	[3163, 3164]	3193	[3496, 1908]
173	[340, 341]	1180	[2014, 2015]	2187	[2770, 1108]	3194	[3801, 3802]
174	[342, 258]	1181	[2016, 2017]	2188	[3165, 951]	3195	[3368, 3509]
175	[343, 344]	1182	[2018, 2019]	2189	[2682, 3038]	3196	[2204, 1837]
176	[345, 346]	1183	[2020, 2021]	2190	[2738, 1002]	3197	[2312, 1625]
177	[347, 348]	1184	[2022, 2023]	2191	[1479, 3166]	3198	[3576, 762]
178	[349, 350]	1185	[1751, 2024]	2192	[3167, 2733]	3199	[3382, 1769]
179	[351, 352]	1186	[2025, 486]	2193	[3168, 3169]	3200	[2174, 202]
180	[353, 354]	1187	[2026, 2027]	2194	[3150, 2965]	3201	[1783, 3771]
181	[355, 356]	1188	[2028, 2029]	2195	[3170, 3171]	3202	[2100, 3660]
182	[357, 358]	1189	[2030, 2031]	2196	[3099, 2812]	3203	[2368, 3803]
183	[359, 360]	1190	[2032, 2033]	2197	[2792, 3172]	3204	[2307, 3723]
184	[361, 362]	1191	[2034, 1780]	2198	[2653, 3173]	3205	[2199, 2251]
185	[363, 112]	1192	[8, 2035]	2199	[2834, 3174]	3206	[3804, 1622]
186	[364, 365]	1193	[2036, 2037]	2200	[3114, 3175]	3207	[3427, 800]
187	[366, 367]	1194	[2038, 2039]	2201	[3074, 1164]	3208	[3641, 1829]
188	[368, 369]	1195	[2040, 539]	2202	[3176, 423]	3209	[3570, 1787]
189	[370, 371]	1196	[2041, 778]	2203	[2675, 3133]	3210	[1639, 3486]
190	[372, 373]	1197	[2042, 1910]	2204	[3177, 1056]	3211	[2356, 3778]
191	[374, 375]	1198	[551, 2043]	2205	[977, 3178]	3212	[3805, 3806]
192	[376, 377]	1199	[2044, 2045]	2206	[3179, 2606]	3213	[1832, 544]
193	[378, 379]	1200	[571, 2046]	2207	[3180, 3121]	3214	[2000, 1866]
194	[380, 381]	1201	[2047, 765]	2208	[3181, 3182]	3215	[696, 1772]
195	[382, 383]	1202	[1695, 55]	2209	[2946, 3183]	3216	[3507, 3639]
196	[384, 385]	1203	[741, 2048]	2210	[3184, 3147]	3217	[543, 1796]
197	[386, 387]	1204	[561, 645]	2211	[3185, 3044]	3218	[3807, 3530]
198	[388, 389]	1205	[2049, 2050]	2212	[3186, 3080]	3219	[3808, 781]
199	[390, 391]	1206	[2051, 747]	2213	[3187, 3135]	3220	[2178, 2181]
200	[381, 392]	1207	[1892, 2052]	2214	[2614, 2894]	3221	[2358, 2183]
201	[393, 85]	1208	[638, 2053]	2215	[3188, 994]	3222	[2162, 2259]
202	[394, 395]	1209	[2054, 2055]	2216	[3189, 996]	3223	[3809, 3697]
203	[396, 397]	1210	[2056, 2057]	2217	[3190, 318]	3224	[630, 1949]
204	[398, 399]	1211	[1691, 2058]	2218	[3191, 3104]	3225	[3751, 1994]
205	[400, 401]	1212	[201, 172]	2219	[3192, 3118]	3226	[3810, 745]
206	[402, 403]	1213	[2059, 2060]	2220	[3193, 3194]	3227	[3786, 3583]
207	[404, 405]	1214	[2061, 2062]	2221	[2825, 3108]	3228	[3549, 2123]
208	[406, 407]	1215	[1611, 2063]	2222	[2502, 3195]	3229	[700, 3798]
209	[20, 408]	1216	[2064, 2065]	2223	[1084, 1416]	3230	[2369, 3811]

210	[409, 410]	1217	[2066, 2067]	2224	[2723, 3196]	3231	[3812, 691]
211	[411, 412]	1218	[2068, 2069]	2225	[449, 3197]	3232	[842, 3755]
212	[413, 414]	1219	[2070, 2071]	2226	[3169, 1148]	3233	[3813, 1607]
213	[415, 416]	1220	[2072, 1938]	2227	[1365, 1480]	3234	[2214, 1618]
214	[417, 418]	1221	[2073, 2074]	2228	[2776, 3198]	3235	[3814, 2342]
215	[419, 420]	1222	[634, 2075]	2229	[82, 1008]	3236	[2050, 3610]
216	[421, 422]	1223	[636, 2049]	2230	[3002, 3199]	3237	[3792, 2073]
217	[423, 424]	1224	[1962, 2076]	2231	[3200, 3201]	3238	[1575, 3638]
218	[317, 425]	1225	[2077, 2078]	2232	[3022, 2874]	3239	[3791, 234]
219	[426, 427]	1226	[660, 2079]	2233	[1241, 3202]	3240	[3815, 2415]
220	[428, 429]	1227	[1726, 2080]	2234	[2788, 2947]	3241	[541, 1583]
221	[430, 431]	1228	[2081, 1933]	2235	[2942, 3032]	3242	[2103, 2378]
222	[432, 433]	1229	[2082, 1906]	2236	[110, 3203]	3243	[3550, 1840]
223	[434, 435]	1230	[2083, 580]	2237	[3204, 2978]	3244	[2263, 3416]
224	[436, 437]	1231	[2084, 210]	2238	[3110, 2718]	3245	[3675, 1827]
225	[438, 439]	1232	[480, 2085]	2239	[92, 3205]	3246	[2335, 3779]
226	[440, 441]	1233	[2086, 2077]	2240	[3206, 1228]	3247	[2033, 3785]
227	[442, 443]	1234	[2087, 2088]	2241	[3207, 1372]	3248	[2354, 792]
228	[444, 445]	1235	[2089, 2090]	2242	[2650, 364]	3249	[197, 1778]
229	[446, 447]	1236	[2091, 2092]	2243	[1251, 1346]	3250	[3563, 3449]
230	[448, 449]	1237	[2093, 2094]	2244	[2619, 2451]	3251	[3654, 3652]
231	[450, 451]	1238	[2095, 2096]	2245	[2536, 1256]	3252	[3542, 1882]
232	[452, 453]	1239	[2097, 2098]	2246	[1223, 2728]	3253	[2245, 3635]
233	[454, 17]	1240	[2099, 2100]	2247	[1321, 1038]	3254	[3558, 3722]
234	[455, 456]	1241	[2101, 2102]	2248	[1465, 3208]	3255	[3816, 1898]
235	[457, 458]	1242	[538, 2103]	2249	[3021, 455]	3256	[2102, 187]
236	[459, 460]	1243	[2104, 2105]	2250	[3085, 3209]	3257	[3521, 1678]
237	[461, 462]	1244	[2106, 2107]	2251	[3210, 2890]	3258	[640, 2112]
238	[24, 463]	1245	[2108, 2109]	2252	[3174, 1509]	3259	[2426, 3690]
239	[464, 465]	1246	[2110, 2111]	2253	[1450, 3211]	3260	[811, 1628]
240	[466, 467]	1247	[2112, 2113]	2254	[1454, 3212]	3261	[1777, 3775]
241	[468, 469]	1248	[1830, 2114]	2255	[3213, 470]	3262	[3417, 3794]
242	[470, 471]	1249	[2115, 2116]	2256	[3148, 71]	3263	[3584, 3667]
243	[472, 473]	1250	[1715, 2117]	2257	[3214, 1059]	3264	[3547, 3799]
244	[474, 475]	1251	[2118, 2119]	2258	[3215, 2583]	3265	[161, 2147]
245	[476, 477]	1252	[1791, 2120]	2259	[2868, 1119]	3266	[2219, 833]
246	[54, 478]	1253	[1927, 1701]	2260	[362, 27]	3267	[3661, 3817]
247	[479, 480]	1254	[1545, 2121]	2261	[3001, 2846]	3268	[3818, 508]
248	[481, 482]	1255	[2122, 1955]	2262	[2935, 3216]	3269	[3703, 3499]
249	[483, 484]	1256	[707, 1958]	2263	[3217, 3218]	3270	[3595, 3819]
250	[485, 8]	1257	[2123, 2124]	2264	[3154, 3039]	3271	[1561, 1579]
251	[486, 487]	1258	[151, 2125]	2265	[2714, 1177]	3272	[2379, 2442]
252	[488, 489]	1259	[2126, 2127]	2266	[3219, 3048]	3273	[3663, 2087]
253	[490, 491]	1260	[2128, 675]	2267	[2854, 2787]	3274	[491, 3730]

254	[492, 493]	1261	[592, 1983]	2268	[3220, 3221]	3275	[1700, 3732]
255	[494, 495]	1262	[2129, 2130]	2269	[1167, 1014]	3276	[34, 3739]
256	[496, 497]	1263	[2027, 2131]	2270	[1514, 3214]	3277	[3820, 3701]
257	[498, 499]	1264	[557, 1915]	2271	[3222, 3223]	3278	[3709, 1661]
258	[500, 501]	1265	[2132, 2133]	2272	[3028, 1403]	3279	[2393, 3643]
259	[502, 503]	1266	[2134, 2135]	2273	[3079, 2644]	3280	[1673, 3787]
260	[504, 505]	1267	[2136, 677]	2274	[3224, 1444]	3281	[3803, 1912]
261	[506, 507]	1268	[2137, 2138]	2275	[3090, 2936]	3282	[3797, 845]
262	[508, 509]	1269	[1699, 1874]	2276	[3225, 3226]	3283	[2152, 2361]
263	[510, 511]	1270	[2139, 2140]	2277	[3140, 3217]	3284	[2193, 2225]
264	[512, 513]	1271	[2141, 2142]	2278	[433, 3227]	3285	[878, 1957]
265	[199, 514]	1272	[169, 2143]	2279	[2588, 2584]	3286	[2144, 1953]
266	[515, 516]	1273	[1601, 2144]	2280	[3228, 1033]	3287	[2377, 3737]
267	[517, 518]	1274	[2145, 2146]	2281	[2844, 440]	3288	[3821, 1870]
268	[519, 520]	1275	[2147, 2081]	2282	[1405, 3229]	3289	[3429, 3553]
269	[521, 522]	1276	[2148, 2149]	2283	[1535, 326]	3290	[3795, 3545]
270	[523, 524]	1277	[708, 2150]	2284	[3230, 3231]	3291	[784, 3756]
271	[525, 526]	1278	[2151, 134]	2285	[3117, 3215]	3292	[2313, 2359]
272	[527, 528]	1279	[1916, 2152]	2286	[3086, 2621]	3293	[3573, 3822]
273	[529, 530]	1280	[2153, 2154]	2287	[1292, 2833]	3294	[2194, 1970]
274	[531, 532]	1281	[2155, 2156]	2288	[3232, 2899]	3295	[3788, 1814]
275	[533, 534]	1282	[2157, 2158]	2289	[1017, 3186]	3296	[1928, 1568]
276	[535, 536]	1283	[2159, 240]	2290	[2813, 2571]	3297	[3823, 3506]
277	[537, 538]	1284	[1730, 529]	2291	[3233, 3234]	3298	[852, 2346]
278	[539, 125]	1285	[606, 2160]	2292	[3107, 1436]	3299	[3746, 1770]
279	[540, 541]	1286	[2092, 2161]	2293	[3235, 1438]	3300	[3707, 238]
280	[542, 543]	1287	[2048, 2162]	2294	[2754, 2798]	3301	[3421, 3624]
281	[544, 545]	1288	[1903, 2163]	2295	[3236, 2762]	3302	[1894, 3481]
282	[546, 547]	1289	[1761, 2145]	2296	[3237, 1089]	3303	[3528, 158]
283	[548, 549]	1290	[2164, 2165]	2297	[961, 3238]	3304	[797, 3808]
284	[550, 551]	1291	[2166, 807]	2298	[3159, 3239]	3305	[2332, 603]
285	[552, 553]	1292	[2167, 2168]	2299	[3040, 3222]	3306	[3591, 1655]
286	[554, 555]	1293	[2080, 1705]	2300	[948, 2633]	3307	[3790, 3533]
287	[556, 557]	1294	[2169, 2170]	2301	[1145, 3240]	3308	[2023, 3824]
288	[558, 559]	1295	[2171, 2172]	2302	[2491, 3241]	3309	[1881, 3761]
289	[560, 561]	1296	[1857, 1850]	2303	[1236, 3242]	3310	[1717, 877]
290	[562, 563]	1297	[2173, 2174]	2304	[3243, 1069]	3311	[1635, 200]
291	[564, 565]	1298	[668, 492]	2305	[3244, 3200]	3312	[3825, 2187]
292	[566, 567]	1299	[2175, 2176]	2306	[3245, 1061]	3313	[1788, 1763]
293	[209, 568]	1300	[2035, 1757]	2307	[1531, 1441]	3314	[3622, 1719]
294	[569, 570]	1301	[868, 2136]	2308	[2958, 3246]	3315	[3717, 3826]
295	[511, 571]	1302	[2177, 722]	2309	[894, 3247]	3316	[3345, 3821]
296	[572, 573]	1303	[759, 2178]	2310	[3248, 2919]	3317	[2439, 3559]
297	[574, 575]	1304	[211, 2179]	2311	[3234, 923]	3318	[3822, 1810]

298	[576, 577]	1305	[809, 496]	2312	[2865, 3249]	3319	[559, 3812]
299	[578, 579]	1306	[2180, 2175]	2313	[3045, 428]	3320	[3767, 546]
300	[580, 581]	1307	[2181, 2182]	2314	[1325, 1265]	3321	[2205, 2403]
301	[582, 583]	1308	[2183, 2184]	2315	[3250, 1245]	3322	[3377, 3805]
302	[584, 585]	1309	[2185, 2186]	2316	[1422, 3235]	3323	[3827, 1789]
303	[586, 587]	1310	[2187, 2188]	2317	[271, 2839]	3324	[3828, 2565]
304	[588, 589]	1311	[2189, 2190]	2318	[3251, 2841]	3325	[3218, 2587]
305	[590, 49]	1312	[2191, 2056]	2319	[2574, 2658]	3326	[2548, 2503]
306	[591, 592]	1313	[2192, 2193]	2320	[1432, 3190]	3327	[3829, 1213]
307	[593, 594]	1314	[1660, 2194]	2321	[2565, 3126]	3328	[3830, 2939]
308	[595, 596]	1315	[2195, 2196]	2322	[3166, 105]	3329	[2886, 3831]
309	[597, 598]	1316	[1804, 2197]	2323	[2626, 2493]	3330	[1009, 1499]
310	[599, 600]	1317	[2198, 2199]	2324	[3026, 980]	3331	[2696, 2540]
311	[601, 602]	1318	[604, 2200]	2325	[1252, 2725]	3332	[3035, 1466]
312	[603, 604]	1319	[2201, 2202]	2326	[3252, 3253]	3333	[1026, 3261]
313	[605, 606]	1320	[2203, 1853]	2327	[2856, 2552]	3334	[3320, 1184]
314	[607, 608]	1321	[801, 2204]	2328	[2891, 2545]	3335	[290, 2516]
315	[609, 610]	1322	[1686, 2205]	2329	[3254, 1240]	3336	[2790, 2922]
316	[611, 612]	1323	[589, 2206]	2330	[2501, 2772]	3337	[2910, 2931]
317	[613, 614]	1324	[2207, 2132]	2331	[3255, 1106]	3338	[3832, 2557]
318	[615, 616]	1325	[2208, 2209]	2332	[1001, 949]	3339	[3833, 982]
319	[617, 59]	1326	[241, 790]	2333	[2779, 3042]	3340	[3834, 3088]
320	[60, 618]	1327	[2210, 2211]	2334	[2448, 883]	3341	[3015, 1204]
321	[619, 620]	1328	[2212, 629]	2335	[2807, 2523]	3342	[2811, 1135]
322	[621, 622]	1329	[2213, 2214]	2336	[327, 3224]	3343	[2972, 2721]
323	[623, 624]	1330	[2215, 2216]	2337	[3256, 1210]	3344	[3835, 103]
324	[625, 626]	1331	[1662, 2217]	2338	[3257, 3258]	3345	[2961, 3836]
325	[627, 628]	1332	[2218, 2219]	2339	[1076, 3259]	3346	[3197, 1242]
326	[629, 630]	1333	[2220, 2221]	2340	[1290, 3146]	3347	[3837, 3838]
327	[631, 632]	1334	[1580, 2222]	2341	[3260, 2555]	3348	[3839, 454]
328	[633, 634]	1335	[2223, 2224]	2342	[3261, 3152]	3349	[3202, 3840]
329	[635, 636]	1336	[1710, 687]	2343	[2632, 3262]	3350	[3841, 2727]
330	[637, 638]	1337	[2225, 2226]	2344	[3263, 1493]	3351	[3842, 3843]
331	[639, 640]	1338	[2227, 2228]	2345	[2620, 3264]	3352	[3844, 3845]
332	[641, 642]	1339	[1939, 1820]	2346	[924, 3265]	3353	[1380, 2601]
333	[643, 644]	1340	[2229, 542]	2347	[3266, 3267]	3354	[3846, 3075]
334	[645, 646]	1341	[2230, 2231]	2348	[1404, 2944]	3355	[3847, 1071]
335	[647, 648]	1342	[2029, 2232]	2349	[3268, 3269]	3356	[3262, 3168]
336	[649, 650]	1343	[2233, 2234]	2350	[1275, 3206]	3357	[2477, 1296]
337	[651, 652]	1344	[2235, 2236]	2351	[1522, 3270]	3358	[3848, 3849]
338	[653, 654]	1345	[2237, 728]	2352	[3271, 3128]	3359	[3172, 2715]
339	[655, 656]	1346	[2117, 2203]	2353	[3272, 3232]	3360	[2488, 917]
340	[657, 658]	1347	[2119, 2238]	2354	[3019, 3273]	3361	[391, 2589]
341	[659, 660]	1348	[2239, 533]	2355	[3274, 3275]	3362	[2954, 2893]

342	[661, 662]	1349	[2240, 1812]	2356	[3132, 3276]	3363	[3850, 2564]
343	[663, 664]	1350	[2241, 2242]	2357	[3198, 3277]	3364	[1288, 1285]
344	[665, 666]	1351	[2243, 2244]	2358	[261, 3161]	3365	[3851, 3852]
345	[667, 668]	1352	[145, 2245]	2359	[3278, 3188]	3366	[2851, 3853]
346	[669, 670]	1353	[2246, 1946]	2360	[2758, 3279]	3367	[1203, 3854]
347	[671, 672]	1354	[2247, 653]	2361	[3280, 3257]	3368	[3855, 1451]
348	[673, 674]	1355	[2248, 2249]	2362	[1060, 3281]	3369	[106, 1259]
349	[675, 676]	1356	[1954, 2250]	2363	[1153, 332]	3370	[1415, 3847]
350	[677, 678]	1357	[1626, 1603]	2364	[3282, 1310]	3371	[3024, 2796]
351	[679, 680]	1358	[2251, 2252]	2365	[3283, 3057]	3372	[2913, 3023]
352	[628, 164]	1359	[823, 2253]	2366	[3284, 1457]	3373	[1494, 2713]
353	[681, 682]	1360	[2254, 1893]	2367	[3062, 250]	3374	[3831, 2765]
354	[683, 684]	1361	[2255, 2256]	2368	[3064, 2878]	3375	[249, 2528]
355	[685, 686]	1362	[2131, 2257]	2369	[2568, 452]	3376	[1028, 2699]
356	[687, 688]	1363	[832, 2258]	2370	[2799, 3058]	3377	[1044, 2801]
357	[689, 690]	1364	[2259, 1564]	2371	[2838, 3285]	3378	[2726, 2945]
358	[691, 692]	1365	[2260, 2261]	2372	[277, 2748]	3379	[2882, 2749]
359	[693, 694]	1366	[2262, 1630]	2373	[113, 2929]	3380	[2987, 3856]
360	[695, 696]	1367	[215, 2263]	2374	[2861, 3155]	3381	[2804, 1172]
361	[697, 698]	1368	[712, 1808]	2375	[3286, 3287]	3382	[3267, 2937]
362	[699, 700]	1369	[2264, 2265]	2376	[1143, 3288]	3383	[1109, 3160]
363	[701, 702]	1370	[1681, 2266]	2377	[2887, 2756]	3384	[2976, 3254]
364	[648, 703]	1371	[2267, 2268]	2378	[3289, 2753]	3385	[425, 3857]
365	[704, 705]	1372	[2269, 601]	2379	[995, 3290]	3386	[3858, 3129]
366	[706, 707]	1373	[2270, 2248]	2380	[1118, 79]	3387	[2538, 3284]
367	[520, 708]	1374	[1904, 2271]	2381	[3041, 2579]	3388	[2781, 958]
368	[709, 710]	1375	[2272, 548]	2382	[3291, 3292]	3389	[3859, 2852]
369	[711, 712]	1376	[682, 2273]	2383	[964, 3016]	3390	[3852, 3860]
370	[713, 714]	1377	[2274, 818]	2384	[2840, 2829]	3391	[3861, 2532]
371	[715, 716]	1378	[2094, 2275]	2385	[1155, 382]	3392	[3862, 3119]
372	[702, 717]	1379	[2096, 156]	2386	[1342, 3293]	3393	[3125, 2780]
373	[718, 183]	1380	[2276, 2277]	2387	[3294, 1154]	3394	[3096, 2497]
374	[719, 720]	1381	[489, 743]	2388	[3295, 1476]	3395	[1344, 3863]
375	[171, 721]	1382	[2278, 1595]	2389	[3066, 366]	3396	[904, 2613]
376	[722, 723]	1383	[1940, 2279]	2390	[2998, 3296]	3397	[3864, 2975]
377	[724, 725]	1384	[1567, 2280]	2391	[3144, 2881]	3398	[2673, 1491]
378	[726, 727]	1385	[2256, 2281]	2392	[3297, 1414]	3399	[1048, 2553]
379	[728, 729]	1386	[1718, 1593]	2393	[2923, 992]	3400	[3838, 1328]
380	[730, 731]	1387	[1742, 2282]	2394	[3199, 1110]	3401	[2657, 3865]
381	[732, 733]	1388	[2283, 2284]	2395	[3014, 2775]	3402	[1408, 3866]
382	[734, 142]	1389	[2285, 2270]	2396	[3265, 3298]	3403	[422, 1129]
383	[735, 736]	1390	[2286, 2287]	2397	[3299, 2941]	3404	[2907, 3867]
384	[737, 738]	1391	[2288, 2289]	2398	[3164, 919]	3405	[3868, 1244]
385	[739, 740]	1392	[2290, 2291]	2399	[471, 2767]	3406	[1105, 2737]

386	[46, 741]	1393	[2292, 2293]	2400	[930, 3134]	3407	[3173, 1338]
387	[742, 242]	1394	[2294, 206]	2401	[418, 3300]	3408	[1439, 1294]
388	[743, 744]	1395	[1945, 2295]	2402	[2648, 2625]	3409	[3869, 3870]
389	[745, 746]	1396	[2296, 1833]	2403	[3246, 3109]	3410	[3195, 2969]
390	[747, 748]	1397	[2297, 2298]	2404	[3178, 1269]	3411	[3871, 2476]
391	[652, 749]	1398	[2299, 586]	2405	[1159, 3301]	3412	[3106, 3299]
392	[750, 751]	1399	[2300, 2301]	2406	[1231, 1525]	3413	[2822, 2459]
393	[752, 753]	1400	[2302, 2303]	2407	[2917, 3302]	3414	[2460, 1077]
394	[754, 755]	1401	[2304, 578]	2408	[3033, 2526]	3415	[2527, 2803]
395	[756, 757]	1402	[721, 582]	2409	[2977, 304]	3416	[420, 2895]
396	[758, 759]	1403	[1550, 2305]	2410	[2452, 361]	3417	[896, 2955]
397	[760, 761]	1404	[2306, 574]	2411	[1205, 3303]	3418	[3872, 2873]
398	[762, 763]	1405	[876, 2307]	2412	[344, 3304]	3419	[1386, 1281]
399	[764, 693]	1406	[2184, 869]	2413	[3305, 3163]	3420	[102, 116]
400	[765, 766]	1407	[2168, 2308]	2414	[2898, 1460]	3421	[3873, 3851]
401	[767, 768]	1408	[2309, 2310]	2415	[3043, 3306]	3422	[1379, 943]
402	[769, 770]	1409	[2311, 2084]	2416	[416, 3307]	3423	[3874, 3233]
403	[727, 771]	1410	[524, 2312]	2417	[373, 2973]	3424	[3212, 3875]
404	[38, 767]	1411	[2045, 2313]	2418	[273, 1423]	3425	[3876, 3082]
405	[772, 773]	1412	[2314, 2315]	2419	[3308, 2912]	3426	[1070, 1073]
406	[774, 775]	1413	[2316, 2292]	2420	[2592, 3025]	3427	[2766, 3095]
407	[776, 777]	1414	[2317, 2318]	2421	[2768, 3237]	3428	[1272, 3877]
408	[778, 657]	1415	[2319, 1842]	2422	[3309, 3072]	3429	[3878, 1010]
409	[779, 780]	1416	[1557, 2104]	2423	[2746, 2509]	3430	[2797, 3879]
410	[781, 782]	1417	[2320, 2018]	2424	[1467, 3093]	3431	[3880, 3881]
411	[783, 784]	1418	[2321, 595]	2425	[3205, 1357]	3432	[1377, 3882]
412	[2, 785]	1419	[2322, 605]	2426	[3012, 2468]	3433	[2521, 3862]
413	[786, 787]	1420	[710, 33]	2427	[3310, 3213]	3434	[3115, 3883]
414	[788, 789]	1421	[2323, 2299]	2428	[3311, 3312]	3435	[3314, 363]
415	[790, 791]	1422	[1744, 2324]	2429	[3313, 3314]	3436	[379, 3069]
416	[792, 793]	1423	[1899, 2325]	2430	[942, 3210]	3437	[2938, 3087]
417	[794, 795]	1424	[2326, 2327]	2431	[3315, 3316]	3438	[3884, 3291]
418	[796, 797]	1425	[2165, 502]	2432	[3317, 3318]	3439	[3885, 3886]
419	[798, 799]	1426	[2328, 1610]	2433	[3319, 3230]	3440	[1136, 3192]
420	[800, 801]	1427	[2329, 2330]	2434	[2875, 2638]	3441	[292, 3139]
421	[802, 803]	1428	[2331, 2332]	2435	[1300, 2885]	3442	[3081, 3313]
422	[804, 805]	1429	[1797, 2333]	2436	[3102, 3320]	3443	[269, 1418]
423	[806, 609]	1430	[2334, 2051]	2437	[3321, 3263]	3444	[2859, 2530]
424	[807, 808]	1431	[870, 2335]	2438	[1461, 3322]	3445	[3887, 2962]
425	[516, 809]	1432	[2257, 1745]	2439	[3156, 3310]	3446	[3888, 3889]
426	[810, 811]	1433	[2336, 1963]	2440	[2692, 3272]	3447	[2622, 1352]
427	[812, 813]	1434	[2337, 663]	2441	[259, 2604]	3448	[3249, 3165]
428	[814, 815]	1435	[1849, 2338]	2442	[3323, 2671]	3449	[3890, 1503]
429	[153, 816]	1436	[2253, 2339]	2443	[3098, 2872]	3450	[3227, 3891]

430	[223, 756]	1437	[2340, 2341]	2444	[922, 1041]	3451	[3056, 2916]
431	[816, 132]	1438	[2324, 556]	2445	[3324, 3325]	3452	[2974, 3315]
432	[768, 185]	1439	[2342, 2171]	2446	[1613, 3326]	3453	[3175, 2835]
433	[817, 772]	1440	[2188, 510]	2447	[3327, 3328]	3454	[3005, 1421]
434	[818, 819]	1441	[2343, 2344]	2448	[3329, 3330]	3455	[3853, 3892]
435	[820, 821]	1442	[2345, 1999]	2449	[568, 3331]	3456	[3296, 1276]
436	[822, 823]	1443	[2346, 2347]	2450	[3332, 2157]	3457	[3867, 2876]
437	[824, 825]	1444	[2348, 1951]	2451	[3333, 1765]	3458	[1270, 2877]
438	[826, 827]	1445	[2349, 1895]	2452	[1766, 3334]	3459	[944, 3850]
439	[828, 829]	1446	[2350, 2351]	2453	[2158, 835]	3460	[997, 2466]
440	[830, 597]	1447	[2352, 2141]	2454	[3335, 3336]	3461	[2773, 3876]
441	[831, 832]	1448	[2353, 2354]	2455	[2090, 3337]	3462	[1437, 3180]
442	[833, 834]	1449	[2355, 2356]	2456	[1645, 3338]	3463	[1469, 3286]
443	[835, 836]	1450	[2357, 2358]	2457	[1863, 2207]	3464	[3893, 3250]
444	[837, 838]	1451	[2359, 195]	2458	[3339, 3340]	3465	[3894, 1299]
445	[839, 840]	1452	[1775, 1560]	2459	[3341, 3342]	3466	[2802, 380]
446	[841, 842]	1453	[2360, 706]	2460	[3343, 1792]	3467	[1512, 1217]
447	[843, 844]	1454	[2361, 1646]	2461	[567, 236]	3468	[3277, 345]
448	[845, 126]	1455	[159, 2362]	2462	[3344, 3345]	3469	[3123, 1484]
449	[770, 846]	1456	[1627, 1767]	2463	[3346, 2267]	3470	[309, 976]
450	[847, 848]	1457	[2363, 9]	2464	[3347, 3348]	3471	[2563, 1495]
451	[849, 566]	1458	[522, 2364]	2465	[3349, 3350]	3472	[1339, 1057]
452	[725, 850]	1459	[1734, 810]	2466	[1643, 3351]	3473	[1492, 3078]
453	[851, 852]	1460	[2365, 2366]	2467	[3352, 3353]	3474	[2702, 1407]
454	[853, 37]	1461	[2367, 2368]	2468	[2179, 178]	3475	[3895, 3219]
455	[854, 786]	1462	[1629, 2369]	2469	[3354, 3355]	3476	[3047, 1199]
456	[855, 856]	1463	[1809, 2370]	2470	[3356, 2192]	3477	[311, 3294]
457	[857, 858]	1464	[2371, 2322]	2471	[2430, 3357]	3478	[3226, 1168]
458	[859, 860]	1465	[1654, 136]	2472	[3358, 1887]	3479	[3231, 3124]
459	[861, 862]	1466	[2372, 2373]	2473	[3359, 3360]	3480	[1003, 107]
460	[863, 51]	1467	[729, 2155]	2474	[829, 2059]	3481	[265, 1079]
461	[184, 864]	1468	[2374, 2375]	2475	[1838, 3361]	3482	[350, 2594]
462	[865, 866]	1469	[2376, 2377]	2476	[3362, 3363]	3483	[1419, 2549]
463	[867, 868]	1470	[2378, 2379]	2477	[3364, 531]	3484	[3879, 2514]
464	[869, 870]	1471	[2380, 1623]	2478	[3365, 3366]	3485	[3896, 2483]
465	[871, 776]	1472	[2381, 1782]	2479	[3367, 3368]	3486	[2582, 1483]
466	[518, 872]	1473	[2382, 214]	2480	[803, 3369]	3487	[3194, 3897]
467	[873, 874]	1474	[1755, 2383]	2481	[3370, 3354]	3488	[2943, 3136]
468	[875, 876]	1475	[2384, 32]	2482	[3371, 1988]	3489	[3898, 3833]
469	[143, 57]	1476	[155, 1750]	2483	[3372, 1574]	3490	[1218, 3899]
470	[877, 713]	1477	[2156, 2385]	2484	[2216, 535]	3491	[1094, 3900]
471	[493, 750]	1478	[2386, 2387]	2485	[2217, 1562]	3492	[1248, 1430]
472	[785, 878]	1479	[2388, 2326]	2486	[3373, 2306]	3493	[2661, 2712]
473	[879, 880]	1480	[2389, 2390]	2487	[3374, 849]	3494	[3901, 2884]

474	[881, 882]	1481	[2391, 1581]	2488	[3375, 1598]	3495	[339, 1160]
475	[883, 884]	1482	[2392, 2393]	2489	[3376, 3377]	3496	[447, 2471]
476	[885, 886]	1483	[2394, 2395]	2490	[2325, 1754]	3497	[3902, 3283]
477	[887, 888]	1484	[2107, 1902]	2491	[2383, 3378]	3498	[2612, 2507]
478	[889, 890]	1485	[1570, 2396]	2492	[3379, 639]	3499	[3241, 1029]
479	[891, 892]	1486	[2397, 2398]	2493	[3380, 617]	3500	[2880, 1487]
480	[893, 894]	1487	[2399, 2005]	2494	[1871, 3381]	3501	[2817, 3065]
481	[895, 896]	1488	[2150, 2400]	2495	[680, 3382]	3502	[3142, 1274]
482	[897, 898]	1489	[2401, 226]	2496	[761, 1721]	3503	[3903, 3103]
483	[899, 252]	1490	[656, 1642]	2497	[3383, 3384]	3504	[2896, 1152]
484	[900, 901]	1491	[147, 699]	2498	[3385, 1965]	3505	[68, 2611]
485	[453, 902]	1492	[2402, 2095]	2499	[2305, 3386]	3506	[3037, 3904]
486	[903, 904]	1493	[2403, 2404]	2500	[3387, 2097]	3507	[2827, 3905]
487	[905, 906]	1494	[2405, 479]	2501	[3388, 3389]	3508	[2905, 3020]
488	[907, 908]	1495	[2406, 1600]	2502	[3366, 3390]	3509	[3854, 1287]
489	[909, 254]	1496	[2407, 2408]	2503	[3391, 3392]	3510	[2607, 891]
490	[910, 911]	1497	[2409, 154]	2504	[40, 2397]	3511	[3293, 3317]
491	[912, 913]	1498	[858, 1992]	2505	[3393, 3329]	3512	[3298, 2487]
492	[383, 914]	1499	[2339, 798]	2506	[2390, 3394]	3513	[3906, 3225]
493	[915, 916]	1500	[1753, 1665]	2507	[3395, 3396]	3514	[2533, 3256]
494	[917, 918]	1501	[1907, 2410]	2508	[3397, 3398]	3515	[2889, 436]
495	[919, 920]	1502	[2190, 2040]	2509	[1877, 3399]	3516	[3907, 2953]
496	[921, 922]	1503	[2411, 2412]	2510	[3400, 3401]	3517	[299, 3832]
497	[923, 924]	1504	[2413, 1929]	2511	[3402, 3403]	3518	[1388, 3908]
498	[925, 926]	1505	[2366, 826]	2512	[2271, 3404]	3519	[403, 87]
499	[927, 928]	1506	[2414, 828]	2513	[3326, 2260]	3520	[2759, 3909]
500	[929, 930]	1507	[2415, 2416]	2514	[3405, 683]	3521	[3910, 2655]
501	[931, 932]	1508	[2417, 2010]	2515	[1799, 739]	3522	[3875, 1521]
502	[933, 934]	1509	[2418, 2419]	2516	[553, 3406]	3523	[2784, 2651]
503	[935, 936]	1510	[1909, 2420]	2517	[3357, 3407]	3524	[3892, 3911]
504	[937, 938]	1511	[2421, 2269]	2518	[1578, 1798]	3525	[3912, 343]
505	[939, 940]	1512	[2422, 2068]	2519	[1795, 3408]	3526	[3201, 3101]
506	[941, 942]	1513	[2423, 2304]	2520	[3409, 3410]	3527	[2928, 3913]
507	[943, 944]	1514	[2424, 2365]	2521	[3411, 3412]	3528	[1201, 2478]
508	[945, 946]	1515	[1687, 1653]	2522	[3413, 1773]	3529	[3270, 3914]
509	[947, 948]	1516	[2425, 758]	2523	[2416, 3414]	3530	[2951, 2821]
510	[949, 950]	1517	[157, 2180]	2524	[3415, 1759]	3531	[263, 1054]
511	[951, 952]	1518	[2231, 2426]	2525	[1836, 41]	3532	[1524, 2992]
512	[953, 954]	1519	[2427, 2428]	2526	[3416, 2169]	3533	[2641, 3887]
513	[955, 282]	1520	[2429, 146]	2527	[514, 1967]	3534	[3223, 1364]
514	[956, 957]	1521	[1869, 2086]	2528	[482, 3417]	3535	[348, 3323]
515	[958, 959]	1522	[836, 1632]	2529	[484, 128]	3536	[375, 2670]
516	[960, 961]	1523	[507, 2430]	2530	[3418, 3419]	3537	[1293, 3084]
517	[962, 963]	1524	[2431, 2432]	2531	[3420, 3421]	3538	[3915, 3052]

518	[932, 964]	1525	[2433, 2283]	2532	[3422, 3423]	3539	[2659, 1092]
519	[965, 308]	1526	[1674, 2243]	2533	[3424, 2195]	3540	[1173, 3143]
520	[966, 967]	1527	[844, 2434]	2534	[746, 2108]	3541	[1348, 3893]
521	[968, 969]	1528	[2435, 148]	2535	[1604, 3425]	3542	[3301, 1355]
522	[970, 971]	1529	[2436, 2189]	2536	[3426, 857]	3543	[1174, 466]
523	[972, 342]	1530	[2437, 2343]	2537	[1668, 3427]	3544	[2743, 398]
524	[973, 974]	1531	[2438, 2439]	2538	[1977, 661]	3545	[3171, 3916]
525	[286, 975]	1532	[2440, 2441]	2539	[2149, 3358]	3546	[3917, 2597]
526	[976, 977]	1533	[2442, 47]	2540	[1844, 504]	3547	[2985, 3918]
527	[978, 979]	1534	[2333, 2429]	2541	[3428, 3429]	3548	[3303, 3236]
528	[980, 981]	1535	[2387, 631]	2542	[1649, 1638]	3549	[3182, 3919]
529	[982, 983]	1536	[536, 2443]	2543	[1807, 3430]	3550	[3863, 2836]
530	[984, 985]	1537	[773, 1964]	2544	[3398, 591]	3551	[1526, 1350]
531	[986, 987]	1538	[2444, 2334]	2545	[3392, 871]	3552	[3920, 3311]
532	[988, 989]	1539	[2445, 2446]	2546	[3431, 3432]	3553	[3877, 3162]
533	[990, 991]	1540	[2447, 2448]	2547	[3433, 3391]	3554	[3290, 3011]
534	[992, 993]	1541	[884, 2449]	2548	[3434, 1651]	3555	[3921, 3858]
535	[994, 995]	1542	[2450, 2447]	2549	[3435, 3436]	3556	[2490, 3878]
536	[996, 997]	1543	[2451, 2452]	2550	[3437, 2089]	3557	[3870, 1186]
537	[998, 999]	1544	[1283, 2453]	2551	[2140, 1682]	3558	[3922, 2814]
538	[1000, 1001]	1545	[2454, 1080]	2552	[2434, 1688]	3559	[2458, 3923]
539	[1002, 1003]	1546	[2455, 2456]	2553	[3408, 719]	3560	[2970, 417]
540	[1004, 118]	1547	[2457, 2458]	2554	[2281, 3379]	3561	[3924, 2997]
541	[1005, 446]	1548	[2459, 2460]	2555	[3438, 3439]	3562	[3911, 2569]
542	[1006, 1007]	1549	[2461, 2462]	2556	[1817, 2350]	3563	[3925, 3926]
543	[1008, 1009]	1550	[2463, 1215]	2557	[3440, 2218]	3564	[3927, 1289]
544	[1010, 1011]	1551	[2464, 2465]	2558	[862, 3441]	3565	[3061, 1023]
545	[1012, 1013]	1552	[2466, 2467]	2559	[1698, 3442]	3566	[3928, 3067]
546	[1014, 1015]	1553	[2468, 89]	2560	[3390, 3443]	3567	[2867, 3266]
547	[1016, 1017]	1554	[2469, 2470]	2561	[44, 764]	3568	[3929, 3181]
548	[1018, 1019]	1555	[2471, 2472]	2562	[3444, 2406]	3569	[2524, 3894]
549	[467, 899]	1556	[2473, 2474]	2563	[3445, 1737]	3570	[1078, 2982]
550	[1020, 287]	1557	[1477, 2475]	2564	[3446, 3447]	3571	[1239, 3924]
551	[1021, 1022]	1558	[2476, 1097]	2565	[3448, 3356]	3572	[1327, 415]
552	[1023, 1024]	1559	[80, 2477]	2566	[3449, 3426]	3573	[2700, 2800]
553	[1025, 1026]	1560	[2478, 2479]	2567	[233, 485]	3574	[1114, 1445]
554	[1027, 1028]	1561	[1229, 2480]	2568	[1917, 174]	3575	[1128, 3872]
555	[1029, 1030]	1562	[2481, 2482]	2569	[3450, 783]	3576	[2684, 900]
556	[1031, 1032]	1563	[2483, 1158]	2570	[173, 3451]	3577	[2550, 3122]
557	[1033, 1034]	1564	[2484, 2485]	2571	[3452, 3453]	3578	[3930, 3835]
558	[1035, 442]	1565	[1428, 2486]	2572	[3454, 3346]	3579	[3883, 3189]
559	[1036, 1037]	1566	[2487, 2488]	2573	[3455, 3456]	3580	[3931, 2627]
560	[251, 338]	1567	[2489, 2490]	2574	[3457, 3458]	3581	[3318, 1025]
561	[1038, 29]	1568	[424, 912]	2575	[513, 1856]	3582	[2862, 256]

562	[1039, 1040]	1569	[1475, 2491]	2576	[3459, 162]	3583	[3054, 3932]
563	[1041, 1042]	1570	[2492, 289]	2577	[848, 3460]	3584	[2934, 1124]
564	[1043, 1044]	1571	[2493, 2494]	2578	[3461, 1873]	3585	[2449, 3933]
565	[1045, 1046]	1572	[1107, 2495]	2579	[3462, 3463]	3586	[3934, 1004]
566	[1047, 1048]	1573	[1303, 2496]	2580	[3464, 2376]	3587	[3141, 1175]
567	[1049, 461]	1574	[2497, 2498]	2581	[2021, 2394]	3588	[3849, 1208]
568	[946, 1050]	1575	[1051, 1462]	2582	[2011, 2230]	3589	[358, 2610]
569	[936, 1051]	1576	[257, 2499]	2583	[3465, 2438]	3590	[3935, 3127]
570	[1052, 1053]	1577	[2500, 2501]	2584	[3466, 193]	3591	[3936, 3282]
571	[1054, 1055]	1578	[296, 122]	2585	[149, 3467]	3592	[2764, 357]
572	[1056, 1052]	1579	[2479, 2502]	2586	[1708, 2421]	3593	[911, 1095]
573	[1057, 1058]	1580	[2480, 1112]	2587	[3384, 3468]	3594	[3937, 3938]
574	[1059, 1060]	1581	[2503, 2504]	2588	[2065, 191]	3595	[245, 3939]
575	[1061, 1062]	1582	[1354, 4]	2589	[3469, 228]	3596	[967, 3834]
576	[1063, 1064]	1583	[1132, 1322]	2590	[2375, 3470]	3597	[2871, 3890]
577	[1065, 1066]	1584	[2505, 2506]	2591	[1826, 2380]	3598	[3857, 972]
578	[1067, 1068]	1585	[2507, 2508]	2592	[1624, 3471]	3599	[1452, 3252]
579	[1069, 1070]	1586	[2509, 1443]	2593	[1936, 3472]	3600	[3940, 3880]
580	[1071, 1072]	1587	[2510, 2511]	2594	[3470, 525]	3601	[3941, 3925]
581	[1073, 359]	1588	[2512, 2513]	2595	[2370, 2371]	3602	[3304, 3895]
582	[979, 1074]	1589	[2514, 353]	2596	[2443, 3473]	3603	[3845, 2855]
583	[1075, 1076]	1590	[1429, 2515]	2597	[1619, 3474]	3604	[3933, 3942]
584	[1077, 1078]	1591	[2475, 1317]	2598	[1854, 802]	3605	[1219, 3943]
585	[1079, 1047]	1592	[2516, 2517]	2599	[3475, 3476]	3606	[3916, 111]
586	[1080, 1081]	1593	[2518, 2519]	2600	[575, 3477]	3607	[2652, 3871]
587	[1082, 1083]	1594	[2520, 2521]	2601	[1841, 160]	3608	[2991, 388]
588	[969, 444]	1595	[2522, 1021]	2602	[2277, 3478]	3609	[2774, 3289]
589	[892, 1084]	1596	[2523, 2524]	2603	[2063, 3371]	3610	[3050, 3915]
590	[1085, 1086]	1597	[1260, 2525]	2604	[3479, 2274]	3611	[1446, 3941]
591	[1087, 1088]	1598	[2526, 2527]	2605	[1925, 2392]	3612	[3932, 3830]
592	[1089, 25]	1599	[2528, 2529]	2606	[1746, 3480]	3613	[1412, 3944]
593	[1090, 1091]	1600	[2530, 2531]	2607	[3481, 2247]	3614	[3264, 1156]
594	[1092, 1093]	1601	[2532, 2533]	2608	[3482, 3483]	3615	[1373, 2608]
595	[473, 1094]	1602	[279, 16]	2609	[1979, 681]	3616	[2496, 3220]
596	[1095, 1096]	1603	[2534, 370]	2610	[3484, 2389]	3617	[3209, 2837]
597	[1097, 1098]	1604	[2535, 2536]	2611	[1559, 3485]	3618	[3938, 2857]
598	[1099, 1100]	1605	[2537, 2538]	2612	[1714, 3397]	3619	[3944, 3274]
599	[981, 1101]	1606	[2539, 1455]	2613	[3486, 2215]	3620	[2863, 3945]
600	[991, 272]	1607	[2540, 2541]	2614	[3487, 3488]	3621	[1393, 3185]
601	[1102, 1103]	1608	[2542, 2543]	2615	[834, 2296]	3622	[3089, 2639]
602	[1104, 1105]	1609	[1426, 2544]	2616	[3488, 3489]	3623	[3908, 3946]
603	[1106, 1107]	1610	[2544, 925]	2617	[3490, 3491]	3624	[3856, 1018]
604	[1108, 1109]	1611	[2545, 2546]	2618	[3406, 3333]	3625	[2732, 3855]
605	[1110, 1111]	1612	[2547, 2548]	2619	[3471, 2028]	3626	[1400, 2566]

606	[1112, 310]	1613	[2549, 2550]	2620	[1758, 2164]	3627	[3881, 3297]
607	[1113, 1114]	1614	[2551, 966]	2621	[3492, 140]	3628	[3882, 434]
608	[1115, 1116]	1615	[2552, 970]	2622	[2146, 1883]	3629	[3899, 3929]
609	[1117, 1118]	1616	[1485, 91]	2623	[2111, 2399]	3630	[3900, 3309]
610	[1119, 1039]	1617	[2553, 1316]	2624	[3493, 2414]	3631	[3943, 3864]
611	[1120, 1121]	1618	[2554, 450]	2625	[3441, 3494]	3632	[3836, 3907]
612	[1122, 1123]	1619	[2555, 2556]	2626	[3495, 3496]	3633	[2996, 3245]
613	[1124, 302]	1620	[2557, 2558]	2627	[3497, 3498]	3634	[3183, 3278]
614	[1125, 1126]	1621	[2559, 2560]	2628	[3499, 2405]	3635	[3287, 897]
615	[1127, 1128]	1622	[2561, 2510]	2629	[2130, 637]	3636	[1309, 3193]
616	[1129, 1130]	1623	[2562, 2563]	2630	[3500, 1612]	3637	[926, 3947]
617	[1131, 1132]	1624	[2564, 1113]	2631	[56, 3501]	3638	[3948, 3896]
618	[117, 1133]	1625	[983, 2565]	2632	[3502, 3503]	3639	[2709, 3063]
619	[1134, 284]	1626	[2566, 2535]	2633	[3504, 3505]	3640	[3905, 3948]
620	[1135, 1136]	1627	[119, 2567]	2634	[3506, 3507]	3641	[3279, 411]
621	[1137, 1138]	1628	[377, 2568]	2635	[3348, 3400]	3642	[1517, 396]
622	[1139, 1140]	1629	[2569, 2570]	2636	[2266, 3508]	3643	[3211, 1304]
623	[389, 1141]	1630	[1163, 378]	2637	[3509, 3510]	3644	[1093, 3149]
624	[1142, 1143]	1631	[2571, 2572]	2638	[3505, 3511]	3645	[3865, 2927]
625	[1144, 1145]	1632	[2573, 2574]	2639	[3512, 2122]	3646	[3949, 2789]
626	[1146, 1147]	1633	[2575, 2576]	2640	[3513, 3514]	3647	[1024, 3937]
627	[1030, 322]	1634	[1361, 2577]	2641	[3342, 558]	3648	[3259, 3308]
628	[1046, 324]	1635	[2578, 990]	2642	[650, 1614]	3649	[3253, 413]
629	[1148, 1149]	1636	[2579, 2580]	2643	[1606, 2191]	3650	[341, 3844]
630	[1150, 1151]	1637	[1264, 1117]	2644	[805, 204]	3651	[1298, 1087]
631	[1152, 1153]	1638	[2581, 2582]	2645	[3515, 3516]	3652	[410, 3243]
632	[1154, 1155]	1639	[2583, 384]	2646	[3517, 3518]	3653	[3950, 1247]
633	[1156, 1157]	1640	[90, 246]	2647	[2344, 2220]	3654	[3258, 3950]
634	[1158, 1159]	1641	[2584, 97]	2648	[602, 3519]	3655	[3112, 2595]
635	[1160, 1161]	1642	[1347, 248]	2649	[3520, 3521]	3656	[2668, 2705]
636	[1162, 1163]	1643	[356, 939]	2650	[3522, 2054]	3657	[2525, 3116]
637	[1164, 1165]	1644	[2585, 2586]	2651	[3523, 3524]	3658	[1351, 3951]
638	[1166, 1167]	1645	[2587, 2588]	2652	[3525, 3526]	3659	[3914, 3901]
639	[1168, 1169]	1646	[2589, 264]	2653	[1886, 651]	3660	[3094, 3952]
640	[1170, 1171]	1647	[2590, 1125]	2654	[716, 569]	3661	[1341, 280]
641	[1172, 1173]	1648	[1178, 2581]	2655	[3527, 2061]	3662	[3939, 3953]
642	[267, 1174]	1649	[70, 2591]	2656	[2211, 3528]	3663	[3273, 3954]
643	[1175, 1176]	1650	[934, 2592]	2657	[3338, 2300]	3664	[387, 3955]
644	[1177, 1178]	1651	[890, 21]	2658	[1572, 3529]	3665	[323, 2940]
645	[392, 1179]	1652	[305, 2593]	2659	[3458, 1878]	3666	[3947, 2446]
646	[1180, 1181]	1653	[928, 268]	2660	[2289, 3454]	3667	[1181, 3873]
647	[123, 1182]	1654	[2594, 270]	2661	[3530, 1825]	3668	[2805, 927]
648	[1183, 978]	1655	[2595, 2596]	2662	[2085, 2254]	3669	[1185, 1036]
649	[1184, 1185]	1656	[918, 955]	2663	[3526, 2106]	3670	[2820, 2615]

650	[1186, 1187]	1657	[2597, 1397]	2664	[3531, 3532]	3671	[3302, 1193]
651	[1188, 1189]	1658	[1453, 2512]	2665	[3533, 1716]	3672	[3860, 3934]
652	[1190, 1191]	1659	[2598, 945]	2666	[3404, 3534]	3673	[2741, 2783]
653	[4, 1192]	1660	[2599, 2600]	2667	[3535, 1776]	3674	[3954, 3861]
654	[1193, 1194]	1661	[2601, 2602]	2668	[3536, 2320]	3675	[3238, 2816]
655	[1195, 1196]	1662	[2603, 2481]	2669	[1993, 224]	3676	[3240, 3906]
656	[1197, 1198]	1663	[2604, 947]	2670	[720, 3537]	3677	[2511, 3027]
657	[1199, 1200]	1664	[1187, 2605]	2671	[3538, 562]	3678	[2616, 1162]
658	[405, 1201]	1665	[321, 935]	2672	[3539, 593]	3679	[3956, 3920]
659	[1202, 1203]	1666	[2606, 2607]	2673	[1702, 232]	3680	[3281, 3869]
660	[1011, 81]	1667	[2608, 2609]	2674	[642, 3540]	3681	[3076, 2785]
661	[1204, 1205]	1668	[1306, 1202]	2675	[3541, 1918]	3682	[3957, 2679]
662	[1206, 1207]	1669	[2610, 895]	2676	[757, 3542]	3683	[2485, 276]
663	[1208, 1209]	1670	[2611, 2612]	2677	[3543, 2159]	3684	[2486, 3305]
664	[1210, 95]	1671	[2613, 2614]	2678	[2114, 3411]	3685	[1081, 3958]
665	[1211, 1212]	1672	[2615, 2616]	2679	[3340, 2440]	3686	[1311, 1501]
666	[1213, 1214]	1673	[1074, 2617]	2680	[626, 1620]	3687	[1295, 3204]
667	[1055, 1137]	1674	[2618, 2619]	2681	[2196, 3544]	3688	[3221, 1307]
668	[1215, 1216]	1675	[1013, 2620]	2682	[1872, 1864]	3689	[1308, 3927]
669	[1217, 1218]	1676	[2621, 2622]	2683	[1582, 584]	3690	[3959, 3960]
670	[1138, 1219]	1677	[2558, 1332]	2684	[3545, 3546]	3691	[3904, 2933]
671	[1220, 1221]	1678	[1490, 2623]	2685	[846, 3547]	3692	[3946, 3848]
672	[1222, 1223]	1679	[2624, 1224]	2686	[3355, 2083]	3693	[294, 903]
673	[1224, 1225]	1680	[2625, 2626]	2687	[3548, 3549]	3694	[78, 3295]
674	[1226, 1227]	1681	[2627, 2628]	2688	[3396, 3550]	3695	[3960, 2980]
675	[1228, 1229]	1682	[2629, 2630]	2689	[3551, 754]	3696	[3203, 3051]
676	[1230, 1231]	1683	[2631, 2632]	2690	[1722, 2151]	3697	[3322, 3060]
677	[1232, 1233]	1684	[2633, 2634]	2691	[1975, 3552]	3698	[3961, 2578]
678	[1234, 355]	1685	[1398, 1082]	2692	[3553, 3413]	3699	[989, 3936]
679	[1235, 1236]	1686	[2465, 2635]	2693	[1542, 679]	3700	[1431, 3137]
680	[1237, 1238]	1687	[2636, 2637]	2694	[3554, 3555]	3701	[3926, 1360]
681	[395, 1239]	1688	[1221, 349]	2695	[3453, 1670]	3702	[3100, 3176]
682	[1240, 1241]	1689	[2638, 1183]	2696	[3556, 3428]	3703	[2842, 2826]
683	[1242, 1243]	1690	[2639, 2640]	2697	[1781, 3492]	3704	[3216, 3083]
684	[1244, 905]	1691	[1207, 2641]	2698	[1847, 2126]	3705	[3962, 3255]
685	[1245, 988]	1692	[2642, 2643]	2699	[1779, 788]	3706	[1103, 386]
686	[1116, 1027]	1693	[2644, 2645]	2700	[3557, 649]	3707	[1389, 402]
687	[1246, 114]	1694	[253, 1381]	2701	[547, 2288]	3708	[2504, 2720]
688	[1247, 1248]	1695	[954, 2646]	2702	[2420, 3558]	3709	[1072, 2888]
689	[283, 1249]	1696	[2647, 2648]	2703	[2121, 1571]	3710	[2482, 2469]
690	[1250, 1251]	1697	[2649, 2650]	2704	[670, 3490]	3711	[1473, 2966]
691	[1037, 1252]	1698	[2651, 2652]	2705	[3559, 3560]	3712	[3031, 1468]
692	[1253, 1254]	1699	[1098, 2653]	2706	[1671, 3561]	3713	[3158, 3841]
693	[1255, 1144]	1700	[1486, 2654]	2707	[3562, 779]	3714	[2698, 3030]

694	[1256, 1146]	1701	[2655, 1507]	2708	[1657, 3563]	3715	[3840, 3963]
695	[1257, 1258]	1702	[2656, 2657]	2709	[3555, 667]	3716	[3130, 2693]
696	[1259, 1260]	1703	[2658, 2659]	2710	[3474, 3564]	3717	[1434, 3912]
697	[1261, 1262]	1704	[2660, 2661]	2711	[3565, 1786]	3718	[333, 2674]
698	[938, 1263]	1705	[2662, 2663]	2712	[2252, 3424]	3719	[920, 3859]
699	[288, 1264]	1706	[2664, 2665]	2713	[2404, 2118]	3720	[3292, 3964]
700	[1265, 1266]	1707	[2513, 2666]	2714	[179, 3566]	3721	[3913, 2960]
701	[1267, 1268]	1708	[2667, 2668]	2715	[2186, 3567]	3722	[462, 2823]
702	[1269, 1270]	1709	[2669, 1246]	2716	[3568, 2422]	3723	[3952, 3888]
703	[1271, 1272]	1710	[1141, 1447]	2717	[3524, 488]	3724	[3316, 3931]
704	[1273, 430]	1711	[2670, 960]	2718	[3569, 2016]	3725	[1126, 3097]
705	[1274, 1275]	1712	[439, 2473]	2719	[585, 3570]	3726	[2849, 3930]
706	[1276, 1131]	1713	[2671, 2672]	2720	[3571, 3497]	3727	[3965, 3935]
707	[1019, 432]	1714	[74, 2673]	2721	[3572, 3573]	3728	[1182, 3319]
708	[1277, 962]	1715	[2674, 2675]	2722	[1676, 3574]	3729	[2580, 937]
709	[1278, 67]	1716	[2676, 2662]	2723	[616, 3575]	3730	[1367, 3966]
710	[1279, 457]	1717	[2677, 1282]	2724	[1647, 3576]	3731	[913, 3898]
711	[1280, 404]	1718	[2678, 2520]	2725	[3577, 3578]	3732	[1263, 3928]
712	[1281, 915]	1719	[2679, 2680]	2726	[2120, 1919]	3733	[2654, 3177]
713	[1282, 1283]	1720	[2681, 2682]	2727	[3579, 841]	3734	[3843, 3837]
714	[1209, 1284]	1721	[1359, 953]	2728	[3529, 3580]	3735	[2663, 3868]
715	[1285, 1286]	1722	[2683, 2684]	2729	[2362, 1990]	3736	[2988, 1399]
716	[1287, 1288]	1723	[401, 2685]	2730	[3581, 3582]	3737	[3288, 2809]
717	[1289, 1290]	1724	[369, 1420]	2731	[3583, 3395]	3738	[3964, 3145]
718	[1291, 1292]	1725	[2686, 2687]	2732	[505, 3584]	3739	[1254, 1297]
719	[385, 1293]	1726	[2556, 1533]	2733	[3480, 3409]	3740	[1442, 3138]
720	[1294, 1295]	1727	[2688, 2575]	2734	[2135, 3585]	3741	[367, 2757]
721	[1296, 1075]	1728	[2689, 2690]	2735	[545, 3586]	3742	[2904, 2717]
722	[1297, 1298]	1729	[2691, 2692]	2736	[3587, 3588]	3743	[335, 3280]
723	[1299, 1300]	1730	[2693, 2694]	2737	[3589, 537]	3744	[3866, 3902]
724	[1301, 1302]	1731	[2695, 2696]	2738	[1896, 1743]	3745	[2515, 1370]
725	[397, 1303]	1732	[2697, 2698]	2739	[3590, 3591]	3746	[64, 2745]
726	[1304, 1305]	1733	[2699, 2700]	2740	[3582, 3592]	3747	[3967, 2676]
727	[1227, 1306]	1734	[2701, 1433]	2741	[3593, 2139]	3748	[1064, 372]
728	[1307, 1308]	1735	[6, 1220]	2742	[48, 3594]	3749	[108, 1090]
729	[1088, 1309]	1736	[1456, 2702]	2743	[1859, 3402]	3750	[2786, 3131]
730	[1310, 1311]	1737	[2703, 2704]	2744	[129, 1694]	3751	[463, 2971]
731	[1312, 1313]	1738	[2705, 2534]	2745	[125, 3595]	3752	[1083, 19]
732	[1314, 1315]	1739	[408, 2706]	2746	[127, 3375]	3753	[3070, 3922]
733	[1316, 374]	1740	[456, 2707]	2747	[3596, 3339]	3754	[3307, 3251]
734	[1317, 1318]	1741	[2708, 274]	2748	[1968, 3344]	3755	[465, 406]
735	[1319, 400]	1742	[1390, 2709]	2749	[1815, 3597]	3756	[28, 3961]
736	[1320, 1321]	1743	[2710, 1291]	2750	[3598, 3418]	3757	[3285, 1279]
737	[1322, 1323]	1744	[2711, 1031]	2751	[3599, 3600]	3758	[451, 291]

738	[1324, 1325]	1745	[2712, 245]	2752	[3601, 512]	3759	[3306, 986]
739	[1326, 1327]	1746	[2713, 2714]	2753	[2209, 3602]	3760	[2462, 120]
740	[1328, 1329]	1747	[2715, 2716]	2754	[3603, 2272]	3761	[2879, 2547]
741	[1330, 1331]	1748	[2717, 929]	2755	[1998, 576]	3762	[2600, 2678]
742	[1332, 1333]	1749	[2718, 2454]	2756	[3604, 599]	3763	[3963, 3921]
743	[908, 1334]	1750	[303, 2719]	2757	[596, 3605]	3764	[2967, 3059]
744	[901, 1335]	1751	[2720, 2683]	2758	[3606, 3607]	3765	[1058, 3839]
745	[985, 1336]	1752	[2721, 2722]	2759	[3386, 2115]	3766	[3897, 1104]
746	[1337, 984]	1753	[319, 2723]	2760	[3585, 3608]	3767	[1123, 73]
747	[1338, 1339]	1754	[2724, 1478]	2761	[3609, 2331]	3768	[3247, 3271]
748	[1340, 1341]	1755	[2725, 2726]	2762	[1889, 3393]	3769	[2646, 3846]
749	[1189, 1342]	1756	[2727, 1211]	2763	[3610, 506]	3770	[3239, 3179]
750	[1343, 1344]	1757	[2728, 2729]	2764	[1599, 3611]	3771	[1335, 3917]
751	[1345, 1343]	1758	[2730, 2561]	2765	[3612, 3327]	3772	[307, 1472]
752	[1346, 1347]	1759	[1448, 1271]	2766	[1828, 2235]	3773	[3951, 3903]
753	[1101, 1348]	1760	[2731, 2732]	2767	[3560, 3613]	3774	[1022, 885]
754	[1096, 1349]	1761	[427, 2573]	2768	[532, 3614]	3775	[2752, 464]
755	[1350, 1351]	1762	[2733, 2734]	2769	[2013, 1900]	3776	[3945, 3260]
756	[1352, 893]	1763	[2735, 2736]	2770	[3394, 2317]	3777	[2915, 2489]
757	[1353, 1354]	1764	[2609, 887]	2771	[1677, 3341]	3778	[3275, 3006]
758	[1355, 1356]	1765	[2737, 2738]	2772	[755, 3565]	3779	[3968, 2455]
759	[1357, 1358]	1766	[2739, 2740]	2773	[3389, 515]	3780	[3942, 3874]
760	[437, 1359]	1767	[365, 2741]	2774	[2261, 3464]	3781	[2964, 973]
761	[1360, 1361]	1768	[2742, 2743]	2775	[3615, 2388]	3782	[1194, 3940]
762	[104, 1362]	1769	[1238, 1378]	2776	[3616, 3405]	3783	[3120, 3962]
763	[1363, 328]	1770	[66, 2744]	2777	[3617, 3618]	3784	[3958, 1280]
764	[1364, 1365]	1771	[2745, 2746]	2778	[3467, 3619]	3785	[1111, 3191]
765	[1366, 1367]	1772	[2747, 2457]	2779	[1740, 3620]	3786	[3276, 3153]
766	[1368, 1369]	1773	[2748, 2461]	2780	[3503, 3440]	3787	[3889, 2731]
767	[1370, 1371]	1774	[2749, 312]	2781	[1813, 1669]	3788	[3229, 2778]
768	[1372, 1373]	1775	[2750, 2751]	2782	[3621, 2210]	3789	[3969, 1425]
769	[281, 1374]	1776	[1406, 2752]	2783	[2109, 1690]	3790	[2707, 2990]
770	[1133, 1375]	1777	[2753, 2754]	2784	[2232, 2066]	3791	[3208, 69]
771	[1376, 1377]	1778	[2755, 1401]	2785	[587, 3622]	3792	[2900, 3829]
772	[1378, 1379]	1779	[1176, 314]	2786	[3623, 2382]	3793	[3269, 3207]
773	[399, 1380]	1780	[2756, 1250]	2787	[3624, 3625]	3794	[3919, 2957]
774	[1381, 1382]	1781	[2757, 2758]	2788	[1633, 3626]	3795	[3242, 3910]
775	[1383, 1384]	1782	[940, 1324]	2789	[3618, 665]	3796	[3068, 3949]
776	[1385, 1386]	1783	[84, 2759]	2790	[3627, 3628]	3797	[2637, 3842]
777	[1387, 1388]	1784	[2760, 2761]	2791	[3629, 3630]	3798	[86, 3248]
778	[1066, 1389]	1785	[2762, 2763]	2792	[3631, 2402]	3799	[3909, 2701]
779	[1315, 1390]	1786	[2643, 2764]	2793	[2024, 1634]	3800	[3955, 3968]
780	[1391, 1234]	1787	[2765, 2450]	2794	[3381, 3632]	3801	[2508, 2688]
781	[1392, 1393]	1788	[1286, 2766]	2795	[3552, 2427]	3802	[2453, 3956]

782	[22, 1206]	1789	[2767, 2768]	2796	[1971, 3633]	3803	[1488, 1012]
783	[1394, 1395]	1790	[2769, 2770]	2797	[1587, 2137]	3804	[3196, 2949]
784	[1262, 1396]	1791	[1502, 2771]	2798	[3602, 3634]	3805	[3918, 1115]
785	[1397, 1099]	1792	[2772, 2773]	2799	[1664, 2437]	3806	[3970, 3228]
786	[100, 1398]	1793	[2541, 2774]	2800	[3635, 2227]	3807	[2517, 2618]
787	[1399, 1400]	1794	[2775, 2776]	2801	[2125, 730]	3808	[3923, 1511]
788	[1401, 298]	1795	[2777, 1139]	2802	[1617, 732]	3809	[2456, 3008]
789	[1402, 300]	1796	[2778, 2779]	2803	[795, 170]	3810	[974, 3184]
790	[1403, 1404]	1797	[2780, 2781]	2804	[3532, 2002]	3811	[2685, 3170]
791	[469, 1405]	1798	[2782, 1326]	2805	[1875, 1615]	3812	[3300, 3884]
792	[1015, 1406]	1799	[2783, 2784]	2806	[1543, 2348]	3813	[1050, 2542]
793	[1407, 1408]	1800	[2785, 2786]	2807	[821, 3415]	3814	[3092, 3151]
794	[1409, 1319]	1801	[2787, 2788]	2808	[555, 3376]	3815	[2572, 1197]
795	[1225, 1410]	1802	[2789, 2790]	2809	[1952, 150]	3816	[1214, 2897]
796	[1411, 1412]	1803	[2791, 2792]	2810	[2364, 863]	3817	[902, 3969]
797	[1413, 1392]	1804	[2793, 2794]	2811	[3626, 3636]	3818	[3312, 3321]
798	[1414, 1415]	1805	[2795, 1518]	2812	[2338, 3637]	3819	[2740, 3187]
799	[1416, 1417]	1806	[2796, 2797]	2813	[864, 3577]	3820	[2498, 3009]
800	[1418, 1419]	1807	[435, 909]	2814	[1934, 3445]	3821	[1515, 3017]
801	[1420, 64]	1808	[2798, 2799]	2815	[2009, 2391]	3822	[2952, 3970]
802	[1421, 889]	1809	[1216, 2660]	2816	[646, 2381]	3823	[3036, 83]
803	[1147, 1422]	1810	[2800, 336]	2817	[3638, 830]	3824	[2560, 3885]
804	[1423, 1424]	1811	[2801, 2802]	2818	[1735, 3479]	3825	[1435, 3167]
805	[1425, 1426]	1812	[2494, 1000]	2819	[3639, 3640]	3826	[2986, 3959]
806	[1427, 1428]	1813	[431, 1278]	2820	[688, 689]	3827	[3953, 3046]
807	[1042, 1429]	1814	[2803, 2804]	2821	[3369, 2041]	3828	[3971, 3773]
808	[1430, 1431]	1815	[1007, 2805]	2822	[2330, 3343]	3829	[3682, 3972]
809	[1266, 409]	1816	[2806, 2518]	2823	[549, 3641]	3830	[3973, 3777]
810	[1329, 1432]	1817	[1529, 2807]	2824	[866, 3642]	3831	[2043, 3774]
811	[1433, 1391]	1818	[975, 2808]	2825	[3477, 2177]	3832	[205, 3740]
812	[1121, 1434]	1819	[2467, 1120]	2826	[3643, 2425]	3833	[219, 3457]
813	[443, 1435]	1820	[2809, 75]	2827	[666, 3644]	3834	[1911, 3745]
814	[1436, 1437]	1821	[2810, 426]	2828	[3456, 3645]	3835	[3476, 2323]
815	[1438, 1439]	1822	[1349, 2811]	2829	[3414, 3646]	3836	[3711, 3974]
816	[1440, 262]	1823	[2812, 1005]	2830	[2228, 3551]	3837	[2226, 2212]
817	[1441, 1442]	1824	[1424, 1427]	2831	[3519, 3647]	3838	[614, 3815]
818	[1443, 956]	1825	[1249, 2813]	2832	[2347, 2302]	3839	[186, 769]
819	[1444, 1142]	1826	[2814, 2562]	2833	[2308, 2153]	3840	[3423, 3538]
820	[1445, 1446]	1827	[2815, 1394]	2834	[3648, 2418]	3841	[3974, 500]
821	[1447, 1448]	1828	[2816, 2817]	2835	[3649, 2433]	3842	[3793, 39]
822	[1449, 1450]	1829	[2818, 2730]	2836	[2236, 2034]	3843	[815, 3758]
823	[1451, 1452]	1830	[2819, 2820]	2837	[3650, 1880]	3844	[658, 2167]
824	[1374, 1453]	1831	[2821, 2822]	2838	[3537, 1801]	3845	[1724, 2099]
825	[1396, 1454]	1832	[2823, 2824]	2839	[2076, 3651]	3846	[751, 2173]

826	[1455, 1456]	1833	[2734, 2825]	2840	[526, 1818]	3847	[2318, 1843]
827	[1457, 1337]	1834	[1243, 965]	2841	[3597, 2]	3848	[3750, 3776]
828	[1458, 1459]	1835	[2826, 2827]	2842	[3652, 3653]	3849	[487, 3612]
829	[1460, 1461]	1836	[2828, 340]	2843	[1706, 701]	3850	[880, 3736]
830	[1462, 1463]	1837	[2829, 2830]	2844	[165, 3654]	3851	[2017, 3975]
831	[1464, 1465]	1838	[2831, 2832]	2845	[3655, 2352]	3852	[1585, 3976]
832	[1466, 1467]	1839	[2833, 2834]	2846	[3656, 3657]	3853	[2298, 1741]
833	[1468, 1102]	1840	[2835, 1402]	2847	[1693, 3658]	3854	[698, 3977]
834	[429, 1469]	1841	[2836, 910]	2848	[3580, 3659]	3855	[2373, 2185]
835	[1470, 1471]	1842	[2837, 2838]	2849	[3660, 774]	3856	[2006, 3781]
836	[1472, 1473]	1843	[2839, 2840]	2850	[181, 1888]	3857	[2074, 2363]
837	[1474, 1475]	1844	[2841, 2842]	2851	[2200, 3383]	3858	[3978, 3623]
838	[1476, 1477]	1845	[2843, 2844]	2852	[1602, 3661]	3859	[2315, 3335]
839	[1478, 1479]	1846	[2845, 2747]	2853	[3662, 2213]	3860	[3975, 615]
840	[1480, 260]	1847	[1169, 2806]	2854	[3600, 1667]	3861	[3743, 475]
841	[1481, 1482]	1848	[2846, 2590]	2855	[3564, 3663]	3862	[3410, 3557]
842	[1483, 419]	1849	[2847, 2636]	2856	[644, 3664]	3863	[3498, 1584]
843	[1484, 1485]	1850	[2848, 2849]	2857	[3665, 3666]	3864	[573, 3364]
844	[1334, 1486]	1851	[2850, 2851]	2858	[2234, 611]	3865	[3611, 3700]
845	[1487, 1488]	1852	[2852, 2492]	2859	[3667, 3420]	3866	[3811, 859]
846	[1489, 1490]	1853	[2853, 2854]	2860	[1913, 483]	3867	[3688, 2237]
847	[1491, 1492]	1854	[315, 2559]	2861	[1996, 2239]	3868	[1984, 1576]
848	[1493, 1494]	1855	[2855, 2856]	2862	[3668, 498]	3869	[3693, 2025]
849	[93, 1049]	1856	[255, 933]	2863	[137, 3455]	3870	[3508, 2026]
850	[1302, 1267]	1857	[1318, 2850]	2864	[3328, 1858]	3871	[3494, 1885]
851	[1495, 1496]	1858	[2857, 2539]	2865	[3669, 619]	3872	[1930, 3527]
852	[1068, 1006]	1859	[2858, 2859]	2866	[3670, 1891]	3873	[3430, 3562]
853	[1497, 77]	1860	[1053, 1489]	2867	[3671, 560]	3874	[1696, 3800]
854	[458, 1498]	1861	[957, 2669]	2868	[217, 3444]	3875	[3972, 3752]
855	[1499, 1500]	1862	[2860, 2861]	2869	[775, 1935]	3876	[2280, 527]
856	[1501, 1502]	1863	[1333, 2862]	2870	[3672, 659]	3877	[2142, 1697]
857	[1503, 1504]	1864	[1062, 2863]	2871	[1738, 3325]	3878	[3979, 3766]
858	[1505, 1506]	1865	[2864, 2865]	2872	[1914, 3669]	3879	[3633, 1551]
859	[1507, 1508]	1866	[2866, 2867]	2873	[1932, 794]	3880	[2039, 3823]
860	[1509, 1510]	1867	[1384, 2868]	2874	[3632, 641]	3881	[3636, 3448]
861	[1511, 1512]	1868	[1336, 2642]	2875	[2046, 2020]	3882	[2273, 2233]
862	[1513, 1514]	1869	[2640, 2869]	2876	[3673, 61]	3883	[495, 3606]
863	[971, 1515]	1870	[2870, 2871]	2877	[213, 655]	3884	[664, 3980]
864	[360, 1045]	1871	[2719, 2870]	2878	[3674, 3433]	3885	[2268, 3687]
865	[1516, 1517]	1872	[2872, 2864]	2879	[478, 3434]	3886	[3443, 3672]
866	[1518, 1519]	1873	[2873, 1413]	2880	[2275, 3675]	3887	[3473, 2012]
867	[1323, 1520]	1874	[1100, 1043]	2881	[3676, 2022]	3888	[2170, 3818]
868	[1521, 1232]	1875	[888, 968]	2882	[1631, 2409]	3889	[3561, 3827]
869	[1165, 1522]	1876	[1371, 459]	2883	[3677, 2030]	3890	[3645, 2413]

870	[1523, 1524]	1877	[2874, 2875]	2884	[52, 613]	3891	[3981, 3535]
871	[1525, 1387]	1878	[2876, 1345]	2885	[703, 3556]	3892	[3588, 879]
872	[963, 1526]	1879	[2877, 2551]	2886	[3447, 3678]	3893	[1890, 2314]
873	[1369, 1527]	1880	[2878, 2879]	2887	[2058, 3493]	3894	[2238, 3689]
874	[1528, 1529]	1881	[2623, 2880]	2888	[3679, 2047]	3895	[3977, 2246]
875	[1530, 1531]	1882	[2881, 2793]	2889	[3680, 2264]	3896	[583, 3782]
876	[1532, 1383]	1883	[1140, 2882]	2890	[2078, 3571]	3897	[3664, 3981]
877	[1533, 1534]	1884	[1527, 1016]	2891	[771, 3431]	3898	[1589, 1707]
878	[1362, 1535]	1885	[2883, 1188]	2892	[563, 2166]	3899	[2067, 3796]
879	[1536, 1537]	1886	[2884, 2853]	2893	[2295, 1784]	3900	[1549, 3759]
880	[1538, 1385]	1887	[2885, 2695]	2894	[2224, 3648]	3901	[3819, 3662]
881	[1539, 1540]	1888	[1040, 1320]	2895	[799, 3370]	3902	[2310, 3768]
882	[1541, 1542]	1889	[1198, 2886]	2896	[632, 3681]	3903	[2244, 752]
883	[600, 1543]	1890	[1508, 2887]	2897	[2060, 1821]	3904	[2408, 3671]
884	[1544, 1545]	1891	[1417, 2782]	2898	[2062, 2367]	3905	[2124, 3749]
885	[1546, 1547]	1892	[1192, 1237]	2899	[3439, 3682]	3906	[530, 3810]
886	[1548, 1549]	1893	[2888, 2889]	2900	[2419, 1554]	3907	[3442, 3719]
887	[612, 1550]	1894	[2890, 2891]	2901	[3620, 3539]	3908	[2160, 2044]
888	[1551, 1552]	1895	[2892, 2710]	2902	[3683, 3684]	3909	[167, 2336]
889	[1553, 43]	1896	[2893, 2711]	2903	[3685, 216]	3910	[2163, 1921]
890	[196, 621]	1897	[2894, 2686]	2904	[3399, 1616]	3911	[692, 3504]
891	[1554, 1555]	1898	[2895, 2896]	2905	[3330, 3686]	3912	[3982, 2198]
892	[1556, 1557]	1899	[2897, 2898]	2906	[3687, 3688]	3913	[3699, 3807]
893	[1558, 1559]	1900	[2899, 2900]	2907	[1749, 1972]	3914	[3510, 554]
894	[1560, 1561]	1901	[2901, 2902]	2908	[3472, 572]	3915	[1982, 3466]
895	[1562, 1563]	1902	[2903, 2904]	2909	[856, 2372]	3916	[1762, 3462]
896	[1564, 1565]	1903	[2680, 2905]	2910	[3491, 3629]	3917	[2182, 2297]
897	[777, 523]	1904	[2906, 2907]	2911	[3689, 1725]	3918	[139, 3804]
898	[1566, 1567]	1905	[285, 2843]	2912	[3690, 1553]	3919	[3594, 3617]
899	[1568, 490]	1906	[1382, 2908]	2913	[2282, 3691]	3920	[1790, 3825]
900	[1569, 1570]	1907	[2909, 2910]	2914	[3692, 3693]	3921	[674, 1803]
901	[1571, 1572]	1908	[2911, 2735]	2915	[2221, 2329]	3922	[3757, 1794]
902	[850, 1573]	1909	[2912, 2913]	2916	[2242, 3694]	3923	[1689, 1924]
903	[1574, 851]	1910	[2914, 2915]	2917	[1785, 2036]	3924	[3733, 3482]
904	[570, 1575]	1911	[1179, 1314]	2918	[1666, 822]	3925	[2351, 2240]
905	[1576, 1577]	1912	[2916, 2818]	2919	[2197, 607]	3926	[1590, 3973]
906	[1555, 1578]	1913	[2824, 1363]	2920	[827, 3621]	3927	[131, 2091]
907	[1579, 1580]	1914	[916, 1134]	2921	[3695, 11]	3928	[579, 3820]
908	[1581, 1582]	1915	[1032, 2917]	2922	[188, 1723]	3929	[2069, 2004]
909	[1583, 843]	1916	[1034, 882]	2923	[3681, 3587]	3930	[3485, 3459]
910	[1584, 1585]	1917	[2706, 2918]	2924	[3696, 2262]	3931	[3826, 3525]
911	[1586, 1587]	1918	[1305, 1180]	2925	[3697, 3465]	3932	[1793, 3705]
912	[1588, 1589]	1919	[2771, 1195]	2926	[3698, 1848]	3933	[135, 3515]
913	[808, 1590]	1920	[2919, 2656]	2927	[1592, 3699]	3934	[3976, 3801]

914	[1591, 1592]	1921	[2628, 2858]	2928	[3700, 3601]	3935	[1732, 1739]
915	[1593, 1594]	1922	[72, 2920]	2929	[3701, 1711]	3936	[3710, 3789]
916	[1595, 550]	1923	[2634, 472]	2930	[3702, 2201]	3937	[3637, 3665]
917	[1596, 1597]	1924	[412, 2921]	2931	[2098, 2148]	3938	[3806, 3359]
918	[1598, 1599]	1925	[2922, 2923]	2932	[3351, 3703]	3939	[475, 1985]
919	[1600, 1601]	1926	[2924, 2624]	2933	[2055, 3495]	3940	[1989, 1995]
920	[748, 1602]	1927	[2925, 2926]	2934	[838, 1569]	3941	[2154, 2337]
921	[1603, 1604]	1928	[2751, 316]	2935	[3468, 3487]	3942	[3331, 3813]
922	[1605, 1606]	1929	[2927, 2928]	2936	[789, 152]	3943	[3334, 1974]
923	[1607, 1608]	1930	[2929, 2742]	2937	[2291, 3704]	3944	[3980, 1713]
924	[736, 1609]	1931	[2930, 1409]	2938	[2071, 3702]	3945	[3824, 3438]
925	[1610, 1611]	1932	[2931, 2791]	2939	[3705, 3609]	3946	[2284, 166]
926	[1612, 1613]	1933	[2932, 2677]	2940	[3684, 2360]	3947	[3802, 2411]
927	[1614, 519]	1934	[346, 2703]	2941	[3706, 3707]	3948	[3644, 3816]
928	[1615, 521]	1935	[2933, 1340]	2942	[3646, 3708]	3949	[3432, 3627]
929	[1616, 1617]	1936	[1500, 2831]	2943	[1960, 3362]	3950	[3983, 3814]
930	[1618, 1619]	1937	[445, 2934]	2944	[1943, 198]	3951	[3658, 3772]
931	[1620, 1621]	1938	[2666, 2935]	2945	[3578, 2134]	3952	[3451, 3650]
932	[1622, 1566]	1939	[2936, 1497]	2946	[3353, 3709]	3953	[477, 3982]
933	[1623, 1624]	1940	[407, 1255]	2947	[2161, 3685]	3954	[3780, 3422]
934	[1625, 1626]	1941	[2937, 2938]	2948	[1884, 35]	3955	[2400, 3983]
935	[618, 1627]	1942	[2744, 2828]	2949	[3614, 734]	3956	[10, 3738]
936	[1628, 1629]	1943	[337, 390]	2950	[1867, 2008]	3957	[3769, 3670]
937	[1630, 1631]	1944	[18, 2522]	2951	[3460, 3373]	3958	[3478, 2401]
938	[1632, 1633]	1945	[2939, 2760]	2952	[2019, 3367]	3959	[2428, 2255]
939	[1634, 1635]	1946	[2940, 2911]	2953	[3625, 1855]	3960	[3378, 3513]
940	[1636, 1637]	1947	[2941, 1020]	2954	[1956, 3590]	3961	[3762, 220]
941	[1638, 1639]	1948	[2716, 2942]	2955	[1563, 3710]	3962	[3742, 1897]
942	[1640, 1641]	1949	[1149, 2943]	2956	[1565, 3683]	3963	[3518, 3978]
943	[1642, 1643]	1950	[1151, 347]	2957	[2113, 144]	3964	[749, 1648]
944	[1644, 1645]	1951	[2908, 295]	2958	[3401, 3523]	3965	[1547, 3809]
945	[1646, 1647]	1952	[2944, 297]	2959	[3567, 2229]	3966	[3764, 1868]
946	[1648, 1649]	1953	[2945, 2946]	2960	[1728, 3711]	3967	[3731, 3979]
947	[503, 1650]	1954	[2947, 2948]	2961	[2176, 812]	3968	[3817, 633]
948	[1651, 168]	1955	[2949, 65]	2962	[3361, 875]	3969	[1609, 2328]
949	[1652, 685]	1956	[2950, 2951]	2963	[3336, 647]	3970	[227, 3589]
950	[1653, 1654]	1957	[1463, 2952]	2964	[3712, 2110]	3971	[3984, 3142]
951	[1655, 588]	1958	[2953, 2914]	2965	[3713, 3349]	3972	[3886, 2906]
952	[1656, 1657]	1959	[1395, 2954]	2966	[235, 3714]	3973	[2529, 1067]
953	[825, 1658]	1960	[30, 320]	2967	[1986, 1806]	3974	[2690, 394]
954	[1659, 1660]	1961	[2955, 2956]	2968	[2222, 53]	3975	[3007, 3967]
955	[1661, 1662]	1962	[2957, 2777]	2969	[610, 2290]	3976	[313, 3113]
956	[1663, 1664]	1963	[329, 1222]	2970	[3715, 3716]	3977	[3891, 3268]
957	[1665, 1666]	1964	[993, 1226]	2971	[50, 2032]	3978	[2586, 3957]

958	[1667, 1668]	1965	[88, 1257]	2972	[2079, 2241]	3979	[3966, 3244]
959	[1669, 709]	1966	[1130, 2958]	2973	[1991, 3717]	3980	[1534, 2599]
960	[1670, 1671]	1967	[2830, 2959]	2974	[3647, 3695]	3981	[1191, 2537]
961	[1672, 1673]	1968	[2960, 2961]	2975	[1658, 2309]	3982	[886, 3965]
962	[690, 1674]	1969	[2962, 1516]	2976	[3718, 3676]	3983	[1086, 2739]
963	[1675, 1676]	1970	[2963, 2964]	2977	[1641, 590]	3984	[3985, 2145]
964	[1621, 1677]	1971	[2965, 2464]	2978	[2172, 1846]	3985	[3986, 1471]
965	[1678, 1679]	1972	[2966, 2967]	2979	[1819, 3713]	3986	[3987, 3552]
966	[1680, 1681]	1973	[1284, 2968]	2980	[3719, 3388]	3987	[3988, 3310]
967	[1682, 1683]	1974	[247, 1366]	2981	[1540, 2064]	3988	[3989, 1832]
968	[1684, 1685]	1975	[2969, 2970]	2982	[1852, 1556]	3989	[3990, 1010]
969	[1552, 1686]	1976	[2902, 1035]	2983	[714, 1544]	3990	[3991, 787]
970	[499, 1687]	1977	[1212, 448]	2984	[2265, 2316]	3991	[3992, 2727]
971	[1688, 1689]	1978	[2971, 1301]	2985	[3720, 208]	3992	[3993, 1691]
972	[1690, 1691]	1979	[1537, 2972]	2986	[3640, 3721]	3993	[3994, 3059]
973	[1692, 1693]	1980	[2973, 2974]	2987	[2412, 3548]	3994	[3995, 1647]
974	[1694, 1695]	1981	[2975, 2976]	2988	[1756, 2319]	3995	[3996, 2684]
975	[177, 1696]	1982	[1410, 2977]	2989	[3722, 1831]	3996	[3997, 1569]
976	[1697, 1698]	1983	[2978, 2979]	2990	[2441, 1834]	3997	[3998, 2492]
977	[598, 1699]	1984	[2980, 2500]	2991	[3723, 1941]	3998	[3999, 560]
978	[672, 1700]	1985	[882, 2981]	2992	[36, 1659]	3999	[4000, 1038]
979	[1701, 1702]	1986	[2982, 1353]	2993	[2432, 3724]	4000	[4001, 59]
980	[1703, 1704]	1987	[371, 2983]	2994	[1720, 2436]	4001	[4002, 118]
981	[1705, 1706]	1988	[2984, 2985]	2995	[3534, 3385]	4002	[4003, 234]
982	[1707, 180]	1989	[2981, 1530]	2996	[3725, 476]	4003	[4004, 457]
983	[813, 1708]	1990	[2506, 2667]	2997	[2327, 3726]	4004	[4005, 859]
984	[1709, 1710]	1991	[1519, 2986]	2998	[133, 3631]	4005	[4006, 1509]
985	[1711, 1712]	1992	[1504, 2987]	2999	[3425, 1905]	4006	[4007, 1909]
986	[1713, 1714]	1993	[1506, 438]	3000	[194, 3512]	4007	[4008, 2592]
987	[1577, 1715]	1994	[1482, 2988]	3001	[3726, 564]	4008	[4009, 182]
988	[1716, 1717]	1995	[1375, 1330]	3002	[3727, 2384]	4009	[4010, 3956]
989	[705, 1718]	1996	[2832, 393]	3003	[624, 3698]	4010	[4011, 1790]
990	[1719, 1720]	1997	[2989, 1063]	3004	[3728, 3365]	4011	[4012, 1435]
991	[1721, 1722]	1998	[2990, 1065]	3005	[1839, 3729]	4012	[4013, 1987]
992	[1723, 1724]	1999	[2593, 2991]	3006	[3730, 3731]	4013	[4014, 3318]
993	[1725, 1726]	2000	[987, 2924]	3007	[3732, 3733]	4014	[4015, 1776]
994	[1727, 1728]	2001	[1196, 1376]	3008	[3337, 1931]	4015	[4016, 2753]
995	[1729, 1730]	2002	[950, 1464]	3009	[2303, 3734]	4016	[4017, 3603]
996	[1731, 1732]	2003	[2992, 2993]	3010	[2052, 1540]	4017	[4018, 3028]
997	[1733, 1734]	2004	[2994, 1528]	3011	[2053, 3656]	4018	[4019, 1550]
998	[763, 1735]	2005	[2995, 2996]	3012	[1950, 176]	4019	[4020, 3244]
999	[782, 1736]	2006	[2997, 1440]	3013	[3694, 3615]	4020	[4021, 2174]
1000	[1737, 1738]	2007	[959, 2998]	3014	[3735, 3616]	4021	[4022, 394]
1001	[1739, 1740]	2008	[2999, 468]	3015	[3736, 2129]	4022	[4023, 756]

1002	[1741, 1742]	2009	[3000, 3001]	3016	[3737, 3696]	4023	[4024, 1353]
1003	[1743, 1744]	2010	[2495, 3002]	3017	[3738, 861]	4024	[1, 2247]
1004	[1745, 1746]	2011	[3003, 3004]	3018	[1937, 697]		
1005	[1747, 494]	2012	[2543, 3005]	3019	[1851, 3649]		
1006	[1748, 1749]	2013	[2956, 2901]	3020	[3739, 2386]		

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	671	0	1342	0	2013	0	2684	0	3355	0
1	0	672	1	1343	1	2014	0	2685	1	3356	0
2	1	673	1	1344	0	2015	0	2686	0	3357	1
3	0	674	1	1345	1	2016	0	2687	1	3358	1
4	1	675	1	1346	1	2017	0	2688	0	3359	0
5	1	676	1	1347	1	2018	1	2689	0	3360	0
6	0	677	1	1348	1	2019	0	2690	1	3361	0
7	0	678	0	1349	1	2020	1	2691	1	3362	1
8	0	679	0	1350	0	2021	0	2692	1	3363	0
9	1	680	0	1351	0	2022	1	2693	0	3364	1
10	1	681	1	1352	1	2023	1	2694	0	3365	0
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12	1	683	1	1354	1	2025	0	2696	0	3367	0
13	0	684	0	1355	0	2026	1	2697	1	3368	0
14	0	685	1	1356	0	2027	1	2698	1	3369	1
15	0	686	1	1357	0	2028	0	2699	1	3370	0
16	0	687	1	1358	1	2029	0	2700	0	3371	0
17	0	688	1	1359	1	2030	1	2701	0	3372	1
18	0	689	1	1360	1	2031	1	2702	1	3373	1
19	1	690	0	1361	0	2032	0	2703	1	3374	0
20	0	691	0	1362	1	2033	0	2704	0	3375	0
21	1	692	0	1363	1	2034	0	2705	1	3376	1
22	1	693	0	1364	1	2035	0	2706	1	3377	0
23	1	694	0	1365	1	2036	1	2707	0	3378	1
24	0	695	1	1366	1	2037	1	2708	1	3379	1
25	1	696	1	1367	0	2038	0	2709	1	3380	0
26	1	697	1	1368	0	2039	0	2710	1	3381	0
27	0	698	1	1369	0	2040	1	2711	0	3382	1
28	0	699	1	1370	1	2041	0	2712	1	3383	0
29	0	700	1	1371	0	2042	1	2713	0	3384	1
30	0	701	1	1372	0	2043	0	2714	0	3385	1
31	0	702	1	1373	1	2044	0	2715	1	3386	1
32	0	703	0	1374	0	2045	1	2716	0	3387	1
33	0	704	1	1375	1	2046	0	2717	1	3388	0
34	1	705	1	1376	0	2047	1	2718	1	3389	0
35	0	706	1	1377	0	2048	1	2719	0	3390	0

36	0	707	0	1378	1	2049	0	2720	1	3391	1
37	0	708	1	1379	1	2050	0	2721	1	3392	0
38	0	709	0	1380	0	2051	0	2722	1	3393	1
39	1	710	1	1381	1	2052	1	2723	1	3394	0
40	1	711	0	1382	1	2053	1	2724	1	3395	0
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42	1	713	0	1384	1	2055	0	2726	1	3397	0
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44	1	715	1	1386	0	2057	1	2728	0	3399	0
45	1	716	1	1387	0	2058	1	2729	0	3400	0
46	1	717	1	1388	0	2059	0	2730	0	3401	1
47	1	718	1	1389	1	2060	1	2731	0	3402	0
48	1	719	0	1390	0	2061	0	2732	0	3403	1
49	0	720	0	1391	1	2062	0	2733	1	3404	1
50	1	721	0	1392	1	2063	0	2734	1	3405	0
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52	1	723	0	1394	0	2065	0	2736	1	3407	0
53	1	724	0	1395	0	2066	0	2737	0	3408	0
54	1	725	0	1396	1	2067	0	2738	0	3409	0
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56	1	727	0	1398	0	2069	0	2740	0	3411	0
57	0	728	1	1399	1	2070	0	2741	1	3412	1
58	0	729	1	1400	1	2071	0	2742	1	3413	0
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60	0	731	1	1402	0	2073	0	2744	1	3415	1
61	0	732	0	1403	1	2074	1	2745	1	3416	1
62	1	733	1	1404	0	2075	1	2746	1	3417	0
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64	0	735	1	1406	0	2077	1	2748	0	3419	0
65	0	736	1	1407	0	2078	1	2749	1	3420	0
66	0	737	1	1408	0	2079	1	2750	1	3421	0
67	0	738	0	1409	0	2080	1	2751	1	3422	1
68	1	739	0	1410	0	2081	1	2752	1	3423	1
69	1	740	1	1411	1	2082	0	2753	0	3424	0
70	1	741	0	1412	0	2083	1	2754	0	3425	0
71	0	742	0	1413	0	2084	1	2755	0	3426	1
72	1	743	1	1414	0	2085	1	2756	1	3427	0
73	0	744	0	1415	0	2086	1	2757	1	3428	0
74	0	745	0	1416	0	2087	0	2758	1	3429	1
75	0	746	0	1417	1	2088	1	2759	1	3430	0
76	1	747	1	1418	1	2089	0	2760	0	3431	0
77	0	748	0	1419	0	2090	0	2761	1	3432	0
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83	0	754	1	1425	1	2096	1	2767	1	3438	1
84	0	755	0	1426	0	2097	1	2768	0	3439	0
85	1	756	1	1427	1	2098	1	2769	0	3440	0
86	1	757	0	1428	0	2099	0	2770	0	3441	0
87	1	758	0	1429	1	2100	1	2771	1	3442	1
88	0	759	0	1430	0	2101	1	2772	0	3443	0
89	1	760	0	1431	1	2102	0	2773	0	3444	0
90	1	761	1	1432	1	2103	0	2774	1	3445	1
91	1	762	1	1433	0	2104	0	2775	1	3446	1
92	1	763	1	1434	0	2105	0	2776	1	3447	0
93	0	764	1	1435	1	2106	0	2777	1	3448	1
94	1	765	1	1436	0	2107	1	2778	0	3449	0
95	1	766	0	1437	0	2108	1	2779	0	3450	1
96	0	767	1	1438	0	2109	0	2780	1	3451	0
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98	0	769	1	1440	0	2111	0	2782	0	3453	0
99	1	770	0	1441	1	2112	1	2783	0	3454	1
100	1	771	0	1442	0	2113	1	2784	1	3455	1
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103	1	774	1	1445	1	2116	0	2787	0	3458	0
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105	1	776	1	1447	0	2118	0	2789	0	3460	1
106	1	777	0	1448	1	2119	1	2790	1	3461	0
107	1	778	0	1449	0	2120	1	2791	0	3462	0
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110	1	781	1	1452	1	2123	1	2794	0	3465	1
111	1	782	1	1453	1	2124	0	2795	0	3466	0
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113	0	784	1	1455	1	2126	1	2797	0	3468	1
114	0	785	1	1456	1	2127	0	2798	0	3469	1
115	1	786	1	1457	1	2128	1	2799	1	3470	0
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117	1	788	0	1459	0	2130	0	2801	0	3472	0
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119	1	790	1	1461	1	2132	1	2803	1	3474	1
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123	1	794	0	1465	0	2136	1	2807	0	3478	1

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126	0	797	0	1468	0	2139	0	2810	1	3481	1
127	1	798	0	1469	0	2140	0	2811	1	3482	1
128	0	799	0	1470	1	2141	0	2812	0	3483	0
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130	0	801	1	1472	0	2143	1	2814	0	3485	1
131	1	802	1	1473	1	2144	1	2815	0	3486	1
132	0	803	0	1474	0	2145	1	2816	0	3487	0
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137	1	808	0	1479	1	2150	0	2821	1	3492	1
138	1	809	0	1480	1	2151	0	2822	0	3493	1
139	0	810	1	1481	0	2152	0	2823	0	3494	0
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141	1	812	1	1483	1	2154	1	2825	1	3496	1
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143	1	814	0	1485	1	2156	0	2827	0	3498	0
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145	1	816	0	1487	1	2158	1	2829	1	3500	0
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147	0	818	1	1489	1	2160	1	2831	0	3502	1
148	0	819	0	1490	1	2161	0	2832	0	3503	1
149	0	820	1	1491	0	2162	0	2833	1	3504	0
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151	1	822	0	1493	0	2164	0	2835	1	3506	0
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155	1	826	1	1497	0	2168	0	2839	1	3510	1
156	1	827	1	1498	0	2169	0	2840	1	3511	0
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158	1	829	0	1500	1	2171	0	2842	1	3513	0
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161	0	832	1	1503	0	2174	0	2845	1	3516	1
162	0	833	0	1504	0	2175	0	2846	1	3517	0
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166	0	837	0	1508	1	2179	0	2850	1	3521	0
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170	1	841	0	1512	0	2183	1	2854	0	3525	1
171	1	842	1	1513	1	2184	0	2855	1	3526	0
172	1	843	1	1514	1	2185	1	2856	0	3527	1
173	0	844	0	1515	1	2186	1	2857	0	3528	1
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176	1	847	0	1518	0	2189	0	2860	0	3531	0
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178	1	849	0	1520	1	2191	1	2862	0	3533	1
179	0	850	1	1521	0	2192	1	2863	1	3534	1
180	1	851	1	1522	0	2193	0	2864	1	3535	1
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182	1	853	0	1524	0	2195	1	2866	1	3537	1
183	0	854	1	1525	0	2196	0	2867	1	3538	0
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187	1	858	0	1529	0	2200	1	2871	1	3542	0
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189	0	860	0	1531	1	2202	0	2873	1	3544	1
190	1	861	0	1532	1	2203	1	2874	1	3545	0
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192	1	863	0	1534	0	2205	0	2876	1	3547	1
193	0	864	1	1535	0	2206	1	2877	1	3548	1
194	0	865	0	1536	0	2207	0	2878	0	3549	0
195	1	866	0	1537	1	2208	0	2879	0	3550	0
196	1	867	0	1538	0	2209	0	2880	0	3551	0
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199	1	870	1	1541	0	2212	1	2883	0	3554	0
200	0	871	0	1542	0	2213	1	2884	1	3555	1
201	1	872	1	1543	1	2214	0	2885	0	3556	0
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204	1	875	0	1546	0	2217	1	2888	1	3559	1
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206	1	877	1	1548	1	2219	0	2890	1	3561	1
207	0	878	1	1549	0	2220	1	2891	0	3562	0
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210	1	881	0	1552	1	2223	0	2894	1	3565	0
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216	1	887	1	1558	1	2229	0	2900	1	3571	1
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218	1	889	0	1560	0	2231	0	2902	1	3573	0
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220	0	891	1	1562	0	2233	1	2904	0	3575	0
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225	1	896	0	1567	1	2238	1	2909	0	3580	0
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228	0	899	0	1570	1	2241	0	2912	0	3583	0
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230	1	901	0	1572	0	2243	0	2914	1	3585	0
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262	1	933	0	1604	0	2275	0	2946	0	3617	1
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266	1	937	0	1608	1	2279	0	2950	1	3621	0
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268	1	939	0	1610	1	2281	1	2952	0	3623	1
269	0	940	0	1611	0	2282	1	2953	0	3624	0
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272	1	943	1	1614	0	2285	1	2956	0	3627	1
273	0	944	0	1615	0	2286	0	2957	1	3628	0
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284	0	955	1	1626	0	2297	1	2968	1	3639	1
285	1	956	1	1627	1	2298	1	2969	1	3640	0
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290	1	961	1	1632	1	2303	1	2974	1	3645	0
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295	1	966	0	1637	0	2308	1	2979	1	3650	1
296	1	967	0	1638	0	2309	0	2980	0	3651	0
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298	0	969	1	1640	1	2311	0	2982	1	3653	1
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303	1	974	1	1645	1	2316	0	2987	0	3658	0
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555	0	1226	1	1897	1	2568	1	3239	1	3910	0
556	0	1227	0	1898	0	2569	1	3240	1	3911	0
557	0	1228	1	1899	1	2570	0	3241	1	3912	1
558	1	1229	0	1900	0	2571	1	3242	0	3913	1
559	0	1230	1	1901	1	2572	1	3243	0	3914	1
560	0	1231	1	1902	0	2573	1	3244	1	3915	0
561	0	1232	1	1903	1	2574	0	3245	0	3916	1
562	1	1233	1	1904	0	2575	1	3246	0	3917	0
563	0	1234	0	1905	1	2576	0	3247	0	3918	0

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566	0	1237	0	1908	1	2579	0	3250	0	3921	1
567	0	1238	0	1909	0	2580	1	3251	0	3922	1
568	0	1239	1	1910	1	2581	0	3252	0	3923	1
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570	0	1241	1	1912	0	2583	1	3254	1	3925	0
571	0	1242	1	1913	0	2584	0	3255	0	3926	1
572	1	1243	0	1914	0	2585	0	3256	0	3927	1
573	0	1244	0	1915	0	2586	1	3257	0	3928	0
574	1	1245	1	1916	1	2587	1	3258	0	3929	0
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576	0	1247	1	1918	0	2589	1	3260	0	3931	0
577	1	1248	1	1919	1	2590	1	3261	0	3932	0
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579	0	1250	0	1921	1	2592	1	3263	1	3934	0
580	1	1251	0	1922	1	2593	1	3264	1	3935	1
581	1	1252	0	1923	0	2594	0	3265	0	3936	0
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585	0	1256	0	1927	0	2598	1	3269	1	3940	0
586	1	1257	1	1928	1	2599	0	3270	0	3941	1
587	0	1258	1	1929	0	2600	1	3271	0	3942	0
588	1	1259	1	1930	1	2601	1	3272	1	3943	0
589	0	1260	1	1931	0	2602	0	3273	1	3944	0
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592	1	1263	1	1934	0	2605	0	3276	1	3947	1
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615	0	1286	1	1957	1	2628	1	3299	0	3970	0
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624	1	1295	0	1966	0	2637	1	3308	1	3979	1
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642	0	1313	1	1984	0	2655	1	3326	0	3997	0
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645	1	1316	1	1987	1	2658	0	3329	0	4000	0
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647	1	1318	0	1989	0	2660	0	3331	0	4002	0
648	1	1319	1	1990	1	2661	1	3332	0	4003	0
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659	1	1330	0	2001	0	2672	0	3343	1	4014	0
660	1	1331	0	2002	0	2673	1	3344	0	4015	0
661	0	1332	0	2003	0	2674	0	3345	0	4016	0
662	0	1333	1	2004	0	2675	1	3346	1	4017	0
663	1	1334	0	2005	1	2676	0	3347	0	4018	0
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665	0	1336	1	2007	1	2678	0	3349	1	4020	0
666	0	1337	0	2008	0	2679	1	3350	1	4021	0
667	1	1338	1	2009	0	2680	1	3351	1	4022	0
668	0	1339	0	2010	0	2681	0	3352	1	4023	0
669	0	1340	0	2011	1	2682	0	3353	0	4024	0
670	0	1341	1	2012	1	2683	1	3354	1		

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