

Instructions of the Number Generator

version 0.1.0

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1 Introduction

In October to November 2021, the idea of designing a number generating algorithm for people's identities came out in my brain, because there was no designed electronic number system in the New Federal State of China (NFSC), which was founded on June 4, 2020 with the establisher Wengui Guo (also named Miles Guo), for more than one year. The documentary management based on software of electronic table but not on database programming has been limiting the development of the NFSC. The people, who support the NFSC to end the ruling of Chinese Communist Party (CCP) over Chinese people, are living everywhere in the world with different conditions to connect to the Internet, which reminded me that the number generating algorithm should also be working in a separated condition to support that the system can run regionally.

Since November 2021, I began to study GUI (graphic user interface) in Python, particularly, the build-in library "tkinter" of Python, which is used to form a visualized computer application. In December 2021, the idea of 4 kinds of numbers (mixed number, member number, organization number, manipulation number) similarly as in Section 1.3 was formed as the framework of the number generating system. In January 2022, I re-wrote the Python script, because I changed the whole algorithm of mixed number, member number, organization number to encode the issuing or creating date and time to avoid duplications, and I set mixed number of 20 digits with each digit of 62 values, member number of 14 digits with each digit of 10 values, organization number of 14 digits with each digit of 62 values, manipulation number of 7 digits with each digit of 10 values. In the end of January 2022, I finished the primary parts of the computer application, in which there are also other functions attached.

On February 22, 2022, I wrote another Python script to modify the algorithm to Section 1.3 (mixed number of 21 digits with each digit of 64 values, member number of 14 digits with each digit of 16 values, organization number of 14 digits with each digit of 64 values, manipulation number of 7 digits with each digit of 16 values), because, several days ago, I noticed that the mixed number of 20 digits with each digit of 62 values could work for some ten million people, but it may not work for about one billion, which is more matching to the population of Mainland China. Then, there are 2 algorithms in my computer, and if to pick the algorithm of Section 1.3, I need to modify or even re-write the whole application, which will be

another large work. There are following events that let me to pick the algorithm of Section 1.3 and re-wrote the whole application.

- On February 24, 2022, Wengui Guo warned people living in Taiwan to leave Taiwan to evacuate from invasion by the CCP. This reminded me that after any wars, the victims are the people of both sides not only the invaded side or the invading side, and then, the number generating system should satisfy the population of Mainland China, 1.4338×10^9 people in 2019 from the United Nations Data (<http://data.un.org/>), and the population of Taiwan, 2.3561×10^7 people in 2020 from the Department of Household Registration (<https://www.ris.gov.tw/>), Republic of China Taiwan. This requires that **the number generating system should be matching to about 1.4 billion of population**. If so, even for Ukraine, 4.3994×10^7 people in 2019 from the United Nations Data (<http://data.un.org/>), and Russia, 1.4587×10^8 people in 2019 from the United Nations Data (<http://data.un.org/>), the application can also satisfy this amount, when the wars stop.
- On February 24, Russia under the dictator, Vladimir Putin, begun an open military invasion of Ukraine, and this warned me that **wars are not far from us in today**. Mainland China and Taiwan will more likely be involved into the other wars by CCP, particularly by the dictator of CCP and Mainland China, Jinping Xi.
- After February 24, 2022, the NFSC begun to prepare for Ukraine rescue operation; on March 2-3, 2022, GTV, which is the major platform of videos and livestreams in Chinese for the NFSC and anti-CCP, was closed due to the hacks from the CCP; on March 8, 2022, due to CCP's manipulation on email service provider with the intention of disrupting the Ukraine rescue operation, the NFSC Ukraine Help changed the email. On one hand, these revealed **the antihuman manipulations by the CCP, particularly that CCP intended to halt the spreads of rescue information in Chinese, while there are still many Chinese people in Ukraine**; on the other hand, these revealed that **during wars, the information paths, communication paths are the first aims to be destroyed**, and after the wars, the communication conditions will be uncertain, while the separably distributed structure in Section 1.1 can somehow resolve this problem.

As I picked the algorithm of Section 1.3 and the corresponding separably distributed structure in Section 1.1, the idea of framework which was formed in my brain in early February, I constructed the number generating system for the purposes: (i) **the number generating system can be applied internationally, exceeding the design only for the NFSC in the old algorithm;** (ii) **separably distributed structure (even in the conditions like USB flash disk, Bluetooth or local area network, the structure still works), other than centralized structure in the most of currently existing number generating systems;** (iii) **the number generating system can help people to support and/or construct the locally democratic organizations, other than communism, totalitarianism, dictatorship, and I hope that the number generating system can support a new pattern of federal and democratic social system to replace the ruling of CCP over Chinese people.**

Besides the general idea and theory of the number generating system, I took a test of the application during March 10 – March 12, 2022: I generated one million testing members' files with 50 times, and 20 000 testing members per each time; the first 2 characters in their given names are identical; the first 2 characters in their family names are identical; the first 2 characters in their another name / virtual name are identical. The result showed that, of course, there is no duplicate mixed number, but there are 9 pairs of duplicate member number in the random generating processes of the test. This result illustrates: (i) as I set the issuing data and time as factors into the mixed number, the mixed number is more unlikely to be duplicate than the member number; (ii) in the bad condition that the first 2 characters in their another name / virtual name are identical and all the testing members' files are generated from the same organization, which means the 5th to 8th digits in their member numbers must be identical, then, the 9 pairs of duplicate member numbers reveal that if there could be $16^{14-4-1} = 16^9 = 6.871948 \times 10^{10}$ possible different numbers, under separated structure, it is unlikely to avoid duplicate numbers if there are one million persons. Similarly, for example, phone numbers, which are usually from less than 10^{10} possible numbers, cannot work under separated structure. Therefore, **if there are some hundred thousand to one million refugees, it is unlikely for the member numbers to avoid duplications, then, in the refugees' management under uncertain communication conditions, member number is not the only factor to distinguish different persons but is a hexadecimal number of 14 digits as a short number for persons to memorize; as every mixed number is unique in probability explained in Section 1.3, to set mixed numbers as**

the key in electronic documentary library is applicable, no matter the temporary documentary library during wars or the national documentary library after wars.

1.1 Separably Distributed Structure

If the Internet and other communications are becoming unstable, or the communications cannot be repaired for some months or years, the centralized structure, like server-to-user, server-to-server probably cannot interact the information successfully. Even under blockchain structure, where the geographically separated servers restore the same data, if these servers are separated in any interactions for months, they cannot share the new information immediately, and then, when some of them connect again, to identify whether the new information, which is restored in very few server(s) not in most of other servers, is valid or not will be another problem. No matter if it is blockchain structure or centralized structure, under the unstable condition of connection, they are more likely to be disabled. Hence, it is quintessential in today to design a structure that can assist to identify the information when some entities can interact again after long-time disconnection, which requires the structure being separably distributed.

In a number generating system for persons' identities, there are 2 characteristics should be resolved in design of a separably distributed structure: (1) for every person's number, which is a combination of some characters, it must be different from any other's number, which requires **uniqueness** or, in a loose condition, **uniqueness in probability**; (2) the number generating system should follow **common rules** that when the generators are separated, if they still follow the common rules, they can identify whichever numbers generated by each other when they reconnect in future.

Furthermore, if the number generating system satisfies the separably distributed structure, then, it can also work under a centralized structure, which means that the number generating system can switch between separably distributed structure and centralized structure to adjust to different situations flexibly.

1.2 Mathematical Theory

When some entities are separated, they don't know which number others will generate, hence, it is impossible to absolutely skip duplicate numbers generated by others, which means that the absolute uniqueness cannot be achieved under a separated distributed structure.

From theory of probability, if there are possibly N valid numbers, under a centralized structure: the first person is endowed with 1 number from the N numbers, the second person is endowed with 1 number from the $(N - 1)$ numbers (excluding the number delivered to the first person), the third person is endowed with 1 number from the $(N - 2)$ numbers (excluding the numbers delivered to the first person and second person), ..., the n -th person is endowed with 1 number from the $(N - n + 1)$ numbers. It is obvious that, under a centralized structure, the theoretical probability of non-duplicate number is 1, if machine fault and some other faults are not considered.

Whereas, if there are also possibly N valid numbers, in a separated structure: the first person is endowed with 1 number from the N numbers, the second person is endowed with 1 number from the N numbers (only $(N - 1)$ are non-duplicate), the third person is endowed with 1 number from the N numbers (only $(N - 2)$ are non-duplicate), ..., the n -th person is endowed with 1 number from the N numbers (only $(N - n + 1)$ are non-duplicate). Then, if the goal is to support n_{max} persons being endowed with non-duplicate numbers, then, the probability of non-duplicate numbers is

$$p_s = \frac{N}{N} \cdot \frac{N-1}{N} \cdot \frac{N-2}{N} \cdot \dots \cdot \frac{N-n+1}{N} \cdot \dots \cdot \frac{N-n_{max}+1}{N} < 1$$

in the same way, the probability of non-duplicate numbers under a centralized structure (and some types of blockchain structure) is

$$p_c = \frac{N}{N} \cdot \frac{N-1}{N-1} \cdot \frac{N-2}{N-2} \cdot \dots \cdot \frac{N-n+1}{N-n+1} \cdot \dots \cdot \frac{N-n_{max}+1}{N-n_{max}+1} = 1$$

For example, the number of a bank card (no matter it is a credit card or debit card) is usually a decimal number of 16 digits, which means there are possibly 10^{16} different numbers at most (in fact, it is less than 10^{16} because the first several digits represent the type of card). If the goal is to support one hundred million (10^8) numbers of bank cards to be non-duplicate: under a centralized structure, the theoretical probability of non-duplicate numbers must be 1, as

$$p_c = \frac{10^{16}}{10^{16}} \times \frac{10^{16}-1}{10^{16}-1} \times \frac{10^{16}-2}{10^{16}-2} \times \dots \times \frac{10^{16}-10^8+1}{10^{16}-10^8+1} = 1$$

and under a separated structure, the theoretical probability of non-duplicate numbers is

$$p_s = \frac{10^{16}}{10^{16}} \times \frac{10^{16} - 1}{10^{16}} \times \frac{10^{16} - 2}{10^{16}} \times \dots \times \frac{10^{16} - 10^8 + 1}{10^{16}} \approx 0.60653066173328$$

then, the theoretical probability of duplicate numbers under the separated structure is

$$q_s = 1 - p_s \approx 0.39346933826672$$

which locates in two-tailed 0.8533- σ of normal distribution, which is very low.

Suppose such environment: from Census Bureau of the United States (<https://www.census.gov/>), the population in the census of 2020 is 331 449 281, which is greater than one hundred million, which means there should be more than one hundred million bank cards in the United States; if to consider one hundred million from 10^{16} possible numbers, the duplicate probability is 0.3935, even to consider the population of 331 449 281, the duplicate probability should be greater than 0.3935, which is very high and indicates that the current number system of bank cards cannot satisfy any kind of separated structure in the United States, not even to say the whole world.

Thus, to support a separably distributed structure, N should be very large.

1.3 The Numbers in the Application

From the United Nations Data (<http://data.un.org/>), it is estimated that there are about 7.7135×10^9 people in the world in 2019, about 1.4338×10^9 people in China in 2019. The design of number generating system should be somehow matching these values or even greater than these values.

There are 4 kinds of numbers in the application, and they are designed for different purposes: (1) **Mixed number**, which belongs to person, and is of 21 digits, and each digit has 64 different values; (2) **Member number**, which belongs to person, and is of 14 digits, and each digit has 16 different values; (3) **Organization number**, which belongs to organization, and is of 14 digits, and each digit has 64 different values; (4) **Manipulation number**, which belongs to manipulator in an organization, and is of 7 digits, and each digit has 16 different values.

(1) **Mixed number** is a mixture of some characters, and each character as digit is from 26 English capital letters, 26 English small letters, number 0-9, {'+', '-'}, totally 64 values, and the map $f(\cdot)$ is from {'G', 'B', 'I', 'A', 'r', 's', '6', 'X', 'c', 'K', 'R', 'Q', 'T', 'x', 'h', 'b', 'i', 'f', 'o', 'a', 'M', 'S',

'w', '0', 'P', 'v', '3', 'N', 't', 'g', '8', '2', '+', '-', '4', 'k', '7', 'e', 'n', 'D', 'V', 'y', 'U', 'W', 'F', 'L', 'd', 'T', '1', 'J', 'u', 'Z', 'z', 'C', 'Y', '9', 'm', 'H', 'O', 'E', '5', 'p', 'j', 'q' to 0-63.

There are 21 digits in a mixed number as,

$$m_1 m_2 m_3 m_4 m_5 m_6 m_7 m_8 m_9 m_{10} m_{11} m_{12} m_{13} m_{14} m_{15} m_{16} m_{17} m_{18} m_{19} m_{20} m_{21}$$

and the common rules are:

- the first 3 digits are the English letter representing the issuer's league/country, and in capital and/or small cases, there are $2^3 = 8$ different types;
- to convert the 4th to 7th digits into decimal, m_{4-7}

$$m_{4-7} = 64^3 \cdot ([f(m_4) - f(m_1)] \bmod 64) + 64^2 \cdot ([f(m_5) + f(m_2)] \bmod 64) + 64 \cdot ([f(m_6) - f(m_3)] \bmod 64) + ([f(m_6) + f(m_1)] \bmod 64)$$

and then the remainder $m_{*,4-7} = m_{4-7} \bmod 7297$ contains the information including the tens digit of issuing year $y_{iss,10}$, the order of the second letter in English alphabet of given name $a_{g,2}$ (order from 1-26, and if it is not an English letter or it is empty, $a_{g,2} = 0$), the order of the second letter in English alphabet of family name $a_{f,2}$ (order from 1-26, and if it is not an English letter or it is empty, $a_{f,2} = 0$), now, $m_{*,4-7}, y_{iss,10}, a_{g,2}, a_{f,2}$ satisfy

$$m_{*,4-7} = 27(27y_{iss,10} + a_{f,2}) + a_{g,2}$$

- to convert the 8th to 11th digits into decimal, m_{8-11}

$$m_{8-11} = 64^3 \cdot ([f(m_8) - f(m_2)] \bmod 64) + 64^2 \cdot ([f(m_9) + f(m_3)] \bmod 64) + 64 \cdot ([f(m_{10}) - f(m_1)] \bmod 64) + ([f(m_{11}) + f(m_2)] \bmod 64)$$

and then the remainder $m_{*,8-11} = m_{8-11} \bmod 6481$ contains the information including the thousands digit of issuing year $y_{iss,1000}$, issuing hour h_{iss} (UTC, Coordinated Universal Time, 24-hour), the order of the first letter in English alphabet of given name $a_{g,1}$ (order from 1-26, and if it is empty, $a_{g,1} = 0$), now, $m_{*,8-11}, y_{iss,1000}, h_{iss}, a_{g,1}$ satisfy

$$m_{*,8-11} = 10(27h_{iss} + a_{g,1}) + y_{iss,1000}$$

- to convert the 12th to 15th digits into decimal, m_{12-15}

$$m_{12-15} = 64^3 \cdot ([f(m_{12}) - f(m_3)] \bmod 64) + 64^2 \cdot ([f(m_{13}) + f(m_1)] \bmod 64) + 64 \cdot ([f(m_{14}) - f(m_2)] \bmod 64) + ([f(m_{15}) + f(m_3)] \bmod 64)$$

and then the remainder $m_{*,12-15} = m_{12-15} \bmod 2707$ contains the information including the hundreds digit of issuing year $y_{iss,100}$, the ones digit of issuing year $y_{iss,1}$, the order of the first letter in English alphabet of family name $a_{f,1}$ (order from 1-26, and if it is empty, $a_{f,1} = 0$), now, $m_{*,12-15}, y_{iss,100}, y_{iss,1}, a_{f,1}$ satisfy

$$m_{*,12-15} = 27(10y_{iss,1} + y_{iss,100}) + a_{f,1}$$

- to convert the 16th to 20th digits into decimal, m_{16-20}

$$m_{16-20} = 64^4 \cdot ([f(m_{16}) - f(m_1)] \bmod 64) + 64^3 \cdot ([f(m_{17}) + f(m_2)] \bmod 64) + 64^2 \cdot ([f(m_{18}) - f(m_3)] \bmod 64) + 64 \cdot ([f(m_{19}) + f(m_1)] \bmod 64) + ([f(m_{20}) - f(m_2)] \bmod 64)$$

and then the remainder $m_{*,16-20} = m_{16-20} \bmod 22343$ contains the information including the issuing month m_{iss} , the issuing day d_{iss} , the issuing minute min_{iss} (UTC, Coordinated Universal Time), now, $m_{*,16-20}, m_{iss}, d_{iss}, min_{iss}$ satisfy

$$m_{*,16-20} = 60(31(m_{iss} - 1) + d_{iss} - 1) + min_{iss}$$

- the last digit is the remainder that

$$f(m_{21}) = \left(\sum_{i=1}^{20} f(m_i) \right) \bmod 64$$

From the rules, it implies that: in every minute, for each case of first 2 letters of English given name, first 2 letters of English family name, there are about 1.405669×10^{16} different numbers, which is more than 1 822 000-folds of the world's population in 2019; if 2 numbers are generated in different minute, the 2 numbers must be different; if 2 numbers are generated in different first 2 letters of English given name or different first 2 letters of English family name, the 2 numbers must be different.

Suppose this situation: when the CCP (Chinese Communist Party) collapses, and a democratic China comes out, the 1.4338×10^9 people have to change their numbers to the new

democratic China; if the goal is to issue 1.5×10^9 numbers, but due to wars the issuers have to work under separated conditions for a long period; if all of the separated issuers can generate 2 000 numbers in a minute, then, even in a very fast calculation pattern, it still needs 1-2 years; if in a very bad condition, it is always that the 2 000 numbers in the same minute are generated according to the same first 2 letters of English given name and same first 2 letters of English family name, then, the extreme probability of minimum that there is no duplicate number in the same minute is

$$p_1 = \frac{1.4057 \times 10^{16}}{1.4057 \times 10^{16}} \times \frac{1.4057 \times 10^{16} - 1}{1.4057 \times 10^{16}} \times \cdots \times \frac{1.4057 \times 10^{16} - 2000 + 1}{1.4057 \times 10^{16}} \\ \approx 0.99999999985772$$

and the extreme probability of minimum that there is no duplicate for the 1.5×10^9 numbers is

$$p = p_1^{1.5 \times 10^9 / 2000} = p_1^{750000} \approx 0.99989329472000$$

the extreme probability of maximum that there is duplicate for the 1.5×10^9 numbers is

$$q = 1 - p \approx 0.00010670528000$$

which locates in two-tailed 3.8748- σ of normal distribution, which is high. This situation supposes the bad condition that “it is always that the 2 000 numbers in the same minute are generated according to the same first 2 letters of English given name and same first 2 letters of English family name”, which is almost impossible in fact, then, the duplicate probability will be much lower than 0.00010670528000.

Therefore, **the mixed number is designed for generating non-duplicate numbers under the separably distributed structure, which can be the key factor in construction of separated electronic documentary libraries.**

(2) **Member number** is a hexadecimal number, and the map $g(\cdot)$ is from {'5', 'B', '7', 'F', '0', 'C', '2', 'D', 'E', '9', '3', '1', '4', '8', '6', 'A'} (regardless capital or small letters) to 0-15.

There are 14 digits in a member number as,

$$n_1 n_2 n_3 n_4 n_5 n_6 n_7 n_8 n_9 n_{10} n_{11} n_{12} n_{13} n_{14}$$

and the common rules are:

- the first 4 digits satisfy

$$\begin{cases} g(n_1) = [f(m_1) + f(m_5) + f(m_9)] \bmod 16 \\ g(n_2) = [f(m_2) + f(m_6) + f(m_{10})] \bmod 16 \\ g(n_3) = [f(m_3) + f(m_7) + f(m_{11})] \bmod 16 \\ g(n_4) = [f(m_4) + f(m_8) + f(m_{12})] \bmod 16 \end{cases}$$

- the 5th, 6th digits satisfy

$$\begin{cases} g(n_5) = [f(o_4) + f(o_8) + f(o_{12})] \bmod 16 \\ g(n_6) = [f(o_3) + f(o_7) + f(o_{11})] \bmod 16 \end{cases}$$

- if $a_{unicode,1}$ is the decimal number of Unicode of the first character of another name / virtual name (if the character is empty, $a_{unicode,1} = 0$), $a_{unicode,2}$ is the decimal number of Unicode of the second character of another name / virtual name (if the character is empty, $a_{unicode,2} = 0$), the 7th, 8th digits satisfy

$$\begin{cases} g(n_7) = \left\lfloor \frac{a_{unicode,1}}{16} \right\rfloor \bmod 16 \\ g(n_8) = a_{unicode,2} \bmod 16 \end{cases}$$

- to convert the 9th to 13th digits into decimal, n_{9-13}

$$n_{9-13} = 16^4 \cdot g(n_9) + 16^3 \cdot g(n_{10}) + 16^2 \cdot g(n_{11}) + 16 \cdot g(n_{12}) + g(n_{13})$$

and then the remainder $n_{*,9-13} = n_{9-13} \bmod 168127$ contains the information including the ones digit of issuing year $y_{iss,1}$, the issuing month m_{iss} , the issuing day d_{iss} , the issuing hour h_{iss} (UTC, Coordinated Universal Time, 24-hour), now, $n_{*,9-13}, y_{iss,1}, m_{iss}, d_{iss}, h_{iss}$ satisfy

$$\begin{aligned} n_{*,9-13} = 31 & \left[11 \left[17 \left((h_{iss} + m_{13}) \bmod 29 \right) + \left((m_{iss} - m_{15}) \bmod 17 \right) \right] \right. \\ & \left. + \left((y_{iss,1} + m_{16}) \bmod 11 \right) \right] + \left((d_{iss} - m_{14}) \bmod 31 \right) \end{aligned}$$

- if there is no English name provided the last digit is fixed to 'A', otherwise the last digit is the remainder that

$$g(n_{14}) = \left(\sum_{i=1}^{13} g(n_i) \right) \bmod 15$$

From the rules, it implies that: the member number encodes some digits of the mixed number, some digits of the issuer's organization number, some digits of Unicode of another name / virtual name, which shows the relevance of the member number with these pieces of information, and this can strengthen the identification ability of member number; for any member numbers issued from the same organization, the 5th and 6th digits are fixed; the algorithm of member number is focused on generating numbers with fewer and simpler digits than the mixed number, and the member numbers would be duplicate in probability.

Therefore, **the member number is designed for persons to memorize the hexadecimal number of 14 digits, which may not be unique in probability, but the hexadecimal number of 14 digits can still help in searching from a database.**

(3) **Organization number** is a mixture of some characters, and each character as digit is from 26 English capital letters, 26 English small letters, number 0-9, {'+', '-'}, totally 64 values, and the map $f(\cdot)$ is the same as mixed number.

There are 14 digits in an organization number as,

$$o_1 o_2 o_3 o_4 o_5 o_6 o_7 o_8 o_9 o_{10} o_{11} o_{12} o_{13} o_{14}$$

and the common rules are:

- the first 3 digits are the English letter representing which league/country the organization belongs to, and in capital and/or small cases, there are $2^3 = 8$ different types;
- to convert the 4th to 6th digits into decimal, o_{4-6}

$$o_{4-6} = 64^2 \cdot ([f(o_4) - f(o_1)] \bmod 64) + 64 \cdot ([f(o_5) + f(o_2)] \bmod 64) + ([f(o_6) - f(o_3)] \bmod 64)$$

and then the remainder $o_{*,4-6} = o_{4-6} \bmod 2887$ contains the information including the hundreds digit of creating year $y_{iss,100}$, the creating month m_{iss} , creating hour h_{iss} (UTC, Coordinated Universal Time, 24-hour), now, $o_{*,4-6}, y_{iss,100}, m_{iss}, h_{iss}$ satisfy

$$o_{*,4-6} = 12(24y_{iss,100} + h_{iss}) + m_{iss} - 1$$

- to convert the 7th to 10th digits into decimal, o_{7-10}

$$o_{7-10} = 64^3 \cdot ([f(o_7) + f(o_1)] \bmod 64) + 64^2 \cdot ([f(o_8) - f(o_2)] \bmod 64) + 64 \cdot ([f(o_9) + f(o_3)] \bmod 64) + ([f(o_{10}) - f(o_1)] \bmod 64)$$

and then the remainder $o_{*,7-10} = m_{7-10} \bmod 3109$ contains the information including the thousands digit of issuing year $y_{iss,1000}$, the tens digit of issuing year $y_{iss,10}$, the issuing day d_{iss} , now, $o_{*,7-10}, y_{iss,1000}, y_{iss,10}, d_{iss}$ satisfy

$$m_{*,8-11} = 10(10(d_{iss} - 1) + y_{iss,1000}) + y_{iss,10}$$

- to convert the 11th to 13th digits into decimal, o_{11-13}

$$o_{11-13} = 64^2 \cdot ([f(o_{11}) + f(o_2)] \bmod 64) + 64 \cdot ([f(o_{12}) - f(o_3)] \bmod 64) + ([f(o_{13}) + f(o_1)] \bmod 64)$$

and then the remainder $o_{*,11-13} = o_{11-13} \bmod 601$ contains the information including the ones digit of issuing year $y_{iss,1}$, the issuing minute min_{iss} (UTC, Coordinated Universal Time), now, $o_{*,11-13}, y_{iss,1}, min_{iss}$ satisfy

$$o_{*,11-13} = 10 min_{iss} + y_{iss,1}$$

- the last digit is the remainder that

$$f(o_{14}) = \left(\sum_{i=1}^{13} f(o_i) \right) \bmod 64$$

From the rules, it implies that: in every minute, there are about 1.662640×10^9 different numbers; if 2 numbers are generated in different minute, the 2 numbers must be different.

Suppose this situation: if the connection conditions are still not so good that people should get together geographically to form local organizations; the goal is to create 3×10^6 numbers (3 million companies/organizations) separately, but in fact, if there are so many companies/organizations, the connection ought to be somehow recovered and the separated conditions may not stand there; in every minute there are at most 3 organizations are created; if in a very bad condition, the goal is to create 3×10^6 numbers for companies/organizations in separated condition, and it is always that for every time of creation, there must be 3 organizations with organization numbers generated in the same minute, then, the extreme probability of minimum that there is no duplicate number in the same minute is

$$p_1 = \frac{1.6626 \times 10^9}{1.6626 \times 10^9} \times \frac{1.6626 \times 10^9 - 1}{1.6626 \times 10^9} \times \frac{1.6626 \times 10^9 - 2}{1.6626 \times 10^9} \approx 0.99999999819564$$

and the extreme probability of minimum that there is no duplicate for the 3×10^6 numbers is

$$p = p_1^{3 \times 10^6 / 3} = p_1^{1000000} \approx 0.99819726787988$$

the extreme probability of maximum that there is duplicate for the 3×10^6 numbers is

$$q = 1 - p \approx 0.00180273212012$$

which locates in two-tailed 3.1209- σ of normal distribution, which is high. In normal condition, for example, only some ten thousand companies/organizations established under separated condition, the duplicate probability will be much lower than 0.00180273212012.

Therefore, **the organization number is designed for generating non-duplicate numbers under the separably distributed structure**, and accompanied with the numbers of person (mixed number and member number), **organization number can show which organization issued the numbers of person, and the first 3 digits can show which league/country the organization belongs to.** During wars, as some organizations may be under unstable communication, they can share their organization numbers and manipulation list as mutual recognition to help each organization to identify the persons with the numbers issued by these organizations.

(4) **Manipulation number** is a hexadecimal number, and the map $g(\cdot)$ is the same as member number.

There are 7 digits in a manipulation number as,

$$u_1 u_2 u_3 u_4 u_5 u_6 u_7$$

and the common rules are:

- the first digit satisfies

$$g(u_1) = [f(o_1) + f(o_2) + f(o_5) + f(o_6) + f(o_9) + f(o_{10})] \bmod 16$$

- to convert the 2nd to 4th digits into decimal, u_{2-4}

$$u_{2-4} = 16^2 g(u_4) + 16g(u_3) + g(u_2)$$

and then the remainder $u_{*,2-4} = u_{2-4} \bmod 97$ satisfies

$$u_{*,2-4} = 19[f(o_1) + f(o_5) + f(o_9)] \bmod 5 + [f(o_2) + f(o_6) + f(o_{10})] \bmod 19$$

- to convert the 5th to 7th digits into decimal, u_{5-7}

$$u_{5-7} = 16^2 g(u_7) + 16g(u_6) + g(u_5)$$

and then the remainder $u_{*,5-7} = u_{5-7} \bmod 127$ satisfies

$$u_{*,5-7} = 7[f(o_2) + f(o_6) + f(o_{10})] \bmod 17 + [f(o_1) + f(o_5) + f(o_9)] \bmod 7$$

From the rules, it implies that: totally, there are 1271 valid manipulation numbers in one organization, and in this application, the max number of manipulation numbers is set to be 777; the length of manipulation number is very short, and it must be generated under centralized structure, which means the manipulation numbers within an organization are under centralized structure, whereas the organization numbers can be generated under separably distributed structure.

Therefore, **the manipulation number is designed for manipulators to memorize the hexadecimal number of 7 digits, and the manipulation numbers can help the organizations to find the exact issuer of mixed numbers and/or member numbers.**

2 The Functions of the Application

As the application is written in Python 3.9, if Python 3.9 or higher is installed in the computer, Number Generator.py can run by directly double click or open&run by Python; or the Number Generator.py can also be converted into an independent application, which can run without Python installed in the computer.

The window of the application is

The screenshot shows the application window with a top bar containing buttons: 'Generate numbers', 'Check validity', 'Output *.csv', 'Setting', and 'other'. To the right of these buttons are labels for 'Organization number:' and 'Manipulation number:'. Below the buttons is a 'Setting: select a function' section with radio buttons for 'Input a manipulation number' (selected), 'Generate a new <organization.dat> file', 'Set directories', 'My organization', and 'Organization list'. Below this is a 'Current organization files:' dropdown menu, followed by labels for 'Selected organization number:', 'Selected organization name:', and 'Input manipulation number:'. At the bottom right is a 'Confirm' button.

and in default, the home window is **Setting** - ☐ **Input a manipulation number**. The top-right zone

This close-up shows the 'Organization number:' and 'Manipulation number:' labels with their corresponding input fields.

shows the organization number and manipulation number currently in the environment of the application.

In the top zone, there are some buttons:

- **Generate numbers** is to generate *.iden (and *.txt) files of mixed numbers and member numbers, and this function requires the top-right zone to be none-empty;
- **Check validity** is manually to check validity if the *.iden (or *.txt) file cannot be provided, and this function requires the top-right zone to be none-empty;

- **Output *.csv** is to output some *.csv table for further analysis and/or management, and this function requires the top-right zone to be none-empty;
- **Setting** is to set the environment, in which 3 functions **Input a manipulation number**, **Generate a new <organization.dat> file**, **Set directories** don't need the top-right zone to be none-empty, and 2 functions **My organization**, **Organization list** requires the top-right zone to be none-empty;
- **other** includes other functions, which don't need the top-right zone to be none-empty.

2.1 Setting

2.1.1 Set Directories

In **Setting** - **Set directories**, it is

where there are 4 directories:

- the directory of new members and, in default, it is ./NewMember/, which is the output location of functions in **Generate numbers**;
- **Also output *.txt in:** is the check options that whether to output *.txt file in several languages in **Generate numbers**, and then, the issuers can send *.txt files to the members for reading;
- the directory of configuration files, and usually **Generate a new <organization.dat> file**, **My organization**, **Organization list** can output such files;

- the directory of *.csv files, and usually and can output such files;
- the directory of database, in which the issuers can restore the *.iden files into the directory for for further analysis and/or management.

2.1.2 Generate a New Organization

In - ☐ Generate a new <organization.dat> file, it is

Input English name of the new organization: The initial 3 digits of the numbers:

Notes.

(1) The initial character of the English name must be from 26 English capital letters and number 0-9.

(2) The other characters of the English name are from: (i) 26 English capital letters, (ii) 26 English small letters, (iii) number 0-9, (iv) space " ", (v) hyphen "-", (vi) and "&", (vii) or "/", (iix) single quotation mark "'" and "" and """, (ix) dot ".", (x) colon ":", (xi) parenthesis "(" and ")".

(3) The max length of the English name is 140.

(4) The 3 initial digits must be from 26 English letters, regardless capital or small letters.

Firstly, to fill in the name of the organization for new creation, for example,

Input English name of the new organization:

and also fill in the initial 3 digits, for example,

The initial 3 digits of the numbers:

and please notice the note, as follows.

- The initial character of the English name must be from 26 English capital letters and number 0-9.
- The other characters of the English name are from: (i) 26 English capital letters, (ii) 26 English small letters, (iii) number 0-9, (iv) space " ", (v) hyphen "-", (vi) and "&", (vii) or "/", (iix) single quotation mark "'" and "" and """, (ix) dot ".", (x) colon ":", (xi) parenthesis "(" and ")".
- The max length of the English name is 140.
- The 3 initial digits must be 26 English letters, regardless capital or small letters.

Then, to click to go to the next window to set administrator, as

☒ Generate a new member number as administrator
☐ Set an existing member number as administrator

(1) English name:

Given Name	Middle Name	Family Name

(2) Another name / virtual name:

Name type: Other

Name: , Addition (@ or #):

(3) Set

☒ English name
☐ another name / virtual name

as the name of administrator.

in default, the above window is in ☒ Generate a new member number as administrator , by which to generate the new member number as the administrator, and the following window is in ☐ Set an existing member number as administrator , by which to set an existing member number as the administrator,

☐ Generate a new member number as administrator
☒ Set an existing member number as administrator

(1) Member:

Member number (14 digits):

☒ English name
☐ another name / virtual name

Given Name	Middle Name	Family Name

(2) Issuer of the member:

Organization number (14 digits):


Organization's created date (UTC):


Year	Month	Day	time (UTC):	Hour	Minute
2020	1	1		0	0

In either window, to fill in the information of administrator, and please note the follows.

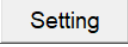
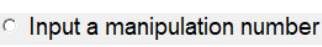
- If to set English name as the administrator, the blank of given name should be filled, otherwise if all the blanks of given name, middle name, family name are empty, the English name will be treated as empty.
- A valid English name requires at least given name is non-empty while given name and family name can be empty, and for each non-empty part of the English name, the initial character should be from 26 English capital letters while the other characters should be from 26 English capital letters, 26 English small letters, space “ ”, hyphen “-”, single quotation mark “'” and “'” and “””.

- If to set another name / virtual name as the administrator, the blank of name in another name / virtual name should be filled, otherwise if the blank of name is empty or the name type is “None”, another name / virtual name will be treated as empty.
- A valid another name / virtual name requires the character ranging from U+0020 to U+FFFF in Unicode (usually, most characters in most languages locate within this range), and single quotation mark “'” U+0027, double quotation mark “”” U+0022 will be replaced with “?” U+003F (Note: if to use single quotation mark in another name / virtual name, please use “'” U+2018 & “'” U+2019; if to use double quotation mark in another name / virtual name, please use “”” U+201C & “”” U+201D.).


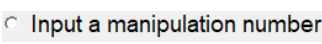
After setting administrator, finally, to click  to generate organization.dat in the directory of configuration, as well, the manipulation number of administrator is shown in the following information window.


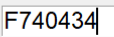

 The file with path
"OutputConfiguration/Org_202203091831_705709CBD4C8DAD0E5ED6.dat" is output.
The manipulation number of the administrator is 'F740434'.

OK

If to show the organization information in  - , please move the new generated organization.dat (note: please not to rename the file, or the application will treat it as an invalid file) into ./assets/.

2.1.3 Input Manipulation Number

If there exists at least one valid organization file in ./assets/, the combo box in  -  will be non-empty, as

Current organization files:

 Selected organization number:
 Selected organization name:
 Input manipulation number:
 

Select in the combo box, and if the organization.dat file is valid, the organization number and organization name will be shown. Then, input the valid manipulation number and then click

Confirm

. If the top-right zone become non-empty, as

```
Organization number:
tstKupacYLAeEw
Manipulation number:
F740434
```

it means the organization number and manipulation number are set in the environment.

2.1.4 Modify Organization.dat

When organization number and manipulation number are set in the environment, and the top-right zone is non-empty, then, in **Setting** - **My organization** to modify the organization.dat of the current organization in the environment.

There are 2 windows in follows.

- **Basic info** as

Output organization.dat			Basic info		Manipulation list	
Organization number	Initial 3 digits	Manipulation number of Administrator				
tstKupacYLAeEw	T S T	F740434	Copy	Change Admin.		
(1) Organization name: Testing Organization			Edit	Copy		
(2) City:			Edit	Copy		
(3) Region: other - Other			Edit			
Created by F740434 , on (UTC) 2022-03-09 , at (UTC) 18:31						
Last-edited by F740434 , on (UTC) 2022-03-09 , at (UTC) 18:31						

in which there are 4 functions, **Change Admin.** to change the manipulation number of the administrator to the current manipulation number in the environment, to change the organization name by **Edit** in the right end, to change the city (note: the format of city is the same as the organization name) by **Edit** in the right end, to change region by **Edit** in the right end. For example,

Output organization.dat Basic info Manipulation list

Organization number	Initial 3 digits	Manipulation number of Administrator
tstKupacYLAeEw Copy	T S T	F740434 Copy Change Admin.

(1) Organization name: [Cancel](#) [Confirm](#)

(2) City: [Edit](#) [Copy](#)

(3) Region: [Edit](#)

Created by F740434 , on (UTC) 2022-03-09 , at (UTC) 18:31
 Last-edited by F740434 , on (UTC) 2022-03-09 , at (UTC) 18:31

when to click [Edit](#) to modify, then, [Cancel](#) to cancel the modification, [Confirm](#) to confirm the modification.

- [Manipulation list](#) as

Output organization.dat Basic info Manipulation list

Currently select: -

1/1 - enabled - F740434 - One ^

<
+
▲
▼
×
>

in which

Currently select: 1/1

1/1 - enabled - F740434 - One ^

<
+
▲
▼
×
>

is the list box of manipulation numbers, and [+](#) to add a new manipulation number, [▲](#) to move up the current selection, [▼](#) to move down the current selection, [×](#) to delete the current selection.

- In [Manipulation list](#) , when one manipulation number is selected in the list box, the window becomes

Output organization.dat Basic info Manipulation list

Currently select: 1/1

1/1 - enabled - F740434 - One

(1) Manipulation Number (7 digits): F740434 Copy ☒ This number is enabled. Confirm

(2) Member: English name another name / virtual name

Member number (14 digits): DDDE270A3507C7

Given Name	Middle Name	Family Name
One		Test

(3) Issuer of the member:

Organization number (14 digits): tstKupacYLAeEw

Organization's created date (UTC):

Year	Month	Day	time (UTC):	Hour	Minute
2022	-3	-9		18	:31

where ☐ This number is enabled. to enable or disable the manipulation number, and to select ☐ English name to set English name or to select ☐ another name / virtual name to set another name / virtual name as the name of the manipulation number, then to fill in the other blanks of member number, name, issuer's organization number, issuer's organization's created date and issuer's organization's created time. Finally, to click

Confirm

, and if the format is correct, the top of the list box will be like

1/1 is modified.

- In ☐ Manipulation list, when one new manipulation number is selected in the list box, the window becomes

Output organization.dat Basic info Manipulation list

Currently select: 2/2

1/2 - disabled - F740434 - One

2/2 - <empty>

(1) Manipulation Number (7 digits): Confirm Randomly generate

to manually input a new manipulation number in the blank or to click

Randomly generate

to randomly generate a new manipulation number in

the blank, then, to click Confirm to go to the next window as

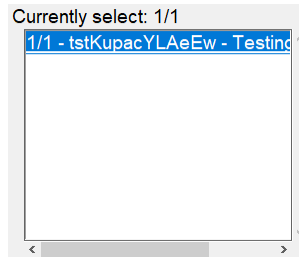
then, to modify ☐ This number is enabled., and to select ☐ English name or to select ☐ another name / virtual name, and fill in the blanks. Finally, to click to finish the process of creating a new manipulation number.





After all the modifications, to click to output the modified organization.dat in the directory of configuration. And do not forget to move the modified organization.dat into ./assets/.

2.1.5 Modify OrganizationList.dat

When organization number and manipulation number are set in the environment, and the top-right zone is non-empty, then, in - ☐ Organization list, the window is


in which

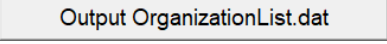


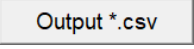
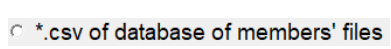
is the list box of manipulation numbers, and  to add a new item,  to move up the current selection,  to move down the current selection,  to delete the current selection.

If one of the items is selected, the window becomes

 A screenshot of a software window for modifying an organization. It has a list box on the left with '1/1 - tstKupacYLAeEw - Testing' selected. Below the list box are four buttons: a plus sign, an up arrow, a down arrow, and a red X. Below these buttons is a button labeled 'Output OrganizationList.dat'. To the right of the list box are five input fields: (1) Organization number: 'tstKupacYLAeEw'; (2) Organization name: 'Testing Organization'; (3) Created date (UTC): Year '2022', Month '-3', Day '-9'; (4) Created time (UTC): Hour '18', Minute ':31'; (5) Manipulation number of the organization's creator: 'F740434'. At the bottom right is a green 'Confirm' button. At the bottom of the window, a status bar reads: 'The OrganizationList.dat is created by F740434 of tstKupacYLAeEw, on 2022-03-09 at 20:09'.

then, to fill in or to modify the blanks of organization number, organization name, created date, created time, manipulation number of the organization's creator, then, to click  to finish the process of modification.

After all the modifications, to click  to output OrganizationList.dat in the directory of configuration. And do not forget to move the modified organization.dat into ./assets/. (Note: the prereading process of OrganizationList.dat is in the opening of the application, thus, if to update the modified organization list in the environment, please close and reopen the application.)

OrganizationList.dat file can be used in  - , where to output *.csv table(s) of member list, and in the column "organization name", whether the cells is empty or non-empty can imply whether the member number is issued from the organization in OrganizationList.dat or not in OrganizationList.dat. Furthermore, **if**

2.2 Generate Numbers

When organization number and manipulation number are set in the environment, and the top-right zone is non-empty, then, in `Generate numbers` - `Output single member number` to generate a mixed number and a member number for a person, as

As the notes, there are the follows.

- 25

- If the type of another name / virtual name is “None”, or if the name of another name / virtual name is empty, then, another name / virtual name will be treated as empty (Note: in this application, if another name / virtual name is treated as empty, the type will be automatically changed to “None”).
- A valid another name / virtual name requires the character ranging from U+0020 to U+FFFF in Unicode (usually, most characters in most languages locate within this range), and single quotation mark “'” U+0027, double quotation mark “”” U+0022 will be replaced with “?” U+003F (Note: if to use single quotation mark in another name / virtual name, please use “’” U+2018 & “”” U+2019; if to use double quotation mark in another name / virtual name, please use ““” U+201C & “”” U+201D.).
- Before generating, please be sure that at least either English name is non-empty or another name / virtual name is non-empty, or both of them are non-empty.

If there is no *.iden file, no *.txt file, no *.csv file in the directory of new member and its sub-directories, then, after filling in the blanks, to click Generate to output *.iden file (and *.txt file) in the directory of new member.

2.2.2 Generate Multiple Member Numbers

When organization number and manipulation number are set in the environment, and the top-right zone is non-empty, then, in Generate numbers - Output multiple member numbers by *.csv file to generate a series of mixed numbers and member numbers for many persons with a *.csv table of English name and/or another name / virtual name, as

Import a *.csv file	Clean
<p>(1) In the first row, title row of the *.csv file, there must be 6 or 7 cells (regardless capital or small letters): (i) "Given Names" or "GN", (ii) "Middle Names" or "MN", (iii) "Family Names" or "FN", (iv) "Another Types" or "Virtual Types" or "AT" or "VT", (v) "Another Names" or "Virtual Names" or "AN" or "VN", (vi) "Another Additions" or "Virtual Additions" or "AA" or "VA", (vii) an optional cell "Index" or "No".</p> <p>(2) The max row number (excluding first row, title row) is 20 000.</p>	
Generate	Stop No *.csv file is imported.
<p>(1) Analyze rows' contents</p> <div style="border: 1px solid #ccc; height: 20px; width: 100%;"></div> <p style="text-align: center;">;</p>	<p>(2) Forming mixed numbers</p> <div style="border: 1px solid #ccc; height: 20px; width: 100%;"></div> <p style="text-align: center;">;</p>
<p>(3) Forming member numbers</p> <div style="border: 1px solid #ccc; height: 20px; width: 100%;"></div> <p style="text-align: center;">;</p>	<p>(4) Output files</p> <div style="border: 1px solid #ccc; height: 20px; width: 100%;"></div> <p style="text-align: center;">;</p>

As the notes, there are the follows.

- The first row in the *.csv table must be the title row for the application to identify the labels of columns; there must be 6 or 7 cells, while other integers will be treated as wrong format. (Note: in advanced setting of *.csv table, the format should be “UTF-8” and “comma delimited”, and usually this setting is the default in many applications.)
- In the title row, the 6 required cells are (regardless the capital or small letters): (i) “Given Names” or “GN”, (ii) “Middle Names” or “MN”, (iii) “Family Names” or “FN”, (iv) “Another Types” or “Virtual Types” or “AT” or “VT”, (v) “Another Names” or “Virtual Names” or “AN” or “VN”, (vi) “Another Additions” or “Virtual Additions” or “AA” or “VA”.
- In the title row the only optional cell is “Index” or “No”.
- Except for the title row, the application can import 1-20000 rows from a *.csv table for generating in one time. If the row number is 0 or greater than 20000, the *.csv table will be treated as wrong format.

For example, the following table is a sample of right format (Note: Like the column G, the quotation mark “” (U+0027) or “” (U+0022) in first and end positions can assist to record numeric format as string, and in the application, the first and end positions of “”&“” or “”&“” will be removed in importing *.csv files),

	A	B	C	D	E	F	G
1	index	gn	mn	fn	at	an	aa
2	1	Two		Test	Name in other language	No. 2 Testing Account	"002"
3	2	Three		Test	Name in other language	No. 3 Testing Account	"003"
4	3	Four		Test	Name in other language	No. 4 Testing Account	"004"
5	4	Five		Test	Name in other language	No. 5 Testing Account	"005"
6	5	Six		Test	Name in other language	No. 6 Testing Account	"006"
7	6	Seven		Test	Name in other language	No. 7 Testing Account	"007"
8	7	Eight		Test	Name in other language	No. 8 Testing Account	"008"
9	8	Nine		Test	Name in other language	No. 9 Testing Account	"009"
10	9	Ten		Test	Name in other language	No. 10 Testing Account	"010"
11	10	Eleven		Test	Name in other language	No. 11 Testing Account	"011"
12	11	Twelve		Test	Name in other language	No. 12 Testing Account	"012"

then, to click

Import a *.csv file

to import this table, and then, to click

Generate

to output *.iden file (and *.txt file) in the directory of new member. **Stop** is to stop the process of generating (Note: it is stop, not pause). When all the four steps in the following screenshot finish, the generating process is finished, and in the bottom-right it shows the report in a *.csv file in the directory of new member, as the follow.

Generate	Stop	Finished.
(1) Analyze rows' contents		(2) Forming mixed numbers
Valid: 11 ; Invalid: 0		11/11 ; 100.0%
(3) Forming member numbers		(4) Output files
11/11 ; 100.0%		11/11 ; 100.0%
'NewMember/Report.csv' is output.		

2.3 Check Validity

When organization number and manipulation number are set in the environment, and the top-right zone is non-empty, then, in **Check validity**, there are 4 functions to check validity of the 4 kinds of numbers:

(1) to check the validity of mixed number in **Mixed number** as

1. Mixed number: **Check** **Clean**

Note: it is not necessary that all the following blanks are filled.

(1) English given name: (2) English family name:

(3) Issued date (UTC): Year Month Day (4) Issued time (UTC): Hour Minute

To check from *.csv file

(1) In the first row, title row of the *.csv file, there is 1 required cell, "Mixed Numbers" or "Mix", and 7 optional cells (regardless capital or small letters): (i) "Given Names" or "GN", (ii) "Family Names" or "FN", (iii) "Issued Year" or "Iss Y", (iv) "Issued Month" or "Iss M", (v) "Issued Day" or "Iss D", (vi) "Issued Hour" or "Iss H", (vii) "Issued Minute" or "Iss Min".

(2) The max row number (excluding first row, title row) is 1 000.

(2) to check the validity of member number in **Member number** as

2. Member number: **Check** **Clean**

Note: it is not necessary that all the following blanks are filled.

(1) Mixed number:

(2) Issuer's organization number:

(3) Another name / virtual name:

To check from *.csv file

(1) In the first row, title row of the *.csv file, there is 1 required cell, "Member Numbers" or "Mem", and 3 optional cells (regardless capital or small letters): (i) "Mixed Numbers" or "Mix", (ii) "Organization Numbers" or "Org", (iii) "Another Names" or "Virtual Names" or "AN" or "VN".

(2) The max row number (excluding first row, title row) is 1 000.

(3) to check the validity of organization number in **Organization number** as

3. Organization number: Check Clean

Note: it is not necessary that all the following blanks are filled.

(1) Created date (UTC): Year Month Day (2) Created time (UTC): Hour Minute

To check from *.csv file

(1) In the first row, title row of the *.csv file, there is 1 required cell, "Organization Numbers" or "Org", and 5 optional cells (regardless capital or small letters): (i) "Created Year" or "Cre Y", (ii) "Created Month" or "Cre M", (iii) "Created Day" or "Cre D", (iv) "Created Hour" or "Cre H", (v) "Created Minute" or "Cre Min".

(2) The max row number (excluding first row, title row) is 1 000.

(4) to check the validity of manipulation number in Manipulation number as

4. Manipulation number: Check Clean

Note: the organization number is required.

(1) Organization number:

To check from *.csv file

(1) In the first row, title row of the *.csv file, there are 2 required cells (regardless capital or small letters): (i) "Manipulation Numbers" or "Mani", (ii) "Organization Numbers" or "Org".

(2) The max row number (excluding first row, title row) is 1 000.

If to check the validity of single number, to fill in the blanks, and then, to click Check to start check. For example, to check the validity of “TsTuM8oSrMnfcPfZt4drf” and “tsTuM8oSrMnfcPfZt4drf”, of which the difference is the first digit, then, after click Check, they are

1. Mixed number: Check Clean Valid (non-empty name).

Note: it is not necessary that all the following blanks are filled.

(1) English given name: (2) English family name:

(3) Issued date (UTC): Year Month Day (4) Issued time (UTC): Hour Minute

and

1. Mixed number: Check Clean Invalid (non-empty name).

Note: it is not necessary that all the following blanks are filled.

(1) English given name: (2) English family name:

(3) Issued date (UTC): Year Month Day (4) Issued time (UTC): Hour Minute

where the words on the right of Check and Clean shows the validity of the current input information. If there are more information in the blanks, the process can include more to check. Clean is to clean all the blanks in the current window.

To check from *.csv file

is the function to check the validity of multiple

numbers. As the notes, there are the follows.

- The first row in the *.csv table must be the title row for the application to identify the labels of columns; there is no limitation for the number of cells in the title row. (Note: in advanced setting of *.csv table, the format should be “UTF-8” and “comma delimited”, and usually this setting is the default in many applications.)
- If to check the validity of mixed number, a cell filled with “Mixed Numbers” or “Mix” is required; if to check the validity of member number, a cell filled with “Member Numbers” or “Mem” is required; if to check the validity of organization number, a cell filled with “Organization Numbers” or “Org” is required; if to check the validity of manipulation number, a cell filled with “Manipulation Numbers” or “Mani” and a cell filled with “Organization Numbers” or “Org” are both required.
- If to check the validity of mixed number, the optional cells in title row are: (i) “Given Names” or “GN”, (ii) “Family Names” or “FN”, (iii) “Issued Year” or “Iss Y”, (iv) “Issued Month” or “Iss M”, (v) “Issued Day” or “Iss D”, (vi) “Issued Hour” or “Iss H”, (vii) “Issued Minute” or “Iss min”.
- If to check the validity of member number, the optional cells in title row are: (i) “Mixed Numbers” or “Mix”, (ii) “Organization Numbers” or “Org”, (iii) “Another Names” or “Virtual Names” or “AN” or “VN”.
- If to check the validity of organization number, the optional cells in title row are: (i) “Created Year” or “Cre Y”, (ii) “Created Month” or “Cre M”, (iii) “Created Day” or “Cre D”, (iv) “Created Hour” or “Cre H”, (v) “Created Minute” or “Cre min”.
- Except for the title row, the application can import 1-1000 rows from a *.csv table for checking validity in one time. If the row number is 0 or greater than 1000, the *.csv table will be treated as wrong format.

After clicking

To check from *.csv file

and import a valid *.csv table, another

*.csv will be output as report in the directory of *.csv output. If to check the validity of mixed number, the title row contains

Cells of the Title Row	Description
------------------------	-------------

index	The number of every row in order.
valid	If the current information in the row is valid, it is 1; otherwise, it is 0.
aim: mixed number	The mixed number from the original *.csv table.
given name	The given name from the original *.csv table.
family name	The family name from the original *.csv table.
issued year	The issued year from the original *.csv table.
issued month	The issued month from the original *.csv table.
issued day	The issued day from the original *.csv table.
issued hour	The issued hour from the original *.csv table.
issued minute	The issued minute from the original *.csv table.

If to check the validity of member number, the title row contains

Cells of the Title Row	Description
index	The number of every row in order.
valid	If the current information in the row is valid, it is 1; otherwise, it is 0.
aim: member number	The member number from the original *.csv table.
mixed number	The mixed number from the original *.csv table.
issuer's organization number	The organization number from the original *.csv table.
another name / virtual name	Another name / virtual name from the original *.csv table.

If to check the validity of organization number, the title row contains

Cells of the Title Row	Description
index	The number of every row in order.
valid	If the current information in the row is valid, it is 1; otherwise, it is 0.
aim: organization number	The organization number from the original *.csv table.
created year	The created year from the original *.csv table.
created month	The created month from the original *.csv table.
created day	The created day from the original *.csv table.
created hour	The created hour from the original *.csv table.
created minute	The created minute from the original *.csv table.

If to check the validity of manipulation number, the title row contains

Cells of the Title Row	Description
index	The number of every row in order.
valid	If the current information in the row is valid, it is 1; otherwise, it is 0.
aim: manipulation number	The manipulation number from the original *.csv table.
organization number	The organization number from the original *.csv table.

2.4 Output *.csv

2.4.1 Copy *.iden into the Database

When organization number and manipulation number are set in the environment, and the top-right zone is non-empty, then, in - to copy the member's files into the slots of database in part 1, before to output *.csv table of member list,

1. To scan *.iden and *.txt in the database, 'Database/', and then to copy *.iden in the slots.

<input type="button" value="Scan"/>		Copy the scanned results to:				<input type="button" value="Stop"/>
		Slot-1	Slot-2	Slot-3	Slot-4	
<input type="button" value="Stop"/>		Slot-5	Slot-6	Slot-7	Slot-8	<input type="button" value="Stop"/>

because in the application the *.csv tables of member lists are generated from the scans in the directories of the slots of database, and then, to output *.csv from the slots of database in part 2,

2. To output *.csv into 'OutputCSV/' from the slots in the database, 'Database/'.

Slot-1	Slot-2	Slot-3	Slot-4	<input type="button" value="Stop"/>
Slot-5	Slot-6	Slot-7	Slot-8	

Firstly, to copy the new generated *.iden files or *.txt files into the directory of database, for example,

- ☐ Slot-1
- ☐ Slot-2
- ☐ Slot-3
- ☐ Slot-4
- ☐ Slot-5
- ☐ Slot-6
- ☐ Slot-7
- ☐ Slot-8
- ☐ Mem_202203091831_One_Test_DDDE270A3507C7.iden
- ☐ Mem_202203100655_Eight_Test_FC3C270A3F1D6C.iden
- ☐ Mem_202203100655_Eleven_Test_ECBF270AA07AFE.iden
- ☐ Mem_202203100655_Five_Test_AF93270A57BA01.iden
- ☐ Mem_202203100655_Four_Test_5B88270A5470C7.iden
- ☐ Mem_202203100655_Nine_Test_A714270AB9608F.iden
- ☐ Mem_202203100655_Seven_Test_5399270AED4F8E.iden
- ☐ Mem_202203100655_Six_Test_AF24270AA0B640.iden
- ☐ Mem_202203100655_Ten_Test_A0FB270A436D5F.iden
- ☐ Mem_202203100655_Three_Test_7DEA270A13085D.iden
- ☐ Mem_202203100655_Twelve_Test_BEB7270A3ED9FB.iden
- ☐ Mem_202203100655_Two_Test_B6B3270ADB7F4F.iden

Secondly, to click **Scan** to read the above *.iden files (and *.txt files) in the directory of database into memory (Note: if there are more than 20 000 *.iden files or *.txt files in the directory of database, the scanning won't start),

1. To scan *.iden and *.txt in the database, 'Database/', and then to copy *.iden in the slots.

Scan		Copy the scanned results to:				
<div></div>		Slot-1	Slot-2	Slot-3	Slot-4	Stop
Finished. Stop		Slot-5	Slot-6	Slot-7	Slot-8	

2. To output *.csv into 'OutputCSV/' from the slots in the database, 'Database/'.

Slot-1	Slot-2	Slot-3	Slot-4	
Slot-5	Slot-6	Slot-7	Slot-8	Stop

'Database/Report_scan.csv' is output, with 12 valid results.

and **Stop** is to stop the process of scanning (Note: it is stop, not pause). Also, a *.csv file as the report is output in the directory of database.

Thirdly, if there exists scanned result in memory, then, to click any button from **Slot-1** to **Slot-8** in part 1 to copy the result into the slot of database.

1. To scan *.iden and *.txt in the database, 'Database/', and then to copy *.iden in the slots.

Scan		Copy the scanned results to:				
<div></div>		Slot-1	Slot-2	Slot-3	Slot-4	Finished. Stop
Finished. Stop		Slot-5	Slot-6	Slot-7	Slot-8	

2. To output *.csv into 'OutputCSV/' from the slots in the database, 'Database/'.

Slot-1	Slot-2	Slot-3	Slot-4	
Slot-5	Slot-6	Slot-7	Slot-8	Stop

'Database/Report_copy_to_Slot-2.csv' is output.

and is to stop the process of scanning (Note: it is stop, not pause). Also, a *.csv file as the report is output in the directory of database. If there exists the same mixed number in the slot, the pieces of the information in the scanned result in memory won't be copied.

In the directory of a slot of database, for example,

```

☐ 342534674024126424410376374526335767514222.iden
☐ 342534726675363635623131257116116003366035.iden
☐ 34255702473340022525025725277505540536541.iden
☐ 342557161176113774337175174570641727606525.iden
☐ 342557272651066361274513262732565536554470.iden
☐ 57053415615655340164405024013762017433161.iden
☐ 570534463044320453564245115333451444263305.iden
☐ 570557153005317450717663254677535321154103.iden
☐ 570557622436222504244621103021633442560421.iden
☐ 570557732735221171017006307456031266413550.iden
☐ 572534514620467354035776673466031455310032.iden
☐ 572557016106353037675743513761370375040145.iden

```

there are only *.iden files with the names of octal numbers, which are from the conversion of mixed numbers. Please do not rename these files, or the renamed files will be treated as wrong format.

2.4.2 Output *.csv from the Database

If there exist files in a slot of database, then, to click the corresponding button from

to in part 2, as

1. To scan *.iden and *.txt in the database, 'Database/', and then to copy *.iden in the slots.

Copy the scanned results to:

<input type="button" value="Slot-1"/>	<input type="button" value="Slot-2"/>	<input type="button" value="Slot-3"/>	<input type="button" value="Slot-4"/>
<input type="button" value="Slot-5"/>	<input type="button" value="Slot-6"/>	<input type="button" value="Slot-7"/>	<input type="button" value="Slot-8"/>

2. To output *.csv into 'OutputCSV/' from the slots in the database, 'Database/'.

<input type="button" value="Slot-1"/>	<input type="button" value="Slot-2"/>	<input type="button" value="Slot-3"/>	<input type="button" value="Slot-4"/>	<div></div>
<input type="button" value="Slot-5"/>	<input type="button" value="Slot-6"/>	<input type="button" value="Slot-7"/>	<input type="button" value="Slot-8"/>	<div>Finished.</div> <div><input type="button" value="Stop"/></div>

'OutputCSV/Slot-2/Report_amount.txt' is output.

then, the *.csv table(s) of member list will be output in the corresponding directory of slot of *.csv output. Also, 2 *.txt files as the reports are output in the directory of slot of *.csv output. For each *.csv table in output, the capacity is 50 000, which means if there are 50 001 – 100 000 valid *.iden files in the slot of database there will be 2 *.csv tables being output, if there are 100 001 – 150 000 valid *.iden files in the slot of database there will be 3 *.csv tables being output, if there are 150 001 – 200 000 valid *.iden files in the slot of database there will be 4 *.csv tables being output...

The title row of the *.csv table(s) contains

Cells of the Title Row	Description
index	The number of every row in order.
mixed number	The mixed number from the *.iden file.
member number	The member number from the *.iden file.
issued date	The issued date (UTC, Coordinated Universal Time) from the *.iden file.
issued time	The issued time (UTC, Coordinated Universal Time) from the *.iden file.
English given name	English given name from the *.iden file.
English middle name	English middle name from the *.iden file.
English family name	English family name from the *.iden file.
type of another name / virtual name	Type of another name / virtual name from the *.iden file, and there are only 4 values, “None”, “Name in other language”, “Social media APP”, “Other”.
another name / virtual name	Another name / virtual name from the *.iden file.
addition (@ or #) of another name / virtual name	Addition (@ or #) of another name / virtual name from the *.iden file.
issuer's manipulation number	Issuer's manipulation number from the *.iden file.
issuer's organization number	Issuer's organization number from the *.iden file.
issuer's organization name	Issuer's organization name from the *.iden file, if there exists ./assets/OrganizationList.dat; if there is no OrganizationList.dat file or the organization number is not in the file, the cell will be empty.
created date of the organization	The created date (UTC, Coordinated Universal Time) of the issuer's organization from the *.iden file.
created time of the organization	The created time (UTC, Coordinated Universal Time) of the issuer's organization from the *.iden file.

2.4.3 Output *.csv of Organization

When organization number and manipulation number are set in the environment, and the top-right zone is non-empty, then, in `Output *.csv` - `*.csv of organization`, there are 2 functions

Output *.csv of manipulation list
File from 'assets/assets/Org_202203091831_705709CBD4C8DAD0E5ED6.dat'.
Output *.csv of organization list
Preread file from 'assets/OrganizationList.dat'.

If to output *.csv table of manipulation list, to click

Output *.csv of manipulation list

to output in the directory of *.csv output, and the title row of the *.csv table(s) contains

Cells of the Title Row	Description
index	The number of every row in order.
if enabled	If the manipulation number in the row is enabled for whole functions that require manipulation number in the environment, it is 1; otherwise, if the manipulation number is disabled, it is 0.
manipulation number	The manipulation number from the organization.dat file.
current organization number	The organization number that the manipulation number belongs to.
current organization name	The organization name that the manipulation number belongs to.
if creator	If the manipulation number in the row is also creator of the organization, it is 1; otherwise, it is 0.
created date	The created date (UTC, Coordinated Universal Time) of the organization.
created time	The created time (UTC, Coordinated Universal Time) of the organization.
if administrator	If the manipulation number in the row is also administrator, it is 1; otherwise, it is 0.
member number	Member number of the manipulation number from the organization.dat file.
name type	Whether it is “English name” or “another name / virtual name” as the member’s name of the manipulation number from the organization.dat file.
English given name	If name type is “English name”, English given name from the organization.dat file; if name type is “another name / virtual name”, it is empty.
English middle name	If name type is “English name”, English middle name from the organization.dat file; if name type is “another name / virtual name”, it is empty.
English family name	If name type is “English name”, English family name from the organization.dat file; if name type is “another name / virtual name”, it is empty.
type of another name / virtual name	If name type is “English name”, it is empty; if name type is “another name / virtual name”, it is type of another name / virtual name from the organization.dat file.
another name / virtual name	If name type is “English name”, it is empty; if name type is “another name / virtual name”, it is

	another name / virtual name from the organization.dat file.
addition (@ or #) of another name / virtual name	If name type is “English name”, it is empty; if name type is “another name / virtual name”, it is addition (@ or #) of another name / virtual name from the organization.dat file.
issuer's organization number	For the member of the manipulation number, the organization number of the member’s issuer from the organization.dat file.
issuer's created date	For the member of the manipulation number, the created date (UTC, Coordinated Universal Time) of the organization number of the member’s issuer from the organization.dat file.
issuer's created time	For the member of the manipulation number, the created time (UTC, Coordinated Universal Time) of the organization number of the member’s issuer from the organization.dat file.

If to output *.csv table of organization list, to click Output *.csv of manipulation list to output in the directory of *.csv output, and the title row of the *.csv table(s) contains

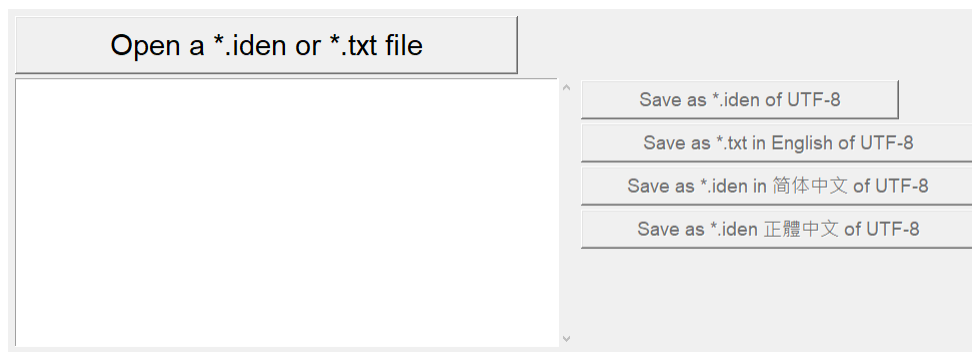
Cells of the Title Row	Description
index	The number of every row in order.
organization number	The organization number from OrganizationList.dat file.
organization name	The organization name from OrganizationList.dat file.
created date	The created date (UTC, Coordinated Universal Time) of the organization from OrganizationList.dat file.
created time	The created time (UTC, Coordinated Universal Time) of the organization from OrganizationList.dat file.
creator's manipulation number	The manipulation number of the creator of the organization from OrganizationList.dat file.

2.5 Other

other includes other functions, and these functions don’t need organization number and manipulation number to be set in the environment.

2.5.1 Scan a *.iden file or *.txt file

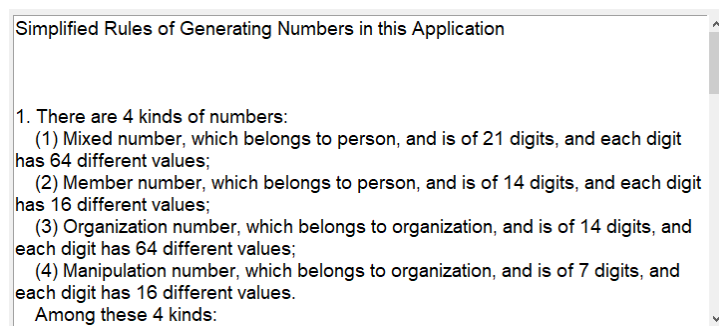
In - ☐ Scan a *.iden or *.txt file whether it is a valid file of member's info ,



to click to start check the validity of the opened file, and the text zone shows the result. If the opened file is valid, the buttons of the right column will be turned on, in which is to save as *.iden file, is to save as *.txt file in English, is to save as *.txt file in simplified Chinese, is to save as *.txt file in traditional Chinese,

2.5.2 Simplified Rules of Generating Numbers

In - ☐ Simplified rules of generating numbers ,



the text zone shows the simplified rules of generating numbers in this application.

In

Generate numbers

 and in

other

 -

☐ Scan a *.iden or *.txt file whether it is a valid file of member's info , the simplified rules of generating numbers are attached in the end of the output *.txt files in different languages.

The simplified rules are as follows.

1. There are 4 kinds of numbers:

(1) Mixed number, which belongs to person, and is of 21 digits, and each digit has 64 different values;

(2) Member number, which belongs to person, and is of 14 digits, and each digit has 16 different values;

(3) Organization number, which belongs to organization, and is of 14 digits, and each digit has 64 different values;

(4) Manipulation number, which belongs to organization, and is of 7 digits, and each digit has 16 different values.

Among these 4 kinds:

(1) The number, of which each digit has 16 values, is a hexadecimal number, and each digit is from number 0-9 and {'A', 'B', 'C', 'D', 'E', 'F'} (regardless capital or small letter);

(2) For the digit of 16 values, the map is from {'5', 'B', '7', 'F', '0', 'C', '2', 'D', 'E', '9', '3', '1', '4', '8', '6', 'A'} to 0-15;

(3) The number, of which each digit has 64 values, is a mixture of some characters, and each digit is from 26 English capital letters, 26 English small letters, number 0-9 and {'+', '-'};

(4) For the digit of 64 values, the map is from {'G', 'B', 'I', 'A', 'r', 's', '6', 'X', 'c', 'K', 'R', 'Q', 'T', 'x', 'h', 'b', 'i', 'f', 'o', 'a', 'M', 'S', 'w', '0', 'P', 'v', '3', 'N', 't', 'g', '8', '2', '+', '-', '4', 'k', '7', 'e', 'n', 'D', 'V', 'y', 'U', 'W', 'F', 'L', 'd', 'T', 'l', 'J', 'u', 'Z', 'z', 'C', 'Y', '9', 'm', 'H', 'O', 'E', '5', 'p', 'j', 'q'} to 0-63.

2. Mixed number

(1) The mixed number is designed with the large amount of possible numbers for the purpose that if the issuers are separated, they can issue different numbers in probability;

(2) The first 3 digits are from a combination of English letters (according to the issuer's first 3 digits) in capital and/or small cases, totally 8 different kinds;

(3) The last digit is the remainder of the sum of the other 20 digits divided by 64;

(4) The combination from 4th digit to the 20th digit encodes issuing date, issuing time, the first 2 letters of English given name, the first 2 letters of English family name;

(5) For each case of first 2 letters of English given name, first 2 letters of English family name, there are possibly $1.405669E+16$ different mixed numbers in the same minute;

(6) For 2 persons, if their first 2 letters of English given name and first 2 letters of English family name are not the same, their mixed number must be different;

(7) For 2 persons, if their mixed numbers are issued in different minute (UTC), their mixed number must be different;

(8) If the English name is empty, the mixed number can also be output.

3. Member number

(1) The member number is designed with the smaller amount of possible numbers than the mixed number, for the purpose that persons can memorize the member numbers;

(2) The combination of the first 4 digits encodes some digits of the mixed number;

(3) The combination of the 5th and 6th digits encodes some digits of the issuer's organization number;

(4) The combination of the 7th and 8th digits encodes some digits of the person's first 2 characters of another name / virtual name in Unicode;

(5) The combination from the 9th to 13th digits encodes issuing date, issuing time;

(6) If the member's English name is not empty, the last digit is the remainder of the sum of the other 13 digits divided by 15;

(7) If the member's English name is empty, the last digit is fixed to 'A', which is 15 as the map;

(8) It is possible that the member numbers of 2 persons are the same in probability.

4. Organization number

(1) The organization number is designed with the large amount of possible numbers for the purpose that if the issuers in the same league/country are separated, some other issuers can come out with the different organization numbers in probability;

(2) The first 3 digits are from a combination of English letters (showing that which league/country these organizations belong to) in capital and/or small cases, totally 8 different kinds;

(3) The last digit is the remainder of the sum of the other 13 digits divided by 64;

(4) The combination from 4th digit to the 13th digit encodes creating date, creating time;

(5) In every minute, there are possibly $1.662640E+9$ different organization numbers;

(6) For 2 organizations, if their organization numbers are created in different minute (UTC), their organization number must be different.

5. Manipulation number

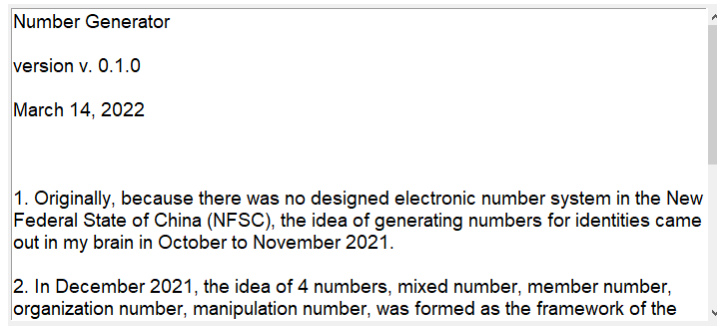
(1) The manipulation number is designed for manipulators to memorize, and for other organizations to search the exact issuers of mixed numbers and/or member numbers;

(2) All the 7 digits as a combination encodes some digits of the organization number;

(3) Within an organization, there are only 1271 are valid.

2.5.3 About

In other - About ,



the text zone shows the information about this application, as follows.

1. Originally, because there was no designed electronic number system in the New Federal State of China (NFSC), the idea of generating numbers for identities came out in my brain in October to November 2021.

2. In December 2021, the idea of 4 numbers, mixed number, member number, organization number, manipulation number, was formed as the framework of the number generating system.

3. In January 2022, to strengthen the avoidance of duplications, I set issuing or creating date and time as factors to be encoded in the numbers.

4. In February 2022, because the old algorithm cannot support at least one billion different numbers in probability, I modified it into the other algorithm. On February 24, 2022, when Russia invaded Ukraine, I noticed that 'the wars are not far from us' and, I decided to continue the modified algorithm, to re-write the whole application as this one.

5. In the first half of March 2022, the Chinese Communist Party (CCP) interrupted the Ukraine rescue of the NFSC, particularly the CCP tried to halt the spreads of rescue information in Chinese from the NFSC, while there are still many Chinese people in Ukraine.

As I am a human, to end communism, totalitarianism, dictatorship is not referring to political views, but to termination of antihuman actions.

As I am a Chinese person, to end the ruling of the CCP over Chinese people, to end the threats of the CCP towards Chinese people, and to bring freedom, democracy, rule-of-law to Chinese people is one of my goals.

As I am a scientist, even though I don't know how to end the wars between Ukraine and Russia, I don't know how to avoid the wars between Mainland China and Taiwan, my hope is still that I can apply my knowledge to help more people.