The Analysis Method of Numbers with the Same Last Digit for Lottery Number Selection

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Abstract: In this paper the analysis method of numbers with the same last digit for the application of the lottery numbers selection has been introduced. A number selection software is developed according to this method. It also discusses the existence, sequence of the numbers with the same last digit and data processing in details. [The Journal Of American Science. 2007;3(4):35-39]. (ISSN: 1545-1003).

Keywords: numbers with the same last digit; lottery mode; permutation and combination; traverse algorithm

1 Introduction

Lottery is a means of generating funds for government projects and providing hope to those less fortunate. Its contributions in education, health and other fields are impressive since its inception. Raising money for charitable organizations by holding a lottery is also popular and usually quite successful[1].

Lottery numbers are randomly drawn. It is a type of game that has the element of chance. There are many scientific number selection skills to choose from[2]. Numbers with the same last digit is one of them. Studying and using it can improve the chances on winning the lottery. It is the method that the lottery player should master[3]. In this paper, numbers with the same last digit analysis method for number selection has been introduced. According to this method, a number selection software with the functions such as data inputting, processing, filtering and printing etc is developed. The purpose of this software is to make full use of the PCs' calculating capacity and assist players to assemble their own play tickets from their selected number.

2 Numbers with the same last digit

In the various lottery games, in addition to analysis the rules of odd/even number, high/low numbers and best sums, numbers with the same last digit is another one that you need to consider[4]. From the statistical report of the previous drawings, the combination of numbers with the same last digit is the characteristics of the winning numbers. It occupies the 95.67% of the winning numbers combination. This means that if you choose the group of numbers without the same last digit, your winning chance will only be 4.33%[5]. Therefore it is important for the players to consider choosing the lottery numbers contain the same last digit.

The range for the number's last digit is from 0 to 9. For example, in a 7/30 game, all the numbers which available for the game are listed, and numbers with the same last digit are putted in a column.

01	02	03	04	05	06	07	08	09	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30

In the above list, every column is a group. The numbers in each group are with the same last digit. Thus the first group contains the number 01, 11, 21 and can be represented by '1', the second group contains the number 02, 12, 22 and can be represented by '2' etc[6]. The analysis method of numbers with the same last digit is to analyze the appearances of these numbers in the winning numbers. So you can get the probability of the winning numbers with the same last digit and to improve the chance of winning a lottery.

3 The Application of the Analysis Method and the Implementation of the Software

The data flow chart of the lottery number selection software is shown in fig.1. According to the player's selection, the program will figure out the mode of the game (eg 7/30, 7/26 or 5/23) and generate the tickets combinations depend on the calculating method of the different mode. These number selections which are generated by the program can also be saved in a file. Later the player can view them by opening the file.

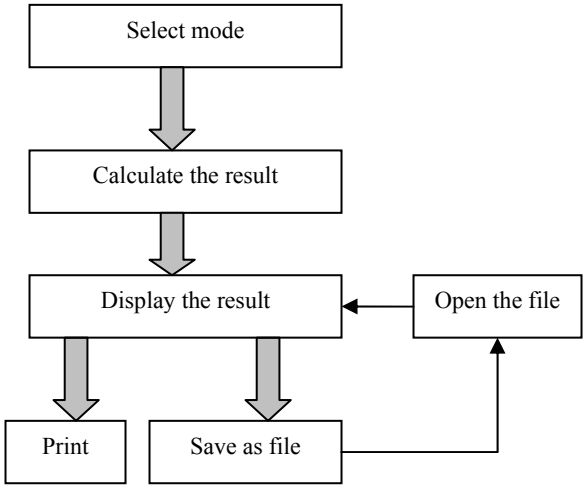

Figure 1. Data flow chart

3.1 Deal with different modes

In this paper, three modes 7/30, 7/36, 5/23 have been discussed.

The program mainly contains two parts: data input and generating ticket selections. In the data input section, the size of the array that is used to generate the ticket is determined by the mode of the user's selection. Meanwhile, in the modes of 5/23 and 7/36, because the amount of the numbers with the same last digit is different, the parameter for the number groups should also be concerned as shown below.

7/30：

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30

5/23：

01	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22								

7/36:

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36				

It obviously shows from the above three tables：In the 7/30 mode, there are three lines with equal

amount of the numbers with the same last digit. When the program has the traverse calculation, it only needs to traverse every digit based on the user's selection.

In the 5/23 mode, there are 3 numbers for the digit '1' and '2' arrays, only 2 numbers for the other groups of the same digit array. When the program has the traverse calculation, it needs to consider two cases based on the user's selection. For the digit '1' and '2', the variable needs to traverse from 1 to 3; for the other digit arrays, the variable needs to traverse from 1 to 2.

Also for the 7/36 mode, there are 4 numbers for the digit '1' to '6' array, and 3 numbers for the rest of the digit arrays. For the traverse calculation, it needs to consider two cases based on the user's selection. For the digit '1' to '6', the variable needs to traverse from 1 to 4; for the other digit arrays, the variable needs to traverse from 1 to 3.

3.2 The resolution for the amount of the numbers of the user's selection

When the users come to choose the lottery numbers, sometimes the amount of numbers that the user selected is not equal to the required amount of the numbers. For this problem, the program provides the following resolution. We use the 7/30 game as a example.

(1) If the amount of the user's selection is less than 7: In this case, the missed number can be replaced by 01-30. First we need to permute and combine the numbers that the users selected, then add the permutation and combination operations of the 01-30 for the missed numbers. For example: if the user chooses 6 numbers with the same last digit '5' and '6', that is 5(3), 6(3), then the number for the ticket is: 05 15 25 06 16 26 C_n^r (n=30, r=1, where n is the amount of numbers that the user can selected, r is amount of number that the user missed).

(2) If the amount of the user's selection is 7: In this case, the program will list the permutation and combination operations for the 7 numbers directly.

(3) If the amount of the user's selection is more than 7: In this case the program will list all the possible combinations of the 7 numbers from the user's selection. This means it first need to determine the combinations of the 7 numbers from the user's selection, then have the permutation and combination operations for each combination. The following resolutions are provided for the computer's operation.

For example, if the user chooses the numbers with the last digit '5', '6' and '8', as stated above, for 7/30 mode, each digit group contains 3 numbers. Assuming the user chooses all the 3 numbers in each group, this means that the user chooses 9 numbers in total, that is 5(3), 6(3), 8(3).

Then the combination of the 7 numbers could be:

331 313 133 322 232 223

Where the number in the first, second and third position represents the amount of numbers contains the same last digit '5', '6' and '8' respectively.

In order to use the calculating capability of the computer, we have the total number combinations subtract the possible combinations of the 7 numbers.

333-331=002
333-313=020
333-133=200
333-322=011
333-232=101
333-223=110

Here we get some numbers contain 3 digits in sequence.

001 332

002	331
010	323
011	322
012	321
……	……

For the numbers such as 331, 332, there is no appropriate algorithm for computer program to calculate. Therefore we need to convert this kind of numbers 331, 332 into numbers 001, 002 which are suitable for computer to calculate. In this way, the computer can calculate the result by starting from the number 000, then 001 and so on. The results are checked one by one, the expected results will be kept and unexpected results will be dropped.

3.3 The appearance orders of the numbers with the same last digit

Here, we use an example to illustrate this problem. For example, in a 7/30 game, the user chooses 3 numbers with the same last digit '4'; 2 numbers with the same last digit '5'; and 2 numbers with the same last digit '6', that is 4(3), 5(2), 6(2). For this choosing, there can only be two numbers for 5,15, 25 group. The possible combination could be 5 15, 5 25, 15 25. Actually, these combinations are determined by the human. For the computer, the combinations could be in the order of 15 5, this is recognized as two different combinations for 5 15.

In order to avoid the above repetition, a low to high value traverse method has been used to control the appearance sequence of the numbers with the same last digit. The possible combination is as following:

	05 15	06 16 06 26 16 26
04 14 24	05 25	06 16 06 26 16 26
	15 25	06 16 06 26 16 26

The order of the numbers combination for the tickets is produced based on the user's selection. That is the numbers with the same last digit is arranged in the order of the low to high value. Then the traverse operations can be applied to these numbers. For the above list, we can get the first number combination is 04 14 24 05 15 06 16 and the second number combination is 04 14 24 05 15 06 26, etc. According to the traverse results, we can get all the possible numbers combinations for the tickets.

4 Conclusion

The numbers with the last same digit frequently occur in the winning numbers. It gradually becomes the characteristics of the winning numbers and takes the important part of the player's consideration. The analysis software can effectively help the player to choose the numbers and has certain utilities. It can also improve the chances on winning the lottery.

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Received: 11/5/2007

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