Check ID Cards with an Excel Function

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ABSTRACT
This paper introduces the rules for the preparation of CHINA’s ID number, and elaborates the method of checking the ID number using functions in Excel, and elaborates on the function used.

Keywords: excel, ID number, function

1. INTRODUCTION

In various forms that contain personnel information, the ID number is a very important data. This article details the use of Excel function to verify the ID number method, has a strong practical value. The number of China’s resident ID card is compiled in accordance with national standards, consisting of 18 digits, in order from left to right in order: 6 digits of digital address code, 8-digit number of digital birth dates, 3-digit sequence codes, and 1-digit check codes. In the ID card number preparation rules, the last one is to play the role of verification. The check rule is to take out the first 17 digits of the ID card number, multiply by the corresponding weighting factor and sum s, using $S \mod 11$ for the remainder Y and then get the ID number 18 by comparison check code corresponding table Bits. The verification method is about to calculate the check code and the original ID number of the 18th digit comparison, consistent is through verification, otherwise the ID number is wrong. Through such preliminary verification can effectively avoid input errors, and even identify some of the forged identity cards. The whole process is complex, with an Excel table instance being implemented step-by-step. Figure 1 is a soldier information sheet containing the ID number, which needs to be checked.

2. HOW TO CHECK

2.1. Weighted Sum

The first thing you need to extract is the first 17 digits of your ID number, which can be done with the MID function: MID(text, start_num, num_chars): Returns characters of a specified length from the starting position specified in the text string.

Numbers extracted from the MID function require weighted sum (the weighted number is shown in Figure 4), and the expression can be written as:

$$
=\text{MID}(D3,1,1)*7+\text{MID}(D3,2,1)*9+\text{MID}(D3,3,1)*10+\text{MID}(D3,4,1)*5+\text{MID}(D3,5,1)*8+\text{MID}(D3,6,1)*4+\text{MID}(D3,7,1)*2+\text{MID}(D3,8,1)*1+\text{MID}(D3,9,1)*6+\text{MID}(D3,10,1)*3+\text{MID}(D3,11,1)*7+\text{MID}(D3,12,1)*9+\text{MID}(D3,13,1)*10+\text{MID}(D3,14,1)*5+\text{MID}(D3,15,1)*8+\text{MID}(D3,16,1)*4+\text{MID}(D3,17,1)*2
$$

Enter the expression in the "Id number verification" cell, which is E3 cell. The result is shown in Figure 2.

2.2. Finding the Remainder

Finding the remainder in Excel can be realized by MOD function:

$\text{MOD}(\text{number}, \text{divisor})$: Returns the remainder of the division of two numbers. The positive and negative sign of the result is the same as the divisor.

The summation result of the first step is nested in the MOD function as a parameter, and the expression is as follows:

$\text{MOD}(\text{SUM}(...), 11)$
The result is shown in Figure 3.

![Figure 3](image3.png)

2.3. **Finding the Check Code**

After calculating the remainder, we need to query the corresponding check codes, and make the corresponding relationship between the remainder and the check codes into a table and store it in another worksheet. The worksheet is named "Check Data", as shown in Figure 4.

![Figure 4](image4.png)

The function which is named "VLOOKUP" can be used to find check codes according to the remainder in this worksheet.

VLOOKUP(lookup_value, table_array, col_index_num, [range_lookup])

- **lookup_value**: The search area is the D2 to E12 regions of the "Check Data" worksheet.
- **table_array**: The reference method can be expressed as follows: Check Data!$D$2:$E$12
- **col_index_num**: The third parameter is to find the column where the region target is located. In this case, it is 2. The last parameter logic value means whether to enable Fuzzy Lookup or not. In this case, no need to enable, just fill in "0" or "FALSE".

Therefore, the synthesis expression is:

$$=\text{VLOOKUP}(\text{MOD(MID(D3,1,1)\ast7+MID(D3,2,1)\ast9+MID(D3,3,1)\ast10+MID(D3,4,1)\ast5+MID(D3,5,1)\ast8+MID(D3,6,1)\ast4+MID(D3,7,1)\ast2+MID(D3,8,1)\ast1+MID(D3,9,1)\ast6+MID(D3,10,1)\ast3+MID(D3,11,1)\ast7+MID(D3,12,1)\ast9+MID(D3,13,1)\ast10+MI}$$

2.4. **Comparison Verification**

The final step requires the check code to be compared with the 18th digit of the ID number to check that it is consistent. The ability to check for consistency can be implemented using the EXACT function:

$$=\text{EXACT}($$ 

$$\text{check code, ID card number at the 18th bit})$$

The function returns the result as shown in Figure 5.

![Figure 5](image5.png)
=EXACT(MID(D3,18,1),VLOOKUP(MOD(MID(MID(D3,1,1)*7+MID(D3,2,1)*9+MID(D3,3,1)*10+MID(D3,4,1)*5+MID(D3,5,1)*8+MID(D3,6,1)*4+MID(D3,7,1)*2+MID(D3,8,1)*1+MID(D3,9,1)*6+MID(D3,10,1)*3+MID(D3,11,1)*7+MID(D3,12,1)*9+MID(D3,13,1)*10+MID(D3,14,1)*5+MID(D3,15,1)*8+MID(D3,16,1)*4+MID(D3,17,1)*2,11),Check(Data!$D$2:$E$12,2,0))

The result is shown in Figure 6.

Figure 6 The last result of check

The result shows that the ID number has passed the verification if it is “TRUE”, else the ID number has errors.

3. CONCLUSION

Identity cards are very important to everyone. Whether the authentication is successful or not, the channels of identification card numbers are usually charged, such as bank channels and Ministry of Public Security channels. Before sending these validation to these channels, validating them first can improve the success rate of charging validation and save cost. It can also improve the user experience, feedback in time when users input errors without waiting for the return of validation channel results. Relying on Excel software, this paper mainly uses Excel function to realize the verification function. It is easy to operate and difficult to realize. I hope it can inspire everyone's work and study.

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