

Validation Checks

Validation checks are checks that the computer performs on data. Some checks can reveal mistakes in data for example a date where the day is 32. The following are a few examples of validation checks

Range check

A **range check** checks the value of data to see if it is within a certain range e.g. the month of the year must be between 1 and 12.

Constraint check

A **constraint check** checks that an entry is obeying a given constraint or constraints for example a password may be required to meet a minimum length and contain characters from multiple categories.

Consistency check

Consistency validation ensures that data is logical. For example, the delivery date of an order cannot be greater than the shipment date.

Check digit.

A **check digit** is added to detect transcription errors in which digits have been altered or transposed. Let us show this by the ISBN-10 check digit.

The check digit is the last digit of the ISBN. Its value is calculated from the other nine digits of the ISBN and provides, as its name implies, a check on the validity of the ISBN. If, in transcribing the ISBN, a mistake is made such as a wrong number or a transposition error, there is a good chance that the resulting ISBN will be invalid, indicating the error.

Check digit calculation

The check digit is calculated by taking the nine digits. The first, leftmost, digit of the nine is multiplied by ten, then working from left to right, each successive digit is multiplied by one less than the one before. So, the second digit is multiplied by nine, the third by eight, and so on to the ninth which is multiplied by two. Each of the nine products calculated is added together. Let us say that is amounts to x . Then let us say that $x \bmod 11$ amounts to y . The check digit is eleven minus x . Let us work it on the digits 019852663.

ISBN without check digit	0	1	9	8	5	2	6	6	3
Weight	10	9	8	7	6	5	4	3	2
Product	0	+ 9	+ 72	+ 56	+ 30	+ 10	+ 24	+ 18	+ 6 = 225

225 divided by 11 = 20 remainder 5.

The check digit is modulus-remainder, $11-5=6$

The possible values for a check digit calculated by this procedure, called modulus 11, is from zero to ten. In order to show a check digit of ten as one character, the convention is adopted of using the letter "X" to stand for a ten, like a Roman ten. That is why you may sometimes see a 10-digit ISBN that ends in an "X" rather than a numeric digit.

Check digit validation

ISBN with check digit	0	1	9	8	5	2	6	6	3	6
Weight	10	9	8	7	6	5	4	3	2	1
Product	0	+ 9	+ 72	+ 56	+ 30	+ 10	+ 24	+ 18	+ 6	+ 6 = 231

231 (the sum of products) divided by 11 (the modulus) = 21 remainder 0. Zero remainder = valid ISBN.