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Luhn's Algorithm

Popular Checksum for Credit, Debit and Other Card numbers

(Payments Domain Program @QBI Institute)

What is a Checksum



- A mathematical technique to verify integrity of data presented.
- It is an easy, quick, good first level check but not fool proof
- Let's take an example of an imagined credit card number say '5324705002766261'
- . While the credit card number will be stored a Checksum will also be stored with this. Let's say the checksum digit should have a divisibility by 10.
- For some predefined mathematical operation on this card number and other credit card numbers if they are valid the result of the mathematical operation should be divisible by 10. This will at a preliminary level ensure that the card number being provided is correct.
- To repeat this is not a fool proof technique but a first level check.



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Luhn's Algorithm

- Luhn's algorithm is a simple Checksum algorithm utilized with credit, debit and other cards, to verify integrity of the card number presented.

Luhn's Algorithm

- Let's consider an imagined credit card number '5324705002766261'
- To arrive at the Checksum for Luhn's algorithm following is done
 - Step 1: Start with the rightmost digit, double every second digit
 - Step 2: If the number obtained by doubling of digits is greater than 9 then add the digits of the product e.g. if the number is 6, $6 \times 2 = 12$ then use $1 + 2 = 3$
 - Step 3: Now take the sum of all the digits
 - Step 4: If the Sum so obtained is divisible by 10 then the number is likely valid

5	3	2	4	7	0	5	0	0	2	7	6	6	2	6	1	
10			4		14		10		0		14		12		12	
1	3	4	4	5	0	1	0	0	2	5	6	3	2	3	1	40

- In the above example the Checksum is 40 so this first level check on the data is a pass.



Checksum Vs Check-digit

- Let's consider an imagined credit card number '5324705002766261'
- Check-digit is 1 , which is always the last digit of the card number.
- Check digit is calculated at the end during credit card no finalization so that the card number satisfies the Luhn's algorithm.

5	3	2	4	7	0	5	0	0	2	7	6	6	2	6	1	
10		4		14		10		0		14		12		12		
1	3	4	4	5	0	1	0	0	2	5	6	3	2	3	1	40

- Checksum here is 40.



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Conclusion

- Luhn's algorithm is a simple and popular algorithm to verify the validity of the credit or debit card number.
- While it is popular it is not fool proof.
- More advanced validation techniques can be used.



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