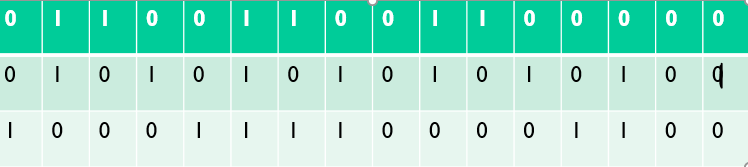
TCP Checksum calculation



|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **0** | **1** | **1** | **0** | **0** | **1** | **1** | **0** | **0** | **1** | **1** | **0** | **0** | **0** | **0** | **0** | |
| 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | |
| Sum of the first two 16 bits? | | | | | | | | | | | | | | | | |
| 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | |
| 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | |
| 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | |
| Carry over the extra bit | | | | | | | | | | | | | | | | 1 |
| 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | |
| Sum of the third 16 bits and the Sum of the first two 16 bits? | | | | | | | | | | | | | | | | |
| 1’s complement (This is the checksum) | | | | | | | | | | | | | | | | |
| 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | |

Now check the errors on the receiver’s side buy adding the 16 bit word and the checksum. If all bits are 1’s there are no errors.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

Consider the data unit to be transmitted is-(UDP is 16 bit but this is an 8 bit example) 10011001 11100010 00100100 10000100. Check to see if there are any errors happed during transmission?

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 |  | |
| 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 |  | |
| Add first two rows | | | | | | | | | |
| 10 | 1 | 1 | 1 | 1 | 0 | 1 | 1 |  | |
|  |  |  |  |  |  |  | 1 |  | |
| 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |  | |
| Add the third bit row | | | | | | | | |  |
| 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |  | |
| 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |  | |
| Add the checksum | | | | | | | | |  |
| 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |  | |
| 10 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |  | |
| 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 |  | |
| 1’s complement (This is the checksum) | | | | | | | | | |
| 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 |  | |

Now check the errors on the receiver’s side buy adding the 16 bit word and the checksum. If all bits are 1’s there are no errors.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |