# Description of CRC32 Working

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## 1   Introduction

CRC stands for Cyclic Redundancy Check which is used for Error-Detection in data. A 32 bit CRC will have a check value 32 bits long and will detect errors of upto 32 bits.

## 2   Theory

It detects error in data blocks by comparing the check value coded with the sent data with the check value newly calculated for the data sequence received. Differences in the values indicate error in the data.

Using a generator polynomial, a non carry based division is carried out, with the message or string being the dividend, the polynomial being the divisor and the CRC would then be the remainder obtained.

## 3   Procedures

We have a binary message and a binary polynomial. To start with, append (polynomial length - 1) number of zeroes to the message. Now taking the newly formed message as dividend, and the polynomial as the divisor, perform long division by XORing at each step. Rules for XOR are:

0 XOR 0 = 0
1 XOR 1 = 0
0 XOX 1 = 1
1 XOR 0 = 1

After completion, obtain the remainder which is the CRC. Send the sum of divident and CRC to the receiving side.

To check for errors, perform the same division operations on the received message. A remainder of 0 indicates there was no error in the transmission of data.