Computer Networks - Assignment II

Due: 14-09-2016, Wednesday 5.00 P.M.

1. Can we perform 2's complement arithmetic instead of 1's complement arithmetic in checksum. Will checksum work fine with this modification. Justify with an example.

2. Assuming 2's complement arithmetic based checksum works fine, exhibit an example for which 1's complement arithmetic based checksum detects an error (clearly mention the error bits) whereas the error is unnoticed by 2's complement arithmetic based checksum. Similarly, present an example for the converse.

3. Show that `101`, `110`, `111` detect all single bit errors.

4. Mention an example and the bits in error for each of the following;

   (a) Error is detected by all four schemes., viz, LRC, VRC, checksum, CRC. Use a suitable CRC polynomial.

   (b) Error is detected by checksum but not by CRC.

   (c) Error is detected by VRC but not by CRC.

5. Mention a divisor polynomial with minimum number of 1's such that it detects all double bit errors. Give an intuitive argument to justify your polynomial.

6. Assuming message size is 5, present a scheme which will detect and correct all single bit error. Like CRC, your scheme can use any number of overhead bits. Will your scheme always *Detect and Correct* all single bit errors.

7. Consider the following Error detection scheme. Message 'x' is converted into a decimal number, $D(x)$, further $D(x) \mod 3$ is performed. The remainder is subtracted from x and the modified message x' is sent to the receiver. Receiver performs $x' \mod 3$, if $R = 0$ then *No Error* otherwise *Error*. Will this scheme work fine. Can the receiver extract x if there is no error. If not, propose a different scheme similar to CRC arithmetic.