Lab 15- CS6111Computer Networks Lab   15.11.2024

Write a C/C++ program to implement a checksum-based error detection mechanism for a **32-bit binary string**. Your program should perform the following tasks:

1. Accept a binary string of exactly 32 bits from the user.

2. **Divide the binary string into 8-bit chunks.**

   o If the binary string's length is not a multiple of 8 (for general cases, though in this specific assignment it's always 32 bits), the last chunk should be padded with zeros to make it 8 bits long.

3. **Calculate the checksum:**

   o Add all 8-bit chunks and handle any carry that may occur.

   o Use the **one's complement** of the sum as the checksum.

4. **Append the checksum** to the original 32-bit binary string to create the encoded codeword (which should now be 40 bits long).

5. **Simulate the receiver side:**

   o Accept the received codeword (a 40-bit string, which includes the original data and the checksum) from the user.

   o Divide the codeword into 8-bit chunks (including the appended checksum).
   o Verify the codeword by recalculating the sum (including the checksum).
   o If the sum results in all ones (11111111), the message is correct; otherwise, an error has occurred.

6. **Print appropriate messages** at both the sender and receiver sides:

   o At the sender side, print the calculated checksum and the encoded codeword.

   o At the receiver side, print whether the received message is correct or contains errors.

Expected Output:
   • **Sender side:** Display the original binary data, the checksum, and the encoded codeword.
   • **Receiver side:** Accept the received codeword, recalculate the checksum, and print whether the received data is correct or erroneous.

Note: For Simulating the Sender and the Receiver side just create 2 functions.