EE-221 Digital Logic Design (BEE-56C)

Open Ended Lab

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Submitted To:

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Lab Report

Introduction :

Error :

It refers to the condition when the data being transmitted is not similar to the data being received.During the transmission many various hinderences or difficulties may be faced causing the damage to the data.This results in errors at the receiving side as 0 bit can change to 1 or vice versa.
In order to tackle the problem we utilize checksum technique of error detection.

Checksum :

It refers to an error detection method in which the transmitter computes a numerical value depending upon the bits to be transformed along with the combination of set or unset bits in message and send it along.At the receivers end same formula is applied to retrieve a particular value, if both the values match than the transmission is considered to be complete and error-free.

Problem Statement :

Design a digital system to calculate checksum of the input data. You need to study in detail what is checksum technique and its role in data communication. Your circuit should take some input bytes, then calculate the checksum from the input bytes and display its every bit on output. Students are required to demonstrate the complete working of design and submit a detailed lab report.

Solution :

In order to calculate the checksum error it is first necessary to divide the given input into equal blocks of m bits which must then be added with each other by using full adders and if a carry if observed it should also be added into the result.After addition of whole blocks, we would obtain the 1’s complement of the total sum and this would provide us with the checksum at the sender’s end.

At the receiver's end we would perform the addition of all the blocks as we did at the sender's end and after obtaining the sum we would add it into the checksum value obtained at the sender's end and then would complement it.If we receive all zero's it would result in the transmission being error free.

Required Components :

- Full bit binary adder with fast carry
- Logic toggle
- Logic probe
- Not gates

Applications :

- Error detection in data transmission
- Networking applications
- IP checksum
- Data integrity verification
- Military applications

Circuit Diagram :