Soumalya Kundu

BCSE UG-3
Roll: 001810501033
Computer Networks

Computer Networks

Assignment-1

November 02, 2020

Overview

The main goal of the assignment is to simulate the different error detection techniques namely CRC(Cyclic Redundancy check), VRC(Vertical Redundancy Check), LRC(Longitudinal Redundancy Check) and CheckSum.

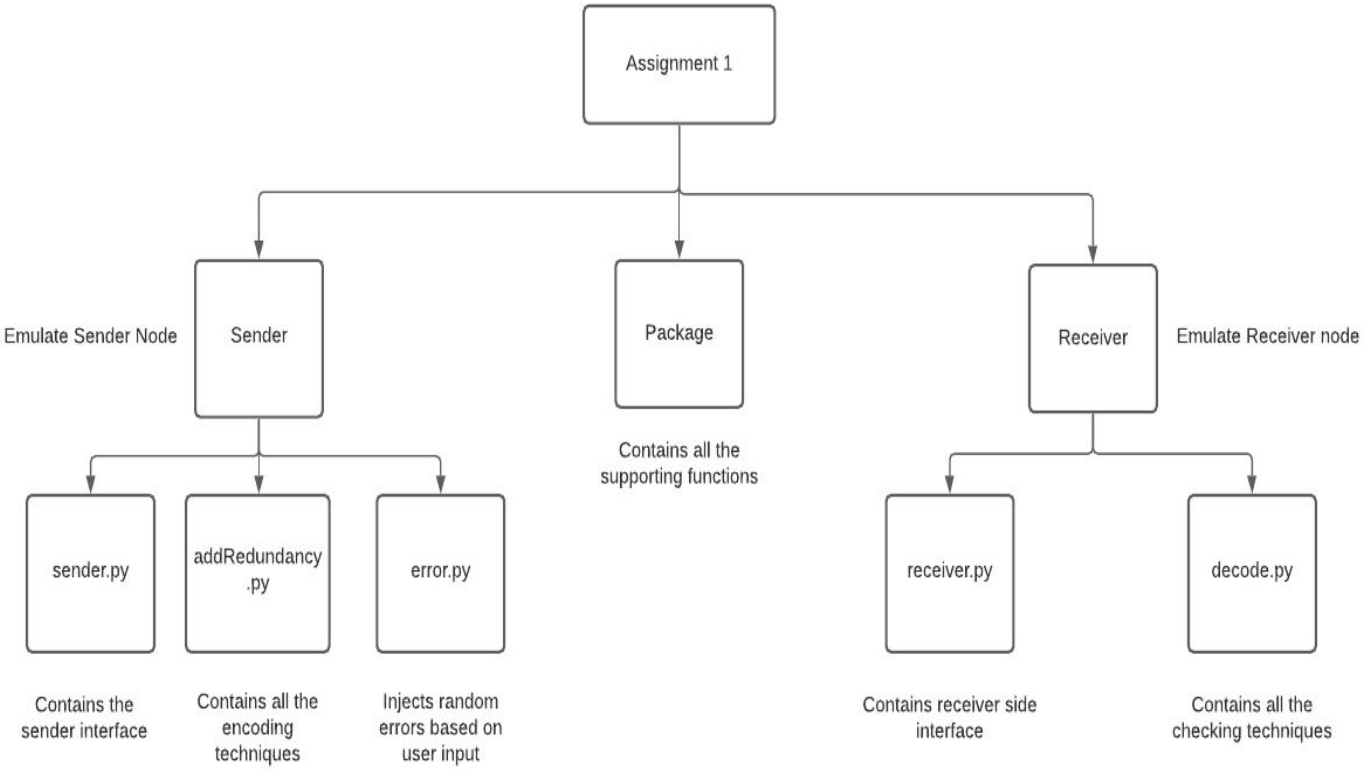
Goals

Implementing different Error detection schemas and test their relative productivity and accuracy.And Testing their working based on real life scenarios.

Specifications

The code has been written into **python**. I have used **socket programming** to simulate the real life scenarios of data transmission and error detection. I also have used normal **text files as input** files to imitate the real life scenarios as closely as possible. The errors are injected at a **random basis.**

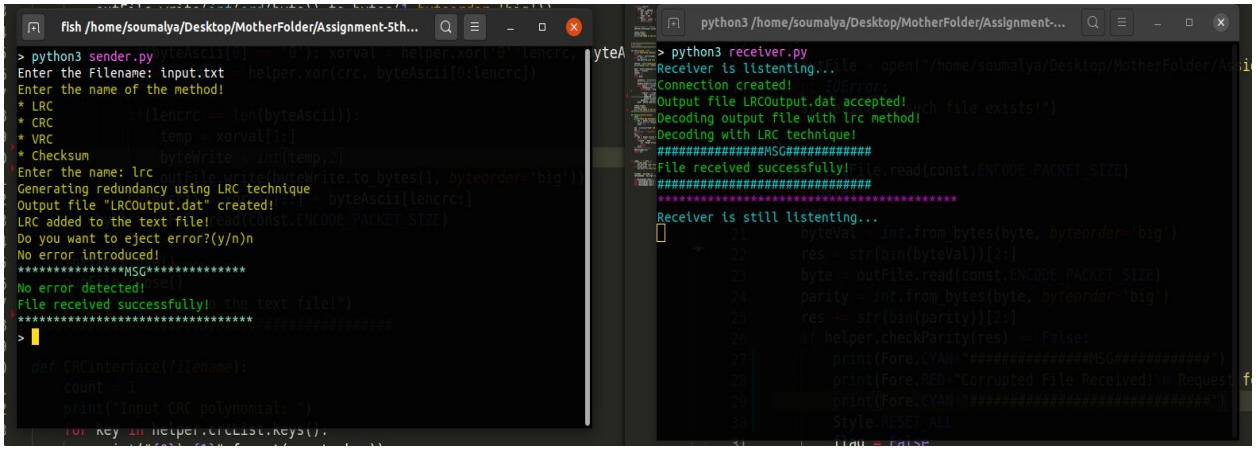
FileStructure and Code



The sender directory imitates the sender node and the Receiver directory imitates the Receiver node. The input.txt file actually resides in the Sender Node. error.py file is responsible for injecting errors into the input file. I have taken the data frame as **8 bits (1 byte)** and encoded the frame with each error detection technique. The receiver node contains decode.py which checks all the output files and determines whether there are any discrepancies with the files or not.

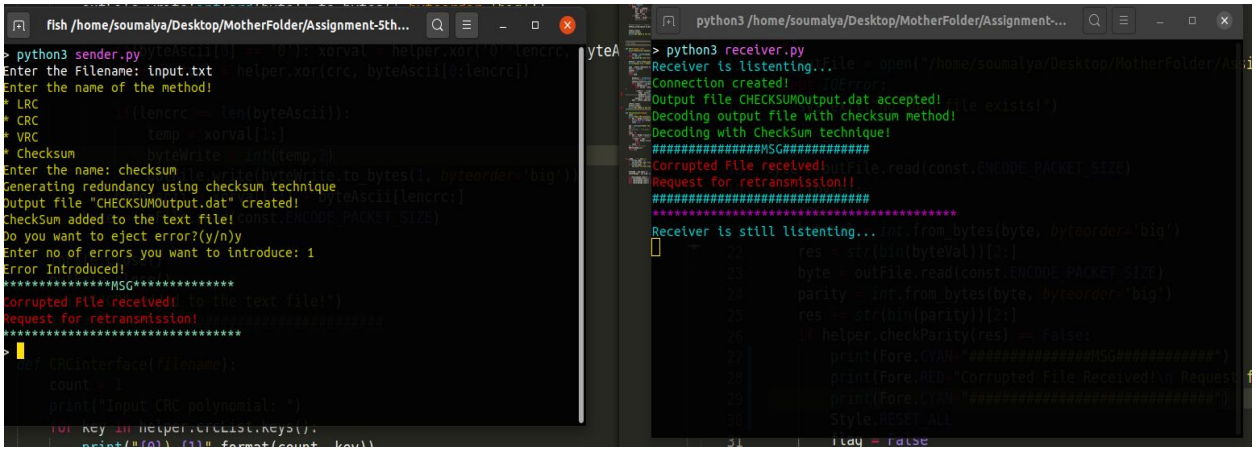
Procedure

I have implemented such that it looks like the messages are getting transferred between sender and receiver node. The output looks like this. The receiver is kind of acting as a server here.



Left side is Sender node and right side is receiver node.

After introducing random error to the channel. And also using checksum technique.



Left side is sender side and right side is receiver side

Observation

- I actually didn't have control over the random error injected by the program. So I actually couldn't be able to generate the scenarios mentioned in the question paper. But it can be done manually and can be proved that the question-mentioned scenarios are very possible. So it's always a good idea to encode the file with more than one error detection technique.

- The **checksum technique is very sensitive to errors.** So it's always a good idea to encode files with checksum. It has a failure rate of mere 0.5% apprx.
- The CRC technique is also very much reliable. It also can be used to detect real life data transfer errors.

Results

1. Using 4 error schemes guarantees errors are caught i**n 97-99% of the time**.

2. CRC 24 was better at checking errors than CRC ITU with CRC 24 failing **only around 2-3%** of the time while that value goes up as high as **8-10% when CRC ITU is used.**