CNL ASSIGNMENT 05
GO BACK TO N AND SELECTIVE ARQ

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CS-A1

Objective: Main objective of this lab task to let student understand the basics off error-recovery using window-based control and simulate Go-back-N and Selective Repeat protocols.

Theory:

Both Go-Back-N Protocol and Selective Repeat Protocol are the types of sliding window protocols. The main difference between these two protocols is that after finding the suspect or damage in sent frames go-back-n protocol re-transmits all the frames whereas selective repeat protocol re-transmits only that frame which is damaged. Now, we shall see the difference between them:

S.NO	Go-Back-N Protocol	Selective Repeat Protocol
1.	In Go-Back-N Protocol, if the sent frame are find suspected then all the frames are re-transmitted from the lost packet to the last packet transmitted.	In selective Repeat protocol, only those frames are re-transmitted which are found suspected.
2.	Sender window size of Go-Back-N Protocol is N.	Sender window size of selective Repeat protocol is also N.
3.	Receiver window size of Go-Back-N Protocol is 1.	Receiver window size of selective Repeat protocol is N.
4.	Go-Back-N Protocol is less complex.	Selective Repeat protocol is more complex.
5.	In Go-Back-N Protocol, neither sender nor at receiver need sorting.	In selective Repeat protocol, receiver side needs sorting to sort the frames.
6.	In Go-Back-N Protocol, type of Acknowledgement is cumulative.	In selective Repeat protocol, type of Acknowledgement is individual.
7.	In Go-Back-N Protocol, Out-of-Order packets are NOT Accepted (discarded) and the entire window is re-transmitted.	In selective Repeat protocol, Out-of-Order packets are Accepted.
8.	In Go-Back-N Protocol, if Receives a corrupt packet, then also, the entire window is re-transmitted.	In selective Repeat protocol, if receives a corrupt packet, it immediately sends a negative acknowledgement and hence only the selective packet is retransmitted.
9.	Efficiency of Go-Back-N Protocol is $N/(1+2*a)$	Efficiency of selective Repeat protocol is also $N/(1+2*a)$

LAB TASK 1: Implement the Go-Back-N Protocol

```cpp
#include<bits/stdc++.h>
#include<ctime>

#define ll long long int
using namespace std;

void transmission(ll & i, ll & N, ll & tf, ll & tt) {
  while (i <= tf) {
    int z = 0;
    for (int k = i; k < i + N && k <= tf; k++) {
      cout << "Sending Frame " << k << "..." << endl;
      tt++;
    }
    for (int k = i; k < i + N && k <= tf; k++) {
      int f = rand() % 2;
      if (!f) {
        cout << "Acknowledgment for Frame " << k << "..." << endl;
        z++;
      } else {
        cout << "Timeout!! Frame Number : " << k << " Not Received" << endl;
        cout << "Retransmitting Window..." << endl;
        break;
      }
    }
    cout << "\n";
    i = i + z;
  }
}

int main() {
  ll tf, N, tt = 0;
  srand(time(NULL));
  cout << "Enter the Total number of frames : ";
  cin >> tf;
  cout << "Enter the Window Size : ";
  cin >> N;
  ll i = 1;
  transmission(i, N, tf, tt);
  cout << "Total number of frames which were sent and resent are : " << tt <<
    endl;
  return 0;
}
```

```
Windows PowerShell
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Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS F:\SIT\5. SEM 5\CNL\Go Back to N> cd "f:\SIT\5. SEM 5\CNL\Go Back to N\" ; if ($?) { g++ go_back_n.cpp -o go_back_n } ; if ($?) { .\go_ba
ck_n }
Enter the Total number of frames : 6
Enter the Window Size : 3
Sending Frame 1...
Sending Frame 2...
Sending Frame 3...
Acknowledgment for Frame 1...
Timeout!! Frame Number : 2 Not Received
Retransmitting Window...

Sending Frame 2...
Sending Frame 3...
Sending Frame 4...
Acknowledgment for Frame 2...
Timeout!! Frame Number : 3 Not Received
Retransmitting Window...

Sending Frame 3...
Sending Frame 4...
Sending Frame 5...
Timeout!! Frame Number : 3 Not Received
Retransmitting Window...

Sending Frame 3...
Sending Frame 4...
Sending Frame 5...
Acknowledgment for Frame 3...
Acknowledgment for Frame 4...
Acknowledgment for Frame 5...
```

```
Sending Frame 6...
Timeout!! Frame Number : 6 Not Received
Retransmitting Window...

Sending Frame 6...
Timeout!! Frame Number : 6 Not Received
Retransmitting Window...

Sending Frame 6...
Acknowledgment for Frame 6...

Total number of frames which were sent and resent are : 15
PS F:\SIT\5. SEM 5\CNL\Go Back to N>
```

Q. What are the key functions of error control techniques?

A. Ways of doing Error Control :

There are basically two ways of doing. Error control as given below :

Error Detection :

Error detection, as name suggests, simply means detection or identification of errors. These errors may cause due to noise or any other impairments during transmission from transmitter to the receiver, in communication system. It is class of technique for detecting garbled i.e. unclear and distorted data or message.

Error Correction :

Error correction, as name suggests, simply means correction or solving or fixing of errors. It simply means reconstruction and rehabilitation of original data that is error-free. But error correction method is very costly and is very hard.