

```
//-----Client of Go-Back-N ARQ-----
import java.io.*;
import java.net.*;
import java.util.*;
class GBNC
{
    public static void main(String args[]) throws Exception
    {
        Socket s=new Socket("localhost",4000);

        DataOutputStream out =new DataOutputStream(s.getOutputStream());
        BufferedInputStream in= new BufferedInputStream(s.getInputStream());
        Scanner sc=new Scanner(System.in);

        System.out.println("\n Enter no of frames to receive=");
        int c=sc.nextInt();
        out.write(c);
        System.out.println("\n Enter mode error=0 or error=1");
        int err=sc.nextInt();

        out.write(err);
        if(err==0)
        {
            for(int j=0;j<c;j++)
            {
                int i=in.read();
                System.out.println("Received frame"+i);
                System.out.println("Sending ack for "+i);
                out.write(i);
            }
        }
        else
        {
            int check=0;
            for(int j=0;j<c;j++)
            {
                int i=in.read();

                if(i==check)
                {
                    System.out.println("Received frame "+i);
                    System.out.println("Sending ack for frame "+i);
                    out.write(i);
                    check++;
                }
                else
                {
                    j--;
                    System.out.println("Discarding frame "+i);
                }
            }
        }
    }
}
```

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        System.out.println("Sending nack");
        out.write(-1);
    }
}

}

}

}

//-----Server program of GO-Back-N ARQ-----
import java.io.*;
import java.net.*;

class GBNS
{
    public static void main(String args[]) throws Exception
    {
        ServerSocket ser=new ServerSocket(4 000);
        Socket s= ser.accept();

        BufferedInputStream in=new BufferedInputStream(s.getInputStream());
        DataOutputStream out=new DataOutputStream(s.getOutputStream());

        int p=in.read();
        int err=in.read();

        if(err==0)
        {
            for(int j=0;j<p;j++)
            {
                System.out.println("Sending frame"+j);
                out.write(j);
                System.out.println("Waiting for ack of"+j);

                Thread.sleep(2000);

                int i=in.read();
                System.out.println("Received ack for frame"+i);
            }
        }
        else
        {
            boolean arr[]=new boolean[p];
            for(int j=0;j<p;j++)
            {
                if(j==2)

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        System.out.println("Sending frame "+j);
    else
    {
        System.out.println("Sending frame "+j);
        out.write(j);
        System.out.println("Waiting for ack "+j);
        Thread.sleep(2000);
        int a=in.read();
        System.out.println("Received ack "+a+" for frame "+j);
        if(a!=255)
            arr[a]=true;
    }
}
for(int i=0;i<p;i++)
{
    if(!arr[i])
    {
        System.out.println("Retransmitting frame "+i);
        out.write(i);
        System.out.println("Waiting for ack "+i);
        Thread.sleep(2000);
        int a=in.read();
        System.out.println("Received ack "+a+" for frame "+i);
        arr[a]=true;
    }
}
}
}
}

```

with error

```
pccoe@ubuntu: ~  
pccoe@ubuntu:~$ javac GBNC.java  
pccoe@ubuntu:~$ java GBNC  
  
Enter no of frames to receive=  
6  
  
Enter mode error=0 or error=1  
1  
Received frame 0  
Sending ack for frame 0  
Received frame 1  
Sending ack for frame 1  
Discarding frame 3  
Sending nack  
Discarding frame 4  
Sending nack  
Discarding frame 5  
Sending nack  
Received frame 2  
Sending ack for frame 2  
Received frame 3  
Sending ack for frame 3  
Received frame 4  
Sending ack for frame 4  
Received frame 5  
Sending ack for frame 5  
pccoe@ubuntu:~$ █  
  
pccoe@ubuntu:~$ javac GBNS.java  
pccoe@ubuntu:~$ java GBNS  
Sending frame 0  
Waiting for ack 0  
Received ack 0 for frame 0  
Sending frame 1  
Waiting for ack 1  
Received ack 1 for frame 1  
Sending frame 2  
Sending frame 3  
Waiting for ack 3  
Received ack 255 for frame 3  
Sending frame 4  
Waiting for ack 4  
Received ack 255 for frame 4  
Sending frame 5  
Waiting for ack 5  
Received ack 255 for frame 5  
Retransmitting frame 2  
Waiting for ack 2  
Received ack 2 for frame 2  
Retransmitting frame 3  
Waiting for ack 3  
Received ack 3 for frame 3  
Retransmitting frame 4  
Waiting for ack 4  
Received ack 4 for frame 4  
Retransmitting frame 5  
Waiting for ack 5  
Received ack 5 for frame 5  
pccoe@ubuntu:~$ █
```

without error

```
pccoe@ubuntu: ~  
pccoe@ubuntu:~$ javac GBNC.java  
pccoe@ubuntu:~$ java GBNC  
  
Enter no of frames to receive=  
6  
  
Enter mode error=0 or error=1  
0  
Received frame0  
Sending ack for 0  
Received frame1  
Sending ack for 1  
Received frame2  
Sending ack for 2  
Received frame3  
Sending ack for 3  
Received frame4  
Sending ack for 4  
Received frame5  
Sending ack for 5  
pccoe@ubuntu:~$ █  
  
pccoe@ubuntu:~$ javac GBNS.java  
pccoe@ubuntu:~$ java GBNS  
Sending frame0  
Waiting for ack of0  
Received ack for frame0  
Sending frame1  
Waiting for ack of1  
Received ack for frame1  
Sending frame2  
Waiting for ack of2  
Received ack for frame2  
Sending frame3  
Waiting for ack of3  
Received ack for frame3  
Sending frame4  
Waiting for ack of4  
Received ack for frame4  
Sending frame5  
Waiting for ack of5  
Received ack for frame5  
pccoe@ubuntu:~$ █
```