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• Go-Back-N-ARQ

Code:

```c
#include <stdio.h>
#include <math.h>
#include <stdlib.h>

int main()
{
    int m, nof, c, i, sn=0, sf=0, timer=0, temp, ackno=0, rn=0, y=1, sw,t, h,
d, e;
    printf("*** Go-Back-N-ARQ Program ***\n\nEnter the size of the sequence
number field in bits(m)...");
    scanf("%d",&m);
    printf("\nEnter the number of frames to be transmitted...");
    scanf("%d",&nof);
    sw = pow(2, m) - 1;
    while(1)
    {
        printf("\n\n1. Sender site\n2. Receiver site\n3. Exit\nEnter your
choice...");
        scanf("%d", &c);
        switch(c)
        {
            case 1:
            {
                printf("\n1. Transmission of frames\n2. Time out\n3. Receive
ACK\n4. Go to main menu\nEnter your choice...");
                scanf("%d",&t);
                switch(t)
                {
                    case 1:
                    {
                        printf("\nSender Window size = %d\nSequence of frames:
", sw);

                        for(i=0;i<nof;i++)
                        {
                            printf("%d ",i%(int)(pow(2,m)));
                        }
```

```c
                    printf("\nEnter number of frames you want to transmit...");
                    scanf("%d",&h);
                    for(i=0;i<h;i++)
                    {
                        if(sn-sf>=sw)
                        {
                            printf("\nWndow is full!");
                        }
                        else
                        {
                            printf("\nFrame %d sent successfully", sn);
                            sn++;
                            sn=sn%(int)(pow(2,m));
                            if(timer!=1)
                            timer=1;
                        }
                    }
                }
                break;
                case 2:
                {
                    timer =1;
                    temp = sf;
                    while(temp<sn)
                    {
                        printf("\n\nFrame %d resent successfully", temp);
                        temp++;
                        temp=temp%(int)(pow(2,m));
                    }
                }
                break;
                case 3:
                {
                    if((ackno>sf)&&(ackno<=sn))
                    {
                        while(sf<ackno)
                        {
                            sf++;
                            sf=sf%(int)(pow(2,m));
                        }
                        printf("\n\nAcknowledgement till %d received successfully", sf-1);
                        timer=0;
                    }
                }
                break;
```

```c
                case 4:
                break;
        }
    }
    break;
    case 2:
    {
        y=1;
        while(y)
        {
            printf("\n\n1. Receive frame and send ACK\n2. Go back to
main menu\nEnter your choice...");
            scanf("%d",&d);
            switch(d)
            {
                case 1:
                {
                    printf("\n\nEnter the number of frames received
successfully...");
                    scanf("%d",&e);
                    rn=(rn+e)%(int)(pow(2,m));
                    printf("\n\nACK%d sent successfully!", rn);
                    ackno = rn;
                }
                break;
                case 2:
                {
                    y=0;
                }
            }

        }
    }
    break;
    case 3:
    exit(0);
        }
    }
}
```

Output:

*** Go-Back-N-ARQ Program ***

Enter the size of the sequence number field in bits(m)...2

Enter the number of frames to be transmitted...15

1. Sender site
2. Receiver site
3. Exit
Enter your choice...1

1. Transmission of frames
2. Time out
3. Receive ACK
4. Go to main menu
Enter your choice...1

Sender Window size = 3
Sequence of frames: 0 1 2 3 0 1 2 3 0 1 2 3 0 1 2
Enter number of frames you want to transmit...3

Frame 0 sent successfully
Frame 1 sent successfully
Frame 2 sent successfully

1. Sender site
2. Receiver site
3. Exit
Enter your choice...2

1. Receive frame and send ACK

2. Go back to main menu

Enter your choice...1

Enter the number of frames received successfully...2

ACK2 sent successfully!

1. Receive frame and send ACK

2. Go back to main menu

Enter your choice...2

1. Sender site

2. Receiver site

3. Exit

Enter your choice...1

1. Transmission of frames

2. Time out

3. Receive ACK

4. Go to main menu

Enter your choice...3

Acknowledgement till 1 received successfully

1. Sender site

2. Receiver site

3. Exit

Enter your choice...1

1. Transmission of frames

2. Time out

3. Receive ACK

4. Go to main menu

Enter your choice...2

Frame 2 resent successfully

1. Sender site

2. Receiver site

3. Exit

Enter your choice...2

1. Receive frame and send ACK

2. Go back to main menu

Enter your choice...1

Enter the number of frames received successfully...1

ACK3 sent successfully!

1. Receive frame and send ACK

2. Go back to main menu

Enter your choice...2

1. Sender site

2. Receiver site

3. Exit

Enter your choice...1

1. Transmission of frames

2. Time out

3. Receive ACK

4. Go to main menu

Enter your choice...1

Sender Window size = 3

Sequence of frames: 0 1 2 3 0 1 2 3 0 1 2 3 0 1 2

Enter number of frames you want to transmit...3

Frame 3 sent successfully

Frame 0 sent successfully

Frame 1 sent successfully

1. Sender site

2. Receiver site

3. Exit

Enter your choice...2

1. Receive frame and send ACK

2. Go back to main menu

Enter your choice...1

Enter the number of frames received successfully...3

ACK2 sent successfully!

1. Receive frame and send ACK
2. Go back to main menu
Enter your choice...2

1. Sender site
2. Receiver site
3. Exit
Enter your choice...3

- Selective Repeat

Code:

```c
#include<stdio.h>
#include<math.h>
int main(){
    int
i,j,z,sf=0,modulo,sn=0,k,counter=0,temp=0,frames,m,bits,rarray[100],sarray[100],caseno,innercaseno,sw,rw,rn=0,sendframes,error=0;
    printf("enter the frames:\n");
    scanf("%d",&frames);

    printf("enter the number of bits to send:\n");
    scanf("%d",&m);

    modulo=pow(m,2);
    sw=pow(2,m-1);   //sender window size
    rw=sw;           //receiver window size
printf("sender's window size is:%d and receiver's window size is:%d\n",sw,rw);

    printf("\nthe sender's and the receiver's array is:\n");
    for(i=0;i<frames;i++){
    sarray[i]=i%modulo;
    printf("%d ",sarray[i]);
    }
    printf("\n");
    for(i=0;i<frames;i++){
    rarray[i]=i%modulo;
    printf("%d ",rarray[i]);
    }

    loop:

        printf("\n1:sender\n2:receiver\n3:halt\n");
        scanf("%d",&caseno);
        switch(caseno){
                case 1:
                        error=1;

                    printf("enter no.\n1:send frame\n2:frame lost\n3:timeout\n");
                        scanf("%d",&innercaseno);

                        if(innercaseno==1)
                        {
                        printf("enter the number of frames to send:\n");
                        scanf("%d",&sendframes);
                        if(sendframes>sw)
```

```c
        {
            printf("not possible\n");
            goto loop;
        }
        for(k=0;k<sendframes;k++)
            {
                if(sn-sf<sw)
                {
                    printf("sent frame:%d",sn);
                    sn+=1;
                    printf("\nsf-sn:\n");

                    for(i=sf;i<=sn;i++)
                    printf("%d",sarray[i%modulo]);

                    if(temp!=0)
                    printf("\nnegative acknowlegment:%d\n",sf);
                            printf("\nthe sender window is:\n");
                            if(frames<sf+sw)
                            {
                            for(i=sf;i<=frames;i++)
                            printf("%d",sarray[i%modulo]);
                            }
                            else
                            {
                            for(i=sf;i<=sf+sw;i++)
                            printf("%d",sarray[i%modulo]);
                            }

                }
                else
                    printf("\ndiscarded\n");
            }
        }
        if(innercaseno==2)
        {
            sn+=1;
            temp=sf;
        }
        if(innercaseno==3)
            goto loop;
    goto loop;
    case 2:
        if(error==0)
        {
        printf("\nerror\n");
        goto loop;
        }
```

```c
            rn++;
            printf("receiver side:\n1:pos ack\n2:nack");
            scanf("%d",&innercaseno);

            if(innercaseno==1)
            {   rn=sn;
                sf=sn;
                printf("rn is:%d\n",rn);
                printf("the receiver side window is:\n");
                if(frames<rn+rw)
                {
                    for(z=rn;z<frames;z++)
                    printf("%d\n",z%modulo);
                }
                else
                {
                    sf=sn;
                    for(z=rn;z<rn+rw;z++)
                    printf("%d\n",z%modulo);
                }
//              printf("\nsf is:%d,sn is:%d,rn is:%d\n",sf,sn,rn);
            }
            else if(innercaseno==2)
            {
                rn+1;
                printf("\nnegative  acknowlegment;%d\n",rn);

                printf("sleep(),resend frame:%d\n",rn-1);

            }
            goto loop;
        case 3:
            break;
        }
        return 0;
}
```

****