**//SENDER SIDE**

#include<stdio.h>

#include<sys/types.h>

#include<sys/socket.h>

#include<netinet/in.h>

#include<string.h>

#include<time.h>

#include<stdlib.h>

#include<ctype.h>

#define W 5

char a[10];

char b[10];

void alpha9(int);

int con();

int main()

{

int s,f,wl,c=1,x,i=0,j,n,p=0,e=0;

struct sockaddr\_in ser;

s=socket(AF\_INET,SOCK\_STREAM,0);

ser.sin\_family=AF\_INET;

ser.sin\_port=6500;

ser.sin\_addr.s\_addr=inet\_addr("192.168.0.109");

connect(s,(struct sockaddr \*) &ser, sizeof(ser));

printf("\nTCP Connection Established.\n");

printf("\nEnter the number of Frames: ");

scanf("%d",&f);

alpha9(f);

send(s,a,sizeof(a),0);

strcpy(b,"Time Out ");

while(1)

{

for(i=0;i<W;i++)

{

alpha9(c);

send(s,a,sizeof(a),0);

if(c<=f)

{

printf("\nFrame %d Sent",c);

c++;

}

}

i=0;

wl=W;

while(i<W)

{

recv(s,a,sizeof(a),0);

p=atoi(a);

if(a[0]=='N')

{

e=con();

if(e<f)

{

printf("\nNAK %d",e);

printf("\nFrame %d sent",e);

i--;

}

}

else

{

if(p<=f)

{

printf("\nFrame %s Acknowledged",a);

wl--;

}

else

{

break;

}

}

if(p>f)

{

break;

}

i++;

}

if(wl==0 && c>f)

{

send(s,b,sizeof(b),0);

break;

}

else

{

c=c-wl;

wl=W;

}

}

close(s);

return 0;

}

void alpha9(int z)

{

int k,i=0,j,g;

k=z;

while(k>0)

{

i++;

k=k/10;

}

g=i;

i--;

while(z>0)

{

k=z%10;

a[i]=k+48;

i--;

z=z/10;

}

a[g]='\0';

}

int con()

{

char k[9];

int i=1;

while(a[i]!='\0')

{

k[i-1]=a[i];

i++;

}

k[i-1]='\0';

i=atoi(k);

return i;

}

**\*\*\*OUTPUT\*\*\***

Aj:~$ cc SelRepS.c -o sender

Aj:~$ ./sender

TCP Connection Established.

Enter the number of Frames: 25

Frame 1 Sent

Frame 2 Sent

Frame 3 Sent

Frame 4 Sent

Frame 5 Sent

Frame 1 Acknowledged

Frame 2 Acknowledged

Frame 3 Acknowledged

NAK 4

Frame 4 sent

Frame 4 Acknowledged

Frame 5 Acknowledged

Frame 6 Sent

Frame 7 Sent

Frame 8 Sent

Frame 9 Sent

Frame 10 Sent

Frame 6 Acknowledged

Frame 7 Acknowledged

Frame 8 Acknowledged

Frame 9 Acknowledged

Frame 10 Acknowledged

Frame 11 Sent

Frame 12 Sent

Frame 13 Sent

Frame 14 Sent

Frame 15 Sent

NAK 11

Frame 11 sent

Frame 11 Acknowledged

NAK 12

Frame 12 sent

Frame 12 Acknowledged

Frame 13 Acknowledged

Frame 14 Acknowledged

Frame 15 Acknowledged

Frame 16 Sent

Frame 17 Sent

Frame 18 Sent

Frame 19 Sent

Frame 20 Sent

NAK 16

Frame 16 sent

Frame 16 Acknowledged

Frame 17 Acknowledged

NAK 18

Frame 18 sent

Frame 18 Acknowledged

NAK 19

Frame 19 sent

Frame 19 Acknowledged

Frame 20 Acknowledged

Frame 21 Sent

Frame 22 Sent

Frame 23 Sent

Frame 24 Sent

Frame 25 Sent

NAK 21

Frame 21 sent

Frame 21 Acknowledged

NAK 22

Frame 22 sent

Frame 22 Acknowledged

Frame 23 Acknowledged

Frame 24 Acknowledged

Frame 25 Sent

Aj:~$

**//RECEIVER SIDE**

#include<stdio.h>

#include<sys/types.h>

#include<sys/socket.h>

#include<netinet/in.h>

#include<string.h>

#include<time.h>

#include<stdlib.h>

#include<ctype.h>

#include<arpa/inet.h>

#define W 5

#define P1 50

#define P2 10

char a[10];

char b[10];

void alpha9(int);

void alp(int);

int main()

{

struct sockaddr\_in ser,cli;

int s,n,sock,i,j,c=1,f;

unsigned int s1;

s=socket(AF\_INET,SOCK\_STREAM,0);

ser.sin\_family=AF\_INET;

ser.sin\_port=6500;

ser.sin\_addr.s\_addr=inet\_addr("192.168.0.109");

bind(s,(struct sockaddr \*) &ser, sizeof(ser));

listen(s,1);

n=sizeof(cli);

sock=accept(s,(struct sockaddr \*)&cli, &n);

printf("\nTCP Connection Established.\n");

s1=(unsigned int) time(NULL);

srand(s1);

strcpy(b,"Time Out ");

recv(sock,a,sizeof(a),0);

f=atoi(a);

while(1)

{

for(i=0;i<W;i++)

{

recv(sock,a,sizeof(a),0);

if(strcmp(a,b)==0)

{

break;

}

}

i=0;

while(i<W)

{

L:

j=rand()%P1;

if(j<P2)

{

alp(c);

send(sock,b,sizeof(b),0);

goto L;

}

else

{

alpha9(c);

if(c<=f)

{

printf("\nFrame %s Received ",a);

send(sock,a,sizeof(a),0);

}

else

{

break;

}

c++;

}

if(c>f)

{

break;

}

i++;

}

}

close(sock);

close(s);

return 0;

}

void alpha9(int z)

{

int k,i=0,j,g;

k=z;

while(k>0)

{

i++;

k=k/10;

}

g=i;

i--;

while(z>0)

{

k=z%10;

a[i]=k+48;

i--;

z=z/10;

}

a[g]='\0';

}

void alp(int z)

{

int k,i=1,j,g;

k=z;

b[0]='N';

while(k>0)

{

i++;

k=k/10;

}

g=i;

i--;

while(z>0)

{

k=z%10;

b[i]=k+48;

i--;

z=z/10;

}

b[g]='\0';

}

**\*\*\*OUTPUT\*\*\***

Aj:~$ cc SelRepR.c -o receiver

Aj:~$ ./receiver

TCP Connection Established.

Frame 1 Received

Frame 2 Received

Frame 3 Received

Frame 4 Received

Frame 5 Received

Frame 6 Received

Frame 7 Received

Frame 8 Received

Frame 9 Received

Frame 10 Received

Frame 11 Received

Frame 12 Received

Frame 13 Received

Frame 14 Received

Frame 15 Received

Frame 16 Received

Frame 17 Received

Frame 18 Received

Frame 19 Received

Frame 20 Received

Frame 21 Received

Frame 22 Received

Frame 23 Received

Frame 24 Received

Aj:~$