PROGRAM CODE:

```
#include<stdio.h>
#include<sys/types.h>
#include<sys/socket.h>
#include<netinet/in.h>
#include<stdlib.h>
#include<string.h>
#include<unistd.h>
#include<arpa/inet.h>
#include<fcntl.h>
#include<stdbool.h>
#include<math.h>
#define MAXLINE 1024

int binary(int num)
{
 int bin=0,r;
 int i=0;
 while(num>0)
 {
  r=num%2;
  bin+=r*pow(10,i);
  num/=2;
  i++;
 }
 return bin;
}

int ispresent(int num,int pos)
{
 int rem;
 for(int i=0;i<pos;i++)
 {
  rem=num%10;
  num=num/10;
 }
 if(rem==1)
   return 1;
 else
   return 0;
}

int isapower2(int n)
{
 if(ceil(log2(n)) == floor(log2(n)))
  return 1;
 else
  return 0;
}

int main()
{
int sockfd,newfd,n=0,arr[30],count=0,bin;// n-no.of bits
char buff[MAXLINE],buffer[MAXLINE],data_t[40];  //char
buffer1[MAXLINE],token[100];
int i,j,r,total,nob,rem,dig,pos;
long data;
struct sockaddr_in servaddr,cliaddr;

// Creating socket file descriptor
 if ( (sockfd = socket(AF_INET, SOCK_STREAM, 0)) < 0 )
 {
        perror("socket creation failed");
        exit(EXIT_FAILURE);
    }

bzero(&servaddr,sizeof(servaddr));

    // Filling server information
servaddr.sin_family    = AF_INET; // IPv4
servaddr.sin_addr.s_addr = INADDR_ANY;
servaddr.sin_port = htons(8080);

    // Bind the socket with the server address
if ( bind(sockfd, (const struct sockaddr
*)&servaddr,sizeof(servaddr)) < 0 )
    {
        perror("bind failed");
        exit(EXIT_FAILURE);
    }
int len,m;

listen(sockfd,2);
len=sizeof(cliaddr);

printf("Enter the data:");
scanf("%ld",&data);
int temp=data;
while(temp>0)
{
 temp=temp/10;
 n++;
}
r=0;
while(pow((double)2,(double)r)<(n+r+1))
```

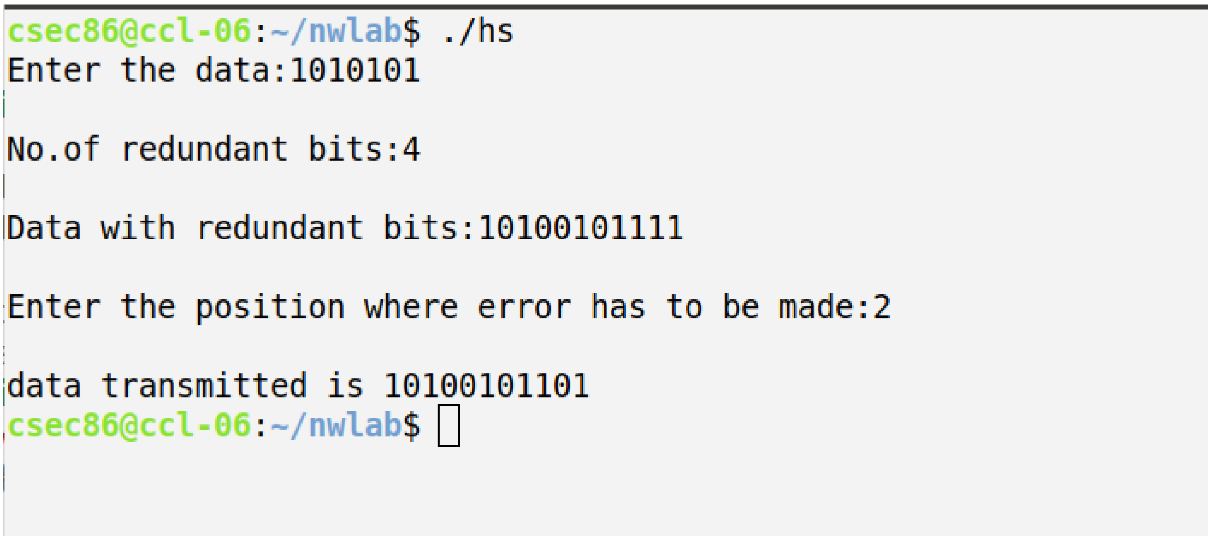
```
{
r++;
}
printf("\nNo.of redundant bits:%d\n",r);
total=n+r;

for(i=1;i<=total;i++)
{
     dig=data%10;
     if(isapower2(i)==0)
     {
     arr[total-i]=dig;
     data/=10;
     }
     else
     arr[total-i]=0;
}

for(i=0;i<r;i++)
{
     for(j=1;j<=total;j++)
     {
          bin=binary(j);
          if(ispresent(bin,i+1))
               count+=arr[total-j];
     }
     if(count%2==0)
          arr[total-(int)pow(2,i)]=0;
     else
          arr[total-(int)pow(2,i)]=1;
     count=0;
}

printf("\nData with redundant bits:");
for(i=0;i<total;i++)
     printf("%d",arr[i]);

printf("\n\nEnter the position where error has to be
made:");
scanf("%d",&pos);

if(arr[total-pos]==0)
     arr[total-pos]=1;
else
     arr[total-pos]=0;
printf("\n");

int k=0;
long num=0;
```

```
for(i=total-1;i>=0;i--)
{
     num+=pow(10,k)*arr[i];
     k++;
}
sprintf(data_t, "%ld", num);
printf("Data transmitted is %s\n",data_t);

newfd=accept(sockfd,(struct sockaddr*)&cliaddr,&len);

m=write(newfd,data_t,sizeof(data_t));
}
```

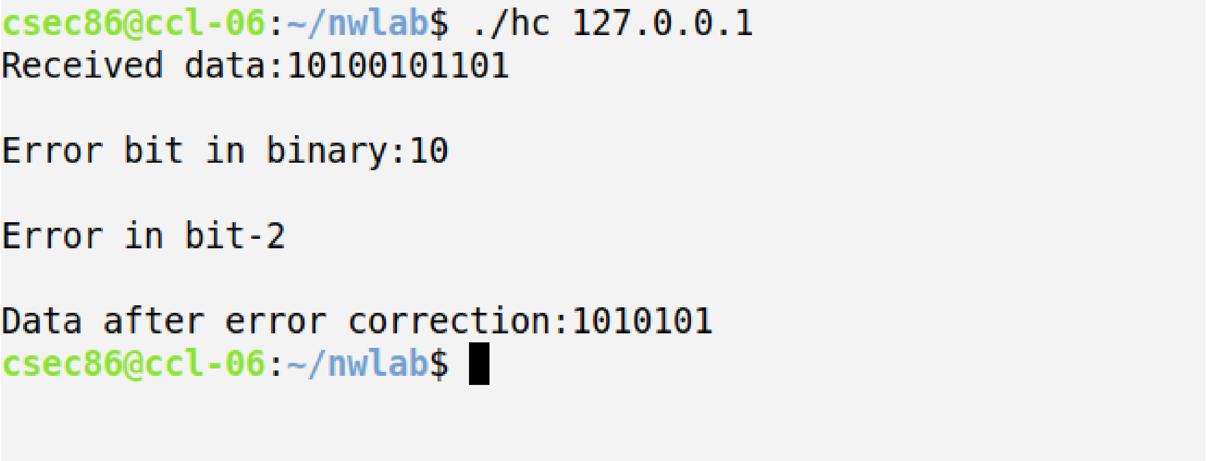
```
#include<stdio.h>
#include<sys/types.h>
#include<sys/socket.h>
#include<netinet/in.h>
#include<string.h>
#include<unistd.h>
#include<arpa/inet.h>
#include<stdlib.h>
#include<math.h>
#define PORT     8080
#define MAXLINE 1024

int countbits(long num)
{
 int count=0;
 while(num>0)
 {
  num=num/10;
  count++;
 }
 return count;
}


int binary(int num)
{
 int bin=0,r;
 int i=0;
 while(num>0)
 {
  r=num%2;
  bin+=r*pow(10,i);
  num/=2;
  i++;
 }
 return bin;
}

int decimal(int num)
{
 int rem,i=0,result;
 while(num>0)
 {
 rem=num%10;
 result+=pow(2,i)*rem;
 num/=10;
 i++;
 }
 return result;
}
int ispresent(int num,int pos)
{
 int rem;
 for(int i=0;i<pos;i++)
 {
  rem=num%10;
  num=num/10;
 }
 if(rem==1)
   return 1;
 else
   return 0;
}


int main(int argc,char **argv)
{
 long num;
 int
sockfd,total,i,rem,arr[20],count=0,r=0,result=0,bin,j,newarr
[20],finalarr[20];
 char buffer1[40];
 struct sockaddr_in  servaddr;
// Creating socket file descriptor
    if ( (sockfd = socket(AF_INET, SOCK_STREAM, 0)) < 0 ) {
        perror("socket creation failed");
        exit(EXIT_FAILURE);
    }
    bzero(&servaddr,sizeof(servaddr));


    // Filling server information
    servaddr.sin_family = AF_INET;
    servaddr.sin_port = htons(PORT);
    servaddr.sin_addr.s_addr = inet_addr(argv[1]);

    int n, len;
    connect(sockfd,(struct
sockaddr*)&servaddr,sizeof(servaddr));
    n=read(sockfd,buffer1,sizeof(buffer1));
   // printf("%s\n",buffer1);


    num=atol(buffer1);
    total=countbits(num);
    //printf("total :%d\n",total);
    printf("Received data:%lu\n",num);

    i=1;
   while(num>0)
    {
     rem=num%10;
     arr[total-i]=rem;
     num/=10;
     i++;
    }
    for(i=1;i<=total;i++)
     if(ceil(log2(i)) == floor(log2(i)))
       r++;        //no. of redundant bits
  //  printf("r is %d\n",r);
    int k=0;
    for(i=0;i<4;i++)
    {
   for(j=1;j<=total;j++)
   {
    bin=binary(j);
    if(ispresent(bin,i+1))
     count+=arr[total-j];
   }
  // printf("count:%d\n",count);
  if(count%2==0)
    result+=pow(10,k)*0;
  else
     result+=pow(10,k)*1;
  k++;
   count=0;
  }
  int error=decimal(result);
  printf("\nError bit in binary:%d\n",result);
  printf("\nError in bit-%d\n",error);
  if(arr[total-error]==0)
```

```
     arr[total-error]=1;
  else
    arr[total-error]=0;
 k=0;
 printf("\nData after error correction:");
 for(i=total-1;i>=0;i--)
 {
     newarr[k]=arr[i];
     k++;
 }
 int x=0;
 for(i=0;i<k;i++)
 {
  if(ceil(log2(i+1)) != floor(log2(i+1)))
  {
    finalarr[x]=newarr[i];
    x++;
  }
 }
 for(i=x-1;i>=0;i--)
  printf("%d",finalarr[i]);

 printf("\n");


 return 0;
}
```

OUTPUT:



```
csec86@ccl-06:~/nwlab$ ./hs
Enter the data:1010101

No.of redundant bits:4

Data with redundant bits:10100101111

Enter the position where error has to be made:2

data transmitted is 10100101101
csec86@ccl-06:~/nwlab$ 
```

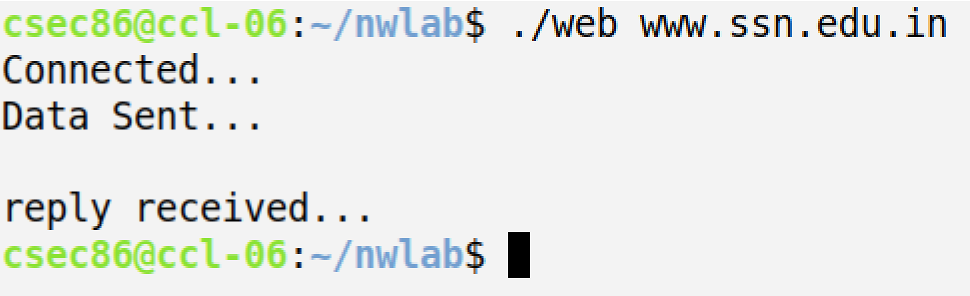


```
csec86@ccl-06:~/nwlab$ ./hc 127.0.0.1
Received data:10100101101

Error bit in binary:10

Error in bit-2

Data after error correction:1010101
csec86@ccl-06:~/nwlab$ 
```

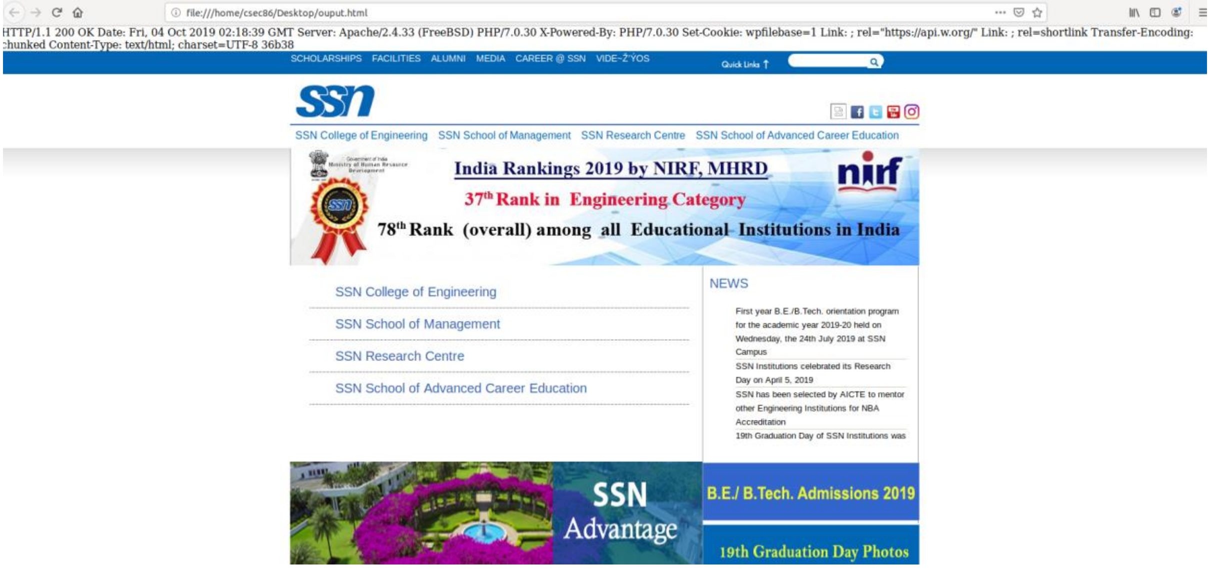
PROGRAM CODE:

```
#include<stdio.h>
#include<stdlib.h>
#include<string.h>
#include<sys/socket.h>
#include<netdb.h>
#include<arpa/inet.h>
#include<sys/types.h>
#include<unistd.h>
#include<fcntl.h>

int main(int argc, char *argv[])
{
int socket_desc, i, bytes_read;
char server_reply[1024], ip[100], request[100];
char *hostname = argv[1];
struct sockaddr_in server;
struct hostent *he;
struct in_addr **addr_list;
FILE *fp;
if ((he = gethostbyname(hostname)) == NULL) {
//gethostbyname failed
herror("gethostbyname\n");
return 1;
}

addr_list = (struct in_addr **) he->h_addr_list;

for(i = 0; addr_list[i] != NULL; i++) {
//Return the first one;
strcpy(ip , inet_ntoa(*addr_list[i]) );
}

//Create socket
socket_desc = socket(AF_INET, SOCK_STREAM, 0);
if (socket_desc == -1) {
printf("Could not create socket!\n");
}

server.sin_addr.s_addr = inet_addr(ip);
server.sin_family = AF_INET;
server.sin_port = htons(80);
//Connect to remote server
if (connect(socket_desc , (struct sockaddr *)&server ,
sizeof(server)) < 0)
{
printf("connect error!\n");
return 1;
}

printf("Connected...\n");

//Send some data
snprintf(request, 99, "GET / HTTP/1.1\r\n"
"Host: %s\r\n"
"\r\n\r\n", hostname);

if (send(socket_desc, request, strlen(request), 0) < 0) {
puts("Send failed!\n");
return 1;
}
puts("Data Sent...\n");

//Receive a reply from the server
fp = fopen("/home/csec86/Desktop/ouput.html", "w+");
//printf("\nhi\n");
while (bytes_read = read(socket_desc, server_reply,
sizeof(server_reply)) >
0)
{
//printf("\n%dhi\n",bytes_read);
fputs(server_reply, fp);
//printf("\n%dhelo\n",bytes_read);
memset(server_reply, 0, sizeof(server_reply));
//printf("\n%dhello\n",bytes_read);
}
//printf("\nhi\n");
do {
bytes_read = read(socket_desc, server_reply,
sizeof(server_reply));
fputs(server_reply, fp);
memset(server_reply, 0, sizeof(server_reply));
} while (bytes_read > 0);

printf("reply received...\n");
fclose(fp);
close(socket_desc);
return 0;
}
```

OUTPUT:



```
csec86@ccl-06:~/nwlab$ ./web www.ssn.edu.in
Connected...
Data Sent...

reply received...
csec86@ccl-06:~/nwlab$ 
```



file:///home/csec86/Desktop/ouput.html

```
HTTP/1.1 200 OK Date: Fri, 04 Oct 2019 02:18:39 GMT Server: Apache/2.4.33 (FreeBSD) PHP/7.0.30 X-Powered-By: PHP/7.0.30 Set-Cookie: wpfilebase=1 Link: ; rel="https://api.w.org/" Link: ; rel=shortlink Transfer-Encoding:
chunked Content-Type: text/html; charset=UTF-8 36b38
```

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37th Rank in Engineering Category

78th Rank (overall) among all Educational Institutions in India

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NEWS

First year B.E./B.Tech. orientation program for the academic year 2019-20 held on Wednesday, the 24th July 2019 at SSN Campus

SSN Institutions celebrated its Research Day on April 5, 2019

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19th Graduation Day of SSN Institutions was