

retransmitted using ARQ, either explicitly (such as through triple-ack) or implicitly due to a timeout.

**Program: 1. Using Hamming Code**

```
#include<stdio.h>
#include<conio.h>
#include<string.h>
#include<math.h>
void main()
{
    char sender[20],buffer[50],reciver[20];
    int d,p=0,i=0,j,k,length,power,count;
    clrscr();
    printf("ENTER THE MESSAGE IN BIT FORM:- ");
    gets(sender);
    d=strlen(sender); //power
    for(p=0; ;p++)
    {
        if(pow(2,p)>=d+p)
        {
            break;
        }
    }
    p--;
    /* COPY THE BITS INTO BUFFER */
    i=1; power=0; j=0;
    do {
        if(i==pow(2,power))
        {
            buffer[i]='0';
            power++;
            i++;
        }
        else
        {
            buffer[i]=sender[j];
            j++;
            i++; }
    }
    while(j<=d);
    buffer[i]='\0'; //APPLY BIT IN CODE
    count=0;
    length=d+p;
    j=0;
    for(j=0;j<=p;j++)
    {
        k=pow(2,j);
        for(i=k+1;i<=length; )
        {
            if(k==1)
            {
                if(buffer[i]=='1')
```

```

        { count++; }
        i=i+2;
    }
    else {
        if(buffer[i]=='1')
        { count++; }
        i++;
        if(i%k==0)
        { i=i+k; }
    }
    if(count%2==1)
    {
        buffer[k]='1';
    }
    count=0;
}
printf("ENCODED MESSAGE IS \n ");
i=1;
do { printf("%c",buffer[i]);
i++;
}while(buffer[i]!='\0');
getch();
}

```

## Program 2. ARQ for Error Correcting

```
#include<stdio.h>
```

```
int main()
```

```
{
```

```
    int window size,sent=0,ack,i;
```

```
    printf("enter window size\n");
```

```
    scanf("%d",&>window size);
```

```
    while(1)
```

```
    {
```

```
        for( i = 0; i < window size; i++)
```

```
        {
```

```
            printf("Frame %d has been transmitted.\n",sent);
```

```
            sent++;
```

```
            if(sent == window size)
```

```
                break;
```

```
        }
```

```
        printf("\n Please enter the last Acknowledgement received.\n");
```

```
        scanf("%d",&ack);
```

```
        if(ack == window size)
```

```
            break;
```

```
        else
```

```
            sent = ack;
```

```
    }
```

```
    return 0;
```

```
}
```