3. Ex-3 Write a program for error detection & correction checksum & Hamming code. /* Hamming code */

```
#include<stdio.h>
void main(){
    int data[10], datarr[10], c, c1, c2, c3, i;
    printf("senden:");
    scanf("%d%d%d%d%d", &data[0], &data[1],
                        &data[2], &data[4]);

    data[3] = data[0] ^ data[1] ^ data[2];
    data[5] = data[0] ^ data[1] ^ data[4];
    data[6] = data[0] ^ data[2] ^ data[4];
    printf("Encoded data:");
    for(int i=0; i<7; i++)
        printf("%d", data[i]);

c1 = data[
    printf("Receiver:");
    for(i=0; i<7; i++)
        scanf("%d", &datarr[i]);
    c1 = datarr[6] ^ datarr[4] ^ datarr[2] ^ datarr[0];
    c2 = datarr[5] ^ datarr[0] ^ datarr[1] ^ datarr[4];
    c3 = datarr[3] ^ datarr[0] ^ datarr[1] ^ datarr[2];
    c = 4*c3 + c2*2 + c1;
    printf("Syndrome bits: %d%d%d", c1, c2, c3);
    if(c==0) { printf("No error while transmission");
```

```
else {
    printf("error in position %d ",c);
    printf("Data sent: ");
    for(i=0;i<7;i++)
            printf("%d", data[i]);
    printf("Data received: ");
    for(i=0;i<7;i++)
        printf("%d", datar[i]);
    printf("\nCorrect message is ");
    if(datar[7-c]==0)
        datar[7-c]=1; else datar[7-c]=0;
    for(i=0;i<7;i++)
            printf("%d", datar[i]);

}
}
```

```
/* checksum */
#include<stdio.h>
unsigned fields[10];
unsigned short checksum(){
    int i;
    int sum=0;
    printf("Enter IP header info 16 bit words \n");
    for(i=0;i<9;i++){
        printf("Number %d \n",i+1);
        scanf("%x",&fields[i]);
        sum=sum+(unsigned short)fields[i];
        while(sum>>16)
        sum=(sum&0xFFFF)+(sum>>16);
    }
    sum=~sum;
    return (unsigned short)sum;
}
int main()
{
    unsigned short result1, result2;
    result1=checksum();
    printf("the computed checksum at sender %x \n",result1);
    result2=checksum();
    printf("Computed checksum at receiver %x \n",result2);
    if(result1==result2) printf("No error");
    else printf("Error in data received");
}
```