**CODE**

//============================================================================

// Name : mini\_project.cpp

// Author : Sneha bandi

// Roll No. : 2401,2406,2408,2410,2413

// Description : The following number system conversions are done by our program:

//1. Binary to gray";

//2. Gray to binary

//3. Binary to decimal to BCD

//4. BCD to decimal to binary

//5. Binary to decimal

//6. Decimal to binary

//7. Binary Adder

//8. BCD Adder

//9. Help:If you need information about any number system

//============================================================================

#include <iostream>

#include<string.h>

#include<math.h>

using namespace std;

class node {

friend class list;

int data;

node\*prev;

node\* next;

public:

node()

{

//data=0;

prev = NULL;

next = NULL;

}

;

node(int d)

{

data=d;

prev = NULL;

next = NULL;

}

};

class list {

node\* start;

public:

void accept();

void display();

int count();

void binary\_gray();

void gray\_binary();

void binary\_bcd();

void bcd\_binary();

void decimal\_binary(int dec);

int binary\_decimal();

list binary\_adder(list,list);

list binary\_six();

list bcd\_adder(list,list);

list()

{start=NULL;}

};

void list::accept() //ACCEPTING NO. IN BINARY FORMAT (BIT BY BIT)

{

node \*temp,\*ptr;

int s,d;

char c;

cout<<"\n\t\tNOTE: ENTER BIT BY BIT........!!";

do

{

cout<<"\nEnter bit: ";

cin>>d;

temp = new node(d);

if(start==NULL)

start=temp;

else

{

ptr=start;

while(ptr->next!=NULL)

{

ptr=ptr->next;

}

ptr->next = temp;

temp->prev=ptr;

}

cout<<"Do you want to enter another bit (y/n)?\t:";

cin>>c;

}while(c=='y'||c=='Y');

}

void list::display() //DISPLAYING ENTERED BINARY NO.

{

node \*ptr;

ptr=start;

while(ptr!=NULL)

{

cout<<ptr->data;

ptr=ptr->next;

}

}

void list::binary\_gray() //BINARY TO GRAY

{

node \*ptr,\*trav,\*temp;

list t;

trav=t.start;

ptr=start;

int i=0;

while(ptr!=NULL)

{

temp= new node();

if(t.start==NULL)

{

t.start=temp;

t.start->data=start->data;

}

else

{

trav=t.start;

while(trav->next!=NULL)

{

trav=trav->next;

}

temp->data=(ptr->prev->data)^(ptr->data);

trav->next=temp;

temp->prev=trav;

}

ptr=ptr->next;

}

//DISPLAY

trav=t.start;

while(trav!=NULL)

{

cout<<trav->data;

trav=trav->next;

}

cout<<"\n";

}

void list::gray\_binary() //GRAY TO BINARY

{

node \*ptr,\*trav,\*temp;

list t;

trav=t.start;

ptr=start;

int i=0;

while(ptr!=NULL)

{

temp= new node();

if(t.start==NULL)

{

t.start=temp;

t.start->data=start->data;

}

else

{

trav=t.start;

while(trav->next!=NULL)

{

trav=trav->next;

}

temp->data=(trav->data)^(ptr->data);

trav->next=temp;

temp->prev=trav;

}

ptr=ptr->next;

}

//DISPLAY

trav=t.start;

while(trav!=NULL)

{

cout<<trav->data;

trav=trav->next;

}

cout<<"\n";

}

void list::binary\_bcd() //BINARY TO BCD

{

node \*ptr,\*trav,\*temp;

list t;

int digit,num;

//BCD no. is from 0-9

num=binary\_decimal();

if(num<10)

{

display();

cout<"\n";

}

else

{

while(num!=0)

{

//start separating digits from L.S.B bit

digit=num%10;

num=num/10;

//now convert each digit to binary

t.decimal\_binary(digit);

}

cout<<"\n\tThe BCD no. is: ";

t.display();

}

}

void list::bcd\_binary() //BCD TO BINARY

{

node \*ptr,\*temp,\*trav;

int sum;

list t;

//traversal till end of list

ptr=start;

while(ptr->next!=NULL)

{

ptr=ptr->next;

}

//till list one ends

while(ptr!=NULL)

{

sum=0;

//taking 4 bits at a time from L.S.B;converting to decimal

for(int i=0;i<4;i++)

{

sum=sum+(pow(2,i))\*(ptr->data);

ptr=ptr->prev;

}

//creating list to store each digit;forward traversal

temp = new node(sum);

if(t.start==NULL)

t.start=temp;

else

{

t.start->prev=temp;

temp->next=t.start;

t.start=t.start->prev;

}

}

//display

cout<<"\nThe decimal no. is: ";

trav=t.start;

while(trav!=NULL)

{

cout<<trav->data;

trav=trav->next;

}

cout<<"\n";

}

int list::binary\_decimal() //BINARY TO DECIMAL

{

node \*temp,\*ptr;

int sum=0,c;

c=count();

ptr=start;

for(int i=(c-1);i>=0;i--)

{

sum=sum+(pow(2,i))\*(ptr->data);

ptr=ptr->next;

}

return sum;

}

void list::decimal\_binary(int dec) //ACCEPTING NO. IN DECIMAL FORM

{

node \*temp;

int n;

while(dec!=0)

{

n = dec % 2;

dec=dec/2;

temp = new node(n);

if(start==NULL)

start=temp;

else //LIST FORMATION IS IN REVERSE ORDER

{

temp->next=start;

start->prev=temp;

start=start->prev;

}

}

}

list list::binary\_adder(list d1,list d2) //ADDITION OF TWO BINARY NO.'s

{

list d;

node \*ptr1,\*ptr2,\*sum,\*temp,\*temp1;

int s=0,carry=0;

//TRAVERSING BOTH THE LIST TILL END

ptr1=d1.start;

ptr2=d2.start;

while(ptr1->next!=NULL)

{

ptr1=ptr1->next;

}

while(ptr2->next!=NULL)

{

ptr2=ptr2->next;

}

//WHILE LOOP TILL BOTH THE LIST END

while(ptr1!=NULL||ptr2!=NULL)

{

//ADDITION STARTING FROM LSB

//SUM BY EXOR

s=(ptr1->data)^(ptr2->data)^(carry);

//CARRY

if((ptr1->data==1 && ptr2->data==1)||(ptr1->data==1 && carry==1)||(ptr2->data==1 && carry==1))

carry=1;

else

carry=0;

//MAKING 3rd LIST 'sum' TO STORE ADDITION OF LISTS d1 AND d2

temp=new node(s);

if(d.start==NULL)

d.start=temp;

else

{

sum=d.start;

while(sum->prev!=NULL)

{

sum=sum->prev;

}

temp->next=sum;

sum->prev=temp;

d.start=temp;

}

//APPENDING CARRY BIT EXPLICITLY

if(ptr1->prev==NULL||ptr2->prev==NULL)

{

if(carry==1)

{

temp1=new node(1);

temp1->next=d.start;

temp->prev=temp1;

d.start=temp1;

}

}

//INCREMENTING POINTERS OF BOTH THE LIST

ptr1=ptr1->prev;

ptr2=ptr2->prev;

}

return d;

}

list list::bcd\_adder(list d1,list d2) //BCD ADDER:ADDITION OF TWO BCD NUMBERS

{

node\* temp;

list t,s,i;

int dec;

//BINARY SIX CREATION

s=binary\_six();

//ADDITION OF ACCEPTED NO (INVALID OR VALID YET TO BE DETERMINED;NORMAL ADDITION)

t=binary\_adder(d1,d2);

dec=t.binary\_decimal();

//CASE I OF OF INVALID BCD: CARRY BIT GENERATION

if(t.count()==5)

{

cout<<"\n\tInvalid BCD addition!! ";

t.display();

cout<<"\nREASON : As carry bit generated at M.S.B it is no longer 4-bit BCD No.!\n\n";

cout<<"------------------------------->ON VALIDATING BCD ADDITION!\n\n\tValid BCD Addition is : ";

temp = new node(0); //to make 0110 as 5 bit i.e. 00110

temp->next=s.start; //we need to make it 5 bit as now the invalid BCD is 5-bit

s.start->prev=temp;

s.start=temp;

i=binary\_adder(t,s);

i.display();

}

//CASE II OF INVALID BCD: ADDITION > 9

else if(dec>9 && dec<16)

{

cout<<"\n\tInvalid BCD addition!! ";

t.display();

cout<<"\nREASON : As addition is greater than 9 and 4-bit BCD no's range fron 0-9 !\n\n";

cout<<"------------------------------->ON VALIDATING BCD ADDITION!\n\n\tValid BCD Addition is : ";

i=binary\_adder(t,s);

i.display();

}

else

{

cout<<"\n\tThe BCD addition is:";

t.display();

}

cout<<"\n\tThe binary six is : ";

s.display();

cout<<"\n";

}

list list::binary\_six() //CREATION FOR BINARY SIX TO ADD IN INVALID BCD NO.

{

node \*ptr1,\*temp,\*temp1;

int x;

list d;

for(int i=0;i<4;i++)

{

//SETTING X AS '1' FOR 2ND N 3RD NODE AS 6 IS 0110

if(i==1||i==2)

x=1;

else

x=0;

//CREATION OF NEW NODE WITH DATA AS X

temp = new node(x);

if(d.start==NULL)

{

d.start=temp;

}

else

{

ptr1=d.start;

while(ptr1->next!=NULL)

{

ptr1=ptr1->next;

}

ptr1->next=temp;

temp->prev=ptr1;

}

}

return d;

}

int list::count() //COUNT FUNCTION FOR COUNTING NODES

{

node \*ptr;

int count=0;

ptr=start;

while(ptr!=NULL)

{

ptr=ptr->next;

count++;

}

return count;

}

//main function

int main()

{

int n,n1,x;

char choice,choice1;

list l1,l2,l3,l4,l5,l6,l7,l8,l9,lba,l10,l11,l12,l13;

cout<<"\n=========================================================\n";

do{

cout<<"\n\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* MENU \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\n\n\tPRESS:";

cout<<"\n\t1. Binary to gray";

cout<<"\n\t2. Gray to binary";

cout<<"\n\t3. Binary to decimal to BCD";

cout<<"\n\t4. BCD to decimal to binary ";

cout<<"\n\t5. Binary to decimal";

cout<<"\n\t6. Decimal to binary";

cout<<"\n\t7. Binary Adder";

cout<<"\n\t8. BCD Adder";

cout<<"\n\t9. Help\n\t\tNOTE : If you need information about any number system select 'HELP'";

cout<<"\n\n\tCHOICE: ";

cin>>n;

switch(n)

{

case 1:

l1.accept();

cout<<"\n\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* BINARY CONVERTED TO GRAY \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\n";

cout<<"\n\tBinary No: ";

l1.display();

cout<<"\n\tGray No: ";

l1.binary\_gray();

break;

case 2:

l2.accept();

cout<<"\n\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* GRAY CONVERTED TO BINARY \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\n";

cout<<"\n\tGray No: ";

l2.display();

cout<<"\n\tBinary No: ";

l2.gray\_binary();

break;

case 3:

l3.accept();

cout<<"\n\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* BINARY CONVERTED TO BCD \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\n";

cout<<"\n\tBinary No: ";

l3.display();

cout<<"\n\tBCD No: ";

l3.binary\_bcd();

break;

case 4:

l4.accept();

cout<<"\n\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* BCD CONVERTED TO BINARY \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\n";

cout<<"\n\tBCD No: ";

l4.display();

cout<<"\n\tBinary No: ";

l4.bcd\_binary();

break;

case 5:

l6.accept();

cout<<"\n\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* BINARY CONVERTED TO DECIMAL \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\n";

cout<<"\n\tBinary No: ";

l6.display();

x=l6.binary\_decimal();

cout<<"\n\tDecimal No: "<<x;

break;

case 6:

cout<<"\nEnter the decimal number: ";

cin>>x;

l5.decimal\_binary(x);

cout<<"\n\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* DECIMAL CONVERTED TO BINARY \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\n";

cout<<"\n\tDecimal No: ";

cout<<x;

cout<<"\n\tBinary No: ";

l5.display();

break;

case 7:

cout<<"\nEnter the first Binary no. :\n";

l7.accept();

cout<<"\nEnter the first Binary no. :\n";

l8.accept();

cout<<"\n\tFirst No. : ";

l7.display();

cout<<"\n\tSecond No. : ";

l8.display();

cout<<"\n\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* BCD ADDITION \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\n";

cout<<"\nThe Binary addition is : ";

lba=l9.binary\_adder(l7,l8);

lba.display();

break;

case 8:

cout<<"\nEnter the first BCD no. :\n";

l10.accept();

cout<<"\nEnter the first BCD no. :\n";

l11.accept();

cout<<"\n\tFirst No. : ";

l10.display();

cout<<"\n\tSecond No. : ";

l11.display();

cout<<"\n\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* BCD ADDITION \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\n";

l12.bcd\_adder(l10,l11);

break;

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* HELP! \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

case 9:

cout<<"\n\t<-------------------------------------------------------------------->\n";

do{

cout<<"\n\t<-------------------- INFORMATION MENU -------------------->\n\n\tPRESS:";

cout<<"\n\t\t1. Binary to gray";

cout<<"\n\t\t2. Gray to binary";

cout<<"\n\t\t3. Binary to BCD";

cout<<"\n\t\t4. BCD to binary ";

cout<<"\n\t\t5. Binary to decimal";

cout<<"\n\t\t6. Decimal to binary";

cout<<"\n\t\t7. BCD Adder";

cout<<"\n\nCHOICE:";

cin>>n1;

switch(n1)

{

case 1:

/\*Convertion of Binary to Gray number.\*/

cout<<"Convertion of Binary to Gray code.\n";

cout<<"\n The MSB of the binary number is kept as it is and every next digit";

cout<<" and its successive digit of the binary number perform EX-OR operation ";

cout<<"to convert d binary number to the equivalent Gray code\n";

cout<<"e.g.\n";

cout<<"\n = 01001 ==> 01101\n";

break;

case 2:

/\* Convertion of Gray to binary number.\*/

cout<<"Conversion of Gray to binary number.";

cout<<"\n The MSB of the Gray number is kept as it is and this digit of the binary number performs";

cout<<"EX-OR operation with the next digit of the gray code to give the next binary number ";

cout<<"and this process continues till the last Gray digit.\n";

cout<<"e.g.\n";

cout<<"\n 01101 ==> 01001\n ";

break;

case 3:

/\*Convertion of Binary to BCD number.\*/

cout<<"Convertion of Binary to BCD number.\n";

cout<<"\n BCD involves turning each decimal digit in a number into its";

cout<<"binary equivalent and concatenating the results.\n";

cout<<"e.g.\n";

cout<<"\n94 = 1001 0100 = = > 10010100 \n ";

break;

case 4:

/\* Convertion of BCD to binary number.\*/

cout<<"Convertion of BCD to binary number.\n";

cout<<"\n Each decimal digit requires 4 bits to represent in binary.";

cout<<"\n The process for conversion from a BCD number back to decimal .";

cout<<"\n Starting from the right hand side, take successive groups of ";

cout<<"4 bits and convert them from binary to decimal.\n";

cout<<"e.g.\n";

cout<<"\n010110010001 ==> 0101 1001 0001 ==> 591\n";

break;

case 5: cout<<"Binary to Decimal"<<endl;

/\*Basic information about binary and decimal numbers \*/

cout<<"\n Binary numbers are the one with base-2.\n This system uses only two digits i.e. 0 and 1.\n\n Whereas the decimal numbers have base 10.\n This system uses the numbers from 0 to 9."<<endl;

break;

case 6: cout<<"Conversion from binary to decimal"<<endl;

cout<<"\n e.g.\n (10011)2=(19)10 \n "<<endl;

cout<<"Conversion from decimal to binary"<<endl;

cout<<"\n e.g.\n 0000=0 \n 0001=1 \n 0010=2 \n ..."<<endl;

break;

case 7: cout<<" BCD ADDER"<<endl;

cout<<"1)BCD adder adds two BCD digits but its addition cannot be greater than 9."<<endl;

cout<<"2)If sum is less than or equal to 9 and carry =0,then the sum is in the true BCD form."<<endl;

cout<<"3)If sum is invalid BCD or carry=1,then the result is wrong ,so six i.e 0110 is added to it to make it valid."<<endl;

break;

default:

cout<<"\nEnter valid choice!\n";

break;

}

cout<<"\n\t<-------------------------------------------------------------------->\n";

cout<<"\n\tDo you want any other information (y/n)? ";

cout<<"\n\t<-------------------------------------------------------------------->\n";

}while(choice1=='y'||choice1=='Y');

break;

default:

cout<<"\nEnter valid choice!\n";

break;

}

cout<<"\n=========================================================\n";

cout<<"\nDo yo want to continue (y/n)?\t";

cin>>choice;

cout<<"==========================================================\n";

}while(choice=='y'||choice=='Y');

return 0;

}

**OUTPUT**

**THIS PROGRAM IS TO PERFORM CODE CONVERSION AND USE IT IN ITS APPLICATIONS -BINARY AND BCD ADDER**

=========================================================

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* MENU \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

PRESS:

1. Binary to gray

2. Gray to binary

3. Binary to decimal to BCD

4. BCD to decimal to binary

5. Binary to decimal

6. Decimal to binary

7. Binary Adder

8. BCD Adder

9. Help

NOTE : If you need information about any number system select 'HELP'

CHOICE: 1

NOTE: ENTER BIT BY BIT........!!

Enter bit: 1

Do you want to enter another bit (y/n)? :y

Enter bit: 0

Do you want to enter another bit (y/n)? :y

Enter bit: 1

Do you want to enter another bit (y/n)? :y

Enter bit: 0

Do you want to enter another bit (y/n)? :n

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* BINARY CONVERTED TO GRAY \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Binary No: 1010

Gray No: 1111

=========================================================

Do you want to continue (y/n)? y

==========================================================

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* MENU \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

PRESS:

1. Binary to gray

2. Gray to binary

3. Binary to decimal to BCD

4. BCD to decimal to binary

5. Binary to decimal

6. Decimal to binary

7. Binary Adder

8. BCD Adder

9. Help

NOTE : If you need information about any number system select 'HELP'

CHOICE: 2

NOTE: ENTER BIT BY BIT........!!

Enter bit: 1

Do you want to enter another bit (y/n)? :y

Enter bit: 1

Do you want to enter another bit (y/n)? :y

Enter bit: 1

Do you want to enter another bit (y/n)? :y

Enter bit: 1

Do you want to enter another bit (y/n)? :n

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* GRAY CONVERTED TO BINARY \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Gray No: 1111

Binary No: 1010

=========================================================

Do you want to continue (y/n)? y

==========================================================

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* MENU \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

PRESS:

1. Binary to gray

2. Gray to binary

3. Binary to decimal to BCD

4. BCD to decimal to binary

5. Binary to decimal

6. Decimal to binary

7. Binary Adder

8. BCD Adder

9. Help

NOTE : If you need information about any number system select 'HELP'

CHOICE: 3

NOTE: ENTER BIT BY BIT........!!

Enter bit: 1

Do you want to enter another bit (y/n)? :y

Enter bit: 1

Do you want to enter another bit (y/n)? :y

Enter bit: 0

Do you want to enter another bit (y/n)? :y

Enter bit: 0

Do you want to enter another bit (y/n)? :n

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* BINARY CONVERTED TO BCD \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Binary No: 1100

BCD No:

The BCD no. is: 110

=========================================================

Do you want to continue (y/n)? y

==========================================================

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* MENU \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

PRESS:

1. Binary to gray

2. Gray to binary

3. Binary to decimal to BCD

4. BCD to decimal to binary

5. Binary to decimal

6. Decimal to binary

7. Binary Adder

8. BCD Adder

9. Help

NOTE : If you need information about any number system select 'HELP'

CHOICE: 4

NOTE: ENTER BIT BY BIT........!!

Enter bit: 0

Do you want to enter another bit (y/n)? :y

Enter bit: 0

Do you want to enter another bit (y/n)? :y

Enter bit: 0

Do you want to enter another bit (y/n)? :y

Enter bit: 1

Do you want to enter another bit (y/n)? :y

Enter bit: 0

Do you want to enter another bit (y/n)? :y

Enter bit: 1

Do you want to enter another bit (y/n)? :y

Enter bit: 0

Do you want to enter another bit (y/n)? :y

Enter bit: 1

Do you want to enter another bit (y/n)? :n

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* BCD CONVERTED TO BINARY \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

BCD No: 00010101

Binary No:

The decimal no. is: 15

=========================================================

Do you want to continue (y/n)? y

==========================================================

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* MENU \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

PRESS:

1. Binary to gray

2. Gray to binary

3. Binary to decimal to BCD

4. BCD to decimal to binary

5. Binary to decimal

6. Decimal to binary

7. Binary Adder

8. BCD Adder

9. Help

NOTE : If you need information about any number system select 'HELP'

CHOICE: 5

NOTE: ENTER BIT BY BIT........!!

Enter bit: 1

Do you want to enter another bit (y/n)? :y

Enter bit: 1

Do you want to enter another bit (y/n)? :y

Enter bit: 0

Do you want to enter another bit (y/n)? :y

Enter bit: 1

Do you want to enter another bit (y/n)? :n

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* BINARY CONVERTED TO DECIMAL \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Binary No: 1101

Decimal No: 13

=========================================================

Do you want to continue (y/n)? y

==========================================================

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* MENU \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

PRESS:

1. Binary to gray

2. Gray to binary

3. Binary to decimal to BCD

4. BCD to decimal to binary

5. Binary to decimal

6. Decimal to binary

7. Binary Adder

8. BCD Adder

9. Help

NOTE : If you need information about any number system select 'HELP'

CHOICE: 6

Enter the decimal number: 13

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* DECIMAL CONVERTED TO BINARY \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Decimal No: 13

Binary No: 1101

=========================================================

Do you want to continue (y/n)? y

==========================================================

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* MENU \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

PRESS:

1. Binary to gray

2. Gray to binary

3. Binary to decimal to BCD

4. BCD to decimal to binary

5. Binary to decimal

6. Decimal to binary

7. Binary Adder

8. BCD Adder

9. Help

NOTE : If you need information about any number system select 'HELP'

CHOICE: 7

Enter the first Binary no. :

NOTE: ENTER BIT BY BIT........!!

Enter bit: 0

Do you want to enter another bit (y/n)? :y

Enter bit: 1

Do you want to enter another bit (y/n)? :y

Enter bit: 0

Do you want to enter another bit (y/n)? :n

Enter the first Binary no. :

NOTE: ENTER BIT BY BIT........!!

Enter bit: 0

Do you want to enter another bit (y/n)? :y

Enter bit: 1

Do you want to enter another bit (y/n)? :y

Enter bit: 1

Do you want to enter another bit (y/n)? :n

First No. : 010

Second No. : 011

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* BCD ADDITION \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

The Binary addition is : 101

=========================================================

Do you want to continue (y/n)? y

==========================================================

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* MENU \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

PRESS:

1. Binary to gray

2. Gray to binary

3. Binary to decimal to BCD

4. BCD to decimal to binary

5. Binary to decimal

6. Decimal to binary

7. Binary Adder

8. BCD Adder

9. Help

NOTE : If you need information about any number system select 'HELP'

CHOICE: 8

Enter the first BCD no. :

NOTE: ENTER BIT BY BIT........!!

Enter bit: 0

Do you want to enter another bit (y/n)? :y

Enter bit: 1

Do you want to enter another bit (y/n)? :y

Enter bit: 0

Do you want to enter another bit (y/n)? :y

Enter bit: 1

Do you want to enter another bit (y/n)? :n

Enter the first BCD no. :

NOTE: ENTER BIT BY BIT........!!

Enter bit: 0

Do you want to enter another bit (y/n)? :y

Enter bit: 1

Do you want to enter another bit (y/n)? :y

Enter bit: 0

Do you want to enter another bit (y/n)? :y

Enter bit: 1

Do you want to enter another bit (y/n)? :n

First No. : 0101

Second No. : 0101

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* BCD ADDITION \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Invalid BCD addition!! 1010

REASON : As addition is greater than 9 and 4-bit BCD no's range fron 0-9 !

------------------------------->ON VALIDATING BCD ADDITION!

Valid BCD Addition is : 10000

The binary six is : 0110

=========================================================

Do you want to continue (y/n)? y

==========================================================

=========================================================

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* MENU \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

PRESS:

1. Binary to gray

2. Gray to binary

3. Binary to decimal to BCD

4. BCD to decimal to binary

5. Binary to decimal

6. Decimal to binary

7. Binary Adder

8. BCD Adder

9. Help

NOTE : If you need information about any number system select 'HELP'

CHOICE: 8

Enter the first BCD no. :

NOTE: ENTER BIT BY BIT........!!

Enter bit: 1

Do you want to enter another bit (y/n)? :y

Enter bit: 0

Do you want to enter another bit (y/n)? :y

Enter bit: 0

Do you want to enter another bit (y/n)? :y

Enter bit: 1

Do you want to enter another bit (y/n)? :n

Enter the first BCD no. :

NOTE: ENTER BIT BY BIT........!!

Enter bit: 1

Do you want to enter another bit (y/n)? :y

Enter bit: 0

Do you want to enter another bit (y/n)? :y

Enter bit: 0

Do you want to enter another bit (y/n)? :y

Enter bit: 1

Do you want to enter another bit (y/n)? :n

First No. : 1001

Second No. : 1001

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* BCD ADDITION \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Invalid BCD addition!! 10010

REASON : As carry bit generated at M.S.B it is no longer 4-bit BCD No.!

------------------------------->ON VALIDATING BCD ADDITION!

Valid BCD Addition is : 11000

The binary six is : 00110

=========================================================

Do you want to continue (y/n)? y

==========================================================

=========================================================

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* MENU \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

PRESS:

1. Binary to gray

2. Gray to binary

3. Binary to decimal to BCD

4. BCD to decimal to binary

5. Binary to decimal

6. Decimal to binary

7. Binary Adder

8. BCD Adder

9. Help

NOTE : If you need information about any number system select 'HELP'

CHOICE: 9

<-------------------------------------------------------------------->

<-------------------- INFORMATION MENU -------------------->

PRESS:

1. Binary to gray

2. Gray to binary

3. Binary to BCD

4. BCD to binary

5. Binary to decimal

6. Decimal to binary

7. BCD Adder

CHOICE:1

Convertion of Binary to Gray code.

The MSB of the binary number is kept as it is and every next digit and its successive digit of the binary number perform EX-OR operation to convert d binary number to the equivalent Gray code

e.g.

= 01001 ==> 01101

<-------------------------------------------------------------------->

Do you want any other information (y/n)?

<-------------------------------------------------------------------->

=========================================================

Do you want to continue (y/n)? y

==========================================================

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* MENU \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

PRESS:

1. Binary to gray

2. Gray to binary

3. Binary to decimal to BCD

4. BCD to decimal to binary

5. Binary to decimal

6. Decimal to binary

7. Binary Adder

8. BCD Adder

9. Help

NOTE : If you need information about any number system select 'HELP'

CHOICE: 9

<-------------------------------------------------------------------->

<-------------------- INFORMATION MENU -------------------->

PRESS:

1. Binary to gray

2. Gray to binary

3. Binary to BCD

4. BCD to binary

5. Binary to decimal

6. Decimal to binary

7. BCD Adder

CHOICE:2

Conversion of Gray to binary number.

The MSB of the Gray number is kept as it is and this digit of the binary number performsEX-OR operation with the next digit of the gray code to give the next binary number and this process continues till the last Gray digit.

e.g.

01101 ==> 01001

<-------------------------------------------------------------------->

Do you want any other information (y/n)?

<-------------------------------------------------------------------->

=========================================================

Do you want to continue (y/n)? y

==========================================================

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* MENU \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

PRESS:

1. Binary to gray

2. Gray to binary

3. Binary to decimal to BCD

4. BCD to decimal to binary

5. Binary to decimal

6. Decimal to binary

7. Binary Adder

8. BCD Adder

9. Help

NOTE : If you need information about any number system select 'HELP'

CHOICE: 9

<-------------------------------------------------------------------->

<-------------------- INFORMATION MENU -------------------->

PRESS:

1. Binary to gray

2. Gray to binary

3. Binary to BCD

4. BCD to binary

5. Binary to decimal

6. Decimal to binary

7. BCD Adder

CHOICE:3

Convertion of Binary to BCD number.

BCD involves turning each decimal digit in a number into itsbinary equivalent and concatenating the results.

e.g.

94 = 1001 0100 = = > 10010100

<-------------------------------------------------------------------->

Do you want any other information (y/n)?

<-------------------------------------------------------------------->

=========================================================

Do you want to continue (y/n)? y

==========================================================

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* MENU \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

PRESS:

1. Binary to gray

2. Gray to binary

3. Binary to decimal to BCD

4. BCD to decimal to binary

5. Binary to decimal

6. Decimal to binary

7. Binary Adder

8. BCD Adder

9. Help

NOTE : If you need information about any number system select 'HELP'

CHOICE: 9

<-------------------------------------------------------------------->

<-------------------- INFORMATION MENU -------------------->

PRESS:

1. Binary to gray

2. Gray to binary

3. Binary to BCD

4. BCD to binary

5. Binary to decimal

6. Decimal to binary

7. BCD Adder

CHOICE:4

Convertion of BCD to binary number.

Each decimal digit requires 4 bits to represent in binary.

The process for conversion from a BCD number back to decimal .

Starting from the right hand side, take successive groups of 4 bits and convert them from binary to decimal.

e.g.

010110010001 ==> 0101 1001 0001 ==> 591

<-------------------------------------------------------------------->

Do you want any other information (y/n)?

<-------------------------------------------------------------------->

=========================================================

Do you want to continue (y/n)? y

==========================================================

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* MENU \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

PRESS:

1. Binary to gray

2. Gray to binary

3. Binary to decimal to BCD

4. BCD to decimal to binary

5. Binary to decimal

6. Decimal to binary

7. Binary Adder

8. BCD Adder

9. Help

NOTE : If you need information about any number system select 'HELP'

CHOICE: 9

<-------------------------------------------------------------------->

<-------------------- INFORMATION MENU -------------------->

PRESS:

1. Binary to gray

2. Gray to binary

3. Binary to BCD

4. BCD to binary

5. Binary to decimal

6. Decimal to binary

7. BCD Adder

CHOICE:5

Binary to Decimal

Binary numbers are the one with base-2.

This system uses only two digits i.e. 0 and 1.

Whereas the decimal numbers have base 10.

This system uses the numbers from 0 to 9.

<-------------------------------------------------------------------->

Do you want any other information (y/n)?

<-------------------------------------------------------------------->

=========================================================

Do you want to continue (y/n)? y

==========================================================

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* MENU \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

PRESS:

1. Binary to gray

2. Gray to binary

3. Binary to decimal to BCD

4. BCD to decimal to binary

5. Binary to decimal

6. Decimal to binary

7. Binary Adder

8. BCD Adder

9. Help

NOTE : If you need information about any number system select 'HELP'

CHOICE: 9

<-------------------------------------------------------------------->

<-------------------- INFORMATION MENU -------------------->

PRESS:

1. Binary to gray

2. Gray to binary

3. Binary to BCD

4. BCD to binary

5. Binary to decimal

6. Decimal to binary

7. BCD Adder

CHOICE:6

Conversion from binary to decimal

e.g.

(10011)2=(19)10

Conversion from decimal to binary

e.g.

0000=0

0001=1

0010=2

...

<-------------------------------------------------------------------->

Do you want any other information (y/n)?

<-------------------------------------------------------------------->

=========================================================

Do you want to continue (y/n)? y

==========================================================

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* MENU \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

PRESS:

1. Binary to gray

2. Gray to binary

3. Binary to decimal to BCD

4. BCD to decimal to binary

5. Binary to decimal

6. Decimal to binary

7. Binary Adder

8. BCD Adder

9. Help

NOTE : If you need information about any number system select 'HELP'

CHOICE: 9

<-------------------------------------------------------------------->

<-------------------- INFORMATION MENU -------------------->

PRESS:

1. Binary to gray

2. Gray to binary

3. Binary to BCD

4. BCD to binary

5. Binary to decimal

6. Decimal to binary

7. BCD Adder

CHOICE:7

BCD ADDER

1)BCD adder adds two BCD digits but its addition cannot be greater than 9.

2)If sum is less than or equal to 9 and carry =0,then the sum is in the true BCD form.

3)If sum is invalid BCD or carry=1,then the result is wrong ,so six i.e 0110 is added to it to make it valid.

<-------------------------------------------------------------------->

Do you want any other information (y/n)?

<-------------------------------------------------------------------->

=========================================================

Do you want to continue (y/n)? n

==========================================================