#include<iostream>

#include<math.h>

using namespace std;

// function for binary to decimal conversion

int BintoDec( int num)

{

int b = num;

int ans =0, i = 0;

while( b != 0)

{

int digit = b%10;

if( digit == 1)

{

ans = ans + pow (2,i);

}

b = b/10;

i++;

}

return ans;

}

// function for Decimal to binary conversion

int DectoBin( int num)

{

int n = num;

int ans = 0;

int i = 0;

while( n!=0)

{

int bit = n & 1;

ans = (bit \* pow(10, i) ) + ans;

n = n >> 1;

i++;

}

return ans;

}

// function to find number of bits in given binary number

int noOfBits( int num)

{

int n=num;

int count = 0;

while ( n!=0)

{

if( n&1==1)

{

count++;

}

n=n>>1;

} return count;

}

// function to add binary numbers

int BinAdd( int n1, int n2)

{

int a,b,c;

a=BintoDec(n1);

b=BintoDec(n2);

c=a+b;

int d=DectoBin(c);

return d;

}

// function to substract two binary numbers

int BinSub( int n1, int n2)

{

int a,b,c;

a=BintoDec(n1);

b=BintoDec(n2);

c=a-b;

int d=DectoBin(c);

return d;

}

// function to multiply two binary numbers

int BinMult( int n1, int n2)

{

int a,b,c;

a=BintoDec(n1);

b=BintoDec(n2);

c=a\*b;

int d=DectoBin(c);

return d;

}

// function to divide two binary numbers

int BinDiv( int n1, int n2)

{

int a,b;

a=BintoDec(n1);

b=BintoDec(n2);

float c=float(a)/float(b);

int d=DectoBin(c);

return d;

}

// function to find 1's compliment of given binary

int Bin\_1s\_complement( int arr[], int size )

{

int newarray[8];

int j=0;

for( j=0;j<size;j++)

{

if(arr[j]==1)

{

newarray[j]=0;

}

else if(arr[j]==0)

{

newarray[j]=1;

}

}

for(int k=0; k < size ; k++)

{

cout << newarray[k] << ends;

}

}

// function to convert decimal to octal conversion

int DecToOcta(int num)

{

int n=num;

int digit=0,i=0,ans=0;

while(n!=0)

{

digit=n%8;

ans = ans + digit\*pow(8,i);

n=n/10;

i=i\*10;

}

return ans;

}

// function to convert binary to octal conversion

int BintoOcta(int num)

{

int n=num;

int p=BintoDec(num);

int answer=DecToOcta(p);

return answer;

}

// function to convert octal to decimal conversion

int OctatoDec(int num)

{

int n=num;

int digit=0,i=0,ans=0;

while(n!=0)

{

digit=n%10;

ans=ans+digit\*pow(8,i);

n=n/10;

i++;

}

return ans;

}

// function to convert octal to binary conversion

int OctatoBin(int num)

{

int n= num;

int p=OctatoDec(n);

int answer=DectoBin(n);

return answer;

}

//

int main()

{

int choice;

//taking input from user to perform a task

cout << " Welcome to Binary CODE HELPER -!!! " << endl << endl ;

cout << " Enter choice" << endl;

cout << " Enter 1 for Binary to decimal conversion " << endl ;

cout << " Enter 2 for Decimal to binary conversion " << endl ;

cout << " Enter 3 to find no. of setbits in number" << endl ;

cout << " Enter 4 for Binary addition " << endl ;

cout << " Enter 5 for Binary substraction " << endl ;

cout << " Enter 6 for Binary multiplication " << endl ;

cout << " Enter 7 for Binary division " << endl ;

cout << " Enter 8 to find 1's complement of binary " << endl ;

cout << " Enter 9 to find decimal to octal conversion " << endl ;

cout << " Enter 10 to find binary to octal conversion " << endl ;

cout << " Enter 11 to find octal to decimal conversion " << endl ;

cout << " Enter 12 to find octal to binary conversion " << endl ;

cin >> choice ;

switch (choice)

{

case 1: { int number;

cout<< " Enter input " << endl;

cin >> number;

cout << " Decimal value for this binary is: " ;

cout << BintoDec( number);

break;

}

case 2: { int number;

cout<< " Enter input " << endl;

cin >> number;

cout << " Binary reprentation for this decimal number is: " ;

cout << DectoBin( number);

break;

}

case 3: {

int number;

cout << " Enter input decimal number: ";

cin >> number ;

cout << "No. of setbits are :" << noOfBits(number);

break;

}

case 4: { int num1,num2;

cout << " Enter binary no.1 " << endl;

cin >> num1;

cout << " Enter binary no.2 " << endl;

cin >> num2;

cout << " Binary addition is: " << BinAdd(num1,num2) ;

break;

}

case 5: { int num1,num2;

cout << " Enter binary no.1 " << endl;

cin >> num1;

cout << " Enter binary no.2 " << endl;

cin >> num2;

cout << " Binary substraction is: " << BinSub(num1,num2);;

break;

}

case 6: { int num1,num2;

cout << " Enter binary no.1 " << endl;

cin >> num1;

cout << " Enter binary no.2 " << endl;

cin >> num2;

cout << " Binary multiplication is: " << BinMult(num1,num2); ;

break;

}

case 7: { int num1,num2;

cout << " Enter binary no.1 " << endl;

cin >> num1;

cout << " Enter binary no.2 " << endl;

cin >> num2;

cout << " Binary division is: " << BinDiv(num1,num2);

break;

}

case 8: { int number[8];

cout << " Enter the 8 digit binary number " << endl;

cout << " please input space after every input " << endl;

for(int i=0; i<8;i++)

{

cin >> number[i];

}

Bin\_1s\_complement( number , 8);

break;

}

case 9: {

cout << " enter decimal input " << endl;

int number;

cin >> number;

cout << "Decimal to octal conversion for this decimal is:" << DecToOcta(number) << endl;

break;

}

case 10: {

cout << " enter binary input " << endl;

int number;

cin >> number;

cout << "Binary to octal conversion for this decimal is:" << BintoOcta(number) << endl;

break;

}

case 11: {

cout << " enter octal input " << endl;

int number;

cin >> number;

cout << "Octal to decimal conversion for this decimal is:" << OctatoDec(number) << endl;

break;

}

case 12: {

cout << " enter octal input " << endl;

int number;

cin >> number;

cout << "Octal to binary conversion for this decimal is:" << OctatoBin(number) << endl;

break;

}

default: {

cout << " Invalid choice entered. Thank you and try again . ";

break;

}

}

cout<< endl << endl << " End of program , Final Thank you" << endl;

return 0;

}