

## OCTAL TO BINARY CONVERSION

**AIM:** To implement octal number into binary number conversion.

### THEORY:

The octal number system is a base-8 number system. This means that it has a total of 8 symbols, 0, 1, 2, 3, 4, 5, 6, 7, for representing the values.

In computers, octal numbers are represented in two ways:

- Writing 8 as the suffix of the value (e.g.  $305_8$ ).
- Writing 0o as the prefix of the value (e.g. 0o305).

The binary number system, on the other hand, is a base-2 number system. This means that it has a total of 2 symbols, 0 and 1, for representing the values.

In computers, binary numbers are represented in the following two ways:

- Writing 2 as the suffix of the value (e.g.  $10110_2$ ).
- Writing 0b as the prefix of the value (e.g. 0b1011010110).

### Converting a number from Octal to Binary

The following steps are needed to convert from Octal to Binary:

- Convert each octal digit to its 3-digit binary representation. Each of the digits must be treated as a decimal value.
- Combine these binary representations to form a single binary number.

### ALGORITHM:

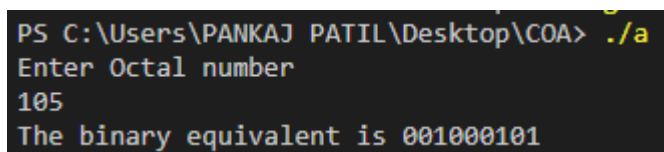
1. START.
2. Count the number of digits present in the given number. Let the number of digits be 'n'.
3. Now multiply each digit of the number with  $8^{n-1}$ , when the digit is in the nth position from the right end of the number. If the number has a decimal part, multiply each digit in the decimal part by  $8^{-m}$  when the digit is in the  $m^{\text{th}}$  position from the decimal point.
4. Add all the terms after multiplication.
5. The obtained value is the equivalent decimal number.
6. Take the above-produced decimal number and divide it by 2.
7. Note down the remainder.
8. Continue the above two steps for the quotient till the quotient is zero.
9. Write the remainder in the reverse order.
10. The received number is the equivalent binary number for the given octal number.
11. STOP.

### PROGRAM:

```
#include<iostream>
#include<math.h>
using namespace std;
void octtobin(int n)
{
    int r,i=0,a[20],rem,c;
    while(n!=0)
    {
        r=n%10;
        if(r>7)
        {
            cout<<"The Number is not Octal\n";
            return ;
        }
        c=0;
        while(c<3)
        {
            rem=r%2;
            a[i++]=rem;
        }
        n/=10;
        cout<<"The binary equivalent is ";
        for(c=i-1;c>=0;c--)
            cout<<a[c];
    }
}

int main()
{
    int num;
    cout<<"Enter Octal number\n";
    cin>>num;
    octtobin(num);
    return 0;
}
```

### OUTPUT:



```
PS C:\Users\PANKAJ PATIL\Desktop\COA> ./a
Enter Octal number
105
The binary equivalent is 001000101
```

### CONCLUSION:

The Program for octal to binary Conversion was successfully written, debugged , compiled and executed.