

Number System Conversion With C

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ABSTRACT:

This report contains C programs on Number System Conversions. These programs are used to convert Numbers from Decimal to Binary, Decimal to Octal, Decimal to Hexadecimal. With the help of these programs, we will convert number from one number system to another number system.

Decimal to Binary: Decimal numbers can be converted to binary by repeated division of the number by 2 while recording the remainder. Let's take an example to see how this happens. Decimal to Octal: Decimal numbers can be converted to octal by repeated division of the number by 8 while recording the remainder. Let's take an example to see how this happens. Decimal to Hexadecimal: Decimal numbers can be converted to octal by repeated division of the number by 16 while recording the remainder. Let's take an example to see how this happens.

INTRODUCTION:

A numeral system is a writing system for expressing numbers; that is, a mathematical notation for representing numbers of a given set, using digits or other symbols in a consistent manner. The same sequence of symbols may represent different numbers in different numeral systems.

Computers use the binary system, base 2, which is easier to express in hexadecimal, base 16, taking four bits at a time. Because we use the decimal system it is necessary to program computers to convert from the hexadecimal system back to the decimal system that we are familiar with.

Types of Number Systems:

There are different types of number systems in which the four main types are as follows.

- Binary number system (Base - 2)
- Octal number system (Base - 8)
- Decimal number system (Base - 10)
- Hexadecimal number system (Base - 16)

SCOPE OF THE PROJECT:

Electronic and Digital systems may use a variety of different number system conversion. Binary is found in computer technology. All computer language and programming is based on the 2-digit number system used in digital encoding (is the process of taking data and representing it with discrete bits of information).

Octal was used widely in the Electronics and Computer Industry, as although digital electronics is based on gates with only two states and is therefore fundamentally binary, binary numbers can quickly become long and hard to transcribe without errors.

Hexadecimal numbering system is often used by programmers to simplify the binary numbering system. Since 16 is equivalent to 2^4 , there is a linear relationship between the numbers 2 and 16.

HARDWARE REQUIREMENTS:

Processor: AMD Ryzen 7 5800H with Radeon Graphics 3.20 GHz

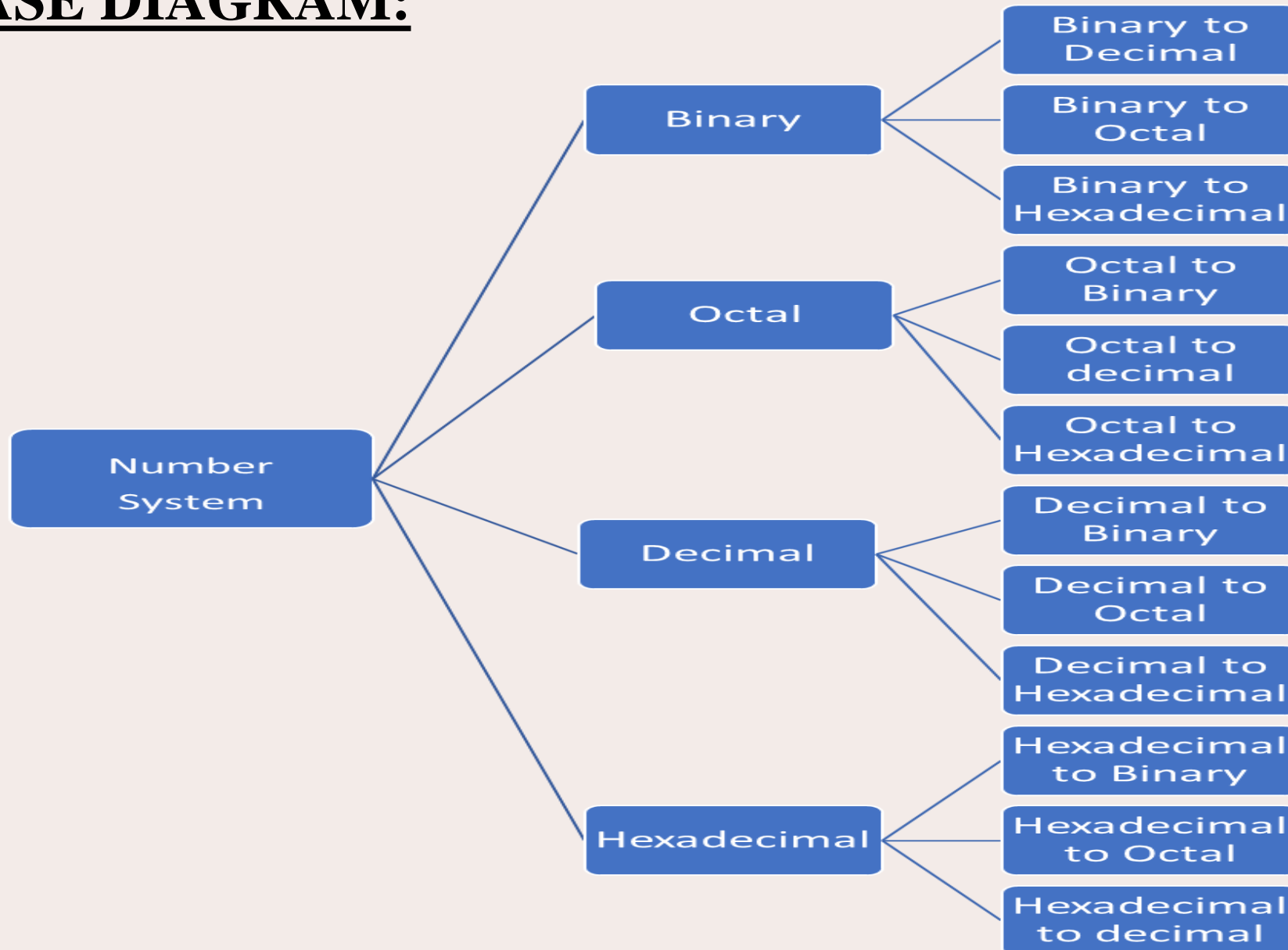
RAM :16.0 GB (13.9 GB usable)

System type: 64-bit operating system, x64-based processor

SOFTWARE REQUIREMENTS:

Programiz - Programiz is a C online compiler. It uses the GCC C compiler to compile code.

USE CASE DIAGRAM:



IMPLEMENTATION

```
1 #include<stdio.h>
2 #include<math.h>
3
4 void dec_bin(long int num)
5 {
6     long int rem[50],i=0,length=0;
7     while(num>0)
8     {
9         rem[i]=num%2;
10        num=num/2;
11        i++;
12        length++;
13    }
14    printf("Binary number : ");
15    for(i=length-1;i>=0;i--)
16        printf("%ld",rem[i]);
17 }
18 void dec_oct(long int num)
19 {
20     long int rem[50],i=0,length=0;
21     while(num>0)
22     {
23         rem[i]=num%8;
24         num=num/8;
25         i++;
26         length++;
27     }
28     printf("Octal number : ");
29     for(i=length-1;i>=0;i--)
30         printf("%ld",rem[i]);
31 }
32 void dec_hex(long int num)
33 {
34     long int rem[50],i=0,length=0;
35     while(num>0)
```

```
36     {
37         rem[i]=num%16;
38         num=num/16;
39         i++;
40         length++;
41     }
42 }
43
44 printf("Hexadecimal number : ");
45 for(i=length-1;i>=0;i--)
46 {
47     switch(rem[i])
48     {
49         case 10:
50             printf("A");
51             break;
52         case 11:
53             printf("B");
54             break;
55         case 12:
56             printf("C");
57             break;
58         case 13:
59             printf("D");
60             break;
61         case 14:
62             printf("E");
63             break;
64         case 15:
65             printf("F");
66             break;
67         default :
68             printf("%ld",rem[i]);
```

```
        break;
    }
}

void main()
{
    long int num,numb;

    printf("Enter the decimal number : ");
    scanf("%ld",&num);
    printf("1.Decimal to binary \n");
    printf("2.Decimal to octal \n");
    printf("3.Decimal to hexadecimal \n");

    scanf("%ld",&numb);
    switch(numb)
    {case 1 : dec_bin(num);
      break;
     case 2 : dec_oct(num);
      break;
     case 3 : dec_hex(num);
      break;
     default : printf(" invalid choice");
    }
}
```

OUTPUT SNAPSHOTS

CASE1:Decimal to Binary

```
Enter the decimal number : 241801
1.Decimal to binary
2.Decimal to octal
3.Decimal to hexadecimal
1
Binary number : 111011000010001001
```

CASE2:Decimal to Octal

```
Enter the decimal number : 241801
1.Decimal to binary
2.Decimal to octal
3.Decimal to hexadecimal
2
Octal number : 730211
```

CASE3:Decimal to Hexadecimal

```
Enter the decimal number : 241801
1.Decimal to binary
2.Decimal to octal
3.Decimal to hexadecimal
3
Hexadecimal number : 3B089
```


CONCLUSION:

From this project, the user can easily convert any number system such as: Binary to decimal, octal, hexadecimal. Decimal to binary, octal, hexadecimal. Octal to binary, decimal, hexadecimal. Hexadecimal to binary, decimal, octal. The user has to choose numbers and then enter the number according to their conversion. This project has made the number system conversion fast and easy for the users. The whole project is designed in 'C' Programming language and different variables and strings have been used for the development of this project. This project is easy to operate and understand the users.