**Number System Programs in C Language**

Program 1:

In this program, we have created a user defined function binaryToDecimal() for binary to decimal conversion. This programs takes the binary number (entered by user) as input and converts it into a decimal number using function.

#include <stdio.h>

#include <math.h>

int binaryToDecimal(long binarynum)

{

int decimalnum = 0, temp = 0, remainder;

while (binarynum!=0)

{

remainder = binarynum % 10;

binarynum = binarynum / 10;

decimalnum = decimalnum + remainder\*pow(2,temp);

temp++;

}

return decimalnum;

}

int main()

{

long binarynum;

printf("Enter a binary number: ");

scanf("%ld", &binarynum);

printf("Equivalent decimal number is: %d", binaryToDecimal(binarynum));

return 0;

}

Output:

Enter a binary number: 1010111

Equivalent decimal number is: 87

Program 2:

In this program, we have created a user defined function decimalToBinary() for decimal to binary conversion. The programs takes decimal number (entered by user) as input and converts it into a binary number using the function decimalToBinary().

#include <stdio.h>

#include <math.h>

long decimalToBinary(int decimalnum)

{

long binarynum = 0;

int rem, temp = 1;

while (decimalnum!=0)

{

rem = decimalnum%2;

decimalnum = decimalnum / 2;

binarynum = binarynum + rem\*temp;

temp = temp \* 10;

}

return binarynum;

}

int main()

{

int decimalnum;

printf("Enter a Decimal Number: ");

scanf("%d", &decimalnum);

printf("Equivalent Binary Number is: %ld", decimalToBinary(decimalnum));

return 0;

}

Output:

Enter a Decimal Number: 234

Equivalent Binary Number is: 11101010

Program 3:

In this program, we have created a user defined function decimalToOctal() for decimal to octal conversion. The program takes the decimal number(entered by user) as input and converts it into an octal number using the function.

#include <stdio.h>

#include <math.h>

/\* This function converts the decimal number "decimalnum"

\* to the equivalent octal number

\*/

int decimalToOctal(int decimalnum)

{

int octalnum = 0, temp = 1;

while (decimalnum != 0)

{

octalnum = octalnum + (decimalnum % 8) \* temp;

decimalnum = decimalnum / 8;

temp = temp \* 10;

}

return octalnum;

}

int main()

{

int decimalnum;

printf("Enter a Decimal Number: ");

scanf("%d", &decimalnum);

printf("Equivalent Octal Number: %d", decimalToOctal(decimalnum));

return 0;

}

Output:

Enter a Decimal Number: 436

Equivalent Octal Number: 664

Program 4:

In this program, we have created a user defined function for octal to decimal conversion. The program takes the octal number (entered by user) as input and converts it into a decimal number using function.

#include <stdio.h>

#include <math.h>

/\* This function converts the octal number "octalnum" to the

\* decimal number and returns it.

\*/

long octalToDecimal(int octalnum)

{

int decimalnum = 0, temp = 0;

while(octalnum != 0)

{

decimalnum = decimalnum + (octalnum%10) \* pow(8,temp);

temp++;

octalnum = octalnum / 10;

}

return decimalnum;

}

int main()

{

int octalnum;

printf("Enter an octal number: ");

scanf("%d", &octalnum);

printf("Equivalent decimal number is: %ld", octalToDecimal(octalnum));

return 0;

}

Output:

Enter an octal number: 754

Equivalent decimal number is: 492

Program 5:

In this program, user is asked to enter the binary number and the program then converts that binary number to the octal number by calling a user defined function.

#include <stdio.h>

#include <math.h>

//This function converts binary number to octal number

int binaryToOctal(long binarynum)

{

int octalnum = 0, decimalnum = 0, i = 0;

/\* This while loop converts binary number "binarynum" to the

\* decimal number "decimalnum"

\*/

while(binarynum != 0)

{

decimalnum = decimalnum + (binarynum%10) \* pow(2,i);

i++;

binarynum = binarynum / 10;

}

//i is re-initialized

i = 1;

/\* This loop converts the decimal number "decimalnum" to the octal

\* number "octalnum"

\*/

while (decimalnum != 0)

{

octalnum = octalnum + (decimalnum % 8) \* i;

decimalnum = decimalnum / 8;

i = i \* 10;

}

//Returning the octal number that we got from binary number

return octalnum;

}

int main()

{

long binarynum;

printf("Enter a binary number: ");

scanf("%ld", &binarynum);

// calling the function here

printf("Equivalent octal value: %d", binaryToOctal(binarynum));

return 0;

}

Output:

Enter a binary number: 111001

Equivalent octal value: 71

Program 6:

In this program we have created a user defined function octalToBinary(). This function converts the octal number (entered by user) to decimal number first and then converts that decimal number to binary number.

#include <stdio.h>

#include <math.h>

//This function converts octal number to binary number

long octalToBinary(int octalnum)

{

int decimalnum = 0, i = 0;

long binarynum = 0;

/\* This loop converts octal number "octalnum" to the

\* decimal number "decimalnum"

\*/

while(octalnum != 0)

{

decimalnum = decimalnum + (octalnum%10) \* pow(8,i);

i++;

octalnum = octalnum / 10;

}

//i is re-initialized

i = 1;

/\* This loop converts the decimal number "decimalnum" to the binary

\* number "binarynum"

\*/

while (decimalnum != 0)

{

binarynum = binarynum + (decimalnum % 2) \* i;

decimalnum = decimalnum / 2;

i = i \* 10;

}

//Returning the binary number that we got from octal number

return binarynum;

}

int main()

{

int octalnum;

printf("Enter an octal number: ");

scanf("%d", &octalnum);

//Calling the function octaltoBinary

printf("Equivalent binary number is: %ld", octalToBinary(octalnum));

return 0;

}

Output:

Enter an octal number: 71

Equivalent binary number is: 111001