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**Section: A**

**Course Code: CSC103**

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**Program:**

**Conversion of Binary , Octal , Hexadecimal number**

**to Decimal number**

#include<stdio.h>

#include<math.h>

#include<string.h>

int main()

{

int no=0,i=0,no\_base=0; //the number is binary and octal ,exponent of number and base number

int rem=0,dec=0,len=0,value=0; // remainder(digit) ,decimal number , length of string , array

while(no!=-1){ //the loop ends at -1

printf("Enter the 2 for Binary number , 8 for Octal number and 16 for Hexadecimal number and -1 to exit the loop\n"); // input number from user

scanf("%d",&no\_base);

if (no\_base!=2 || no\_base!=8 || no\_base!=16)

{

Printf(“ Invalid base ! Enter the base again!\n”);

Scanf(“%d”,&no\_base);

switch(no\_base){ //cases for binary , octal and Hexadecimal numbers

case 2 :

printf("Enter the binary number\n"); //if user enter binary number this case executes

scanf("%d",&no);

while(no!=0){ // to get digits in separated form

rem=no%10;

if(rem !=0 && rem!=1){

printf("number exceed base! number must be smaller than its base\n"); //condition for number validity

scanf("%d",&no);

}

dec = dec + rem \* pow(2,i); //calculation of decimal number

no = no / 10;

i++;

}

printf("the decimal number is :%d\n",dec); //results

break;

case 8:

printf("Enter the Octal number\n"); // for octal number

scanf("%d",&no);

while(no!=0){

rem=no%10; //digits separation in number

if(rem>=8){

printf("number exceed base! number must be smaller than its base ! enter the number again\n"); // number validity

scanf("%d",&no);

}

dec=dec+rem\*pow(8,i); //decimal number calculation

no=no/10;

i++;

}

printf("the decimal number is :%d\n",dec); //results in decimal number

break;

case 16:

printf("Enter the Hexadecimal Number\n"); //for hexadecimal number

scanf(" %s",&no);

char hexa[32]="2D"; //array to store digits of hexadecimal number

int dec,i,c,digit; // decimal number ,counter , exponent, digits of number

for(i=(strlen(hexa)-1);i>=0;i--){

switch(hexa[i]){ //cases for A=10,B=11,C=12,D=13,E=14 and F=15

case'A':

case'a':

digit=10;

break;

case'B':

case'b':

digit=11;

break;

case'C':

case'c':

digit=12;

break;

case'D':

case'd':

digit=13;

break;

case'E':

case'e':

digit=14;

break;

case'F':

case'f':

digit=15;

break;

default: // number other than 0-9 or character other than A-F

digit=hexa[i]-0\*30;

}

dec=dec+digit\*pow(16,c); //decimal number calculation

c++;

}

printf("dec no is %d",dec); //results

}

}

return 0; //main program ends here

}

**Program Execution:**

**Code Explanation:**

* In the first step , we allow user to enter the numbers base i.e binary number=2 , octal number=8 and hexadecimal number=16 .
* If the base is other than 2,8 and 16 , we allow user to enter the base again.
* After inputting or selecting the base , we allow user to enter the respective number i.e binary(0,1), octal (0-7) or hexadecimal number (0-9 + A-F).
* If the digits in the number exceed the base then the user will enter the number again.
* For binary number , 1st case of switch executes and the digits separate then values are put in formula for decimal number results.
* For octal number , the same steps will repeat , separation of digits, validity of digits and calculation of decimal number , etc.
* In case of hexadecimal number, we make further switches for characters A-F and assign them respective values .
* The program executes and validity of number, base, calculation will performed .

**Pseudocode Of Porgram:**