Madhav Institute of Technology & Science Gwalior (M.P.)

(A Govt. Aided UGC Autonomous Institute & NAAC Accredited, Est. in 1957, Affiliated to RGPV Bhopal)

A Skill Based Mini Project Report

On

COMPUTER PROGRAMMING (2160122)

BASE CONVERSION SYSTEM FOR VARIOUS NUMBER SYSTEMS

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Submitted to:

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE

GWALIOR - 474005 (MP) est. 1957

NOVEMBER-MARCH 2022-23

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CERTIFICATE

This is certified that **SURYANSH DIXIT** (0901EC221130)**, SAKSHAM YADAV** (0901EC221099)**, SHASHANK PANDEY** (0901EC221110) and **PULKIT KAPOOR** (0901EC221080) have submitted the project report titled

BASE CONVERSION SYSTEM FOR VARIOUS NUMBER SYSTEMS

under the mentorship of **Dr. Ranjeet Kumar Singh, Hemlata Arya** and **Kratika Sharma**, in partial fulfilment of the requirement for the award of degree of Bachelor of Technology in Electronics Engineering from Madhav Institute of Technology and Science, Gwalior.

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DECLARATION

We hereby declare that the work being presented in this project report, for the partial fulfilment of requirement for the award of the degree of Bachelor of Technology in Electronics Engineering at Madhav Institute of Technology & Science, Gwalior is an authenticated and original record of our work under the mentorship of **Dr. Ranjeet Kumar Singh, Hemlata Arya,** and **Kratika Sharma, Assistant Professor , Computer Science and Engineering**

We declare that we have not submitted the matter embodied in this report for the award of any degree or diploma anywhere else.

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ACKNOWLEDGEMENT

The full semester project has proved to be pivotal to my career. We are thankful to our institute, **Madhav Institute of Technology and Science** to allow us to continue our disciplinary/interdisciplinary project as a curriculum requirement, under the provisions of the Flexible Curriculum Scheme (based on the AICTE Model Curriculum 2018), approved by the Academic Council of the institute. We extend our gratitude to the Director of the institute, **Dr. R. K. Pandit** and Dean Academics, **Dr. Manjaree Pandit** for this. We would sincerely like to thank our department, Department of Electronics Engineering, for allowing us to explore this project. We humbly thank **Dr. Vandana Vikas Thakre**, Head Department of Electronics Engineering, for her continued support during the course of this engagement, which eased the process and formalities involved. We are sincerely thankful to our faculty mentors. We are grateful to the guidance of **Dr. Ranjeet Kumar Singh, Hemlata Arya,** and **Kratika Sharma, Assistant Professor, Computer Science and Engineering**, for their continued support and guidance throughout the project. We are also very thankful to the faculty and staff of the department

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INTRODUCTION

This report discusses the result of the work done in development of

"**BASE CONVERSION SYSTEM FOR VARIOUS NUMBER SYSTEMS**"

on C++ platform. It is a part of Skill Based Mini Project going in Electronics Engineering Department, Madhav Institute of Technology and Science, Gwalior and aims at the development of a programme for providing an easy approach for base conversion for various types of number systems.

IMPLEMENTATION

```
//Number System.
//Base Converter.

#include<iostream>
#include<math.h>
#include<string.h>
using namespace std;
//prototypes//
void decitobin(int);
void decitooct(int);
void decitohex(int);
int bintodeci(int);
int octatodeci(int);
int hexatodeci(string);
//main function//
int main(){
    char choice;
    int y, a, b, c, d;

    execute:

    cout<<"\n";
    cout<<"\n\t\t\t\t\t\t\t\t\t----------------------------------\t\t\n";
    cout<<"\t\t\t\t\t\t|\t\t--->  SELECT YOUR NUMER SYSTEM  <---\t\t|";
    cout<<"\n\t\t\t\t\t\t|\t\t                                \t\t|\
    \n\t\t\t\t\t\t|\t\t  PRESS '1' For Decimal System.\t\t\t|\
    \n\t\t\t\t\t\t|\t\t  PRESS '2' For Binary System.\t\t\t|\
    \n\t\t\t\t\t\t|\t\t  PRESS '3' For Octal System.\t\t\t|\
    \n\t\t\t\t\t\t|\t\t  PRESS '4' For Hexadecimal System.\t\t|\
    \n\t\t\t\t\t\t\t\t----------------------------------\t\t\
    \n\
    \n\t\t\t\t\t\t\t\t   YOUR CHOICE HERE: ", cin>>y;
    cout<<"\n";
//if the system is decimal//
        if(y==1)
        {
            int x;
            cout<<"    Enter Your Number In Decimal System  [0-9]  : ",cin>>x;
            cout<<"    Number In Binary System.                    : ";
            decitobin(x);
            cout<<"\n    Number In Octal System.                     : ";
            decitooct(x);
            cout<<"\n    Number In Hexadecimal System.               : ";
```

```
            decitohex(x);
        }
//if the system is binary//
        else if(y==2)
        {
            int x;
            cout<<"    Enter Your Number In Binary System  [0,1]  : ", cin>>x;
            cout<<"    Number In Decimal System.                   : ";
            cout<<bintodeci(x);
            a=bintodeci(x);
            cout<<"\n    Number In Octal System.                     : ";
            decitooct(a);
            cout<<"\n    Number In Hexadecimal.                      : ";
            decitohex(a);
        }
//if the system is octal//
        else if(y==3)
        {
            int x;
            cout<<"    Enter Your Number In Octal System  [0-8]: ", cin>>x;
            cout<<"    Number In Decimal System.                 : ";
            cout<<octatodeci(x);
            b=octatodeci(x);
            cout<<"\n    Number In Binary.                       : ";
            decitobin(b);
            cout<<"\n    Number In Hexadecimal.                  : ";
            decitohex(b);
        }
//if the system is hexadecimal//
        else if(y==4)
        {
            string x;
            cout<<"    Enter Your Number In Hexadecimal  [0-9] and [a-f]: ",
cin>>x;
            cout<<"    Number In Decimal System.                         : ";
            cout<<hexatodeci(x);
            c=hexatodeci(x);
            cout<<"\n    Number In Binary System.                          : ";
            decitobin(c);
            cout<<"\n    Number In Octal System.                           : ";
            decitooct(c);
        }
        cout<<"\n";

    error:

    cout<<"\t\t\t\t\t\t\t\t-----------------------------------\t\t\n\
```

```
    \n\t\t\t\t\t\t|\t\t  Want to execute the Program ?\t\t\t|\n\
    \n\t\t\t\t\t\t\t\t-------------------------------------\t\t\n";
    cout<<"\n\t\t\t\t\t\t\t\t  Enter your choice (Y/N):\t", cin>>choice;

    if (choice == 'Y'|| choice == 'y')
    {
        goto execute;
    }
    else if (choice == 'N'|| choice == 'n' )
    {
        cout<<"\nThank You. Have a nice day..!!\n\n\n";
    }
    else{
        cout<<"\nError.!! Enter a valid choice.";
        cout<<"\n";
        goto error;
    }

    return 0;
}
//function01//
void decitobin(int numb)
{
    int remain[64];
    int j, n=numb, i=0;
    while(n>0)
    {
        remain[i]=n%2;
        n=n/2;
        i++;
    }
    for(j=(i-1);j>=0;j--)
    {
        cout<<remain[j];
    }
}
//function02//
void decitooct(int numb)
{
    int n=numb, j, i=0;
    int remain[64];
    while(n>0)
    {
        remain[i]=n%8;
        n=n/8;
        i++;
    }
```

```
    for(j=i-1; j>=0; j--)
    {
        cout<<remain[j];
    }
}
//function03//
void decitohex(int numb)
{
    int x=0;
    int arr[50] = {};
    char alpha[6][2] = {{10, 'A'}, {11, 'B'}, {12, 'C'}, {13, 'D'}, {14, 'E'},
{15, 'F'}};
    while(numb>0)
    {
        arr[x]=numb%16;
        x++;
        numb/=16;
    }
    for(int i=(x-1); i>=0; i--)
    {
        if(arr[i]>=10)
        {
            cout<<alpha[arr[i]-10][1];
        }
        else
        {
            cout<<arr[i];
        }
    }
}
//function04//
int bintodeci(int numb)
{
    int a, d, i, n, r, x, y;
    a=numb;
    y=0;
    i=0;
    do
    {
        d = a % 10;
        y= y + d*(pow(2,i));
        i++;
        a=a/10;
    }
    while(a>0);
    return(y);
}
```

```
//function05//
int octatodeci(int numb)
{
    int a, d, i, x, y;
    a=numb;
    y=0;
    i=0;
    do
    {
        d = a % 10;
        y= y + d*(pow(8,i));
        i++;
        a=a/10;
    }
    while(a>0);
    return (y);
}
//function06//
int hexatodeci(string a)
{
    string c;
    int b = 0;
    string s = "0123456789abcdef";
    for (int i = 0; i < a.size(); i++)
    {
        for (int j = 0; j < s.size(); j++)
        {
            if (a[i] == s[j])
            {
                c += j;
            }
        }
    }
    for (int i = 0; i < c.size(); i++)
    {}
    int t = 0;
    int p = c.size();
    while (p)
    {
        b += c[p - 1] * pow(16, t);
        p--;
        t++;
    }
    return (b);
}

//END//
```

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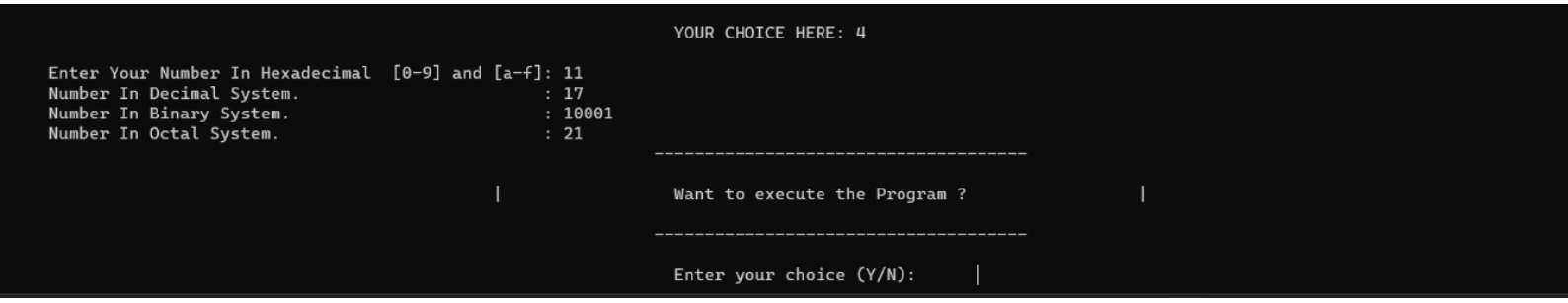
RESULT

```
                                    ------------------------------------
                                    --->  SELECT YOUR NUMER SYSTEM  <---
                                    |
                                      PRESS '1' For Decimal System.
                                      PRESS '2' For Binary System.
                                      PRESS '3' For Octal System.
                                      PRESS '4' For Hexadecimal System.
                                    ------------------------------------

                                      YOUR CHOICE HERE: 1

Enter Your Number In Decimal System  [0-9]  : 457
Number In Binary System.                    : 111001001
Number In Octal System.                     : 711
Number In Hexadecimal Sytem.                : 1C9
                                    ------------------------------------

                                    |   Want to execute the Program ?

                                    ------------------------------------

                                      Enter your choice (Y/N):      Y


                                    ------------------------------------
                                    --->  SELECT YOUR NUMER SYSTEM  <---
                                    |
                                      PRESS '1' For Decimal System.
                                      PRESS '2' For Binary System.
                                      PRESS '3' For Octal System.
                                      PRESS '4' For Hexadecimal System.
                                    ------------------------------------

                                      YOUR CHOICE HERE: 2

Enter Your Number In Binary System  [0,1]  : 101101
Number In Decimal System.                  : 45
Number In Octal System.                    : 55
Number In Hexadecimal.                     : 2D
                                    ------------------------------------

                                    |   Want to execute the Program ?

                                    ------------------------------------

                                      Enter your choice (Y/N):      Y


                                    ------------------------------------
                                    --->  SELECT YOUR NUMER SYSTEM  <---
                                    |
                                      PRESS '1' For Decimal System.
                                      PRESS '2' For Binary System.
                                      PRESS '3' For Octal System.
                                      PRESS '4' For Hexadecimal System.
                                    ------------------------------------

                                      YOUR CHOICE HERE: 3

Enter Your Number In Octal System  [0-8]: 25
Number In Decimal System.               : 21
Number In Binary.                       : 10101
Number In Hexadecimal.                  : 15
                                    ------------------------------------

                                    |   Want to execute the Program ?

                                    ------------------------------------

                                      Enter your choice (Y/N):      Y


                                    ------------------------------------
                                    --->  SELECT YOUR NUMER SYSTEM  <---
                                    |
                                      PRESS '1' For Decimal System.
                                      PRESS '2' For Binary System.
                                      PRESS '3' For Octal System.
                                      PRESS '4' For Hexadecimal System.
                                    ------------------------------------
```



CONCLUSION

From this project we learnt about the Base Conversion of Various Number Systems and development of a programme for providing an easy approach with the help of C++ language.

The group students got deep knowledge in the field of C++ programming especially focusing on the concepts such as Functions, Recursions, Prototyping, Arrays, Loops, Goto statement, Strings, etc.

Hence, this Project enhanced our Logical Thinking, Fundamentals of this particular language and spirit of Team Work.