



University Institute of Computing
Chandigarh University
Gharuan , Mohali(Punjab)
COMPUTING APTITUDE MINI PROJECT
ON
“Number System Converter”

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Mini Project Report on Number Converter System in C Language

1. Title

Number Converter System

2. Aim

To design and implement a Number Converter System using the C programming language that converts numbers between different numeral systems such as Decimal, Binary, Octal, and Hexadecimal.

3. Introduction

A Number Converter System is a simple yet useful program that allows users to convert numbers from one base system to another.

Number systems like Binary (base 2), Octal (base 8), Decimal (base 10), and Hexadecimal (base 16) are commonly used in computer science and digital electronics.

This project demonstrates how to perform these conversions using basic logic, loops, and conditional statements in C.

The system helps users understand number systems practically and enhances their programming logic and problem-solving skills.

4. Objectives

1. To develop a menu-driven program for number system conversions.
2. To allow conversion between:
 - Decimal ↔ Binary
 - Decimal ↔ Octal
 - Decimal ↔ Hexadecimal
 - Binary ↔ Decimal

3. To strengthen understanding of **loops**, **functions**, and **conditional logic** in C language.
 4. To provide an easy-to-use and accurate number conversion tool.
-

5. Tools and Technologies Used

- **Programming Language:** C
 - **Compiler:** GCC / Turbo C / Code::Blocks
 - **Platform:** Windows / Linux
 - **Concepts Used:** Loops, Functions, Arrays, Conditional Statements
-

6. System Design

The system is **menu-driven**, allowing the user to:

1. Choose the type of conversion.
2. Enter the number to convert.
3. Get the converted output displayed on the screen.

Flow of the Program:

Start



Display Menu



Take User Choice



Input Number



Perform Conversion



Display Result

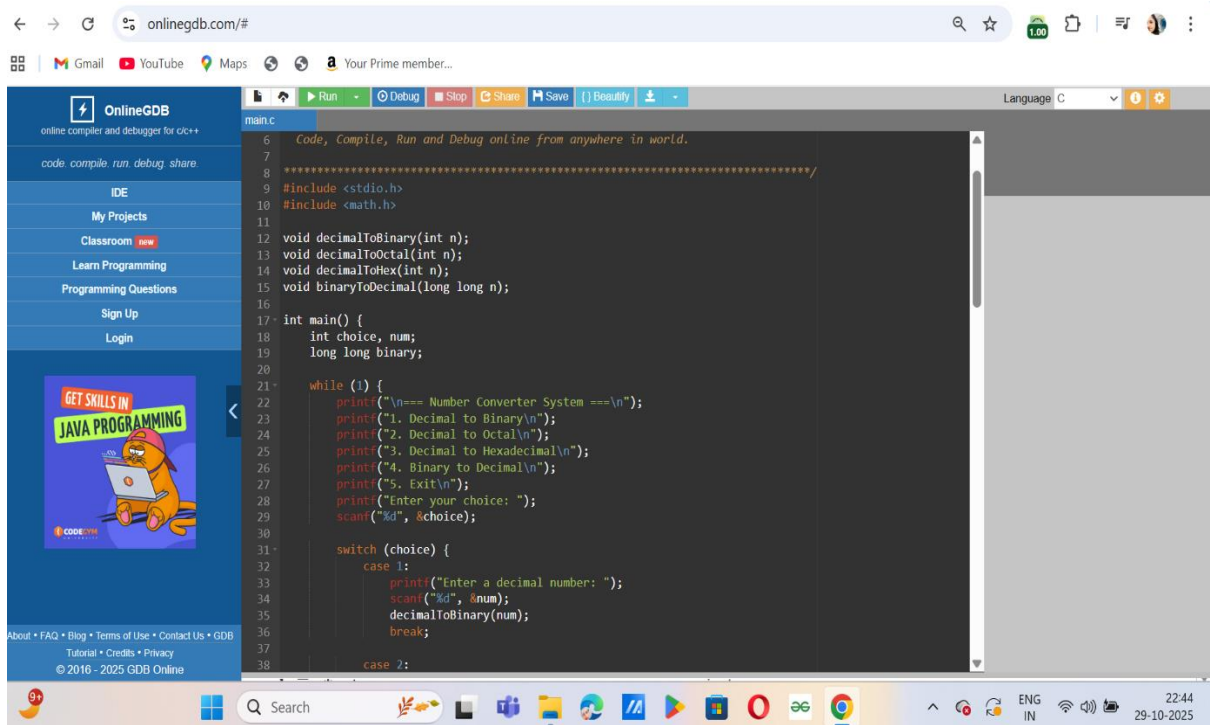


Repeat or Exit



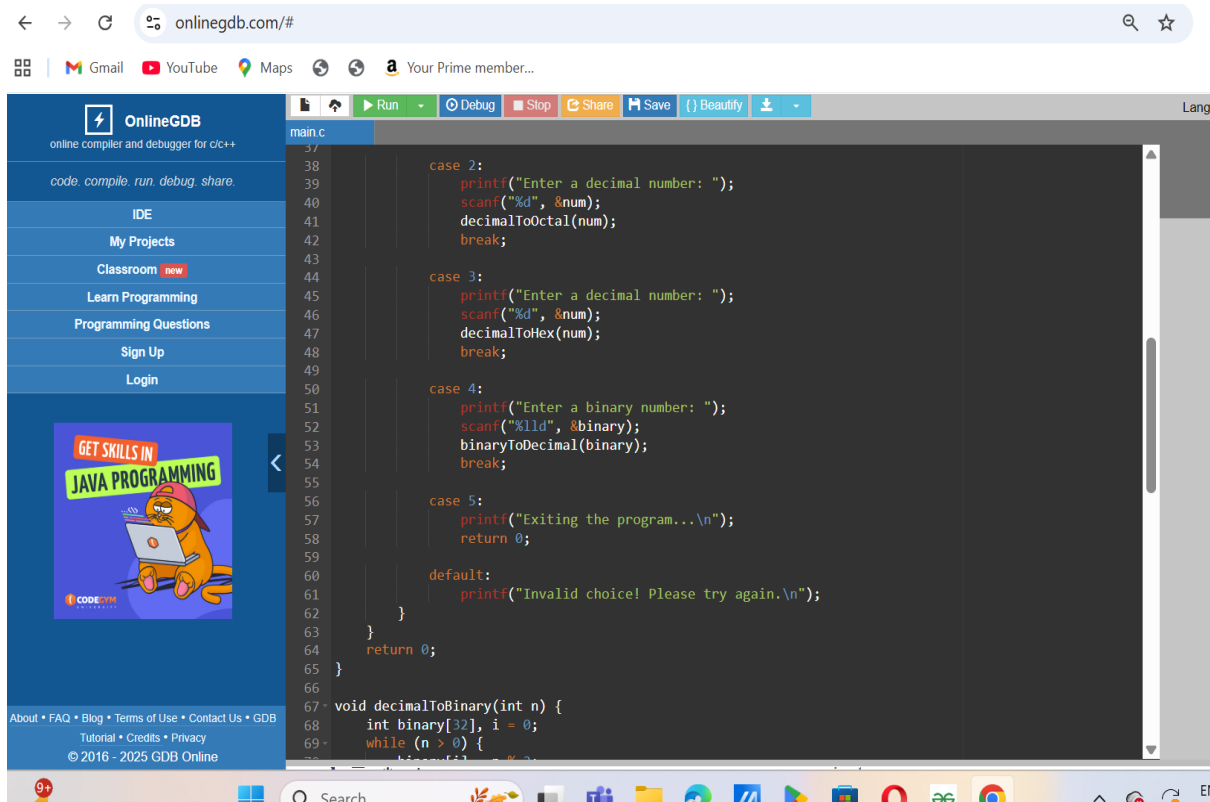
End

7. Source Code (C Program)



The screenshot shows the OnlineGDB website interface. The browser address bar displays "onlinegdb.com/#". The website's navigation menu on the left includes links for "code, compile, run, debug, share.", "IDE", "My Projects", "Classroom", "Learn Programming", "Programming Questions", "Sign Up", and "Login". A promotional banner for "GET SKILLS IN JAVA PROGRAMMING" is visible. The main editor area displays the source code of a C program named "main.c". The code implements a number converter system with the following functions: `decimalToBinary`, `decimalToOctal`, `decimalToHex`, and `binaryToDecimal`. The `main` function uses a `while` loop to present a menu of options to the user, allowing them to convert between decimal, binary, octal, and hexadecimal, or to exit the program. The code is as follows:

```
6 Code, Compile, Run and Debug online from anywhere in world.
7
8 *****/
9 #include <stdio.h>
10 #include <math.h>
11
12 void decimalToBinary(int n);
13 void decimalToOctal(int n);
14 void decimalToHex(int n);
15 void binaryToDecimal(long long n);
16
17 int main() {
18     int choice, num;
19     long long binary;
20
21     while (1) {
22         printf("\n=== Number Converter System ===\n");
23         printf("1. Decimal to Binary\n");
24         printf("2. Decimal to Octal\n");
25         printf("3. Decimal to Hexadecimal\n");
26         printf("4. Binary to Decimal\n");
27         printf("5. Exit\n");
28         printf("Enter your choice: ");
29         scanf("%d", &choice);
30
31         switch (choice) {
32             case 1:
33                 printf("Enter a decimal number: ");
34                 scanf("%d", &num);
35                 decimalToBinary(num);
36                 break;
37
38             case 2:
```



This screenshot shows the continuation of the C program source code from the previous image. The `switch` statement in the `main` function continues with cases 2 through 5, each calling the appropriate conversion function and then breaking out of the loop. The `default` case prints an error message. The `decimalToBinary` function is also shown, which uses an array to store the binary digits. The code is as follows:

```
39             case 2:
40                 printf("Enter a decimal number: ");
41                 scanf("%d", &num);
42                 decimalToOctal(num);
43                 break;
44             case 3:
45                 printf("Enter a decimal number: ");
46                 scanf("%d", &num);
47                 decimalToHex(num);
48                 break;
49             case 4:
50                 printf("Enter a binary number: ");
51                 scanf("%lld", &binary);
52                 binaryToDecimal(binary);
53                 break;
54             case 5:
55                 printf("Exiting the program...\n");
56                 return 0;
57             default:
58                 printf("Invalid choice! Please try again.\n");
59         }
60     }
61     return 0;
62 }
63
64 void decimalToBinary(int n) {
65     int binary[32], i = 0;
66     while (n > 0) {
67         binary[i] = n % 2;
68         n = n / 2;
69         i++;
70     }
71     printf("Binary: ");
72     for (int j = i - 1; j >= 0; j--) {
73         printf("%d", binary[j]);
74     }
75     printf("\n");
76 }
```

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main.c

```
69 while (n > 0) {
70     binary[i] = n % 2;
71     n = n / 2;
72     i++;
73 }
74 printf("Binary: ");
75 for (int j = i - 1; j >= 0; j--)
76     printf("%d", binary[j]);
77 printf("\n");
78 }
79
80 void decimalToOctal(int n) {
81     int octal[32], i = 0;
82     while (n > 0) {
83         octal[i] = n % 8;
84         n = n / 8;
85         i++;
86     }
87     printf("Octal: ");
88     for (int j = i - 1; j >= 0; j--)
89         printf("%d", octal[j]);
90     printf("\n");
91 }
92
93 void decimalToHex(int n) {
94     char hex[32];
95     int i = 0;
96     while (n != 0) {
97         int temp = n % 16;
98         if (temp < 10)
99             hex[i] = temp + 48;
100         else
101             hex[i] = temp + 55;
```

Language: C

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main.c

```
92
93 void decimalToHex(int n) {
94     char hex[32];
95     int i = 0;
96     while (n != 0) {
97         int temp = n % 16;
98         if (temp < 10)
99             hex[i] = temp + 48;
100         else
101             hex[i] = temp + 55;
102         n = n / 16;
103         i++;
104     }
105     printf("Hexadecimal: ");
106     for (int j = i - 1; j >= 0; j--)
107         printf("%c", hex[j]);
108     printf("\n");
109 }
110
111 void binaryToDecimal(long long n) {
112     int decimal = 0, base = 1, rem;
113     while (n > 0) {
114         rem = n % 10;
115         decimal = decimal + rem * base;
116         n = n / 10;
117         base = base * 2;
118     }
119     printf("Decimal: %d\n", decimal);
120 }
121
```

input

Enter a decimal number: 10

8. Output

```
119     printf("Decimal: %d\n", decimal);
120 }
121
```

input

```
=== Number Converter System ===
1. Decimal to Binary
2. Decimal to Octal
3. Decimal to Hexadecimal
4. Binary to Decimal
5. Exit
Enter your choice: 1
Enter a decimal number: 10
Binary: 1010

<=== Number Converter System ===
1. Decimal to Binary
2. Decimal to Octal
3. Decimal to Hexadecimal
4. Binary to Decimal
5. Exit
Enter your choice: 2
Enter a decimal number: 64
Octal: 100

=== Number Converter System ===
1. Decimal to Binary
2. Decimal to Octal
3. Decimal to Hexadecimal
4. Binary to Decimal
5. Exit
Enter your choice: 3
Enter a decimal number: 255
```

input

```
Enter your choice: 3
Enter a decimal number: 255
Hexadecimal: FF

=== Number Converter System ===
1. Decimal to Binary
2. Decimal to Octal
3. Decimal to Hexadecimal
4. Binary to Decimal
5. Exit
<Enter your choice: 4
Enter a binary number: 1010
Decimal: 10

=== Number Converter System ===
1. Decimal to Binary
2. Decimal to Octal
3. Decimal to Hexadecimal
4. Binary to Decimal
5. Exit
Enter your choice: 5
Exiting the program...

...Program finished with exit code 0
Press ENTER to exit console.
```

9. Result

The Number Converter System successfully converts numbers between different numeral systems (Decimal, Binary, Octal, Hexadecimal) as per user input. The program runs efficiently and produces accurate results.

10. Conclusion

This mini project helped in understanding:

- Number systems and their conversions.
- Use of loops, arrays, and functions in C.
- Designing user-friendly console-based applications.

It also improved logical thinking and practical implementation of C programming concepts.

11. Future Enhancements

1. Add conversion between Octal \leftrightarrow Binary and Hexadecimal \leftrightarrow Decimal.
 2. Create a GUI version using graphics or modern languages.
 3. Add error checking for invalid inputs.
 4. Provide file saving options for results.
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