Problem Definition:

As a group of computer science students we are interested to develop a program that enables users to convert Binary to three major codes that are Binary to Gray Code, Weighted Binary Coded Decimal (BCD), Excess 3.

This a menu driven program in which the user is given a choice to convert Binary to any of the above given codes. To develop this program we use certain Java tools like creating a main class , creating object of a class and calling the functions of a class. We have also used recursion (it is a technique by which the function calls itself ) to convert Binary to Gray code. To convert Binary to BCD we first convert Binary to Decimal as an intermediate stage and then each decimal digit is converted to binary bits. To convert to Excess 3 we convert Binary to Decimal and add 3 to it, then that decimal value is converted to Binary bits.

* *Aim:*

The main purpose of this project is to convert Binary to the following codes:-

1. Gray Code: To convert Binary to Gray code we use recursion (it is technique by which the function calls itself ).
2. BCD: To convert Binary to BCD we first convert Binary to Decimal as intermediate stage, then each of the Decimal digits are expressed in Binary bits.
3. Excess 3: To convert Binary to Excess 3, we convert Binary to Decimal, them we add 3 to the decimal answer and convert it to Binary bits.

Note:- For Binary to BCD and Excess 3 conversion, where an intermediate stage is required where we convert Binary bits to Decimal digits we create an object of a class and call the functions in that class.

* *Objectives:*

Conversion from the binary system to any other system is complex, time-consuming, and somewhat ‘dry’ for any person. An easy way to make conversion with just a few taps on the keyword is by using a [binary converter](http://www.binarytranslator.com/). With the help of this tool, you can easily take different kinds of binary codes, and quickly convert them in the desired format to understand them. There are a lot of ways to use a binary converter, such as:

1. Binary to Gray code
2. Binary to BCD
3. Binary to XS3

With so many options at disposal, it is now extremely easy to convert different binary codes into a format that can be easily understood by the user. Not only that, different formats can be changed into binary codes as well, making the process hassle-free.

**Output:-**

**C:\Program Files\Java\jdk-10.0.2\bin>javac Codeconverter.java**

**C:\Program Files\Java\jdk-10.0.2\bin>java Codeconverter**

**Press 1 for Binary to Gray**

**Press 2 for Binary to BCD**

**Press 3 for Binary to XS3**

**Press 4 to exit**

**1**

**Enter Binary number:**

**1000**

**Gray Code:1100**

**Press 1 for Binary to Gray**

**Press 2 for Binary to BCD**

**Press 3 for Binary to XS3**

**Press 4 to exit**

**2**

**Enter a binary number: 1000**

**BCD= 1000**

**Press 1 for Binary to Gray**

**Press 2 for Binary to BCD**

**Press 3 for Binary to XS3**

**Press 4 to exit**

**3**

**Enter a binary number: 1000**

**XS3 : 1011**

**Press 1 for Binary to Gray**

**Press 2 for Binary to BCD**

**Press 3 for Binary to XS3**

**Press 4 to exit**

**5**

**Press 1 for Binary to Gray**

**Press 2 for Binary to BCD**

**Press 3 for Binary to XS3**

**Press 4 to exit**

**4**

**C:\Program Files\Java\jdk-10.0.2\bin>**

**Conclusion**

The project has been developed successfully and the performance of the system has been found satisfactory. In the end we can conclude that :

**Binary Coded Decimal (BCD) code**

One of the most popular types of codes is the BCD code used in a wide range of modern applications. This type of code comprises of decimal digits where a 4-bit binary number represents each digit.

**Gray Code**

Gray code is another type of non-weight code that doesn’t link with arithmetic codes – meaning that it doesn’t have any specific weights allocated to any specific bit position.

**Excess-3 Code**

Also known as XS-3 code, it is a common non-weighted coding method that is used for defining decimal numbers. It is an important 4-bit code, as well as a form of BCD code, used with BCD numbers.

**Future Scope**

While the concept behind the binary system may seem like something that was used by the earlier generations of computers, they are still considered an important part in today’s modern tech world. It is computer language in its most raw form, as computers and other electronic equipment that are run by digital circuitry communicate using the same two concepts: 0 and 1 or on and off. Whether it is storing data, executing a command, or any other application, computers and other digital systems available today use different types of binary codes to carry out actions that users instruct through a graphical user interface.

For a user to understand and communicate with a computer, conversions must be made of the binary codes into a more understandable, human form so that further processes can take place. One of the simplest ways of converting binary to an understand form, like text, decimal, hexadecimal, octal, or any other system, is to use a[binary converter](http://www.binarytranslator.com/). It is an extremely straightforward and easy-to-use tool that allows you to convert binary codes into the desired form and vice versa. Binary converters online are readily available and that too for free to help people better understand the computers and other digital system.

**Limitations:**

In the end, after developing the program we can observe 2 major limitations:

1. The number of Binary bits that can be feeded at the input are not as much that, that are required in real life uses.
2. If the user enters any number other than the Binary numbers .i.e. (1, 0) , the program does not have a proper output for that kind of input.

**References:**

1. [www.wikipedia.com](http://www.wikipedia.com)
2. [www.binarytranslator.com](http://www.binarytranslator.com)
3. [www.acknowledgementsample.com](http://www.acknowledgementsample.com)
4. [www.testbook.com](http://www.testbook.com)