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**C++ Programming
Decimal to Binary
Converter**

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Decimal to Binary Converter

Create a C++ program that will allow the user to:

1. Convert Decimal Numbers to Binary
2. Convert Binary Numbers to Decimal

Repeated Division-by-2 Method

An easy method of converting a decimal number to its binary number equivalent is to take the decimal number and to continually divide it by 2 to give a result and a remainder of either a "1" or a "0" until the final result equals zero.

Example 1.

Convert the decimal number 294₁₀ into its binary number equivalent.

Example 2.

Convert the decimal number 19₁₀ into its binary number equivalent.

Step 1: $19/2 = 9$, Remainder = 1

Step 2: $9/2 = 4$, Remainder = 1

Step 3: $4/2 = 2$, Remainder = 0

Step 4: $2/2 = 1$, Remainder = 0

Step 5: $1/2 = 0$, Remainder = 1

19 in decimal = 10011 in binary

Number 294			
divide by 2			
result	147	remainder	0 (LSB)
divide by 2			
result	73	remainder	1
divide by 2			
result	36	remainder	1
divide by 2			
result	18	remainder	0
divide by 2			
result	9	remainder	0
divide by 2			
result	4	remainder	1
divide by 2			
result	2	remainder	0
divide by 2			
result	1	remainder	0
divide by 2			
result	0	remainder	1 (MSB)

Dividing each decimal number by "2" as shown will give a result plus a remainder.

If the decimal number being divided is even then the result will be whole and the remainder will be equal to "0". If the decimal number is odd then the result will not divide completely and the remainder will be a "1".

The binary result is obtained by placing all the remainders in order with the least significant bit (LSB) being at the top and the most significant bit (MSB) being at the bottom.

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Learning Outcomes

Programming Concepts and Skills

- A1. demonstrate the ability to use different data types, including one-dimensional arrays, in computer programs
- A2. demonstrate the ability to use control structures and simple algorithms in computer programs
- A3. demonstrate the ability to use subprograms within computer programs
- A4. use proper code maintenance techniques and conventions when creating computer programs

Software Development

- B1. use a variety of problem-solving strategies to solve different types of problems independently and as part of a team
- B2. design software solutions to meet a variety of challenges
- B3. design algorithms according to specifications
- B4. apply a software development life-cycle model to a software development project

Please fill out all the information in this column using a pen before getting this assignment marked.

Name

_____ _____
Date Class

Academic Honesty

The work I am submitting is completely my own creation and has not been copied from anyone else's work. If I have received help on this project, the names of those who have assisted are listed below.

Signature

Pre-Marking

The following people have pre-marked this assignment:
(minimum of two)

User Interface

- Appropriate Title, Author Information, etc.
- Efficient and Esthetically-Pleasing User Interface
- Spelling and Grammar are correct

Code / Programming Style

- Variables are declared and logically named
- Code is commented where appropriate
- Code is indented and spaced to show structure
- Code is efficient

Work Ethic / Problem Solving Skills

- Problem Solving Skills are demonstrated
- Makes Productive Use of Time
- Only Seeks Help when Necessary

Program-Specific Criteria

- Program properly converts from Decimal to Binary
- Program properly converts from Binary to Decimal

Teacher Comments

- Level 1 - Limited ability to meet standard and limited effectiveness
- Level 2 - Some ability demonstrated and moderately effective
- Level 3 - Considerable ability demonstrated, considerable clarity or accuracy
- Level 4 - Thorough, high degree of skill demonstrated, insightful, highly accurate

Level