



NCERT Tutor

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11



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Computer



Ask your question:

Can you explain how our decimal numbers are converted to binary numbers that computer can understand ? Give some examples



Get Answer

Answer

To convert decimal numbers to binary numbers that a computer can understand, we follow a systematic process of dividing the decimal number by 2 and recording the remainders. Here are the steps involved:

1. **Divide the decimal number by 2.**
2. **Write down the remainder.**
3. **Continue dividing the quotient by 2**, noting the remainder each time, until the quotient becomes 0.
4. **Collect the remainders from bottom to top** to get the binary equivalent.

Example:

Let's convert the decimal number 65 to binary.

- Step 1: Divide 65 by 2. The quotient is 32 and the remainder is 1.
- Step 2: Divide 32 by 2. The quotient is 16 and the remainder is 0.
- Step 3: Divide 16 by 2. The quotient is 8 and the remainder is 0.
- Step 4: Divide 8 by 2. The quotient is 4 and the remainder is 0.
- Step 5: Divide 4 by 2. The quotient is 2 and the remainder is 0.
- Step 6: Divide 2 by 2. The quotient is 1 and the remainder is 0.
- Step 7: Divide 1 by 2. The quotient is 0 and the remainder is 1.

Now, collecting the remainders from bottom to top gives us: 1000001.

Thus, the binary equivalent of $(65)_{10}$ is $(1000001)_2$.

Sources

- File Name:** data/grade_11/computer/02_encoding_schemes_and_number_systems.pdf - **Page Number:** 11 - **Relevant Content:** Computer SCienCe – ClaSS xi 38 a binary number to its equivalent decimal value as

shown below: Why 3 bits in a binary number are grouped together to get octal number? The base value of octal number system is 8. Convert value 8 in terms of exponent of 2, i.e., $8=2^3$. Hence, three binary d
- File Name:** data/grade_11/computer/02_encoding_schemes_and_number_systems.pdf - **Page Number:** 8 - **Relevant Content:** given in above till the quotient is 0. Record the remainder after each division and finally write the remainders in reverse order in which they are computed. In Figure 2.1 you saw that the binary equivalent of 65 is $(1000001)_2$. Let us now convert a decimal value to its binary representation a
- File Name:** data/grade_11/computer/02_encoding_schemes_and_number_systems.pdf - **Page Number:** 11 - **Relevant Content:** 2.3.3 Conversion from Binary Number to Octal/ Hexadecimal Number and Vice-Versa A binary number is converted to octal or hexadecimal number by making groups of 3 and 4 bits, respectively, and replacing each group by its equivalent octal/ hexadecimal digit. Ch 2.indd 38 21-May-19 11:41:57 AM R
- File Name:** data/grade_11/computer/02_encoding_schemes_and_number_systems.pdf - **Page Number:** 11 - **Relevant Content:** (B) Octal Number to Decimal Number The following example shows how to compute the decimal equivalent of an octal number using base value 8. Example 2.7 Convert $(257)_8$ into decimal number. Digit 2 5 7 Position Number 2 1 0 Positional Value 8^2 8^1 8^0 Decimal Number 2×8^2 5×8^1 $+ 7 \times$

