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The base value of a number system determines the number of digits used to represent a numeric value.
For example, the binary number system uses two digits 0 and 1, octal number system uses 8 digits from 0-7 and decimal number system uses 10 digits 0-9 to represent any numeric value.

Hexadecimal Number

In hexadecimal number we use 16 symbols {0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F} to represent all numbers.

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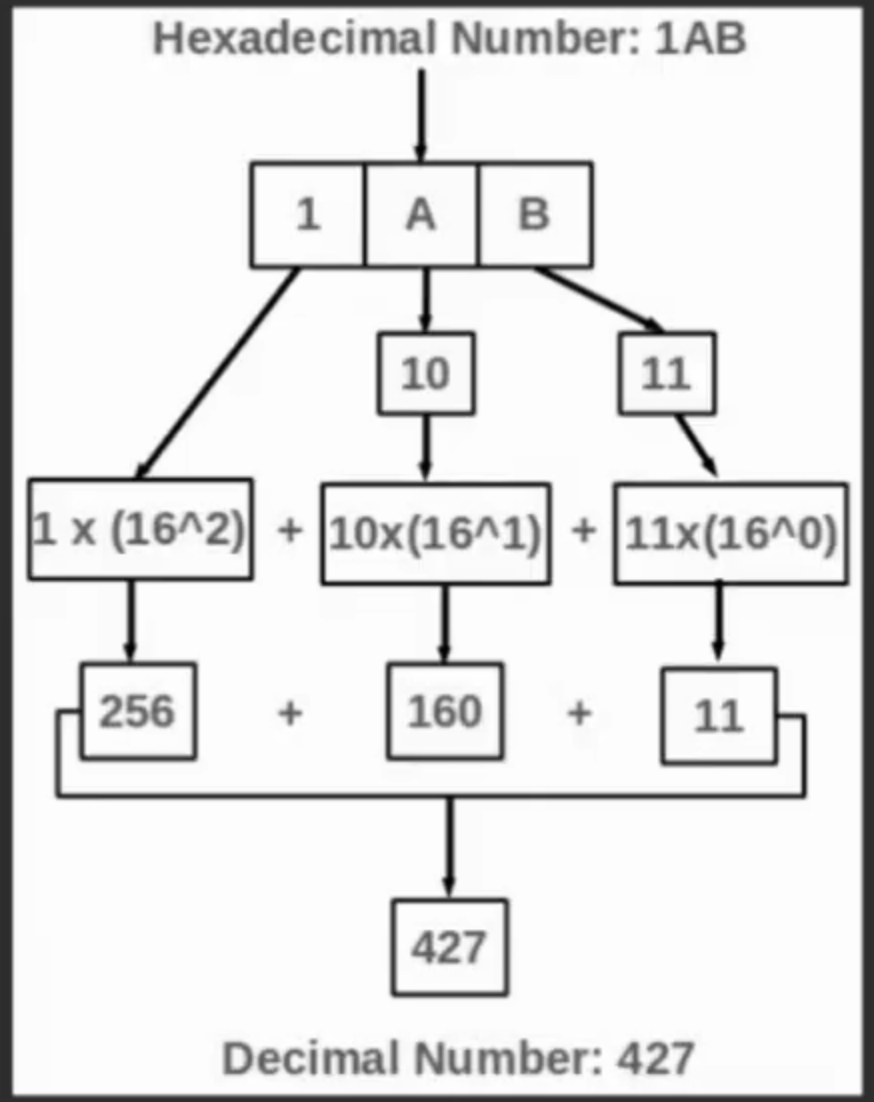
To remove confusion here we substitute,

10 -> A
11 -> B
12 -> C
13 -> D
14 -> E
15 -> F

Algorithm

1. Convert alphabets to numerals.
2. Multiply each digit separately from left to right by 16^0, 16^1, 16^2... respectively.
3. Add all the results coming from step 1.
4. Equivalent decimal number would be the result obtained in step 2.

Algorithm



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4. Equivalent decimal number would be the result obtained in step 2.

Code

```
// Function to convert hexadecimal to decimal
int hexadecimalToDecimal(char hexVal[])
{
    int len = strlen(hexVal);

    // Initializing base value to 1, i.e 16^0
    int base = 1;

    int dec_val = 0;

    // Extracting characters as digits from last character
    for (int i=len-1; i>=0; i--)
    {
        // if character lies in '0'-'9', converting
        // it to integral 0-9 by subtracting 48 from
        // ASCII value.
        if (hexVal[i]>='0' && hexVal[i]<='9')
        {
            dec_val += (hexVal[i] - 48)*base;

            // incrementing base by power
            base = base * 16;
        }

        // if character lies in 'A'-'F' , converting
        // it to integral 10 - 15 by subtracting 55
        // from ASCII value
        else if (hexVal[i]>='A' && hexVal[i]<='F')
        {
            dec_val += (hexVal[i] - 55)*base;

            // incrementing base by power
            base = base*16;
        }
    }

    return dec_val;
}
```

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int hexadecimalToDecimal(char hexVal[])
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        // if character lies in '0'-'9', converting
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        if (hexVal[i]>='0' && hexVal[i]<='9')
        {
            dec_val += (hexVal[i] - 48)*base;

            // incrementing base by power
            base = base * 16;
        }

        // if character lies in 'A'-'F' , converting
        // it to integral 10 - 15 by subtracting 55
        // from ASCII value
        else if (hexVal[i]>='A' && hexVal[i]<='F')
        {
            dec_val += (hexVal[i] - 55)*base;

            // incrementing base by power
            base = base*16;
        }
    }

    return dec_val;
}
```

Dry Run

hexVal[] = 1AB

base = 1

dec_val = 0

i = 2

Thank you for watching!

Please leave us your comments.