**Cyptocurrency & Blockchain**

**ASSIGNMENT**

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**Question 1:**Write a **Solidity program**to illustrate the functionality of the  
given **Bitwise operators**. Additionally, provide a concise explanation, consisting of  
a maximum of two lines, for each of these operators.

**Code:**

// SPDX-License-Identifier: MIT

pragma solidity ^0.8.0;

contract BitwiseOperators {

uint256 public leftShiftResult;

uint256 public rightShiftResult;

uint256 public orResult;

uint256 public andResult;

uint256 public xorResult;

constructor(uint256 a, uint256 b) {

// Left Shift (<<): Shifts the bits of 'a' to the left by 'b' positions.

leftShiftResult = a << b;

// Right Shift (>>): Shifts the bits of 'a' to the right by 'b' positions.

rightShiftResult = a >> b;

// OR (|): Performs a bitwise OR operation between 'a' and 'b'.

orResult = a | b;

// AND (&): Performs a bitwise AND operation between 'a' and 'b'.

andResult = a & b;

// Exclusive OR (^): Performs a bitwise XOR operation between 'a' and 'b'.

xorResult = a ^ b;

}

}  
  
  
1) Left Shift (<<)  
Shifts the bits of 'a' to the left by 'b' positions.  
  
2) Right Shift (>>)  
Shifts the bits of 'a' to the right by 'b' positions.  
  
3) OR (|)  
Performs a bitwise OR operation between 'a' and 'b'.  
  
4) AND (&)  
Performs a bitwise AND operation between 'a' and 'b'.  
  
5) Exclusive OR (^)

Performs a bitwise XOR operation between 'a' and 'b'.

**Question 2:** Explain how is it **possible for int8** to represent values from **-128 to  
127**.

**Ans:** In binary, an 8-bit integer can represent 2^8 (256) distinct values. However, if it is signed, the sign (positive or negative) is typically represented by one bit, leaving seven bits for the integer's magnitude.

Positive numbers fall between 0 to 27 - 1, or 0 and 127. Negative numbers fall between -27 and -1, or -128 and -1. The int8 can represent values between -128 and 127 when these ranges are combined. The sign bit, which is the leftmost and most significant bit, has the values 0 and 1, signifying positive and negative, respectively.