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1  #include <iostream>
2
3  using namespace std;
4
5  // Function to check if the 3rd bit is set
6  bool isThirdBitSet(int num) {
7      return (num & (1 << 3)) != 0; // Mask with 1 at the 3rd position
8  }
9
10 // Function to set a specific bit
11 int setBit(int num, int position) {
12     return num | (1 << position); // OR with 1 at 'position'
13 }
14
15 // Function to clear a specific bit
16 int clearBit(int num, int position) {
17     return num & ~(1 << position); // AND with NOT(1 at 'position')
18 }
19
20 // Function to toggle a specific bit
21 int toggleBit(int num, int position) {
22     return num ^ (1 << position); // XOR with 1 at 'position'
23 }
24
25 // Function to swap two numbers without using a temporary variable
26 void swapUsingXOR(int &a, int &b) {
27     a = a ^ b;
28     b = a ^ b;
29     a = a ^ b;
30 }
31
32 int main() {
33     int num = 10; // Binary: 1010
34     cout << "Checking if 3rd bit is set in " << num << ": "
35          << (isThirdBitSet(num) ? "Yes" : "No") << endl;
36
37     // Set bit at position 1 (0-based)
38     cout << "Setting 1st bit: " << setBit(num, 1) << endl; // 1010 | 0010 = 1010
39     // (no change)
40
41     // Clear bit at position 3 (0-based)
42     cout << "Clearing 3rd bit: " << clearBit(num, 3) << endl; // 1010 & 0111 =
43     // 0010 (2)
44
45     // Toggle bit at position 2 (0-based)
46     cout << "Toggling 2nd bit: " << toggleBit(num, 2) << endl; // 1010 ^ 0100 =
47     // 1110 (14)
48
49     // Swapping numbers using XOR
50     int a = 5, b = 7;
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48     cout << "Before Swap: a = " << a << ", b = " << b << endl;  
49     swapUsingXOR(a, b);  
50     cout << "After Swap: a = " << a << ", b = " << b << endl;  
51  
52     return 0;  
53 }  
54
```