

1. Write a statement that left shifts that value stored in the `unsigned int` variable `num` by 1 bit.

What is the output of each of the following code segments?

```
2.   unsigned int num = 5;
      num = num << 1;
      cout << "1: " << num << endl;
      num = num << 2;
      cout << "2: " << num << endl;
```

```
3.   unsigned int num = 36;
      num = num >> 2;
      cout << "1: " << num << endl;
      num = num >> 1;
      cout << "2: " << num << endl;
```

4. Fully explain the mathematical effect that left shifting has on a value stored in an `unsigned int` variable? Give one or more examples with code in your explanation.

5. Fully explain the mathematical effect that right shifting has on a value stored in an `unsigned int` variable? Give one or more examples with code in your explanation.

What is the output of each of the following code segments?

```
6.   cout << (7 & 2) << endl;
```

```
7.   cout << (5 | 3) << endl;
```

```
8.   cout << (5 ^ 3) << endl;
```

```
9.  int num1 = 5;
    int num2 = 3;
    num1 = num1 ^ num2;
    cout << "num1 = " << num1 << endl;
```

```
10. int num1 = 5;
    int num2 = 3;
    num1 = num1 ^ num2;
    num2 = num1 ^ num2;
    cout << "num1 = " << num1 << endl;
    cout << "num2 = " << num2 << endl;
```

```
11. int num1 = 5;
    int num2 = 3;
    num1 ^= num2;
    num2 ^= num1;
    num1 ^= num2;
    cout << "num1 = " << num1 << endl;
    cout << "num2 = " << num2 << endl;
```

```
12. int a = 15;
    int b = 10;
    int c = 0;

    while (b != 0)
    {
        if ((b & 1) != 0)
            c += a;
        a = a << 1;
        b = b >> 1;
    }
    cout << c << endl;
```