

Binary Numbers

By Mark Luu, for CMPT 141

Exercise 1: Addition

In decimal math, when there's an overflow in one digit when adding you carry 10 over to the next digit. In binary math (groups of 2), you carry over 2 instead.

Add 0b00010110 and 0b00011010 without converting them to decimal format.

Then, convert those binary numbers and their answer to decimal format.

Do the same with 0b11001100 and 0b10101010.

Exercise 2: Multiplication

When multiplying $0b01000$ by $0b00011$, the first number's 1 is shifted 3 to the left, and the second's first 1 is shifted 1 to the left, for a total of 4 shifts. Therefore, put a 1 4 to the left, for $0b10000$.

Repeat with the second number's second 1, to get $0b01000$. Then add them for $0b11000$.

Multiply $0b10101$ by $0b10100$ without converting them to decimal format.

Do the same with $0b11111$ by $0b00100$.

Exercise 3: Subtraction

In binary, instead of borrowing 10 from the left, you borrow 2.

Find the binary value of $0b1111101000111 - 0b1010101010101$ without converting them to decimal format.

Do the same with $0b111110100 - 0b101011110$.

Exercise 4: Division

Remember, long division is repeated subtraction.

Divide 0b100110 by 0b000111 without converting them to decimal format.