Problem 3.

Justify why right shift of an integer by n bits is equivalent to dividing the integer by 2 to the power n.

Answer:

When we shift an integer by n bits, it is equivalent to dividing the integer by 2^n. This is because we are working in binary, so shifting it each side to the right is equivalent to dividing its value by 2 ^ (the value it is shifted by) as binary has only 2 symbols— 0s and 1s i.e its base is 2. The same way, when we shift decimal numbers to the right side is equivalent to dividing the number by 10 ^ (the value it was shifted by). This will works in the same principle for different bases as well.

For example:

Let's say a = 5

Therefore a = 5 = 00000101
         a >> 1 = 00000010 = 2
         a >> 2 = 00000001 = 1

Hence:

a >> n = a / (2^n)