IST-110

Spring 2025

L02: Activity: Binary Representation

Binary representation expresses decimal numbers in a base 2 representation. This means each bit of a binary number represents a power of 2. Let’s say we have decimal number 13. Each bit we use to represent the number in binary represents a multiple of two, starting with one and then ascending going to the left (ex: 8-4-2-1). Each number represents the value of that bit as a 1. Consequently, 1000 is 8, 0100 is 4, 0010 is 2, and 0001 is 1. To get your final value for the binary number, you would add the value from each bit: 1100 is 8 + 4+0+0 = 12, 1010 is 8 + 0 + 2 + 0 = 10, and so on. Finally, to get 11 we would need 8 and 3 == 8 + 2 +1 which in binary is 1011.

Binary is useful as all data simplifies to it, and it allows easy storage of different types of data on the same hardware, It also allows logic to be very simple (on or off) which was necessary for earlier languages that didn’t have compilers. It also means that compilers can calculate output much quicker since their output logic can be simpler.

References:

1. *Binary to decimal converter*. Binary to Decimal Converter. (n.d.). <https://www.rapidtables.com/convert/number/binary-to-decimal.html>
2. Pumpkin Programmer. (2014, October 3). *Intro to Binary Numbers* [Video]. YouTube. <https://www.youtube.com/watch?v=b7pOcU1xMks>