EXERCISE - DAY 1 - BINARY MATH

Learning Objectives:
1. 'Speak' the language of a computer.
2. Demonstrate an understanding of base-2 number system by performing binary math.

$$\begin{array}{r} 10111 \\ +\ \ 111 \\ \hline ? \end{array} \qquad \begin{array}{r} 10111 \\ +\ 00111 \\ \hline ? \end{array}$$

Activity:
Using paper, whiteboard, cardstock, pipe cleaners or other materials, solve the binary math problems posed.

Questions Posed:
Q1: What is 1+1 in base-2 math?

A1: 0

Q2: What is 1+0 in base-2 math?

A2: 1

Q3: What is 0+0 in base-2 math?

A3: 0

Q4: What is the solution to the problem on the left?

A4: 11000

Q5: What is the solution to the problem on the right?

A5: 11000

Q4: What does every bit of input that a computer takes ultimately get turned into?

A4: 0s and 1s

Q5: How do we get from the language humans use to the binary that a computer uses?

A5: High level language, to low level language, then translated into 0s and 1s, which are translated into signal (on and off) which is stored in a physical state on a hard drive.

Key Vocabulary & Concepts:

Binary - also called base-2; a number system where there are only two possible values for each digit: 0 and 1.

Base-10 Number System - a number system where there are 10 possible values for each digit: 0, 1, 2, 3, 4, 5, 6, 7, 8, or 9

Supplemental Vocabulary & Concepts

Programmer - a person who writes computer programs

Program - a collection of instructions that performs a specific task when executed by a computer

Processor - the component of a computer that performs the basic operations (processing data) of the system; it exchanges data with a systems memory and peripherals; manages the system's other components

Peripherals - electronic equipment connected to a computer wirelessly or by cable; can include both input and output devices

Memory - also called storage; device that stores information for immediate or later use

Inputs - a device that gives information to the computer; can also be software

Outputs - data generated by a computer; this can be physical (a printed document) or data produced by software (the result of a calculation)

Data - information processed or stored by a computer

Algorithm - a well-defined procedure that allows a computer to solve a problem