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# Joy of Computers and Binary Code

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### *Binary Code*

The modern-day computers make computing so easy. But the computing existed for about 4000 years. It was during the bronze age when Sumer developed and rose to prominence being first urban civilization.

Their Harvests and flocks were not large enough, so to keep track of their livestock and crops using a notch on tally sticks. They used one bigger notch representing '10' and one smaller notch representing '1'. They performed calculations by stacking those notches together.

After the Sumerians, people learned to write on clay board. This when people came with the idea of abacus using the wood and clay board. This board is divided into columns with order of base 60 number system. They used different shaped and sized objects in those columns for calculations. The order use to be 1's, 10's, 60's, 600's, and 3600's and placing tokens and removing does the addition and subtraction.

After this came modern abacus, as people are used to count with fingers, and we can do this to count till 10. So, to count more than 10 we need more fingers or any object. This made to implement the abacus with base ten i.e., 1's, 10's, 100's, 1000's..... etc.

Now, the era of computers came and all we have is just electricity to communicate with these electronic devices. So, like morse code dots and dashes to decode alphabets for communicating with people. We have on and off switch to communicate with computer. As calculations are an integral part of computing which is a core functionality of computers, we need to build everything around this as part of communication. This made us to choose the reliable calculation option of 10 finger option of base 10 and reducing it to base 2 to accommodate the 2 level on and off switch functionality. The base 2 binary code has 0's and 1's filling the $2^0$, $2^1$, $2^2$, .... etc.

### *Computers*

A computer can store and process data. Most computers use binary code, which uses two variables, 0 and 1, to complete storing data and calculations. Throughout history many prototypes have been developed leading to the modern-day computer. During World War II, physicist John Mauchly, engineer J. Presper Eckert, Jr., and their colleagues at the University of Pennsylvania designed the first programmable general-purpose electronic digital computer, the Electronic Numerical Integrator and Computer (ENIAC). Programming languages, such as C, C++, JavaScript and Python, work using many forms of programming patterns. Programming, which uses mathematical functions to give outputs

based on data input, is one of the regular ways to provide instructions for a computer.

***Binary Code and Transistors***

Computers are made using transistors and they operate based on electricity flow. The binary code is just representation of whether transistor is conducting or not. A simple addition operation using transistors:

Let's see we want to do 1+1=2, take two transistors allow voltage to flow(transfer) from we get the 2 times the voltage.

if we want 0+1=1, same two transistors but make one resist the voltage allowing only voltage we get just 1 time the voltage.

The bigger the number and operation, the more transistors required in computers for computing.