LESSON 1: History of Computing
Before we start in everything that we will study about our MS EXCEL proficiency class we need to know its roots first. We will answer the following question for this Lesson

- **How did computing begin?**
- **What are the key components of computing in our personal computer?**
- **What is Manual and Electronic Computing?**

Connect: **Intro for lessons**
Have you ever wondered how our computer started? In this lesson we will look at a flashback of computing. This will tackle simple machines that helped achieve what super computers we have today. Let us get started with our Journey.

14th C. - Abacus - an instrument for performing calculations by sliding counters along rods or in grooves. This is probably the first ever machine-y ever made. At times people use their fingers (up to their toes) to **quantify** things, but later improvised it to what others call the **counting frame**. But its first counterpart dates it back to 500CE falling in the Tang Dynasty. It is called the **Suanpan**, or the Chinese Abacus which is primarily used for counting more than 10.
http://www.cits.net/china-travel-guide/suanpan-the-fifth-invention-in-chinese-history.html
https://www.ee.ryerson.ca/~elf/abacus/history.html

1642 – Pascaline, a mechanical calculator built by Blaise Pascal, a 17th century mathematician, for whom the Pascal computer programming language was named. This machine uses repeated addition and subtraction to perform multiplication and division. It can now perform more complex computation by the use of rotating wheels that serves as the computing arm of the machine. He dedicated it to his father who is a tax collector in his time. There are only 50 Pascaline made in 20 years during his time.
https://www.britannica.com/technology/Pascaline

17th C. - Slide rule - a manual device used for calculation that consists in its simple form of a ruler and a movable middle piece which are graduated with similar logarithmic scales. This arises from the most complicated mathematical computation in a short time. As of today, the concept of slide rule is applied in our modern day engineering computations.
http://www.sliderulemuseum.com/SR_Course.htm

1804 - Jacquard loom - a loom programmed with punched cards invented by Joseph Marie Jacquard. Holes are punched in to a paper that represents the computation desired. You can visually see the print and count the holes of it into the paper. This is the first step in what we call computer output, reflecting it on paper.
https://commons.wikimedia.org/wiki/File:NMS_Jacquard_loom.JPG

Compu-Bits:
Do you know that the Jacquard's Loom is the model in which the printer does it work? This is also the reference of modern day thread and fabric making

ca 1850 - Difference Engine, Analytical Engine – This plan is formulated by no other than the father of Modern Computer Charles Babbage and the first Lady Programmer Agusta Ada Byron. Babbage's

description, in 1837, of the Analytical Engine, a hand cranked, mechanical digital computer anticipated virtually every aspect of present-day computers. It wasn't until over a 100 years later that another all-purpose computer was conceived. The era of modern personal computer (in which at that time as big as a living room) started to shape up because of this contribution. The difference of this machine is that it is now automatic. The machine after given the specific task moves on its own, thus computing the specific task.
http://www.computerhistory.org/babbage/

Context   **Lesson Proper**
https://www.geeksforgeeks.org/what-happens-when-we-turn-on-computer/

What really happens when we turn on our Computer?
To illustrate how this is works,

The System Start-Up
BIOS means basic input and output system. This is a small chip in the computer which main role is to check whether the parts of your CPU is working. This is the black screen before we see the windows loading screen in shown in the monitor. This action happens so fast that we can't even see it.

BIOS runs another part of the startup process called POST. This starts up the checking software of your personal computer. It runs to ensure all the hardware that the computer needs is all working fine.
The POST first checks the bios and then tests the CMOS RAM. If there is no problems with this then POST continues to check the CPU, hardware devices such as the Video Card, the secondary storage devices such as the Hard Drive, Floppy Drives, Zip Drive or CD/DVD Drives. If some errors found then an error message is displayed on screen or a number of beeps are heard. These beeps are known as POST beep codes

Master Boot Record
This is also known as MBR starts when the computer is booting. This starts with the POST and ends when the BIOS is done searching for the MBR on the Hard drive.

Bootloader
This is the data pulled from the hard drive at the end of the MBR. It is also referred to as a small program called the bootstrap loader. This starts up the real operating system and then moves to the 2nd to the last part the GRUB.

Grand Unified Bootloader (GRUB) is executed. Grub waits for you to select the kernel image you want to load. Grub has the information about kernel image and initrd images. It loads and executes them both. There are times (if you are running in Windows 7 or 8) a **prompt** in which you will select a

compressed image file of the operating system you want to run. It can either be you are running or working with multiple operating system or your computer operating system wants to always check your operating system for errors.

The Kernel now works to **decompress** all of the files necessary to load your program. This is the longest process of the boot up system, but because our computers boot up speed is rapidly increasing, we cannot possibly monitor it one by one.
https://manybutfinite.com/post/kernel-boot-process/

init
init is the last step of the kernel boot sequence. It looks for the file /etc/inittab to see if there is an entry for initdefault. It is used to determine initial run-level of the system. A run-level is used to decide the initial state of the operating system.
Some of the run levels are:

Level
0 –> System Halt
1 –> Single user mode
3 –> Full multiuser mode with network
5 –> Full multiuser mode with network and X display manager
6 –> Reboot

In this sequence your computer is in the user interface mode. This is a screen where your input is needed or not. If you are a single user without **restrictions** (passwords) you end up booting it continuously. If in a computer you have multiple accounts you need to choose one first before proceeding.

Compu-Bits:
A computer responds to your personal input, don't be mad at them when it seems it is not following what you want to do. The lighter side of this is, it is your actions he process, so more likely it is your fault. PEACE OUT!

Collaborate: **Group Activity**
The class will be divided into three groups and explain how the following works. You need to detail every step that the following follows:
1. The Garbage Collection Process
2. Ordering Online
3. Teaching a 4 year-old kid to write letters and numbers.

LESSON 2: MS Excel Program