

# From Abacus to Analytical Engine

When you hear the word computer,  
maybe you think of something like  
a beefy gaming desktop with flashing lights.  
Or maybe you think of a slim and sleek laptop.  
These fancy devices aren't what people  
had in mind when computers were first created.  
To put it simply, a computer is a device that stores  
and processes data by performing calculations.  
Before we had actual computer devices,  
the term computer was used to  
refer to someone who actually did the calculation.  
You're probably thinking that's crazy talk.  
My computer lets me check social media,  
browse the Internet, design graphics.  
How can it possibly just perform calculations?  
Well, friends, in this course,  
we'll be learning how  
computer calculations are baked into applications,  
social media games, etc,  
all the things that you use every day.  
But to kick things off,  
we'll learn about the journey computers took from  
the earliest known forms of  
computing into the devices that you know and love today.  
In the world of technology and if I'm  
getting really philosophical in life,  
it is important to know where we've been in  
order to understand where we are and where we're going.  
Historical context can help you  
understand why things work the way they do today.  
Have you ever wondered why the alphabet  
isn't laid out in order on your keyboard?  
The keyboard layout that most of the world  
uses today is the Cordelia,  
distinguished by the Q-W-E-R-T-Y  
keys in the top row of the keyboard.  
The most common letters that you type aren't found on  
the home row where your fingers sit the most.  
But why? There are

many stories that claim to answer this question.  
Some say it was developed to slow down type so they wouldn't jam old mechanical typewriters.  
Others claim it was meant to resolve problem for telegraph operators.  
One thing is for sure the keyboard layout that millions of people use today isn't the most effective one.  
Different keyboard layouts have even been created to try and make typing more efficient.  
Now that we're starting to live in a mobile centric world with our smartphones, the landscape for keyboards may change completely.  
My typing fingers are crossed.  
And the technology industry, having a little contexts can go a long way to making sense of the concepts you will encounter.  
By the end of this lesson, you'll be able to identify some of the most major advances in the early history of computers.  
Do you know what an abacus is?  
It looks like a wooden toy that a child would play with.  
But it's actually one of the earliest known computers.  
It was invented in 500 BC to count large numbers.  
While we have calculators like the old reliable TI 89 or the ones in our computers.  
The abacus is actually still used today.  
Over the centuries, humans built more advanced counting tools, but they still require a human to manually perform the calculations.  
The first major step forward was the invention of the mechanical calculator in the 17th century by Blaise Pascal.  
This device uses a series of gears and levers to perform calculations for the user automatically.  
While it was limited to addition, subtraction, multiplication, and division for pretty small numbers.  
It paved the way for more complex machines.  
The fundamental operations of the mechanical calculator later apply to the textile industry.  
Before we had streamline manufacturing looms we're used to we've yarn into a fabric.  
If you want to design patterns on your fabric.  
That took an incredible amount of manual work.

In the 1800s, a man by the name of Joseph Jacquard invented a programmable loom. These looms took a sequence of cards with holes in them. When the loom encountered a hole, it would hook to thread underneath it. If it did or encounter a whole, the hook wouldn't thread anything. Eventually the spun up a design pattern on the fabric. These cards were known as punch cards. While Mr. Jacquard reinvented the textile industry, he probably didn't realize that his invention would shape the world of computing and the world itself today. Pretty epic, Mr. Jacquard, pretty epic. Let's fast forward a few decades and meet a man by the name of Charles Babbage. Babbage was a gifted engineer who developed a series of machines that are now known as the greatest breakthrough on our way to the modern computer. He built what was called a difference engine. It was a very sophisticated version of some of the mechanical calculators we were just talking about. It could perform fairly complicated mathematical operations, but not much else. Babbage's follow-up to the difference engine was a machine he called the analytical engine. He was inspired about Jacquard, use of punchcards to automatically perform calculations instead of manually entering them by hand. Babbage use punch cards and his analytical engine to allow people to pre-define a series of calculations they want it to perform. As impressive as this achievement was, the analytical engine was still just a very advanced mechanical calculator. It took the powerful insights of a mathematician named Ada Lovelace to realize the true potential of the analytical engine. She was the first person to recognize that the machine could be used for more than pure calculations. She developed the first algorithm for the engine. It was the very first example of computer programming. Algorithm is just a series of steps that solve specific problems. Because of Lovelace's discovery,

the algorithms could be  
programmed into the analytical engine.  
It became the very first general  
purpose computing machine in history.  
A great example that women have had some of  
the most valuable Mines and Technology since the 1800s.

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Revision #2

Created 29 May 2023 08:22:21 by naruzkurai

Updated 29 May 2023 08:51:35 by naruzkurai