‘I’m scared mom,’ my initial expression on my first day of kindergarten that I could not help to hide from my mom. During my childhood, I unintentionally exhibited an introverted image wherever I’ve been. However, upon looking back of being an introvert person, I would rather say it was a blessing in disguise as it prompted my curiosity to sense the art of mathematics. Instead of spending time with my peers, I was in my own phantom world where I was left all alone to explore the hidden beauty of mathematics. We encounter mathematics in our everyday life and the fact that it simply occurs without one consciousness, it fascinates me even more. Let me prove it by sharing a part of my daily morning routine.

I would usually wake up by the piercing sound of my alarm clock. After wriggling and stretching for a while on my cosy, warm bed, I would go straight to the kitchen. To appease the demand of my stomach, I would make a grilled cheese sandwich mainly because it requires a few simple steps. But, the sensation of the melting cheese would never let me down and here’s how I would prepare it:

1. Slice some bread and make sure it is not sliced too thin.
2. Slice some cheese into bricks then slice down to fit the bread.
3. Butter the outside parts of the sliced bread and season with salt. Flip over and add cheese to both sides of the bread.
4. Cook by flipping and pushing down until the cheese appears melted.
5. Enjoy!

Behind those simple steps, lies an amazing mathematical concept which is one of the foundations in building the advance technological world we’re living in. One word. Nine letters. Can you guess it? It’s an algorithm. If you can guess this, thumbs up since you truly understand mathematics. People often thought that algorithm comes in hand with technology. This is a very huge misconception and to support my statement, let me introduce to you the father of the algorithm, Muhammad ibn Musa al-Khwarizmi. Remark as the Persian mathematical genius, he was born around 780 AD in the region known as Uzbekistan. Back in the 9th century, he was the director in the House of Wisdom, an intellectual centre for scholars in Baghdad. The origin of the word algorithm comes from the Latinised version of Al-Khwarizmi’s name, algoritmi. Without a doubt, this proves that the history of algorithms dates back to a few hundred years ago.

Before we go further into the topic, keep in mind that algorithm carries the meaning of a set of instructions to be followed. Hence, a simple example of an algorithm is making a grilled cheese sandwich in the morning. However, looking from a more complex point of view, computers or any systems rely heavily on algorithm to operate. Interestingly, algorithm is the mother of Computer Science discipline. Any social media such as Instagram, Tik Tok, Facebook and even the search engines use algorithms to satisfy the preferences or the needs of the users. For instance, Instagram’s algorithm finds the users' interests through their browsing keywords and recommend new posts on the top of the feed. Google, on the other hand, shows the most relevant websites within the first few pages and personally it’s a rare occasion for me to browse the next few pages of the results to find the information I’m seeking for.

With the existence of plethora of sorting systems, computers are able to arrange your emails according to the dates received, list your contact names alphabetically and list down the price of Adidas sneakers from lowest to the highest price. Some notable examples of sorting algorithms include insertion sort, merge sort, and also spaghetti sort. Scientists and engineers

focused on two main criteria in deriving an optimised algorithm which are the time taken to sort the given data and the memory space needed during the execution of the algorithm.

To further understand the concept of algorithm, the best way is to illustrate it through one of the simplest sorting algorithms which is the bubble sort or sometimes referred to as sinking sort. Bubble sort would compare the adjacent elements and swap them if they are in the wrong order. It is named after the way elements are being sorted as the smaller or larger elements will "bubble" their way to the top of the list. Take an array of numbers " 5 3 7 2 9 ", and sort them from the lowest to the greatest number. Here's how a bubble sort works:

First Pass
(5 3 4 2 9) → (3 5 4 1 9), Swap 5 with 3 since 5 > 3
(3 5 4 1 9) → (3 4 5 1 9), Swap 5 with 4 since 5 > 4
(3 4 5 1 9) → (3 4 1 5 9), Swap 5 with 1 since 5 > 1

Second Pass
(3 4 1 5 9) → (3 1 4 5 9), Swap 4 with 1 since 4 > 1
(3 1 4 5 9) → (1 3 4 5 9), Swap 3 with 1 since 3 > 1

Third Pass
As the array had already been sorted, in order to ensure that it has already been completed, the algorithm needs one more pass without any more swap.
(1 3 4 5 9) → (1 3 4 5 9), No swap needed
(1 3 4 5 9) → (1 3 4 5 9), No swap needed
(1 3 4 5 9) → (1 3 4 5 9), No swap needed
(1 3 4 5 9) → (1 3 4 5 9), No swap needed

At a glance, it wouldn't be hard to figure out the sorted list as we could straight away sort the numbers. Although, this example with 5 inputs does not reflect the complex real life we are living in, just imagine if we would have to sort millions of numbers. Thus, it's the whole point in building an algorithm, to ease our jobs. It goes without saying that artificial intelligence with the ability of such algorithms will easily take over our jobs as well as deskilling people due to the fact that we depend more on them as day goes by. Putting aside this hotly-debated topic that manages to divide thousands of people opinions, I strongly believe that we should appreciate mathematics more than ever especially after knowing the benefits gained from this one word, nine letters.