“Find one bottle that contains poison among 1000 using 10 mice given that mouse would not die immediately.”This question on quora has captured my attention when I was at senior 1. After reading the answer, I found it necessary to solve this question with the binary. Firstly, create a table with the column representing the number of each bottle 0-999 and the line representing the name of every mouse; and then fill the entire table according to the binary of the bottle number so that each mouse corresponding to 1 drink the poison at the line labelled 1. In this case, when the poison works, the mice that have drunk poison will die. The binary of the bottle could be educed by converting each dead mouse into 1 and the rest into 0. Then the position of the poison could be determined by converting the results to decimal system. With no previous learning about binary, I was astonished by the incredible concept that only 0 and 1 exists in computers after checking relevant information, which aroused my initial interest in computers.

Later, coincidentally, I saw a tricky question on CSDN: how to get exactly 4L of water with a 5L beaker and a 3L beaker. The idea that programming could possibly be used to solve this kind of question sprung into my mind. After researches and inquiries, it came away clear to me that this was about depth-first and breadth-first algorithm. I started to use the same concept following figuring out the principle. I found that I could derive the next state with changes of the existing state, and then get another state with iterative method. All possible states could then be obtained by comparing whether the new state is the same as the existing state.

After getting exposure to programming, my interest was completely ignited. After learning how high-level language is transformed into assembly language, each piece of code seemed to be a binary of computer to me. With the simple 0 and 1, many problems could be solved as if I have the wand of Hogwarts, which brought me a sense of accomplishment that I had never had before. As I progressed in programming, I increasingly realized the importance of understanding the mathematical model behind the question. That's why I took part in the UKMT competition to strengthen my math skills. In the 11th grade I won the UKMT Silver Award, and following one year of further study, I got the UKMT Gold Award in the 12th grade.

To test my programming skills, I attended 2019 SPC Suzhou programming competition. Regardless of the third place I won, I did not manage to code an algorithm called KNN classifier and I put it into my mind deeply. After the competition, I did some research about this algorithm. During the process, I learned that artificial neural networks might perform better in the field of classification and recognition, which also provided an idea for my later thoughts.

This idea came from my own experience. I want to make a clock that automatically recognizes whether the user accidentally fell asleep after the alarm has rung. My initial thought was to install a miniature camera on the clock and judge whether the user is in bed or not by comparing the RGB total values of the pictures before and after the ring. But the results of the test were unsatisfactory. After consulting the teacher, I realized that the method of Euclidian distance could significantly improve the success rate. However, following the review of these images over and over again, I found their accordance in great contrast of light and shade resulted in the inaccuracy of color recognition. At this moment, the artificial neural network gave me a new idea that could directly identify whether someone is in the bed. However, due to my limited knowledge of mathematics and programming, it is impossible for me to get further into this idea for the moment. I hope to acquire further study at the university and master better techniques to perfect and realize my ideas.