**Mathematical activities. [300-350 words]**

Spider Solitaire was my favorite childhood game, and Sudoku books occupied my book shelves, they were my major source of entertainment. I also had tremendous fun learning abacus from my mother, a math teacher, and beating her in 24 Game. Klotski number game, a Chinese classic, is my all-time favorite. It has a n^n matrix with one space left blank. The position of numbers is disorganized and the player needs to recover it.

After three days of my initial contact with this game, my record improved from over one minute to 26 seconds. Constantly endeavoring for a higher record, I came across one puzzle particularly hard, where only two numbers were displaced and I only needed to switch the positions of 14 and 15. An arduous half-hour attempt resulted in zero progress, which pushed me to take a step back and think hard about the problem.

I came up with a new idea: first complete the outmost orders to make it become a 3\*3 matrix, then continue to make it become 2\*2. I tried this method on that unsolved puzzle, but still, the outcome was frustrating. I got a 3\*3 matrix where there is no solution, and it was proved by showing the number of inversions in the sequence was odd, and the Klotski was thus unsolvable. *What if mine has no solution neither? But how can I prove that with n=4?*

By investigating in the concept of inversion, I found that it the case of n=4, there are two possibilities: if the empty space is in an even line, then it’s solvable if the number of inversions is even, and if the empty space is in an odd line, then it is solvable if the number of inversions is odd. The concept of Inversion in a sequence: the parity of the number of inversions determines whether a Klotski puzzle is solvable.

My addiction to Klotski may contribute to the easy-to-follow rule of the game, but the most important reason is that I enjoyed the process of pushing my limits, and that by employing mathematical methods, I could surpass myself.

**Non-mathematical activities. [300-350 words]**

One year ago, I attended a NASA program to get a taste of the most advanced aeronautics technology in the world and to challenge myself with the hands-on programs. However, in my section, only six out of thirty participants were females while the male students constantly emphasized that they were “ready to help.” Even my teacher discouraged me from majoring in the CS program saying that “it’d be hard for the girls.” Moreover, male students outnumber their counterparts in every single STEM class I’ve taken. It’s hard to find support around me. Occasionally, I just can’t help but feel out of place.

However, none of this has stopped my desire to excel. Since my high school curriculum didn’t offer Computer Science, I signed up for an outside after-school class and self-studied Python.

Thinking of how many female students might share my experience, I decided to take another step further - assembling a team called U-CODE within school, ready to break down some stereotypes. “Everyone should learn to program a computer, because it teaches you how to think.” Steve Jobs’ words resonated with me. We then approached different organizations for sponsorship. After a month’s effort, a Shanghai-based company responded and generously sent us a teacher, with whom we studied two hours per week for free. After a semester of preparation, we started to provide coding courses to girls in local primary and middle schools with a bilingual instruction, aiming to stimulate young female students’ interest in STEM and enabling them to access educational resources outside of the Great Firewall.

Our first class project that I led was indeed about “penetrating the wall” - a collective effort.

Day 1: Requirement identification and framework set up.

Day 4: Visual Studio installed.

Day 18: Database migration completed.

Day 60: Data security with encapsulated security payload(ESP) done!

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Upon the project’s completion, we spent three days debating. Finally, we got its name: Papercraft. It would carry our hope like an aircraft, free and ambitious, into the distant sky.

Our influence has grown steadily ever since then, now 20 volunteers on board and over 100 students.

**What are your non-mathematical interests and hobbies? [300-350 words]**

I watched a herd of yaks returning home at sunset in Yellow Stone National Park; I hiked 15 hours to top Mount Huangshan in Anhui; I climbed an Iceland glacier laying my bare hands on the permafrost of a thousand-year history; I joined the monkeys for hot spring in a village deep into the mountains of Shirakawago; I kept vigil on a nameless lake in Norway for the splendid aurora; I suffered from seasickness in a fisher boat in Sri Lanka to study whales; Tents, woods, ice caves. Wind, snow and rain. But I wanted to test how far courage can take me.

Intimacy with the nature happens in many ways. When I don’t travel, I farm, the cropland full of yellow rape flowers in spring, the green watermelon resting under its vine in summer, the golden wheat bundled near the field in fall, and the grandma’s garden filled with white radish in winter.

After spreading the seeds into the soil, I took good care of them and waited to see the colors covering the field - from the refreshing green cabbage with fiber good for digestion to the energetic red peppers full of capsaicin to promote metabolism. Harvesting those colors from the field, I started to imagine how they could be cooked, bring people happiness and health.

Putting on the gloves and stepping into the field, I’m brought back to the very moment that I first touched the soft, moist soil. Laboring on land connects us to the Great Nature. For nature is where we came from, I find it home to rest our bodies and minds. Taking time from our intense lives to observe a plant gradually growing tall from sprouts, I savor that inner peace and joy. Like our ancestors, on land, we grow, share and bond.