# Assignment #1
# Essay
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In the contemporary world, high-performance computing has found many applications. They are used even in cases that were difficult to think about. Imagine a regular soda can. It turns out that in order to ensure ideal construction, you have to use high-performance computing. And why is that? There are statistics showing how many people use soda cans per day. And it turns out that the number reaches about 53000. And if you don't optimize its design, it's going to waste tons of aluminum and millions of dollars.

If we talk about my needs in HPC, considering the activities in Skoltech, at the moment I am experiencing a great need for high-performance computing during the semester. I need it when I do tasks and final projects.
I just started working on my master's thesis, my current tasks did not require HPC. In the work, my task is to model a lens matrix antenna based on metamaterials. I may need high-performance computing when I will write a script to automatically create a periodic structure for a printed lens or something else, but this is a future task.

In this term, I decided to take Dylov's course "Biomedical Imaging and Analytics". Healthcare is closely related to computing as the double helix of DNA. With computing in medicine, many processes become more simple. For example, it is possible to analyze the effectiveness of drugs. Due to the current situation in the world, high-performance computing is also used to produce a coronavirus vaccine. For example, IBM has enabled the scientific and medical community to develop treatment methods by giving access to supercomputers to accelerate the discovery of the vaccine. Their high-performance computing systems enable a large number of calculations in epidemiology, bioinformatics, and molecular modeling. They could take years if done manually, or months if slower traditional computing platforms were used.

Another interesting case of using high-performance computing is James Cameron's movie Avatar. It was made using HPC. In order to create his movie, he turned to visual effects company Weta Digital. Their 10,000 square foot server farm is working on visualizing images for movies. In working on

Avatar, Weta Digital used supercomputers that process up to 1.4 million tasks per day to render the film, which consisted of processing 8 gigabytes of data per second, working 24 hours for more than a month. The company also worked on films such as trilogy "The Lord of the Rings", "X-Men: The Last Battle" and other famous paintings.

## References


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