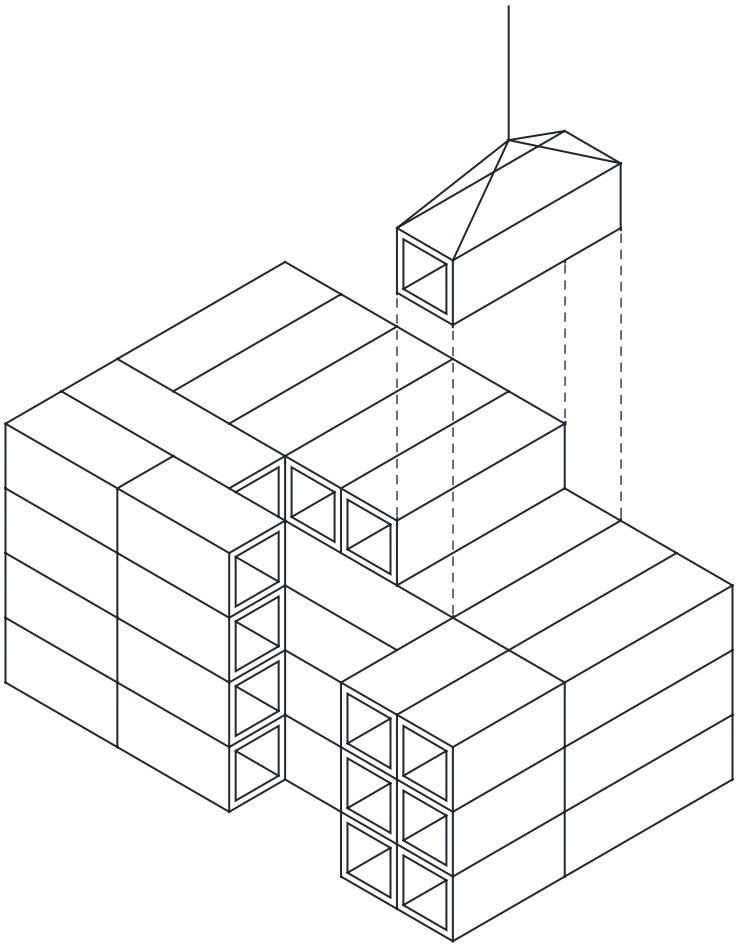

REFLECTION PAPER

MODULE+

TOWARDS AFFORDABLE AND QUALITATIVE STUDENT HOUSING

PAWEL ANDRUSZKIEWICZ
aE STUDIO | 2023

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TOWARDS AFFORDABLE AND QUALITATIVE STUDENT HOUSING

STUDIO

Architectural Engineering Studio
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Delegate of the Board of Examiners: Robert Nottrot

1. WHAT IS THE RELATION BETWEEN YOUR GRADUATION PROJECT TOPIC, YOUR MASTER TRACK AND YOUR MASTER PROGRAMME?

The main point of my work is an attempt to create an universal system based on computational design and timber modules, which could be a potential solution to the problem of the lack of sufficient number of affordable student housing, while providing adequate quality of living conditions. Focusing on people and their needs in the context of looking for new tools and ways of shaping and creating space is, as I believe, a key aspect of architecture. In turn, the approach to the problem from the technical, engineering side of architecture, examining the combination of timber modular architecture and computational design, as well as raising the issue of "1 Million Homes", in my opinion fits well into the thematic framework of the Architectural Engineering studio.

2. HOW DID YOUR RESEARCH INFLUENCE YOUR DESIGN/RECOMMENDATIONS AND HOW DID THE DESIGN/RECOMMENDATIONS INFLUENCE YOUR RESEARCH?

The research phase focuses on the problem of affordability, specifically on the key issue of finding a balance between providing maximum number of living units and the minimum material consumption. In addition, as part of the research, specific conditions regarding the parameters of modular units, the method of their gradation and joining, as well as the layers of materials they consist of were defined. As a consequence, based on the research conclusions, a theoretical model of computational system operation was created, which was supposed to be a main core of the graduation project. In this way, research became a kind of starting point for further design work.

In the design phase, the system was revised and supplemented with the aspect of the quality of living environment, which was an extremely significant part for the entire concept of the system. Another key aspect was also a new design of residential modules based on "open units" consisting of CLT floors and glulam columns, which replaced the "closed units" made entirely of CLT and described in the research. In addition, based on further design work, the operation fo the system was improved and the place of its implementation in the designing process was changed in order to provide more reliable results.

3. HOW DO YOU ASSESS THE VALUE OF YOUR WAY OF WORKING (YOUR APPROACH, YOUR USED METHODS, USED METHODOLOGY)?

The process of creating a computational system was quite demanding and required many experimental trials to get to the point where the results generated by the system were satisfactory. The reason behind this was the relatively small available literature due to the fact that the subject of computational design and multi-objective optimization in architecture is quite new and under constant development. For this reason, it was necessary to develop own, independent method of the system functioning. The research and the methodology selected in it turned out to be extremely helpful and allowed to create a theoretical basis for the way the system works. Nevertheless, with the development of the project and the addition of further design aspects, the principles of the system's operation and its parameters were under constant change and improvement. Furthermore, for the part of the system related to the multi-objective optimization algorithm, as the aspect of implementing objectives defining high quality living environment turned out to be extensive, it was necessary to focus only on the most important, selected elements. Therefore, for the purposes of the graduation project, in addition to the number of residential units and the consumption of materials, the algorithm also took into account solar parameters, based on the conducted solar study. Aspects such as view quality, carbon footprint were not included in the script, but were mentioned as potential improvements to the algorithm in the future.

4. HOW DO YOU ASSESS THE ACADEMIC AND SOCIETAL VALUE, SCOPE AND IMPLICATION OF YOUR GRADUATION PROJECT, INCLUDING ETHICAL ASPECTS?

Computational design and the related concept of multi-objective optimization is a new, still developing topic, especially in the context of its implementation in architecture. Combining its capabilities with other technologies, such as modular architecture, as well as in combination with important and current design and social issues, such as the affordability of student housing or high quality living environment, is an extremely interesting topic that can bring new solutions or answers both on the academic and societal level.

However, in my opinion, an important aspect when using computational design, in particular as a part of the design process, is to pay special attention to the scope of its operation and areas where it can be implemented. Giving too much control to computer algorithms may make them the right designers, and the role and decision-making power of the architect will be limited. For this reason, the computational system made for the purpose of this graduation project, serves only as a design tool that streamlines the process and presents only general design proposals, instead of generating ready-made buildings.

5. HOW DO YOU ASSESS THE VALUE OF THE TRANSFERABILITY OF YOUR PROJECT RESULTS?

The purpose of created system is to function as an universal tool, which, based on carefully designed and flexible modules, along with the rules of their configuration, connection and materials, is able to generate a huge number of functional solutions in any context, while providing detailed information such as the number of created units, the amount of material consumption or insolation parameters, based on the conducted solar study. The system also contains defined main assumptions and design directions, enabling further development of the design concept towards affordable and qualitative student housing. Thanks to this, the system can be widely used as a tool for architects, universities or housing companies, which is able to speed up and facilitate the design process of student housing, as well as make more thoughtful design decisions supported by detailed data.