UNIVERSITY OF ŽILINA
Faculty of Management Science and Informatics

Semester project for the course 6UI0004 Algorithms and Data Structures 1

During the semester, it is required to develop a semester project (SP) focused on the practical application of the acquired knowledge. The SP assignments will be published on an ongoing basis. Each part of the assignment will add additional functionality to the SP. At the end of the semester, student will hand in the final version of the SP. SP is focused on data processing of territorial units in Austria.

Each SP must meet the following requirements:

- The SP is implemented in C++ using manual memory management. The memory must be demonstrably clean (free of memory leaks) after the application has finished. A heap monitor is available for the MS Visual Studio environment. If the student does not work in the recommended environment, the heap monitor must be set up by the student (e.g., https://valgrind.org can be used).
- It is possible to use "smart pointers", but this is not covered in the course. You can use std::unique_ptr, other kinds of smart pointers are not allowed.
- The data structures used must be programmed by the student, implemented universally and correct object-wise. It is not possible to use libraries with structures. You may use the data structure implemented in the labs, but the use of such structures must be specified in the documentation.
- The SP must include documentation with:
    - application design,
    - UML class diagram – an internal view of the custom classes, the used data structures just need to be in the form of a class header,
    - an analysis of the appropriate use of the chosen data structures,
    - a user guide,
    - a list of the structures used in the thesis that were implemented together in the lab (for the sake of originality checking),
    - other requirements that will be published in the SP assignment.

A student whose term paper fails to meet any of the above requirements (including documentation!) will automatically receive 0 points.

The submission of the SP is done uniformly via the Moodle system. The student must submit the SP by the end of the thirteenth week at the latest. **A student who fails to submit the SP via Moodle by the deadline will automatically receive 0 points for the SP.**

Originality check of submitted works

Each submitted work (functional demonstration application, term paper, documentation) will be checked by a plagiarism detection system. If the system declares a match with another submitted work, this case will be thoroughly checked by the teachers of the course. If plagiarism is found, the matter will be referred to the disciplinary procedure. Teachers do not investigate who is the originator of the original solution and who is the plagiarist. The originality checking system will not check the part that has been programmed together in the labs.

Semester project points

The scoring of the SP is divided into four levels according to the continuously released parts of the assignment. The student receives a score according to the level at which he/she develops the SP. The assignments for each level will be published continuously in weeks 3, 6 and 9 of the semester. The development of a level is not required to demonstrate functionality (e.g., if a student fails to demonstrate the functionality of Level 2, you can still develop it as part of the term paper – the student will simply not earn 5 points for the demonstration). To receive points for a given level, the student must implement the full functionality of all levels before it in the SP (e.g., if the student wants points for Level 3, he/she must develop both Level 1 and Level 2 of the SP). The functionality of the work at each level is graded separately.

During the semester, it is possible (not mandatory) to demonstrate the functionality of the application with the currently published parts of the assignment. The demonstration of functionality will take place in the labs in weeks 6, 9 and 12.The teacher will ask the requirement in accordance with the published part of the assignment (and any clarification of the functionality demonstration in the specific level assignment), and if done correctly, the student will receive 5 points for the functionality demonstration. Scoring is not mandatory on documentation, the teacher will not look at the source code in detail. If the student chooses to demonstrate the functionality of the application, he/she will be required to upload the demonstrated version of the application to Moodle for originality checking purposes. If the student does not upload the work to Moodle, the student will not receive points for the functionality demonstration.

SP scoring levels are as follows:

Level	Functionality demonstration	Points in level	Maximum points for SP
1	5	15	20
2	5	15	40
3	5	15	60
4	-	20	80
Bonus	-	10	90

In order to receive points for the SP, the student must defend the previously submitted SP in person. The student must register for the SP defense date. The specific method of registering for the defense will be announced by the end of the twelfth week. The defenses will take place in weeks 1 and 2 of the exam period.

During the defense, the teacher may ask the student to program a new functionality to the appropriate extent. If the student is unable to complete this functionality, the SP will be considered undefended. **A student who fails to defend the SP will automatically receive 0 points for the SP.**