BACHELOR'S THESIS ASSIGNMENT

I. Personal and study details

Student's name: **Tůma Ondřej** Personal ID number: **491867**

Faculty / Institute: **Faculty of Electrical Engineering**

Department / Institute: **Department of Computer Science**

Study program: **Open Informatics**

Specialisation: **Software**

II. Bachelor's thesis details

Bachelor's thesis title in English:

The Multi-Agent Path Finding Demonstrator

Bachelor's thesis title in Czech:

Demonstrátor systému plánování pro více agentů

Guidelines:

As part of the EU solution of the SafeLog project, a laboratory demonstrator with TurtleBot robots was created for trajectory planning for a group of robots in an automated warehouse. The aim of the thesis is to get acquainted with this environment and develop it further. The specific procedure is as follows:
1) Get acquainted with the current state of development of the demonstrator and the simulator for multi-agent planning (https://github.com/Kei18/mapf-IR).
2) Modify the simulator to serve as the basic user interface (GUI) of the demonstrator.
3) Display robot positions obtained from the Vicon system in the GUI.
4) Integrate the supplied components for planning and plan execution into the demonstrator.
5) Evaluate experimentally properties of the implemented system. Describe and discuss obtained results.

Bibliography / sources:

[1] K. Okumura, Y. Tamura and X. Défago, "Iterative Refinement for Real-Time Multi-Robot Path Planning," 2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2021, pp. 9690-9697, doi: 10.1109/IROS51168.2021.9636071.
[2] A. Andreychuk T. Rybecky M. Kulich, K. Yakovlev. On the application of prioritized safe-interval path planning with kinematic constraints to the single-shot pickup and delivery problem. 17th International Conference on Informatics in Control, Automation and Robotics, 2020.
[3] Tomáš Rybecký: Trajectory planning for a heterogeneous team in an automated warehouse, diploma thesis, FEL, CTU in Prague, 2020

Name and workplace of bachelor's thesis supervisor:

RNDr. Miroslav Kulich, Ph.D. Intelligent and Mobile Robotics CIIRC

Name and workplace of second bachelor's thesis supervisor or consultant:

Date of bachelor's thesis assignment: **02.02.2022** Deadline for bachelor thesis submission: **20.05.2022**

Assignment valid until: **30.09.2023**

RNDr. Miroslav Kulich, Ph.D. Supervisor's signature	Head of department's signature	prof. Mgr. Petr Páta, Ph.D. Dean's signature

III. Assignment receipt

The student acknowledges that the bachelor's thesis is an individual work. The student must produce his thesis without the assistance of others, with the exception of provided consultations. Within the bachelor's thesis, the author must state the names of consultants and include a list of references.

Date of assignment receipt	Student's signature