



## THESIS ASSIGNMENT

**Name and Surname:** Bc. Barbora Klembarová  
**Study programme:** Computer Science (Single degree study, master II. deg., full time form)  
**Field of Study:** Computer Science, Informatics  
**Type of Thesis:** Diploma Thesis  
**Language of Thesis:** English  
**Secondary language:** Slovak

**Title:** Complexity of solving puzzles

**Aim:** The goal of this thesis is to select a small set of puzzles and to investigate various aspects of their complexity.

The puzzles we are interested in are activities for a single player that require logical thinking.

Examples of such puzzles include Paint-By-Numbers, Sudoku, and Sokoban.

The complexity of these puzzles can be defined in multiple ways.

Primarily, we can define it as the computational complexity of deciding whether a puzzle instance is solvable.

For many known puzzles these decision problems are NP-hard, or even harder. On the other hand, we can measure and eventually even model the difficulty of an instance for a human solver.

In this thesis the author should investigate these complexity measures of several puzzles (using real data about human solvers where available) and they should discuss the relation between the different complexity measures.

**Supervisor:** RNDr. Michal Foríšek, PhD.  
**Department:** FMFI.KI - Department of Computer Science  
**Head of department:** prof. RNDr. Martin Škoviera, PhD.

**Assigned:** 29.02.2016

**Approved:** 13.04.2016

prof. RNDr. Rastislav Kráľovič, PhD.  
Guarantor of Study Programme

.....  
Student

.....  
Supervisor