**Riga Technical University**

Faculty of Computer Science, Information Technology and Energy

**Report on the first practical assignment**

Study course "Fundamentals of artificial intelligence"

Team number: /team number/

Students: /first name, last name, student ID/

Teaching staff: Alla Anohina-Naumeca

Project/code link: /link/

2024/2025 academic year

# Statement of use of AI tools

<in case of using artificial intelligence tools in the development of the assignment, include a list of the tools used (name, year, version, link) and the purpose of the use of each of the tools (generation of the report text, developing the game algorithms and data structures of the game, developing the user interface of the game, generating ideas or receiving inputs for the heuristic evaluation function, debugging the generated code, obtaining additional explanations, designing experiments, etc.)>

ChatGPT version GPT-4.o <https://openai.com/index/chatgpt>

ChatGPT version GPT-3.5 <https://openai.com/index/chatgpt>

The use of the AI has been mostly made to correct the code and optimize it. Some use also has been made to get a better understanding of the alpha-beta pruning algorithm and how to implement it in the Minmax code that as been made.

# Demonstration example of the software

<this section should include (1) a description of the game and the changes that were made to it, if applicable, and (2) screenshots showing the game course and the choices to be made, and explanations of them>

## Description of the game :

The game we had to code was the following one:

### Game description:

At the beginning of the game, the number chosen by the human-player is given. The total number of points is equal to 0 (points are not counted for each player separately). In addition, the game uses a game bank, which is initially equal to 0. Players make consecutive moves, dividing the current number by 2, 3, 4 or 5 in each move. The number can be divided only if the result is a whole number. If the division results in an odd number, then 1 point is added to the total number of points, if the number is even, then one point is deducted from the total number of points. On the other hand, if a number ending with 0 or 5 is obtained, then 1 point is added to the bank. The game ends when the resulting number can no longer be divided. If the total number of points is an odd number, the points accumulated in the bank are subtracted from it. If it is an even number, the points accumulated in the bank are added to it. If the final total score is an odd number, the player who started the game wins. If the number is even, then the second player.

### Additional software requirements

At the beginning of the game, the game software randomly generates 5 numbers in the range of 30000 to 50000. The human player chooses which of the generated numbers he wants to start the game with.

## Game Course:

### Une image contenant texte, capture d’écran Le contenu généré par l’IA peut être incorrect.Choice of the Number

### Choice of the Algorithm

Une image contenant texte, capture d’écran, logiciel

Le contenu généré par l’IA peut être incorrect.

### Choice of the Vs

Une image contenant texte, capture d’écran, logiciel

Le contenu généré par l’IA peut être incorrect.

### Choice of the first player

#### For Human Vs AI

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Le contenu généré par l’IA peut être incorrect.

#### For AI Vs AI

Une image contenant texte, capture d’écran, logiciel

Le contenu généré par l’IA peut être incorrect.

### Choice of the Division Number:

#### For the Human

Une image contenant texte, capture d’écran, Police, logiciel

Le contenu généré par l’IA peut être incorrect.

#### For the AI

Une image contenant texte, Police, logiciel, capture d’écran

Le contenu généré par l’IA peut être incorrect.

The score is from the action of the previous player, the New value is from the action of the AI. 1 or 2 is added to show wich AI is playing in case of an AI VS AI game.

### Display of the results:

Une image contenant texte, capture d’écran, logiciel

Le contenu généré par l’IA peut être incorrect.

# Description of data structures and algorithms

### Description of data structures:

<a description of the data structures used to store the game tree, with detailed comments on what is stored in each data structure>

### Description of a heuristic evaluation function:

<a detailed description and justification of the heuristic evaluation function>

### Description of algorithms:

<code of the main algorithms implemented in the software (generating a game tree, assigning heuristic values to graph nodes, applying a game algorithm, finding winning paths) together with explanations. The code must be added to the report in text form only. It is not allowed to add it as a set of images>

Comparison of algorithms:

<a comparison of the algorithms and the conclusions drawn by the student team>

# Information sources

# Appendix 1

< all software code that corresponds to the implementation of the game and not to the creation of the graphical interface>

# Appendix 2

<in case of using artificial intelligence tools in the development of the assignment, add screenshots of all the prompts entered by the student team in a specific AI tool and all the answers provided by the tool; both the prompts and the answers must be visible in full and in good quality>