MINISTRY OF EDUCATION AND RESEARCH

TECHNICAL UNIVERSITY
OF CLUJ-NAPOCA, ROMANIA

FACULTY OF AUTOMATION AND COMPUTER SCIENCE
COMPUTER SCIENCE DEPARTMENT

SUMMARY
of the License Thesis entitled:

CRAFT MASTERY - EXTENSION OF THE ORIGINAL MINECRAFT GAME

Author: **Casian-Cristi CRISTIAN**
Advisor: **Prof.Dr.Ing. Lia-Anca HANGAN**
Consultant: **Ing. Tudor Florentin COROIAN**

1. Requirements:

The main objective of Craft Mastery mod is to add special tools in Minecraft in order to solve problems from the game. These tools are going to be made from different items, not the classic craft, and will help players to cut down trees faster, and mine efficiently. The items will be made using special entities with custom recipes. Functional requirements of the project are to **add new items** which will be used by the player for crafting, **add new tools** to solve some of the problems from the game, **add new entities for** new crafting methods in the game, and **add new recipes** which are custom used by the entities and others used for crafting. Non-functional requirements are the **response time**, **similarity** with the Minecraft, and **compliance** with the game.

2. Proposed solutions:

The **Craft Mastery** mod was developed with Fabric API, which is a library used in modding the Minecraft's game. The time consuming problem for cutting down trees and mining is solved by introducing the specialized tools: **Lumber Axe**, **Mining Pickaxe** and **Mining Hammer**. The first two use a **Depth-first Search (DFS)** algorithm for gathering the resources faster by cutting down/mine all the connected blocks of the same type, and the last one uses an algorithm for finding all the neighbors of a block and mine all of them (3x3 area). Also, the durability of them are custom based on how many iron ingots are used in their crafting. **Magnet** is a tool used for collecting all the nearby dropped items.

Tool Rod and **Tool Plate** items were added in the mod and are used for crafting the tools mentioned before. **Tool Rod** is crafted with the help of **Rolling Mill block entity** which holds a **custom recipe**: for obtaining one **Tool Rod** you need to smelt 2 iron ingots and 3 coals. **Tool Plate** is crafted with the help of **Metal Press block entity** which holds a **custom recipe**: for obtaining one **Tool Plate** you need to smelt 4 iron ingots and 5 coals.

All the items, blocks, block entities, recipes, and interfaces which were added to the game, are registered with the help of **Fabric Mod Loader** which injects the new stuff into the Minecraft base game.
Figure 1 represents the conceptual architecture of the project.

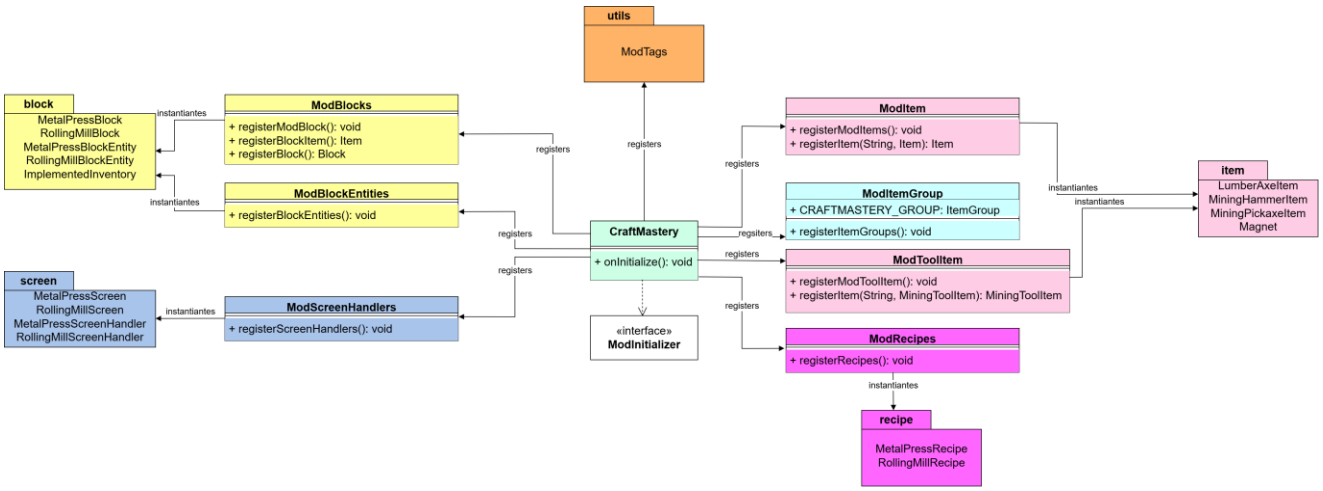

Figure 1. Conceptual architecture

3. Results obtained:

The tools used for handling time consuming problem were added in the Craft Mastery mod: **Lumber Axe, Mining Hammer, Mining Pickaxe, Magnet**. These tools are crafted using **new items** provided into the game: **Tool Rod** and **Tool Plate**. The items are obtained with the help of new block entities added, each of them having **custom interface** and **custom recipe**: **Rolling Mill** and **Metal Press**. The mod is generated in a .jar file which users can use with version 1.20 of the Minecraft.

4. Tests and verifications:

Crafting of the tools added into the game together with their usage, crafting of the block entities together with their custom recipes and custom interface for obtaining new items added into the game were tested. Each test were successfully, meaning that Craft Mastery mod is validate.

5. Personal contributions:

My contributions to the project are: addition of **new tools**, additions of **new items**, additions of new **block entities** with **custom interface**, addition of **new custom recipes** for obtaining new items, and **continuity** of the original game.

6. Documentation sources:

1. "Fabric documentation", https://wiki.fabricmc.net/start [Online].
2. D. Saito, A. Takebayashi, and T. Yamaura, "Minecraft-based preparatory training for software development project," in 2014 IEEE International Professional Communication Conference (IPCC), 2014. [Online]. Available: https://ieeexplore.ieee.org/abstract/document/7020393.

Date: 11.07.2025	Author	Casian-Cristi CRISTIAN
	Coordonator	Prof.Dr.Ing. Lia-Anca HANGAN
	Consultant	Ing. Tudor Florentin COROIAN