CRAFT MASTERY - EXTENSION OF THE ORIGINAL MINECRAFT GAME

Graduate: Casian-Cristi CRISTIAN

Supervisor: Prof.Dr.Ing. Lia-Anca HANGAN

Consultant: Ing. Tudor Florentin COROIAN

Introduction

Problem statement

- Time consuming processes
- Same smelting process

Proposed solution

- Craft Mastery
- New tools, items, crafting mechanism

Motivation and context

- Minecraft

Minecraft modding

- Applying algorithms
- Experience new things
- Fabric API
- Forge API

Objective and Requirements

Main objective

- Creating Craft Mastery mod aimed to solve common gameplay limitations in Minecraft

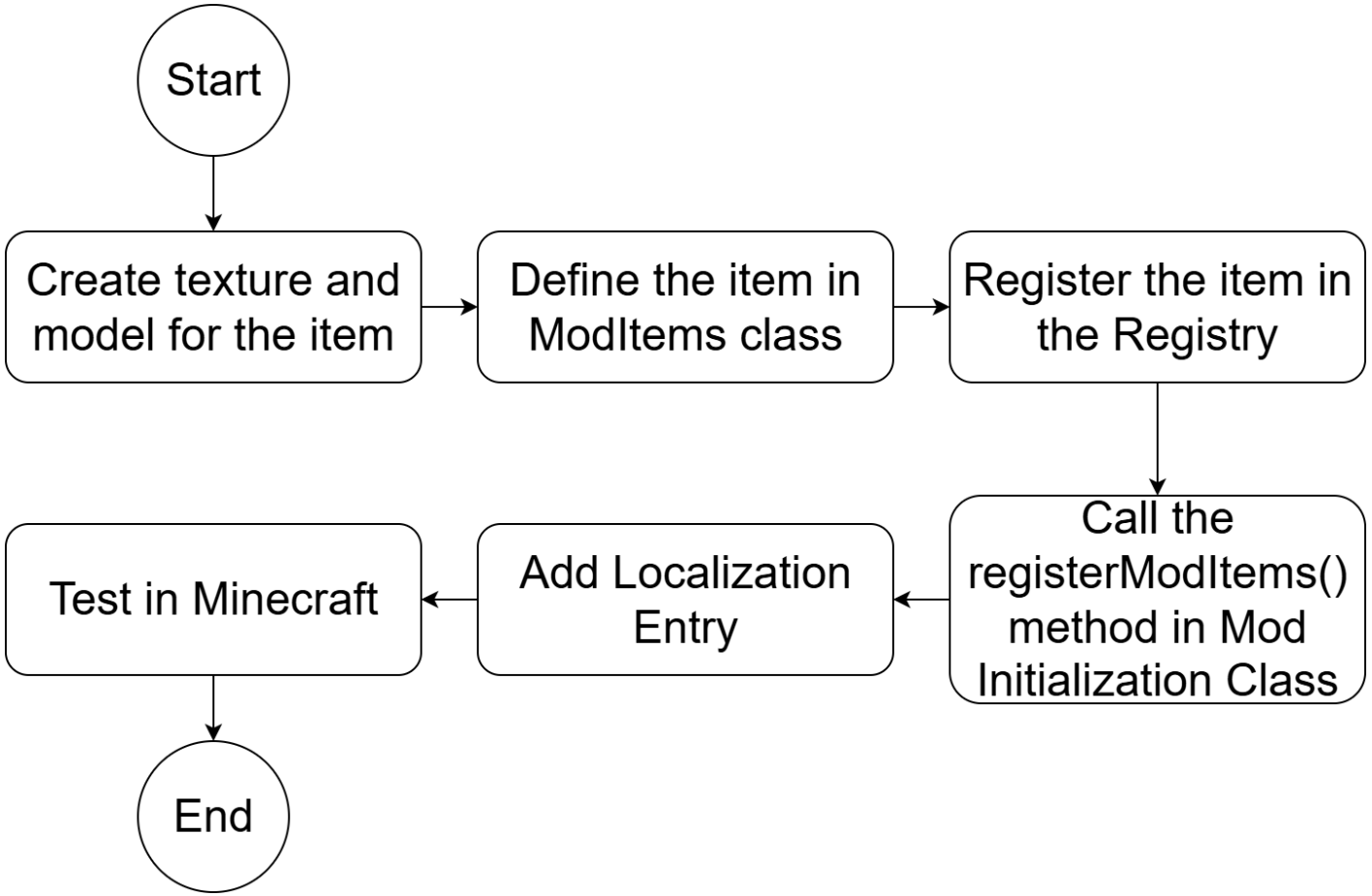
Functional requirements

- Introduce Tool Rod and Tool Plate items for crafting new tools
- Add Lumber Axe, Mining Hammer, Mining Pickaxe, Magnet tools for solving time consuming problem from Minecraft
- Insert Rolling Mill and Metal Press block entities which will act as machines
- New custom recipes for machines in order to obtain the new items

Comparation between existing mods and Craft Mastery mod

Feature	Mekanism	GregTech	Craft Mastery
Tool rods from iron	No	Yes	Yes
Tool plates from iron	No	Yes	Yes
Metal Press	Yes	Yes	Yes
Rolling Mill	No	No	Yes
Lumber Axe	No	No	Yes
Mining Hammer	Yes	No	Yes
Mining Pickaxe	No	No	Yes
Magnet	Yes	No	Yes

Minecraft Registries



- After registering, Fabric Mod Loader injects the registered items, block, recipes, etc. into Minecraft

Use cases

Lumber Axe – cuts down all wood blocks from a tree

Mining Hammer – mines 3x3

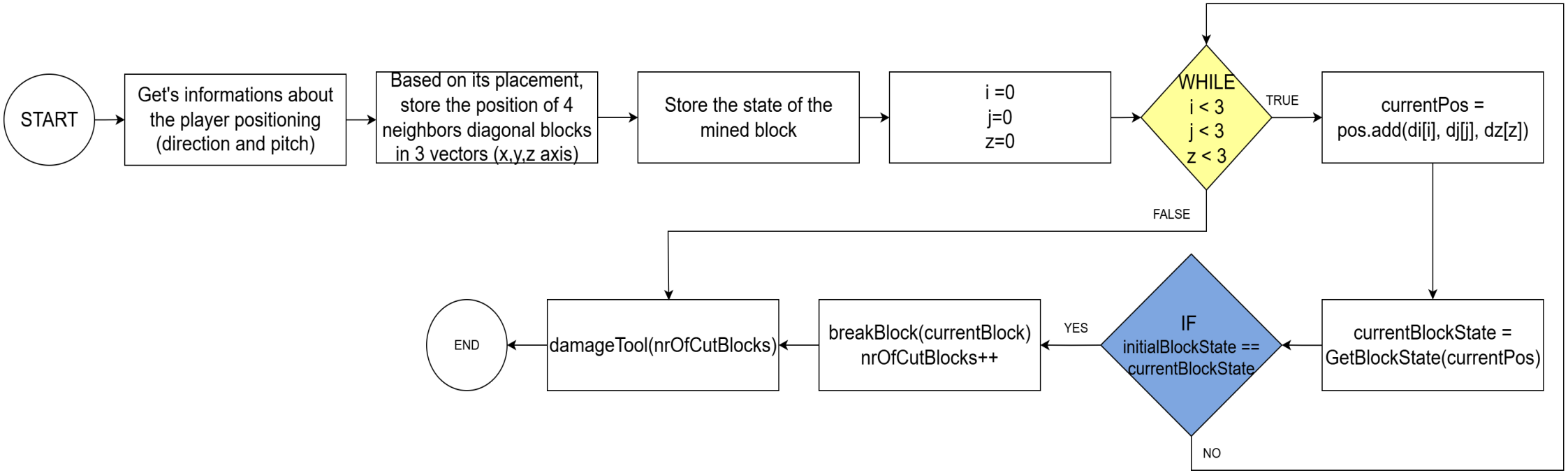
Mining Pickaxe – mine all connected ore blocks of the same type

Magnet – collects nearby dropped items and blocks

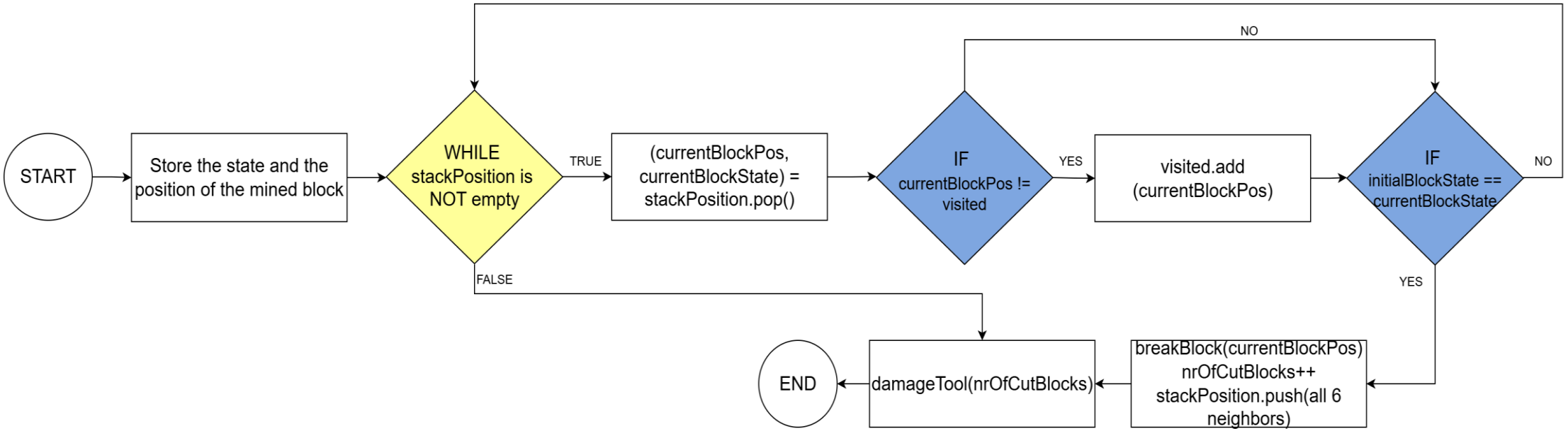
Tool Rod and **Tool Plate** – items used for crafting the new tools

Rolling Mill and **Metal Press** – block entities used for obtaining the new items

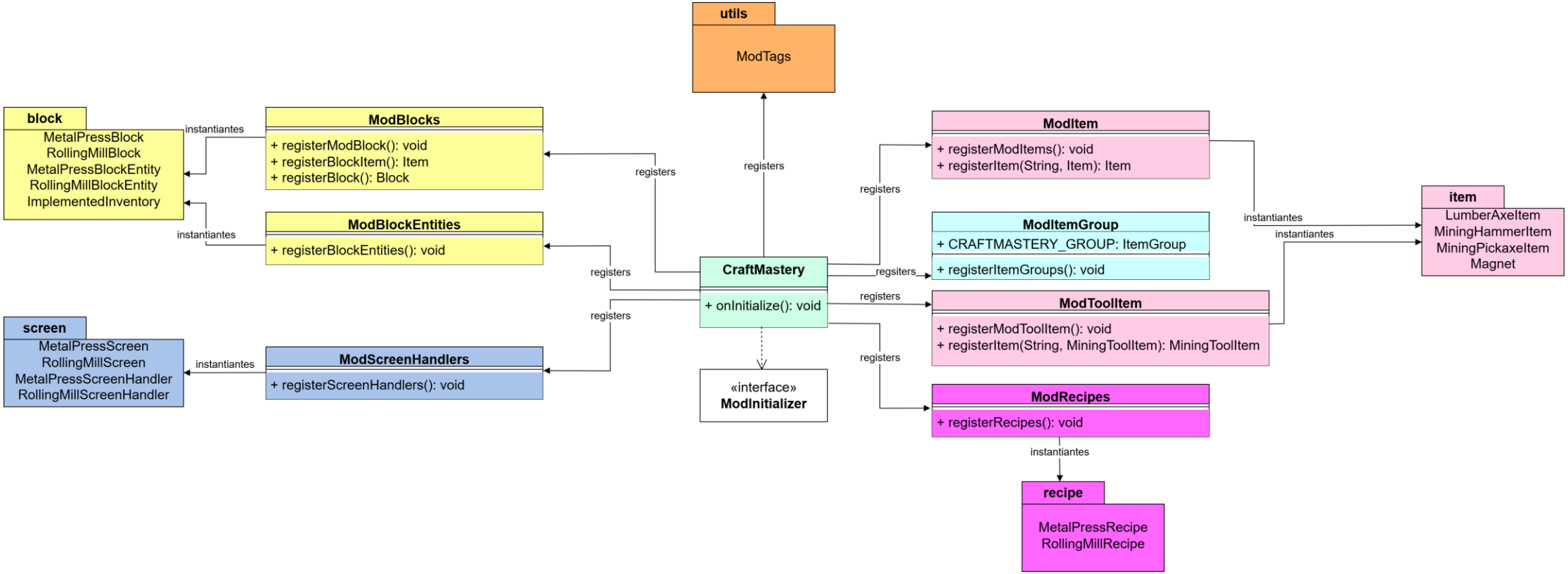
Mining 3x3 algorithm



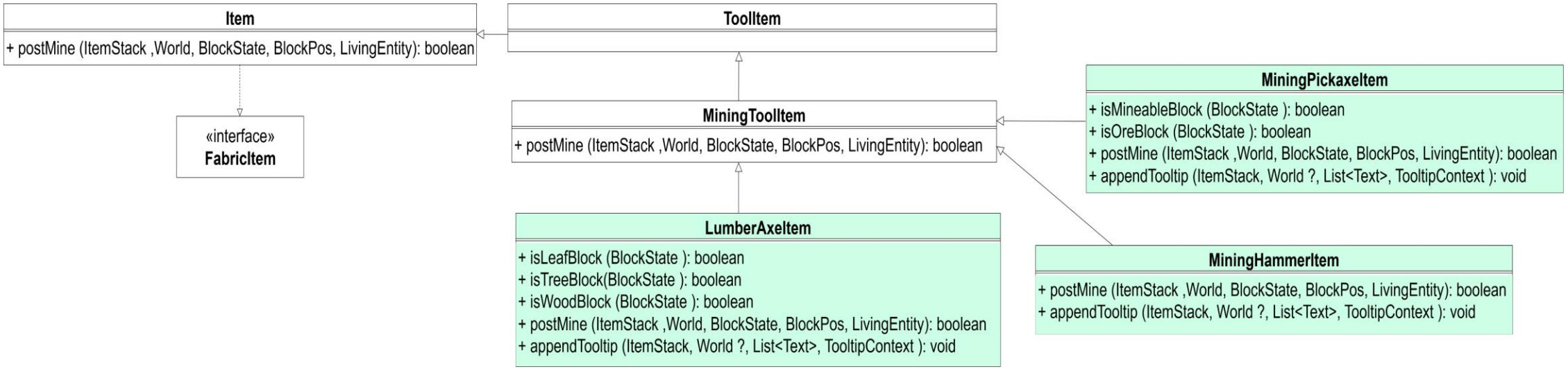
Algorithm for cut down/mine connected blocks



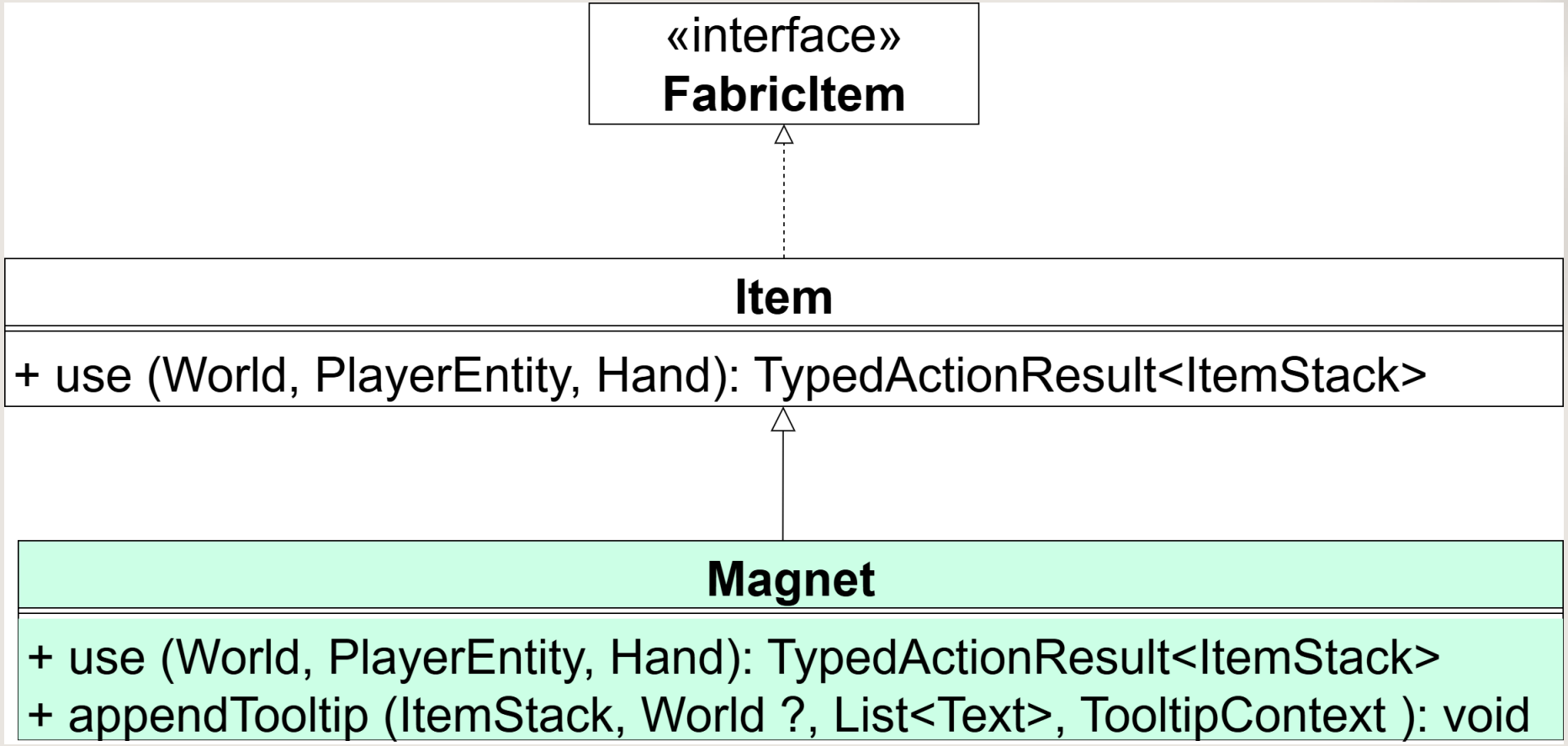
Craft Mastery – conceptual architecture



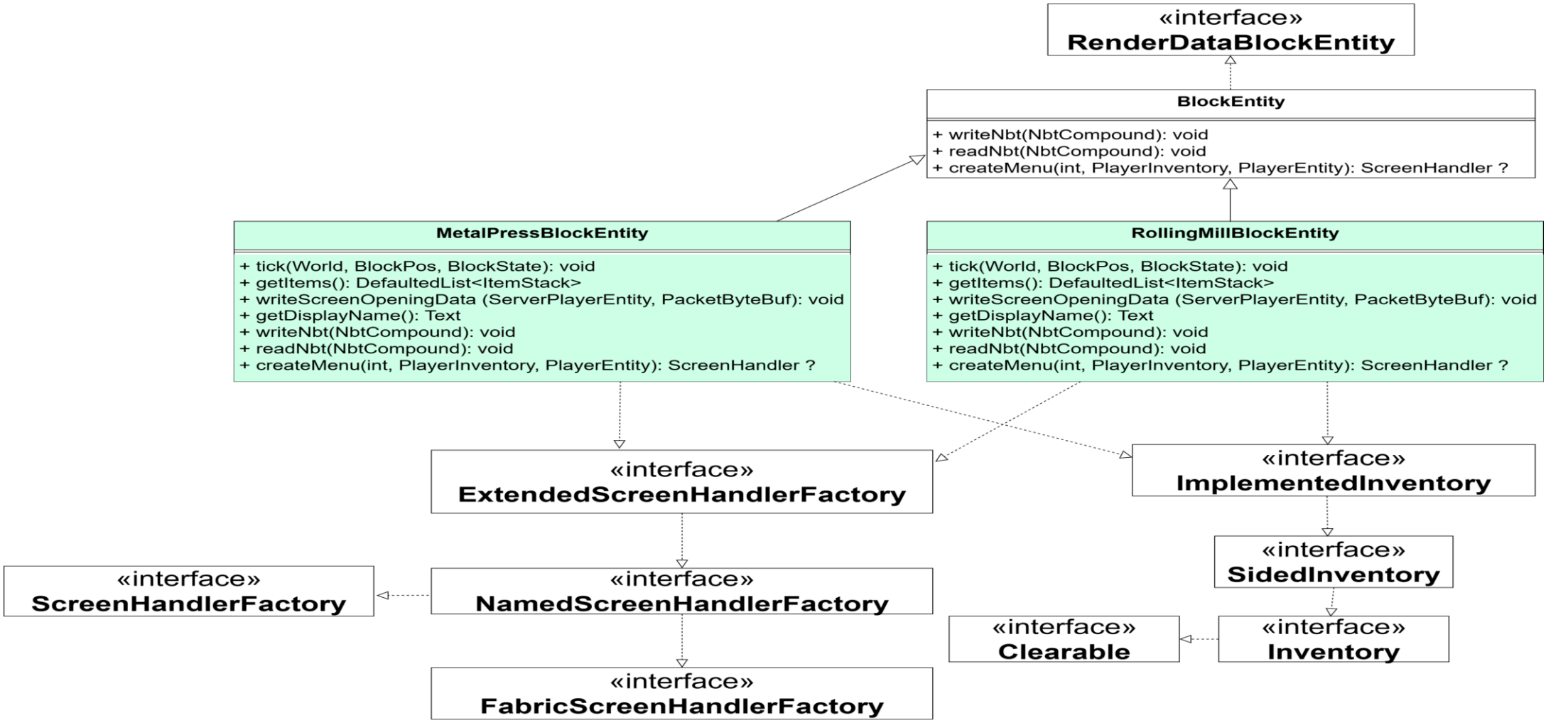
Custom tools



Custom tools - Magnet

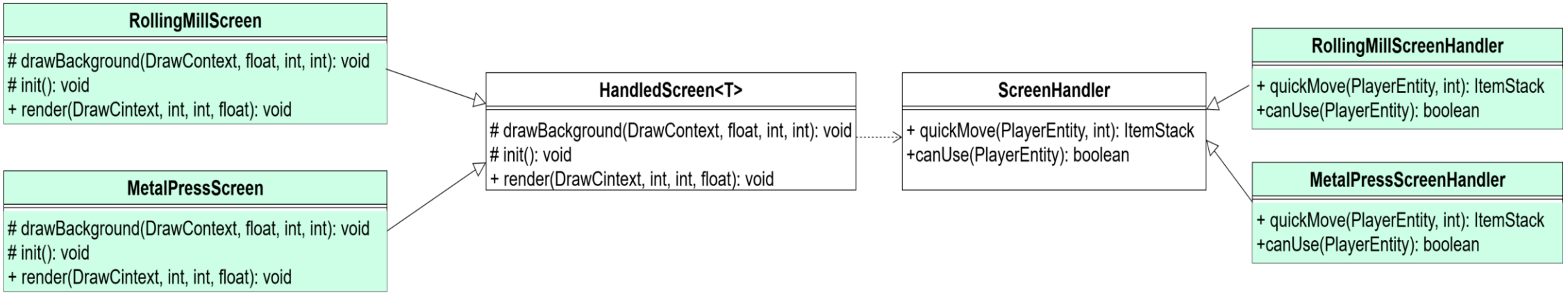


Custom block entities



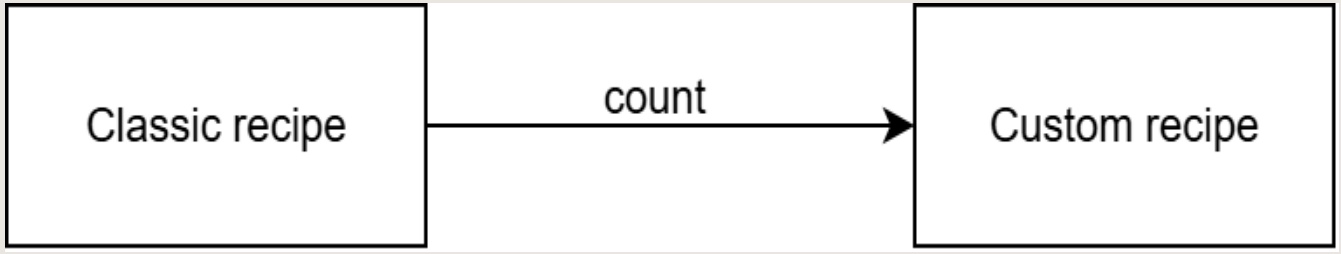
Custom interfaces

- RollingMillScreen and MetalPressScreen are Screen classes
- RollingMillHandler and MetalPressHandler are Menu classes

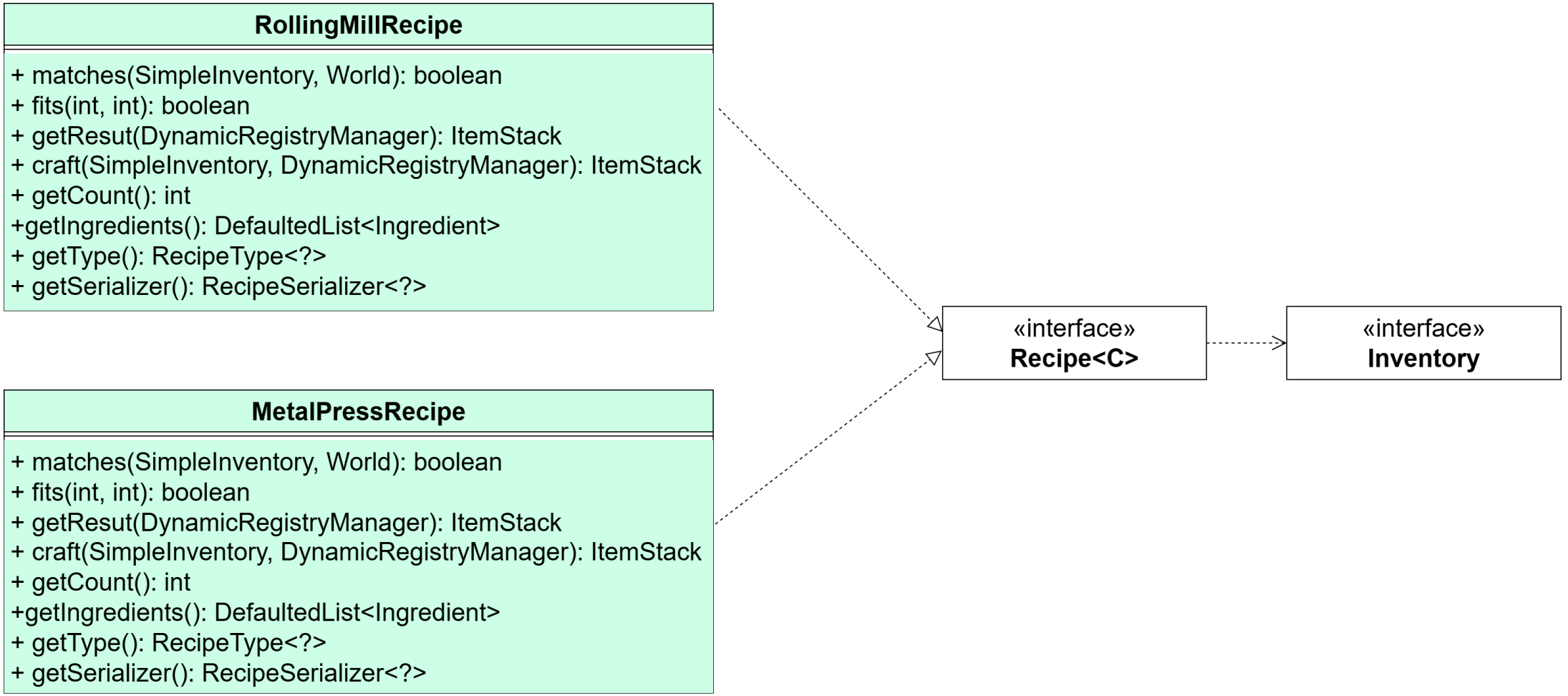


Custom recipe type

```
{
  "type": "craftmastery:rolling_mill",
  "count": 2,
  "ingredients": [
    {
      "item": "minecraft:iron_ingot"
    }
  ],
  "output": {
    "item": "craftmastery:tool_rod"
  }
}
```



Custom recipe type



Testing

Crafting methods

- Precondition: to have access to a crafting table
- Materials and Recipe for tools and block entities to be the correct one
- Player can equip the tool or can place in the world the block entity

Functionality

- Each tool was tested using different type of blocks
- Recipes from block entities was tested with different ores

Conclusions

Contributions and achievements

- Added new items
- Introduce new tools
- Insert new block entities
- Implemented interfaces for block entities
- Created new custom recipes for new items
- Made recipes for tools and block entities

Further development

- Integration with other mods
- Generating new resources
- Making new machines

Thank you for your attention

Testing – Lumber Axe

Test	Expected output	Actual output
Player right-clicks crafting table.	System should display the crafting table GUI.	System displays the crafting table GUI.
Player arranges 2 Tool Rods and 3 Tool Plates in the input slot.	System should display Lumber Axe in the output slot.	System displays Lumber Axe in the output slot.
A stone block is broken using the Lumber Axe.	The process takes a long time, durability decreases by one, and the block is not dropped.	The process takes a long time, durability decreases by one, and the block is not dropped.
Locate a tree in the world, numbered how many wood blocks are, and cut the block from the base of the tree.	Durability of the tool decreases with exactly the number of wood blocks that the tree had, perform DFS and cut all woodblocks down.	Durability of the tool decreases with exactly the number of wood blocks that the tree had, perform DFS and cut all woodblocks down.
A dirt block is broken using the Lumber Axe.	The dirt block is broken and dropped, and durability de-creases by one.	The dirt block is broken and dropped, and durability de-creases by one.

Testing – Mining Hammer

Test	Expected output	Actual output
Player right-clicks crafting table.	System should display the crafting table GUI.	System displays the crafting table GUI.
Player arranges 1 Tool Rod and 6 Tool Plates in the input slot.	System should display Mining Hammer in the output slot.	System displays Mining Hammer in the output slot.
Aimed down, up, north, south, east, and west towards a stone block.	Mining Hammer mines all stone-like blocks in a 3x3 area around the targeted stone block in the horizontal/vertical plane.	Mining Hammer mines all stone-like blocks in a 3x3 area around the targeted stone block in the horizontal/vertical plane.
Aimed down, up, north, south, east, and west towards a dirt block.	Mining Hammer only mines the targeted dirt block.	Mining Hammer only mines the targeted dirt block.

Testing – Mining Pickaxe

Test	Expected output	Actual output
Player right-clicks crafting table.	System should display the crafting table GUI.	System displays the crafting table GUI.
Player arranges 2 Tool Rods and 3 Tool Plates in the input slot.	System should display Mining Hammer in the output slot.	System displays Mining Hammer in the output slot.
Mined a connected ore block with the Mining Pickaxe after counting how many connected blocks of the same type are.	Durability of Mining Pickaxe decreases with exactly the number of connected ore blocks, and also the tool is performing a DFS on the blocks and mine them. them.	Durability of Mining Pickaxe decreases with exactly the number of connected ore blocks, and also the tool is performing a DFS on the blocks and mine them.
Broke a stone blockusing the Mining Pick-axe.	Only the stone block is brokenand dropped. Durability de-creases by one.	Only the stone block is broken and dropped. Durability de-creases by one.

Testing – Magnet

Test	Expected output	Actual output
Player right-clicks crafting table.	System should display the crafting table GUI.	System displays the crafting table GUI.
Player arranges 2 Tool Rods, 5 Tool Plates and 1 Ender Pearl in the input slot.	System should display Magnet in the output slot.	System displays Magnet in the output slot.
Dropped items and blocks within 5 blocks in each direction, then equipped and right-clicked the Magnet.	The Magnet pulls all nearby dropped items, and durability de-creases by the exact number of distinct items pulled.	The Magnet pulls all nearby dropped items, and durability de-creases by the exact number of distinct items pulled.
Dropped items and blocks at more than5 blocks distance in each direction, then equipped and right-clicked the Magnet.	The Magnet does not pull the dropped items, and durability does not decrease.	The Magnet does not pull the dropped items, and durability does not decrease.

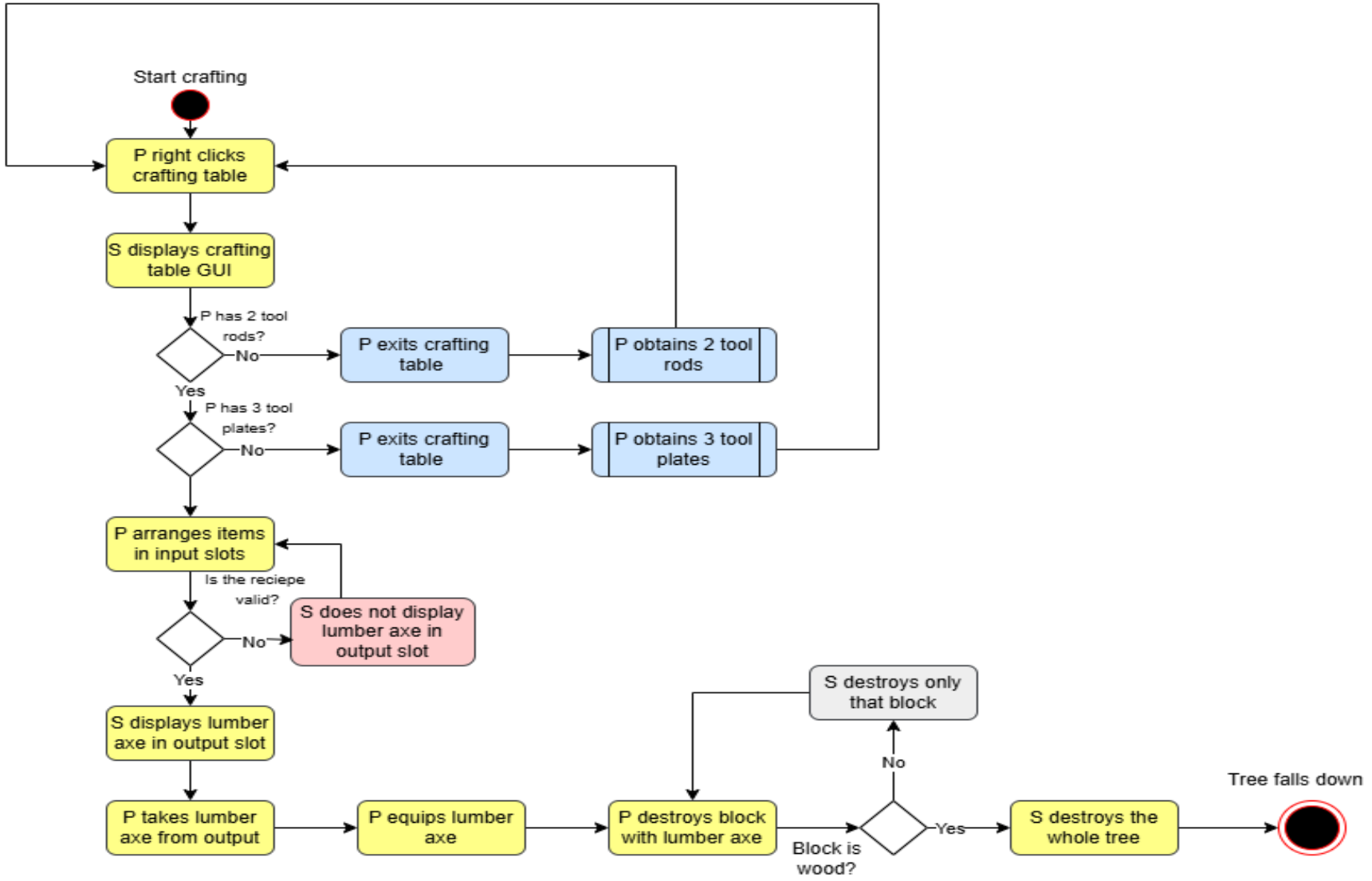
Testing – Crafting the Rolling Mill and the Tool Rod

Test	Expected output	Actual output
Player right-clicks crafting table.	System should display the crafting table GUI.	System displays the crafting table GUI.
Player arranges 4 copper ingots, 2 iron ingots, 1 copper block,1 iron block, and 1 dispenser in the input slot.	System should display Rolling Mill in the output slot.	System displays Rolling Mill in the output slot.
Player right-clicks Rolling Mill.	System should display the Rolling Mill GUI.	System displays the Rolling Mill GUI.
Player places at least 2 iron ingots in the input slot and at least 3 coals in the energy slot.	System should consume 2 iron ingots and 3 coals, should updates the process in GUI, and should outputs 1 Tool Rod.	System consumes 2 iron ingots and 3 coals, updates the process in GUI, and outputs 1 Tool Rod.

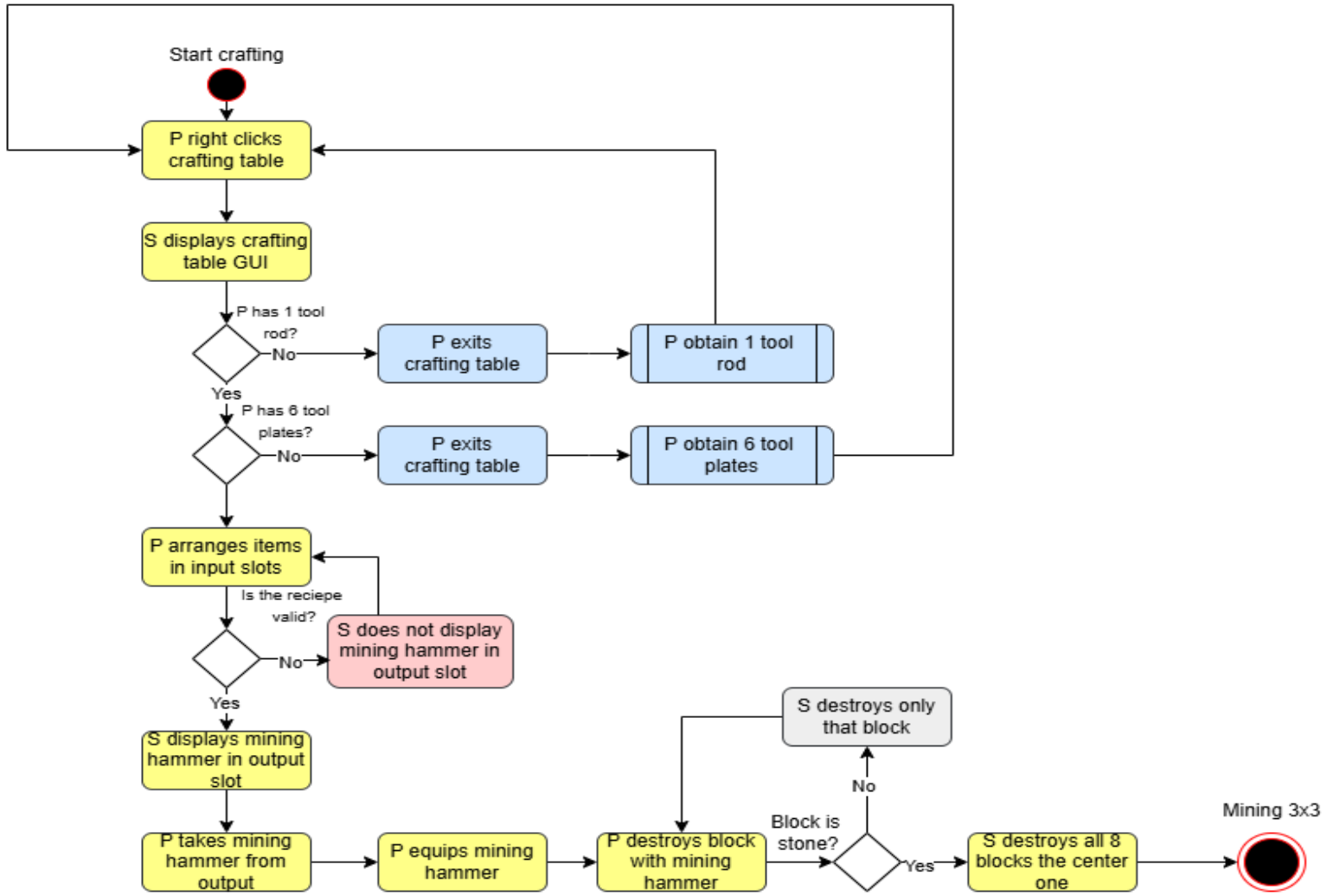
Testing – Crafting the Metal Press and the Tool Plate

Test	Expected output	Actual output
Player right-clicks crafting table.	System should display the crafting table GUI.	System displays the crafting table GUI.
Player arranges 4 copper ingots, 2 iron ingots, 1 copper block,1 iron block, and 1 piston in the input slot.	System should display Metal Press in the output slot.	System displays Metal Press in the output slot.
Player right-clicks Metal Press.	System should display the Metal Press GUI.	System displays the Metal Press GUI.
Player places at least 4 iron ingots in the input slot and at least 5 coals in the energy slot.	System should consume 4 iron ingots and 5 coals, should updates the process in GUI, and should outputs 1 Tool Plate.	System consumes 4 iron ingots and 5 coals, updates the process in GUI, and outputs 1 Tool Plate.

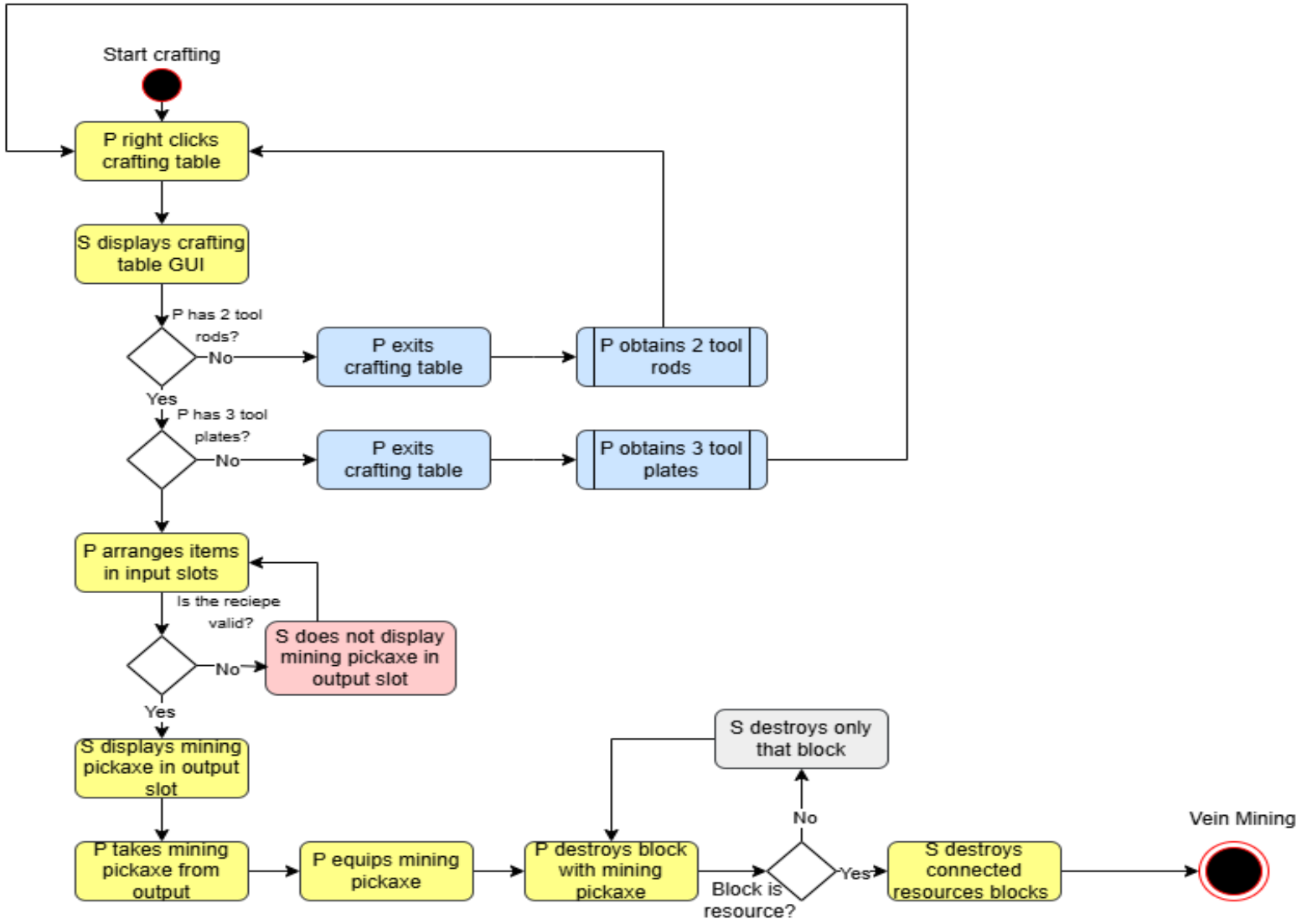
Lumber Axe use case



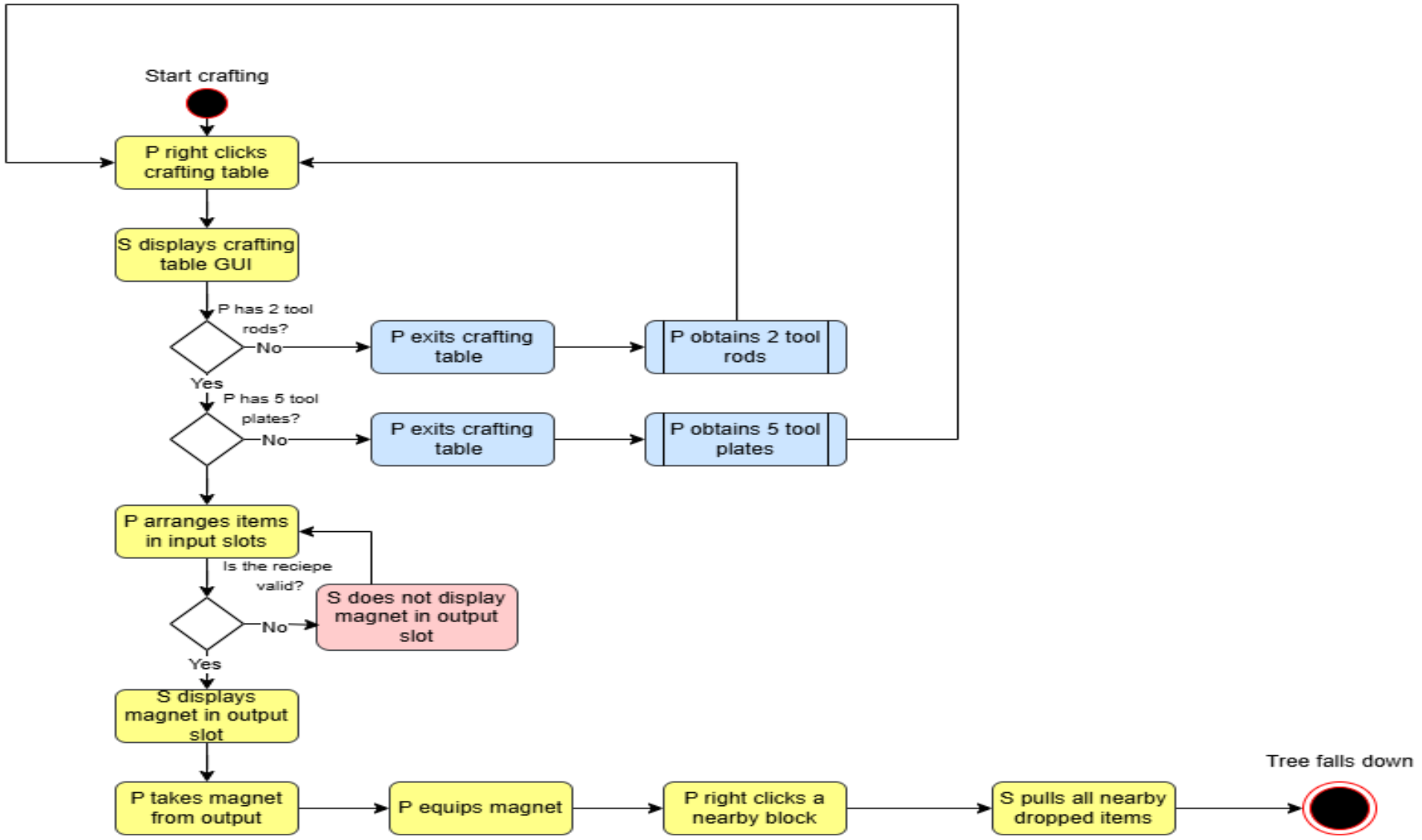
Mining Hammer use case



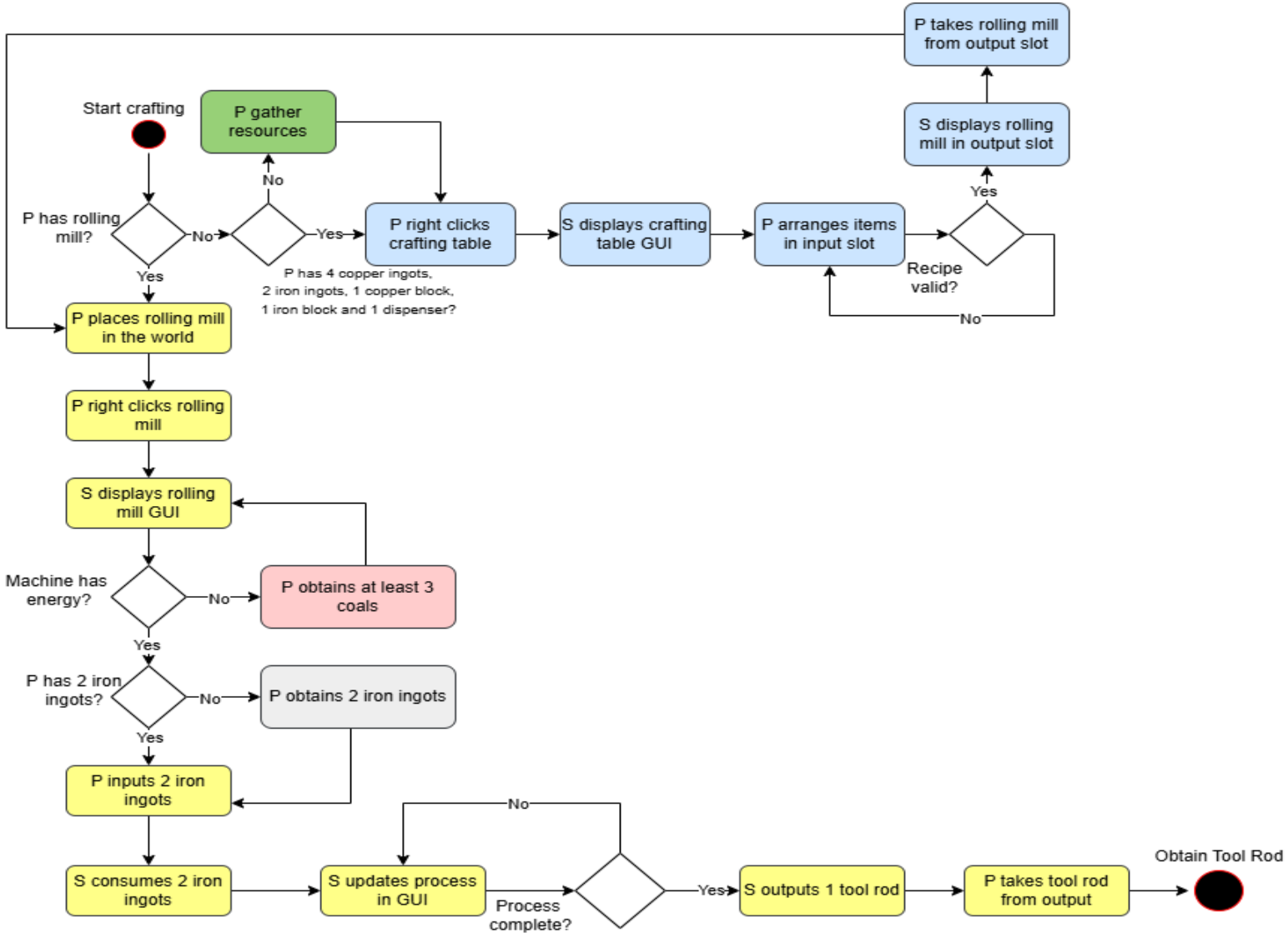
Mining Pickaxe use case



Magnet use case



Obtain Tool Rod use case



Obtain Tool Plate use case