

Tacita's JavaCraft - Provisional Report (Group 18)

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Group Details

Group Name	Tacita
Group Number	18
TA	TA assigned to Group 18

Participating Students

Student Name	Student ID
Leopold Meinel	i6352276
Anton Haarmann	i6367288
Sian Lodde	i6343174
Tristan Dormans	i6343359

Introduction

Meet JavaCraft, the first project we were assigned in our University journey. JavaCraft is a very simplified version of the game Minecraft that is set in a two dimensional world that is visualized using ASCII characters.

For this project, we are given a code for the JavaCraft game. That code is, what we are meant to work on.

We are supposed to expand the game in different aspects like adding new items or crafting recipes to it and documenting and understanding it, which we should show in the form of code descriptions, flowcharts, pseudocodes, automatas.

So far we've already learned a lot from this project!

JavaCraft's Workflow

Class JavaCraft

Pseudocode

BEGIN

Define global constants/variables and assign values to some;

Initialize game by assigning some global variables;

Generate world with different blocks by using randomness;

PRINT INFO `instructions`;

PRINT INFO "Start the game? (Y/N): ";

IF `

Set `

Set `

Set `

Set `

WHILE true

PRINT INFO `initial UI containing legend, world, inventory`;

PRINT INFO "Enter your action: 'WASD': Move, 'M': Mine, 'P': Place, 'C': Craft, 'I': Interact, 'Save': Save, 'Load': Load, 'Exit': Quit, 'Unlock': Unlock Secret Door\n" (colored in green);

IF `

IF `

Set `

Move player;

ELSE IF `

IF `

Set `

Mine block;

ELSE IF `

PRINT INFO `players inventory`;

PRINT INFO "Enter the block type to place: ";

Place block `

ELSE IF `

PRINT INFO `crafting recipes`;

PRINT INFO "Enter the recipe number to craft: ";

Craft item `

ELSE IF `

Interact with world;

ELSE IF `

PRINT INFO "Enter the file name to save the game state: ";

Save game as `

ELSE IF `

PRINT INFO "Enter the file name to load the game state: ";

Load game from `

ELSE IF `

```

        PRINT INFO "Exiting the game. Goodbye!\n";
        Exit game;
    ELSE IF `<String> READ user input` == "look" (caseless check)
        Print all blocks surrounding player;
    ELSE IF `<String> READ user input` == "unlock" (caseless check)
        Set `<boolean> unlockMode` = true;
    ELSE IF `<String> READ user input` == "getflag" (caseless check)
        TRY TO
            Set up connection to a server;
            PRINT INFO " " + `<String> get country from server via a
POST request`;
            PRINT INFO " " + `<String> get quote from server via a POST
request`;
        ON EXCEPTION
            PRINT ERROR containing `stacktrace`;
            PRINT ERROR "Error connecting to the server";
            Wait on player to press ENTER;
    ELSE IF `<String> READ user input` == "open" (caseless check)
        IF `<boolean> unlockMode` == true AND `<boolean>
craftingCommandEntered` == true AND `<boolean> miningCommandEntered` ==
true AND `<boolean> movementCommandEntered` == true
            Set `<boolean> secretDoorUnlocked` = true;
            Reset world to an empty world;
            PRINT INFO "Secret door unlocked!\n";
            Wait on player to press ENTER;
        ELSE
            PRINT WARNING "Invalid passkey. Try again!\n";
            Set `<boolean> unlockMode` = false;
            Set `<boolean> craftingCommandEntered` = false;
            Set `<boolean> miningCommandEntered` = false;
            Set `<boolean> movementCommandEntered` = false;
    ELSE
        PRINT WARNING "Invalid input. Please try again." (colored in
yellow);
    IF `<boolean> unlockMode` == true
        IF `<String> READ user input` == "c" (caseless check)
            Set `<boolean> craftingCommandEntered` = true;
        IF `<String> READ user input` == "m" (caseless check)
            Set `<boolean> miningCommandEntered` = true;
    IF `<boolean> secretDoorUnlocked` == true
        PRINT INFO `description of current state`;
        Set `<boolean> inSecretArea` = true;
        Reset world to an empty world;
        Set `<boolean> secretDoorUnlocked` = false;
        Fill `<Integer list> inventory` with all available blockTypes;
        Wait on player to press ENTER;
    ELSE
        Exit game;

END

```


Functionality Exploration

See [Appendix](#) for documentation of all functions and flowcharts and pseudocodes of 16 functions.

Code Repetition

`getBlockSymbol` contains code repetition in its switch statement, where each block contains a different color that corresponds to a different block.

This also occurs in multiple functions like `getBlockChar`, `getBlockTypeFromCraftedItem`, `getCraftedItemFromBlockType`, `getRequiredItemForMining`, `craftItem`, `craftStonePickaxe`, `craftIronPickaxe`, `craftWoodenPlanks`, `craftStick`, `craftIronIngot`, `interactWithWorld`, `getBlockName` and `getCraftedItemColor`.

`inventoryContains` and `craftedItemsContains` are almost identical and the general concepts are exactly the same.

Finite State Automata (FSA) Design

Secret door logic (boolean secretDoorUnlocked)

General Description

The secret door logic is triggered when `<boolean> secretDoorUnlocked` is true and will replace the map with an empty map containing a dutch flag. It will also replace the green player symbol with a blue one.

The `<boolean> secretDoorUnlocked` is true if the player supplies the following input in order:

1. `y` (caseless check)
2. Nothing OR anything other than `exit` (caseless check)
3. `unlock` (caseless check)
4. Nothing OR anything other than `exit` (caseless check)
5. Mandatory `a`, `c` AND `m` plus optional `y` AND/OR `unlock` in any order (caseless check, repetition is possible)
6. Nothing OR anything other than `exit` (caseless check)
7. `open` (caseless check)

After point 7, the `<boolean> secretDoorUnlocked` is true and the secret door logic triggers.

Automaton

$$D=(Q, \Sigma, \delta, q_0, F)$$

a=w, up, s, down, a, left, d, right

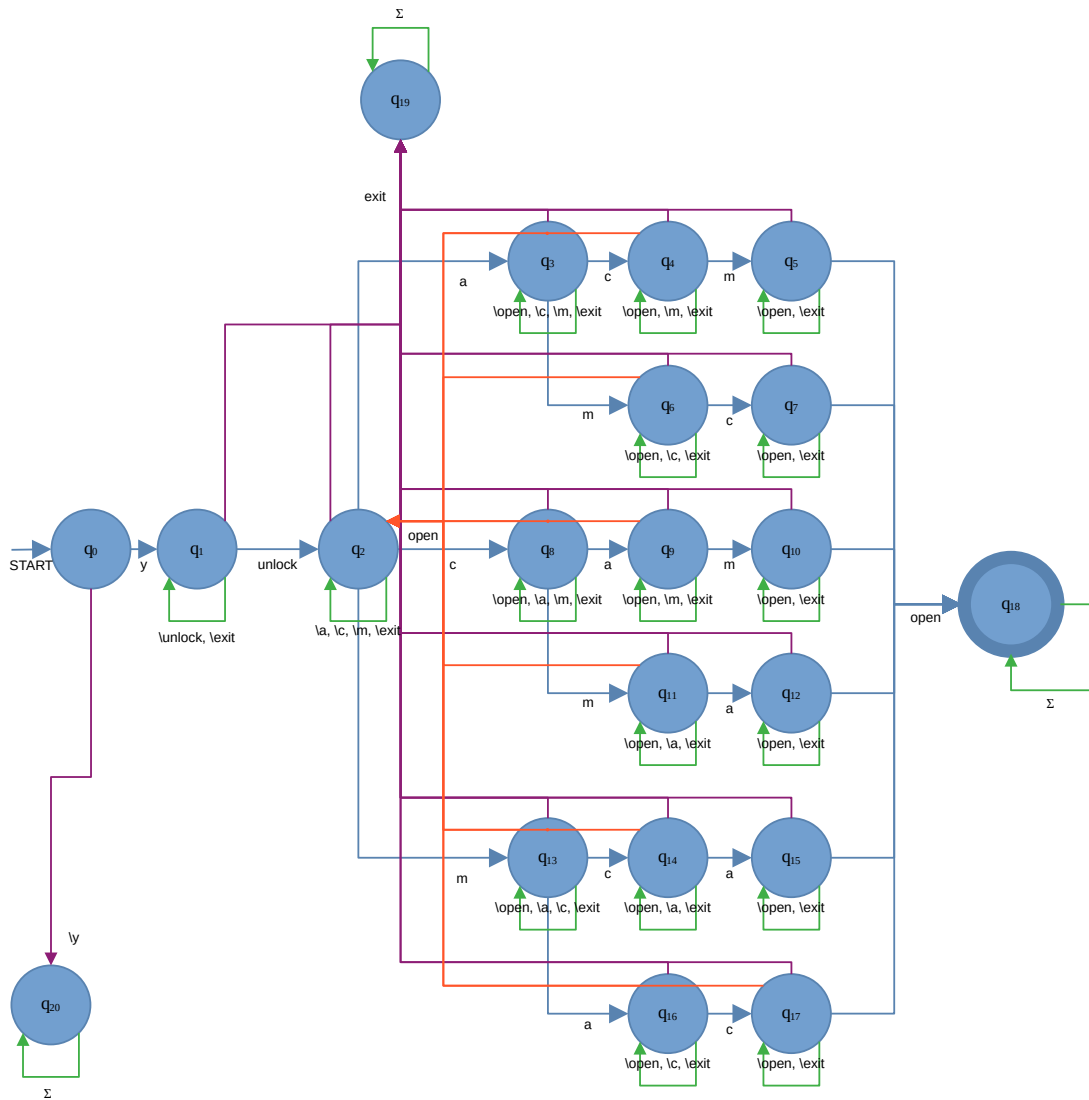
$\Sigma=\{y, \text{unlock}, a, c, m, \text{open}, \text{exit}\}$ (caseless check)

δ : Transition Function

$L(D)=\{y, \text{unlock}, \{\text{mandatory } a, c, m \text{ and optional } y, \text{unlock in any order; repetition is possible}\}, \text{open}\}$

$Q=\{q_0, q_1, q_2, q_3, q_4, q_5, q_6, q_7, q_8, q_9, q_{10}, q_{11}, q_{12}, q_{13}, q_{14}, q_{15}, q_{16}, q_{17}, q_{18}, q_{19}, q_{20}\}$

$F=\{q_{18}\}$



[illegible]

Git Collaboration & Version Control

Overview

UM Gitlab Repository, Branch Group 18

Git usage

We used Gitlab as our main collaboration method. By splitting up the tasks in a fair manner we divided the workload to be more efficient. Through Gitlab we kept each other up to date by making commits after every completed task.

That way everybody knew in what state the project was and how much still needed to be done. We also made sure to document our commits well, in an effort to better our understanding of the changes made.

Each one of us made multiple commits and used Gitlab extensively. This in return improved our team performance and also kept each other motivated to work on the project.

Changes & Conflicts

Merge conflicts were handled efficiently and quickly. As a team we all had our experiences with these conflicts, one example was that a local repository was a few key commits behind. This was solved by choosing what parts of the code to keep, and what parts of the code needed to be replaced by the newer version on the repository.

Some other issue we faced was not being able to merge in the first place, which was inevitably resolved by re-cloning the repository and pasting in our modified files, which we wanted to replace older files on the remote repository.

Extending the game code

[Provide details on the new block types, craft recipes, and their integration into the game. Include code snippets where appropriate]

Extending the game code

[Provide details on the new block types, craft recipes, and their integration into the game. Include code snippets where appropriate]

firstversion

We added two new Blocktypes and two new Crafting Items to the Game. Additionally we added a new Game mechanic and fixed a few bugs in the existing code.

Blocktypes

The Blocktypes we added are Coal and Emerald, we added them to the Game by assigning them an integer value and an ANSI color. We had to change a few functions to be able to fully integrate them into the Game. The first being generateWorld() in which we changed spawn values of each block to fit with the new additions which gives them a kind of rarity as Emerald and Coal are generated less often as Wood and Leaves for Example. [insert screenshot of Code]

We had to make some minor changes as well, for instance assigning the color to the integer value in getBlockSymbol(), and assigning them ASCII characters in getBlockChar(). [add screenshot of ASCII Character] We also had to change an integer value in fillInventory(), placeBlock() and displayInventory(), to fit with the new amount of Blocktypes. This was necessary so they would get considered while using these methods otherwise the Game would've only used the Old Blocktypes. [insert screenshots]

Additionally we assigned them String values in getBlockName(), assigned each block to its colour in getBlockColor() and added them to the Legend in displayLegend(). Also we added a message whenever they get mined in interactWithWorld().

Crafted Items

Our Crafted Items we added to the Game are Iron and Stone Pickaxe, crafting the Stone Pickaxe requires three Stone and one stick, crafting the Iron Pickaxe requires three Iron ingot and one stick.

We choose these two items because we wanted to implement a mechanic to the gameplay, that only lets a player mine a block when he fits the requirements to do so.

In this case for the player to be able to mine Coal and Iron blocks, he needs to have a Stone Pickaxe in his Inventory. To be able to mine emerald blocks he needs an Iron Pickaxe.

To accomplish this we had to first Implement the Crafted Items, we did this in similar fashion as the Blocktypes by assigning them integer values. And adding their values to the preexisting Crafted Items Methods.

Afterwards we implemented the Methods craftStonePickaxe() and craftIronPickaxe() in which we specified the Crafting requirements for each Item. for this to work we had to add a new method

`removeItemFromCraftedItem()`, that removes items from the crafted items inventory. [screenshot of `removeItemFromCraftedItem`] And `craftedItemsContains()` that checks if the player has the amount of crafted items in his `Inventory()`. [SCREENSHOT function]

The biggest change was the implementation of the mine requirements in `mineBlock()`, we did this by checking for the blocktype that is going to be mined first and then checking if the Player fits the requirements. [screenshot of mineblock changes]

To do this we implemented a new method `getMineRequFromBlockType()` wich gets the Blocktype as parameter and gives back the needed Crafted Item to be able to mine it. [screenshot of function]

Interacting with Flags API

We have rewritten the template function `getCountryAndQuoteFromServer()` to interact with the flags API at <https://flag.ashish.nl>.

The old code used a now deprecated constructor for URL: `new URL(String)`. Java complains with the following warning: `The constructor URL(String) is deprecated since version 20`. Therefore we decided on using `URI.create(String).toURL()` instead. This is not deprecated.

The rest of our code just uses the provided template which gets a country and a quote from the flags API via a POST request. Within the post request we send a json String containing the following:

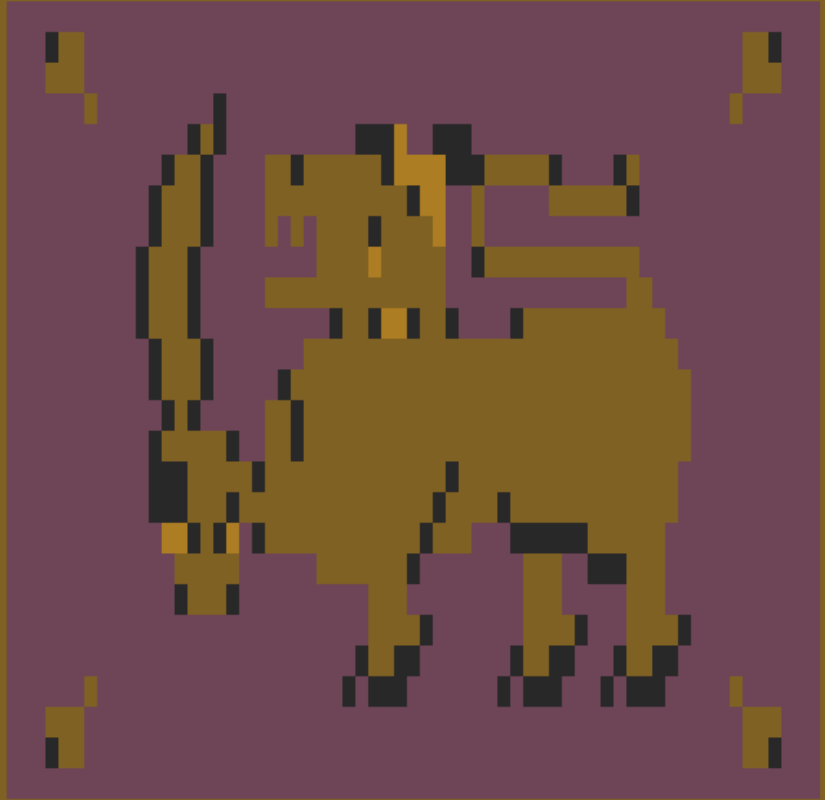
- `"group_number" : "18"`
- `"group_name" : "group18"`
- `"difficulty_level" : "hard"`

This is meant to identify our group via its' name and number and lets the server know which difficulty level it should choose for the flag.

Since we only use this to know which flag we have to build, it wasn't necessary to pretty print any response we get. Therefore we didn't work on that and didn't really change the code.

In our current code we have replaced https://flag.ashish.nl/get_flag with <https://example.com> to avoid unnecessary interactions with the API.

We got Sri Lanka as our first response and used a string to represent its' flag. The result is the following:



Secret door unlocked!
Press Enter to continue...

Conclusion

[Provide a summary of achievements, challenges, and learnings.]

firstversion

So we have achieved to create a lot of beautiful and ordered flowcharts, unfortunately we have encountered some troubles along the way. For instance, it was really challenging to fit the flow chart of the whole game on one page, for readability. Sian however managed to change the properties of the whole chart to make it fit. Leo encountered difficulties while constructing the FSA. He had to redo the whole automaton multiple times to. We learned how to work together in a team, managing team tasks, dividing tasks. Maintaining a functioning code base, fighting over who gets to do what. We learned how to read and understand code written by someone else, via pseudocode and flowchart, this also greatly helped us advance our java knowledge. In the end, we managed to create a proper looking and well formatted pdf by using markdown, to learn how to use an API, how to draw a challenging flag using only ASCII characters.

secondversion

We have achieved the creation of a lot of beautiful and ordered flowcharts, a well documented code base and as expected encountered no lack of issues along the way. For instance, it was really challenging to fit the flowchart of the whole game on one page, for readability. Sian however managed to change the properties of the whole chart to make it fit. Leo encountered difficulties while constructing the FSA. He had to redo the whole automaton multiple times. Antons pain has been eased by the success he attained by the addition of adding new blocks and crafting recipes to the game, which highly enriched the gameplay. We learned how to work together in a team, managing team tasks and dividing tasks. Also included in our learning experience is learning to maintain a functioning and readable codebase and fighting over who gets to do what. We learned how to read and understand code written by someone else, via pseudocode and flowchart, this also greatly helped us advance our java knowledge. Furthermore we have established an even better understanding of the art of discipline. An art we all learned to love, by designing and creating a vast amount of flowcharts and pseudocodes, with our own blood, sweat and tears. In the final stages of our project, we managed to create a proper looking and well formatted pdf using markdown, we learned how to use an API and how to draw a challenging flag using only ASCII characters.

thirdversion

Who Did What?

Task	Who worked on the task	Participation in percentage
Creating initial pseudocode and flowcharts	Leopold, Anton, Tristan, Sian	Even across all participants
Setting up Gitlab repository	Leopold, Sian	Even across all participants
Creating documentation for JavaCraft code	Leopold, Anton, Tristan, Sian	Even across all participants
Finding repetitions in code	Sian	100%
Creating flowchart and pseudocode for class JavaCraft	Tristan	100%
Creating FSA for automaton	Leopold, Tristan	90%, 10%
Creating table and description for automaton	Leopold	100%
Converting ODF Flowcharts to .graphml	Tristan	100%
Deciding on the uniformal format for flowcharts	Leopold, Anton, Tristan, Sian	Even across all participants
Deciding on the uniformal format for pseudocode	Leopold, Anton, Tristan, Sian	70%, 10%, 10%, 10%
Converting flowcharts to uniformal format	Sian, Tristan, Anton	80%, 10%, 10%
Converting pseudocode to uniformal format	Leopold	100%
Creating documentation	Leopold	100%
Cleaning up repository directories	Sian	100%
Exporting flowcharts to SVG format	Sian	100%
Implementing two new blocks and two new crafting items	Anton	100%
Updating functions involved with new blocks and crafting items	Anton	100%
Creating provisional report document	Leo, Tristan, Anton, Sian	70%, 10%, 10%, 10%
Merging flowchart images with report document into single PDF	Sian	100%
Implementing uniformal directory structure	Leopold	100%

Appendix

void clearScreen()

Documentation

clearScreen

```
private static void clearScreen()
```

Clears the screen.

This method clears the screen and uses different logic depending on the OS.

Catched Exceptions:

- On IOException: Prints stacktrace when I/O exception of some sort has occurred.
- On InterruptedException: Prints stacktrace when a thread is waiting, sleeping, or otherwise occupied, and the thread is interrupted, either before or during the activity.

Java

```
private static void clearScreen() {
    try {
        if (System.getProperty("os.name").contains("Windows")) {
            new ProcessBuilder("cmd", "/c",
"cls").inheritIO().start().waitFor();
        } else {
            System.out.print("\033[H\033[2J");
            System.out.flush();
        }
    } catch (IOException | InterruptedException ex) {
        ex.printStackTrace();
    }
}
```

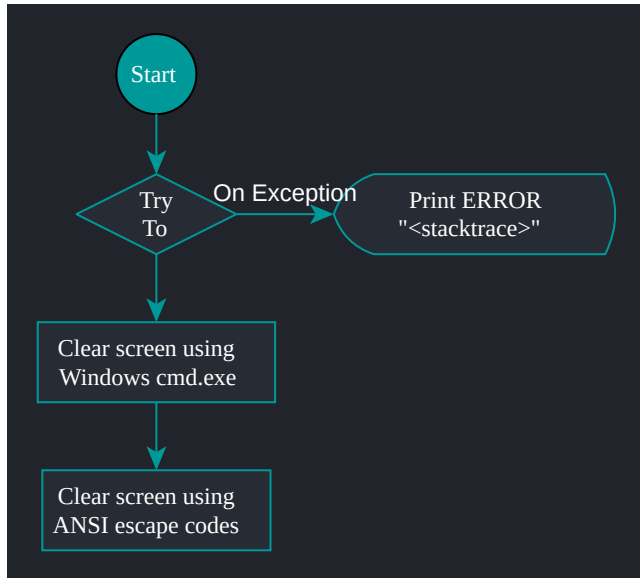
Pseudocode

```
BEGIN

TRY TO
    IF current operating system matches Windows
        Clear screen using Windows cmd.exe by calling "/c cls";
        Wait on process to finish;
    ELSE
        Clear screen using ANSI code;
ON EXCEPTION
    PRINT ERROR containing `stacktrace`;

END
```

Flowchart



void craftIronIngot()

Documentation

craftIronIngot

```
public static void craftIronIngot()
```

Crafts CRAFTED_IRON_INGOT.

This method crafts CRAFTED_IRON_INGOT from 3 IRON_ORE that is taken from the players inventory.

Prints message if the player doesn't have the correct items in his inventory.

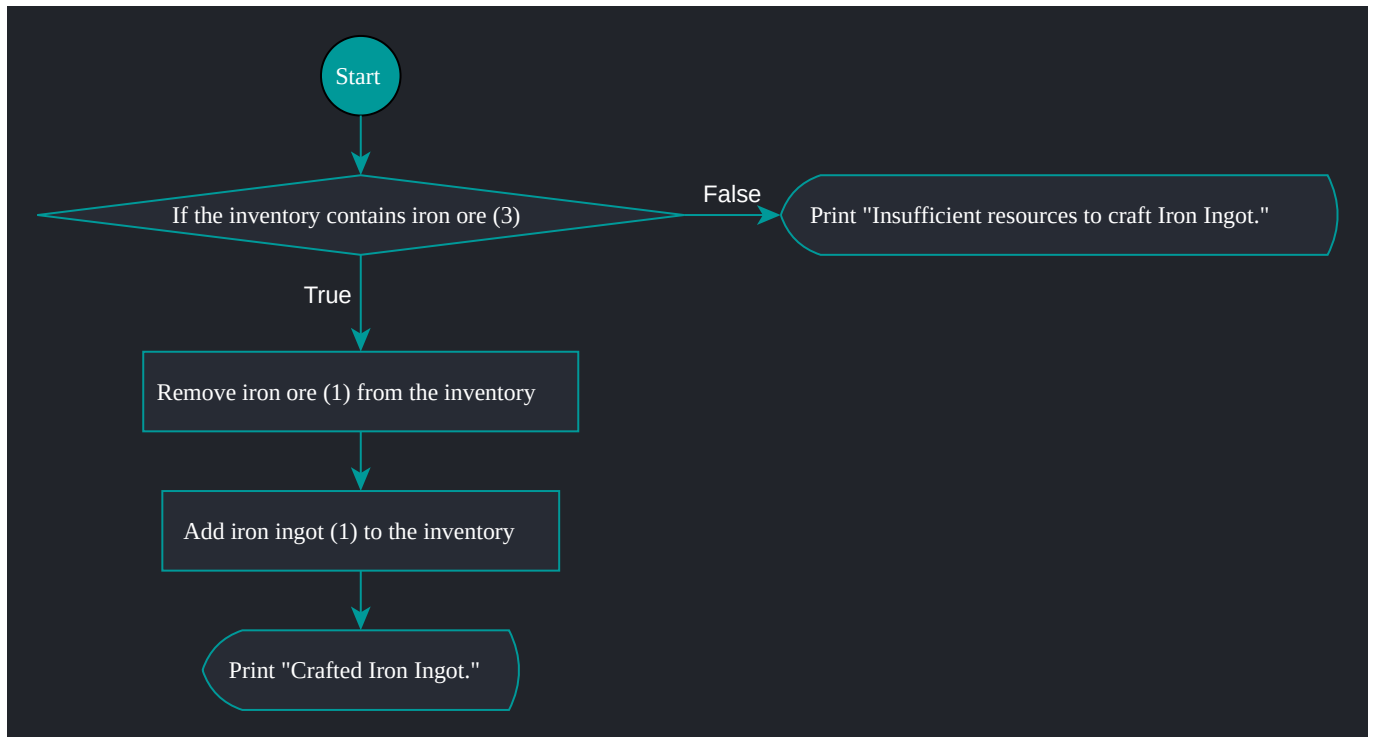
Java

```
public static void craftIronIngot() {  
    if (inventoryContains(IRON_ORE, 3)) {  
        removeItemsFromInventory(IRON_ORE, 3);  
        addCraftedItem(CRAFTED_IRON_INGOT);  
        System.out.println("Crafted Iron Ingot.");  
    } else {  
        System.out.println("Insufficient resources to craft Iron Ingot.");  
    }  
}
```

Pseudocode

```
BEGIN  
  
IF `<list> inventory` contains at least 3 iron ore  
    Remove 3 iron ore from `<list> inventory`;  
    Add the crafted item 1 iron ingot to `<list> inventory`;  
    PRINT INFO "Crafted Iron Ingot.\n";  
ELSE  
    PRINT WARNING "Insufficient resources to craft Iron Ingot.\n";  
  
END
```

Flowchart



void craftItem(int recipe)

Documentation

craftItem

```
public static void craftItem(int recipe)
```

Crafts an item.

This method crafts an item from a recipe.

Prints message if invalid recipe was supplied.

Parameters:

`recipe` - The recipe used to craft the item

Java

```
public static void craftItem(int recipe) {
    switch (recipe) {
        case 1:
            craftWoodenPlanks();
            break;
        case 2:
            craftStick();
            break;
        case 3:
            craftIronIngot();
            break;
        case 4:
            craftStonePickaxe();
            break;
        case 5:
            craftIronPickaxe();
            break;
        default:
            System.out.println("Invalid recipe number.");
    }
    waitForEnter();
}
```

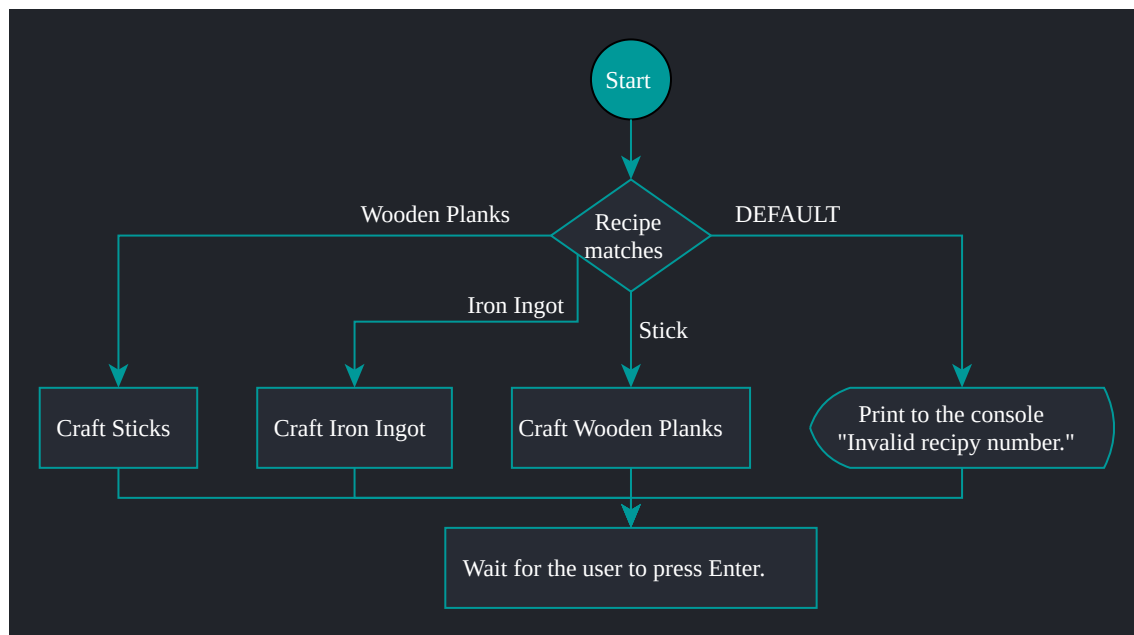
Pseudocode

```
BEGIN

IF `<Integer> recipe` == 1
    Craft wooden planks;
ELSE IF `<Integer> recipe` == 2
    Craft stick;
ELSE IF `<Integer> recipe` == 3
    Craft iron ingot;
ELSE IF `<Integer> recipe` == 4
    Craft stone pickaxe;
ELSE IF `<Integer> recipe` == 5
    Craft iron pickaxe;
ELSE
    PRINT WARNING "Invalid recipe number.\n";
Wait on player to press ENTER;

END
```

Flowchart



void craftStick()

Documentation

craftStick

```
public static void craftStick()
```

Crafts CRAFTED_STICK.

This method crafts CRAFTED_STICK from 1 WOOD that is taken from the players inventory.

Prints message if the player doesn't have the correct items in his inventory.

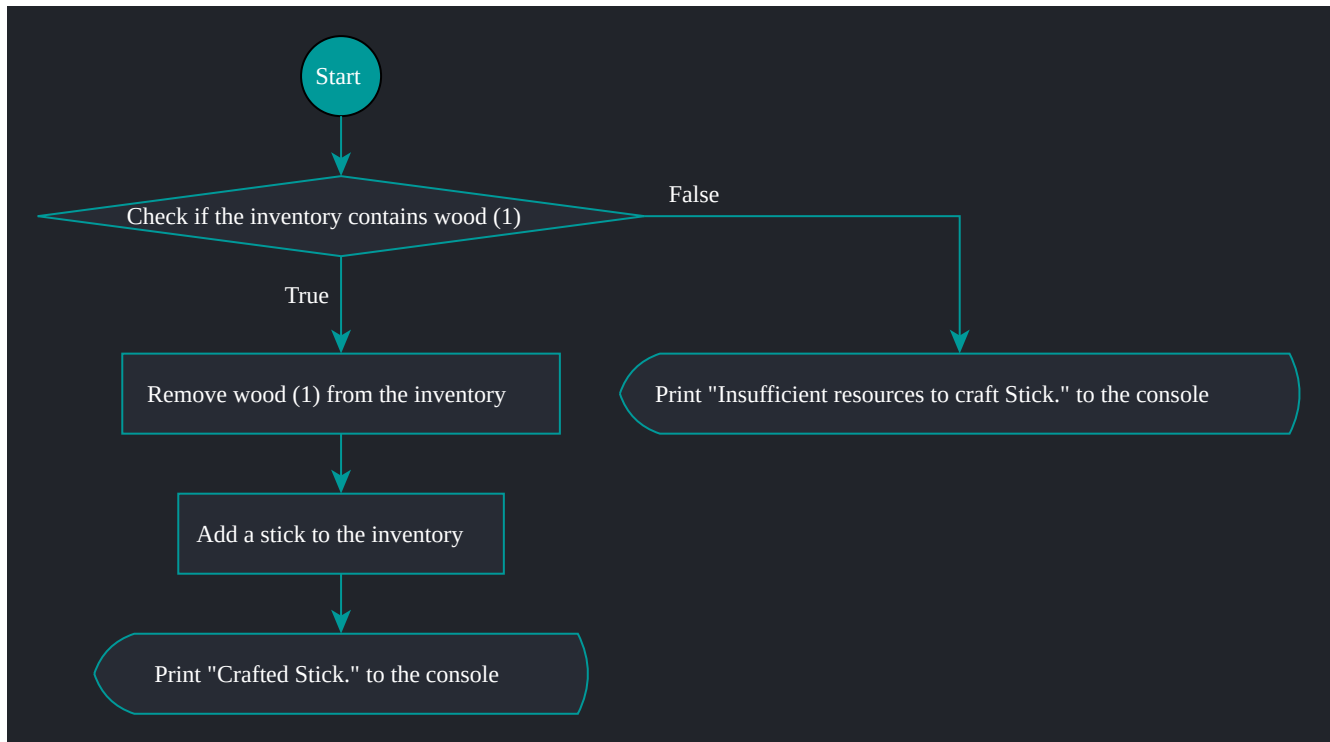
Java

```
public static void craftStick() {  
    if (inventoryContains(WOOD)) {  
        removeItemsFromInventory(WOOD, 1);  
        addCraftedItem(CRAFTED_STICK);  
        System.out.println("Crafted Stick.");  
    } else {  
        System.out.println("Insufficient resources to craft Stick.");  
    }  
}
```

Pseudocode

```
BEGIN  
  
IF `<list> inventory` contains wood  
    Remove 1 wood from `<list> inventory`;  
    Add the crafted item 1 stick to `<list> inventory`;  
    PRINT INFO "Crafted Stick.\n";  
ELSE  
    PRINT WARNING "Insufficient resources to craft Stick.\n";  
  
END
```


Flowchart



void craftWoodenPlanks()

Documentation

craftWoodenPlanks

```
public static void craftWoodenPlanks()
```

Crafts CRAFTED_WOODEN_PLANKS.

This method crafts CRAFTED_WOODEN_PLANKS from 2 WOOD that are taken from the players inventory.

Prints message if the player doesn't have the correct items in his inventory.

Java

```
public static void craftWoodenPlanks() {
    if (inventoryContains(WOOD, 2)) {
        removeItemsFromInventory(WOOD, 2);
        addCraftedItem(CRAFTED_WOODEN_PLANKS);
        System.out.println("Crafted Wooden Planks.");
    } else {
        System.out.println("Insufficient resources to craft Wooden
Planks.");
    }
}
```

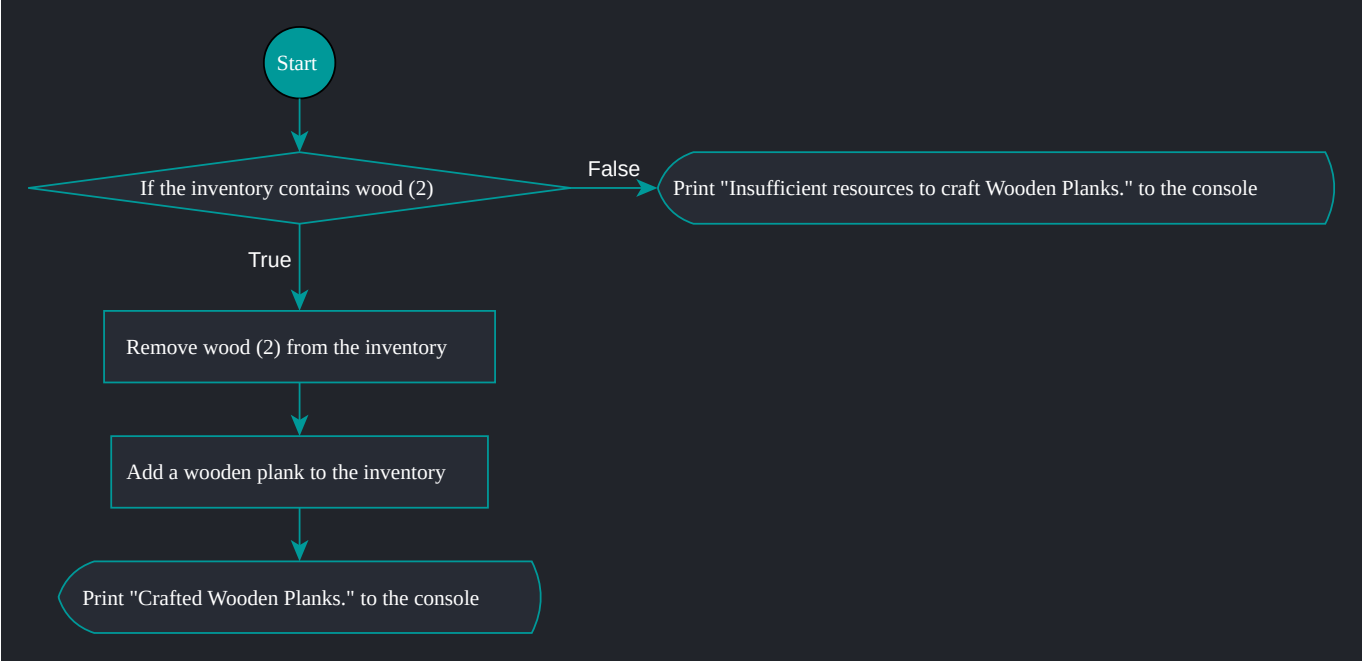
Pseudocode

```
BEGIN

IF `<list> inventory` contains at least 2 wood
    Remove 2 wood from `<list> inventory`;
    Add the crafted item 1 wooden planks to `<list> inventory`;
    PRINT INFO "Crafted Wooden Planks.\n";
ELSE
    PRINT WARNING "Insufficient resources to craft Wooden Planks.\n";

END
```

Flowchart



void displayCraftingRecipes()

Documentation

displayCraftingRecipes

```
public static void displayCraftingRecipes()
```

Prints crafting recipes.

This method prints the available crafting recipes.

Java

```
public static void displayCraftingRecipes() {  
    System.out.println("Crafting Recipes:");  
    System.out.println("1. Craft Wooden Planks: 2 Wood");  
    System.out.println("2. Craft Stick: 1 Wood");  
    System.out.println("3. Craft Iron Ingot: 3 Iron Ore");  
    System.out.println("4. Craft Stone Pickaxe: 1 Stick, 3 Stone");  
    System.out.println("5. Craft Iron Pickaxe: 1 Stick, 3 Iron Ingot");  
}
```

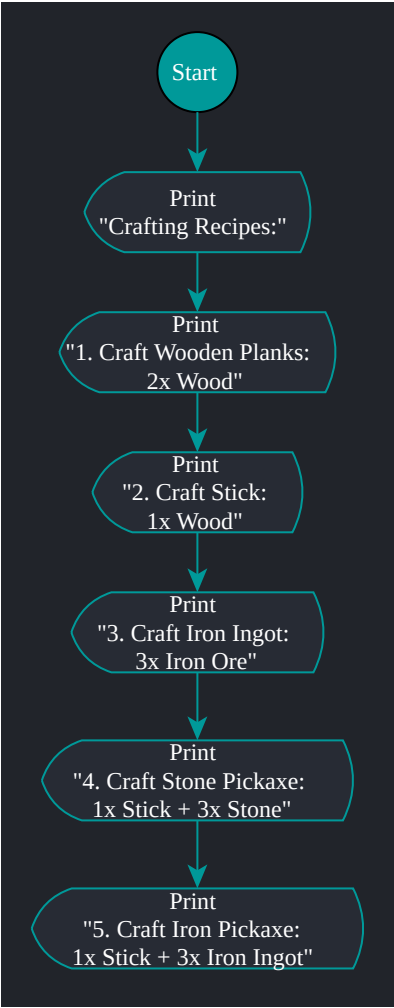
Pseudocode

BEGIN

```
PRINT INFO "Crafting Recipes:\n";  
PRINT INFO "1. Craft Wooden Planks: 2 Wood\n";  
PRINT INFO "2. Craft Stick: 1 Wood\n";  
PRINT INFO "3. Craft Iron Ingot: 3 Iron Ore\n";  
PRINT INFO "4. Craft Stone Pickaxe: 1 Stick, 3 Stone\n";  
PRINT INFO "5. Craft Iron Pickaxe: 1 Stick, 3 Iron Ingot\n";
```

END

Flowchart



void displayInventory()

Documentation

displayInventory

```
public static void displayInventory()
```

Prints players inventory.

This method prints the players inventory including craftedItems.

Java

```
public static void displayInventory() {
    System.out.println("Inventory:");
    if (inventory.isEmpty()) {
        System.out.println(ANSI_YELLOW + "Empty" + ANSI_RESET);
    } else {
        int[] blockCounts = new int[7];
        for (int i = 0; i < inventory.size(); i++) {
            int block = inventory.get(i);
            blockCounts[block]++;
        }
        for (int blockType = 1; blockType < blockCounts.length;
blockType++) {
            int occurrences = blockCounts[blockType];
            if (occurrences > 0) {
                System.out.println(getBlockName(blockType) + " - " +
occurrences);
            }
        }
        System.out.println("Crafted Items:");
        if (craftedItems == null || craftedItems.isEmpty()) {
            System.out.println(ANSI_YELLOW + "None" + ANSI_RESET);
        } else {
            for (int item : craftedItems) {
                System.out.print(
                    getCraftedItemColor(item) + getCraftedItemName(item) +
", " + ANSI_RESET);
            }
            System.out.println();
        }
        System.out.println();
    }
}
```

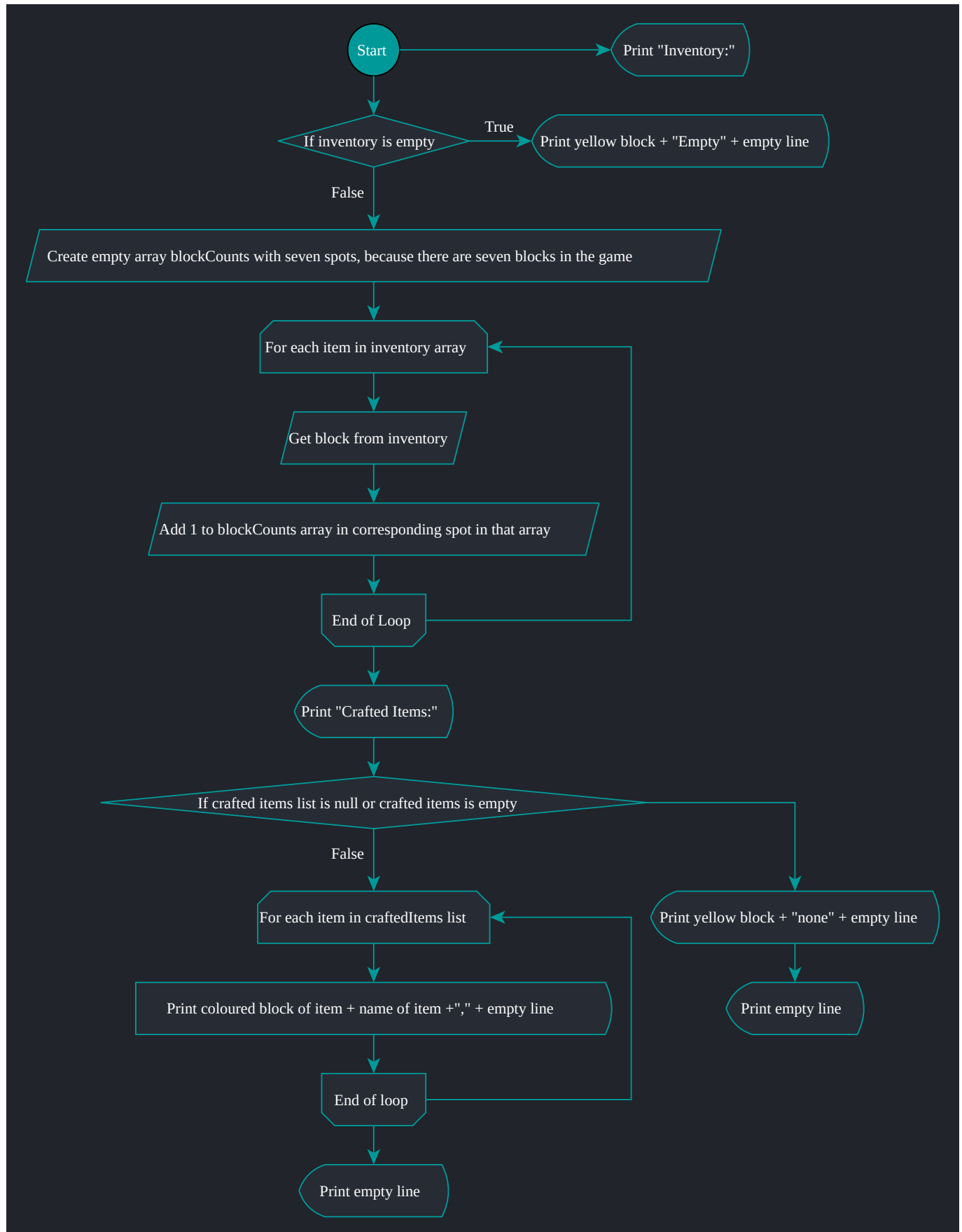
Pseudocode

```
BEGIN

PRINT INFO "Inventory:\n";
IF `<Integer list> inventory` is empty
    PRINT INFO "Empty\n" (colored in yellow);
ELSE
    CREATE `<Integer array> blockCounts` of size 7;
    FOR EACH `<Integer> element` in `<Integer list> inventory`
        Assign `<Integer> block` = `<Integer> element`;
        Set `<Integer array> blockCounts @ index <Integer> block` += 1;
    FOR `<Integer> blockType` = 1; `<Integer> blockType` < `length of
<Integer array> blockCounts`
        Assign `<Integer> occurrences` = `<Integer array> blockCounts @
index <Integer> blockType`;
        IF `<Integer> occurrences` > 0
            PRINT INFO `<String> get block name matching <Integer>
blockType` + " - " + `<Integer> occurrences\n`;
            Set `<Integer> blockType` += 1;
PRINT INFO "Crafted Items:\n";
IF `<Integer list> craftedItems` is non-existent or empty
    PRINT INFO "None\n" (colored in yellow);
ELSE
    FOR EACH `<Integer> item` in `<Integer list> craftedItems`
        PRINT INFO `<String> get name matching <Integer> item` + ", "
(colored in `<String> get color matching <Integer> item`);
        PRINT INFO "\n";
PRINT INFO "\n";

END
```

Flowchart



void fillInventory()

Documentation

fillInventory

```
private static void fillInventory()
```

Fills players inventory with all blocks.

This method fills the players inventory with all available blockTypes.

Part of secret door logic.

Java

```
private static void fillInventory() {  
    inventory.clear();  
    for (int blockType = 1; blockType <= 6; blockType++) {  
        for (int i = 0; i < INVENTORY_SIZE; i++) {  
            inventory.add(blockType);  
        }  
    }  
}
```

Pseudocode

BEGIN

Clear `<Integer list> inventory`;

FOR `<Integer> blockType` = 1; `<Integer> blockType` <= 6

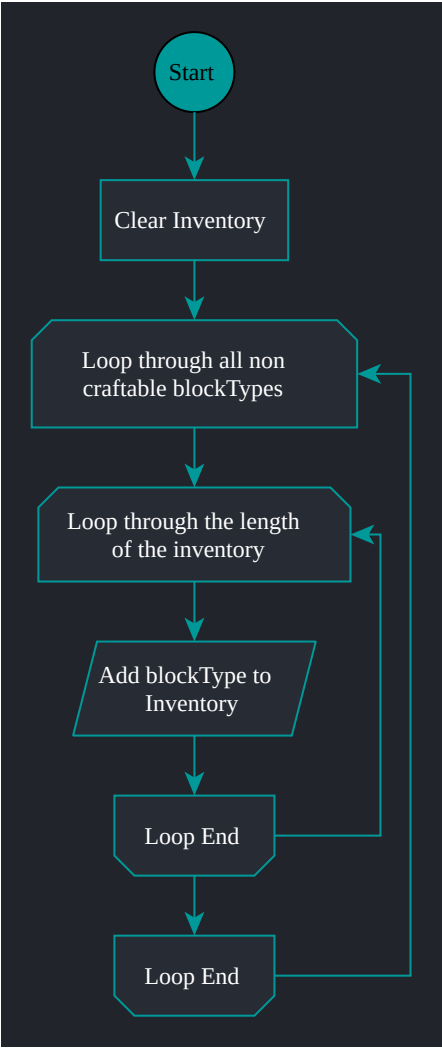
FOR EACH `<Integer> element` in `<Integer list> inventory`

Set `<Integer> member` = `<Integer> blockType`;

Set `<Integer> blockType` += 1;

END

Flowchart



void generateWorld()

Documentation

generateWorld

```
public static void generateWorld()
```

Generates the world.

This method uses randomness to generate a world out of different materials.

Java

```
public static void generateWorld() {
    Random rand = new Random();
    for (int y = 0; y < worldHeight; y++) {
        for (int x = 0; x < worldWidth; x++) {
            int randValue = rand.nextInt(100);
            if (randValue < 17) {
                world[x][y] = WOOD;
            } else if (randValue < 30) {
                world[x][y] = LEAVES;
            } else if (randValue < 45) {
                world[x][y] = STONE;
            } else if (randValue < 57) {
                world[x][y] = COAL_ORE;
            } else if (randValue < 65) {
                world[x][y] = IRON_ORE;
            } else if (randValue < 70) {
                world[x][y] = EMERALD_ORE;
            } else {
                world[x][y] = AIR;
            }
        }
    }
}
```

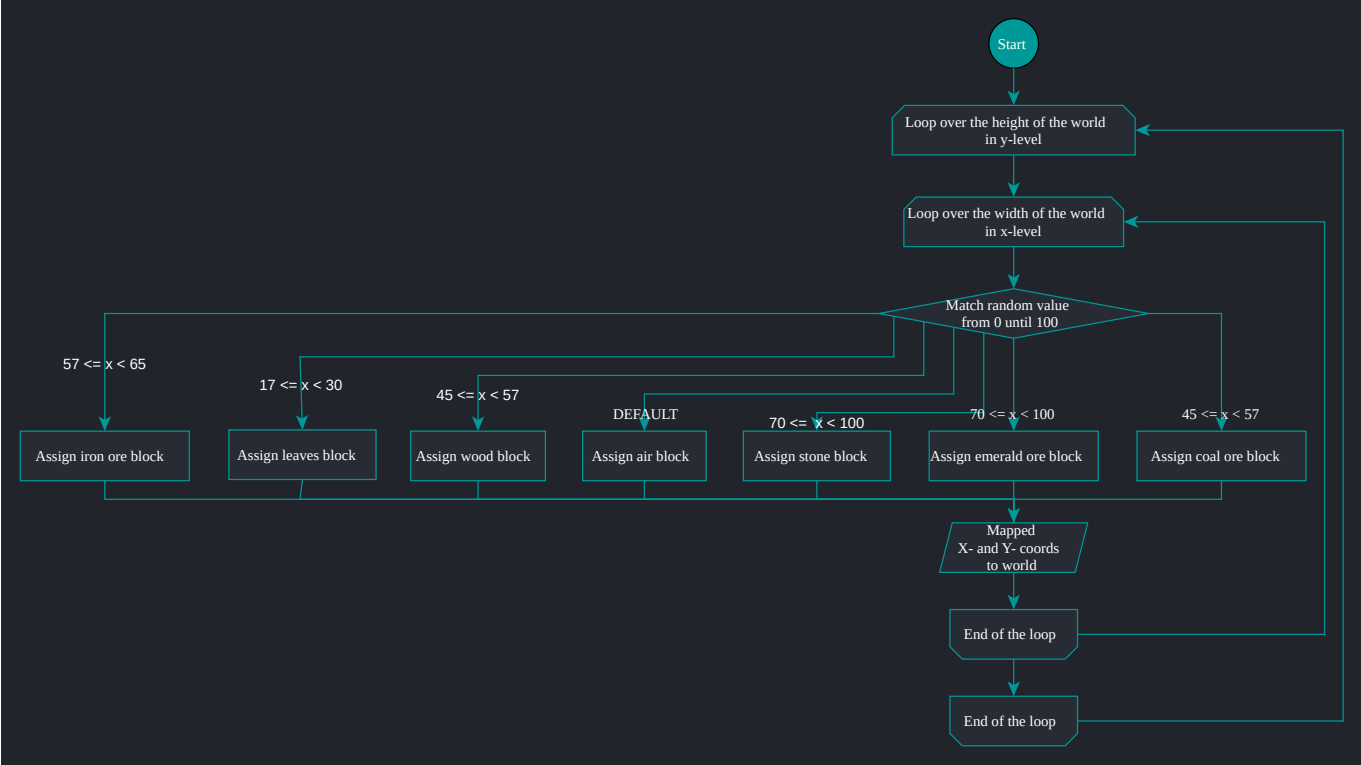
Pseudocode

```
BEGIN

FOR `<Integer> y` = 0; `<Integer> y` < `<Integer> worldHeight`
  FOR `<Integer> x` = 0; `<Integer> x` < `<Integer> worldWidth`
    Assign `<Integer> randValue` = `random value between 0 and 99`;
    IF `<Integer> randValue` < 17
      Set `<two dimensional Integer array> world @ indexes <Integer>
x, <Integer> y` = `<Integer> wood`;
    ELSE IF `<Integer> randValue` < 30
      Set `<two dimensional Integer array> world @ indexes <Integer>
x, <Integer> y` = `<Integer> leaves`;
    ELSE IF `<Integer> randValue` < 45
      Set `<two dimensional Integer array> world @ indexes <Integer>
x, <Integer> y` = `<Integer> stone`;
    ELSE IF `<Integer> randValue` < 57
      Set `<two dimensional Integer array> world @ indexes <Integer>
x, <Integer> y` = `<Integer> coal ore`;
    ELSE IF `<Integer> randValue` < 65
      Set `<two dimensional Integer array> world @ indexes <Integer>
x, <Integer> y` = `<Integer> iron ore`;
    ELSE IF `<Integer> randValue` < 70
      Set `<two dimensional Integer array> world @ indexes <Integer>
x, <Integer> y` = `<Integer> emerald ore`;
    ELSE
      Set `<two dimensional Integer array> world @ indexes <Integer>
x, <Integer> y` = `<Integer> air`;
      Set `<Integer> x` += 1;
      Set `<Integer> y` += 1;

END
```

Flowchart



char getBlockChar(int blockType)

Documentation

getBlockChar

```
private static char getBlockChar(int blockType)
```

Returns the symbol for blockType.

This method returns the mapped char for blockType.

Parameters:

blockType - The type of block

Returns:

char The mapped symbol for blockType

Java

```
private static char getBlockChar(int blockType) {  
    switch (blockType) {  
        case WOOD:  
            return '\u2592';  
        case LEAVES:  
            return '\u00A7';  
        case STONE:  
            return '\u2593';  
        case IRON_ORE:  
            return '\u00B0';  
        case COAL_ORE:  
            return '\u2593';  
        case EMERALD_ORE:  
            return '\u00B0';  
        default:  
            return '-';  
    }  
}
```

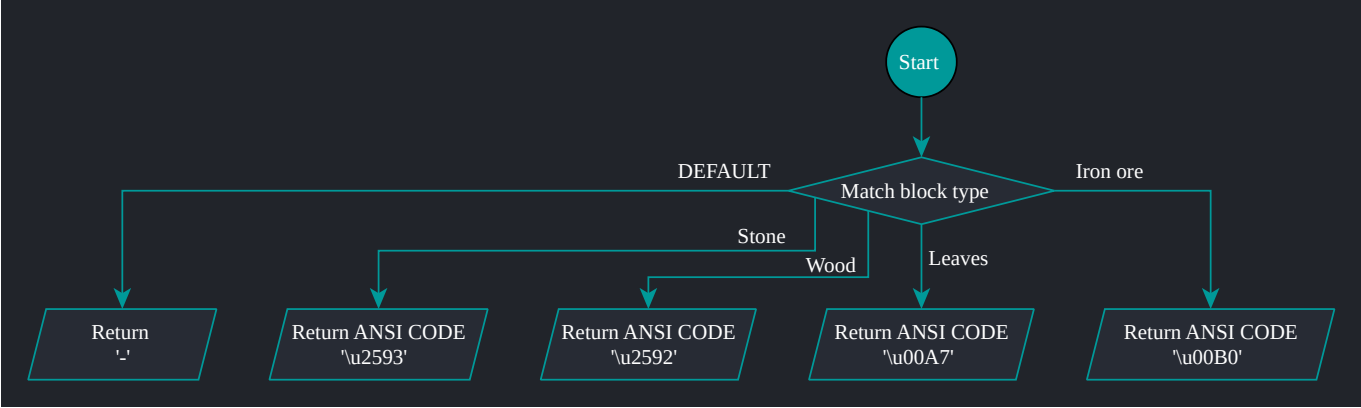
Pseudocode

```
BEGIN

IF `<Integer> blockType` == `<Integer> wood`
    RETURN `<Character> medium shade`;
ELSE IF `<Integer> blockType` == `<Integer> leaves`
    RETURN `<Character> section sign`;
ELSE IF `<Integer> blockType` == `<Integer> stone`
    RETURN `<Character> dark shade`;
ELSE IF `<Integer> blockType` == `<Integer> iron ore`
    RETURN `<Character> degree sign`;
ELSE IF `<Integer> blockType` == `<Integer> coal ore`
    RETURN `<Character> dark shade`;
ELSE IF `<Integer> blockType` == `<Integer> emerald ore`
    RETURN `<Character> degree sign`;
ELSE
    RETURN `<Character> -`;

END
```

Flowchart



String getBlockName(int blockType)

Documentation

getBlockName

```
private static StringⒺ getBlockName(int blockType)
```

Returns human readable block name.

This method returns a human readable block name for blockType.

Defaults to "Unknown"

Parameters:

blockType - The type of block

Returns:

String The human readable block name.

Java

```
private static String getBlockName(int blockType) {  
    switch (blockType) {  
        case AIR:  
            return "Empty Block";  
        case WOOD:  
            return "Wood";  
        case LEAVES:  
            return "Leaves";  
        case STONE:  
            return "Stone";  
        case IRON_ORE:  
            return "Iron Ore";  
        case COAL_ORE:  
            return "Coal Ore";  
        case EMERALD_ORE:  
            return "Emerald Ore";  
        default:  
            return "Unknown";  
    }  
}
```

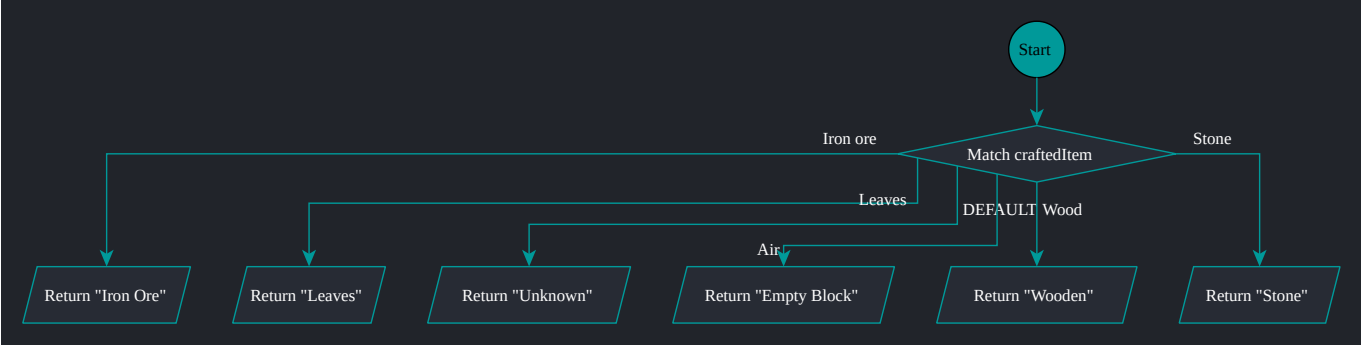
Pseudocode

```
BEGIN

IF `<Integer> blockType` == `<Integer> air`
    RETURN "Empty Block";
ELSE IF `<Integer> blockType` == `<Integer> wood`
    RETURN "Wood";
ELSE IF `<Integer> blockType` == `<Integer> leaves`
    RETURN "Leaves";
ELSE IF `<Integer> blockType` == `<Integer> stone`
    RETURN "Stone";
ELSE IF `<Integer> blockType` == `<Integer> iron ore`
    RETURN "Iron Ore";
ELSE IF `<Integer> blockType` == `<Integer> coal ore`
    RETURN "Coal Ore";
ELSE IF `<Integer> blockType` == `<Integer> emerald ore`
    RETURN "Emerald Ore";
ELSE
    RETURN "Unknown";

END
```

Flowchart



String getBlockSymbol(int blockType)

Documentation

getBlockSymbol

```
private static StringⒺ getBlockSymbol(int blockType)
```

Returns the symbol and color for blockType.

This method returns the mapped char and blockColor for blockType.

Parameters:

blockType - The type of block

Returns:

String The mapped symbol and blockColor for blockType

Java

```
private static String getBlockSymbol(int blockType) {
    String blockColor;
    switch (blockType) {
        case AIR:
            return ANSI_RESET + "- ";
        case WOOD:
            blockColor = ANSI_RED;
            break;
        case LEAVES:
            blockColor = ANSI_GREEN;
            break;
        case STONE:
            blockColor = ANSI_BLUE;
            break;
        case IRON_ORE:
            blockColor = ANSI_WHITE;
            break;
        case COAL_ORE:
            blockColor = ANSI_COAL_GRAY;
            break;
        case EMERALD_ORE:
            blockColor = ANSI_EMERALD_GREEN;
            break;
        default:
            blockColor = ANSI_RESET;
            break;
    }
    return blockColor + getBlockChar(blockType) + " ";
}
```

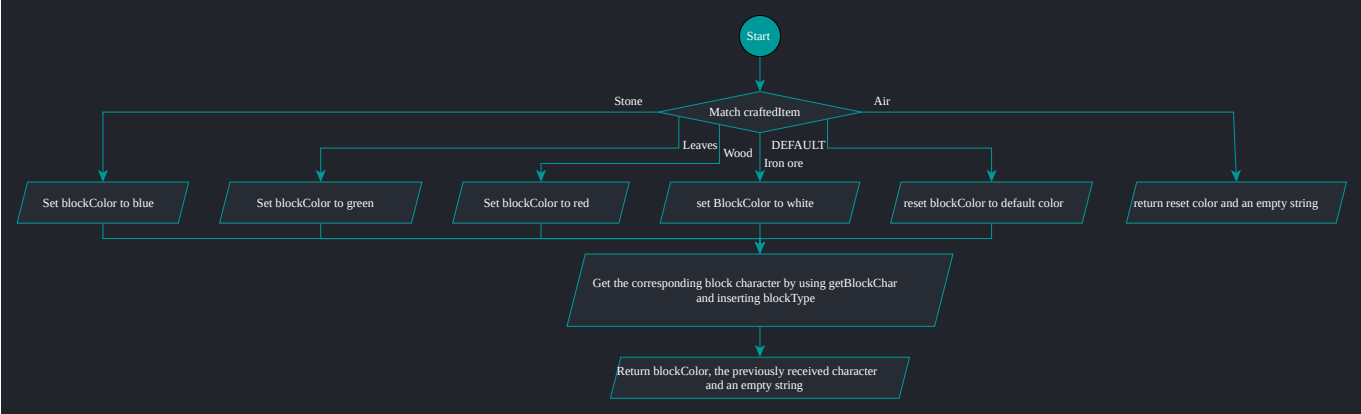
Pseudocode

```
BEGIN

Define `<String> blockColor`;
IF `<Integer> blockType` == `<Integer> air`
    RETURN "Empty Block";
ELSE IF `<Integer> blockType` == `<Integer> wood`
    Set `<String> blockColor` = `(color red)`;
ELSE IF `<Integer> blockType` == `<Integer> leaves`
    Set `<String> blockColor` = `(color green)`;
ELSE IF `<Integer> blockType` == `<Integer> stone`
    Set `<String> blockColor` = `(color blue)`;
ELSE IF `<Integer> blockType` == `<Integer> iron ore`
    Set `<String> blockColor` = `(color white)`;
ELSE IF `<Integer> blockType` == `<Integer> coal ore`
    Set `<String> blockColor` = `(color coal gray)`;
ELSE IF `<Integer> blockType` == `<Integer> emerald ore`
    Set `<String> blockColor` = `(color emerald green)`;
ELSE
    Set `<String> blockColor` = `(reset color)`;
RETURN `<String> blockColor` + `<Character> get symbol matching blockType`
+ " ";

END
```

Flowchart



String getCraftedItemName(int craftedItem)

Documentation

getCraftedItemName

```
private static StringⒺ getCraftedItemName(int craftedItem)
```

Returns human readable item name.

This method returns a human readable item name for craftedItem.

Parameters:

craftedItem - The crafted item

Returns:

String The human readable name of craftedItem

Java

```
private static String getCraftedItemName(int craftedItem) {  
    switch (craftedItem) {  
        case CRAFTED_WOODEN_PLANKS:  
            return "Wooden Planks";  
        case CRAFTED_STICK:  
            return "Stick";  
        case CRAFTED_IRON_INGOT:  
            return "Iron Ingot";  
        case CRAFTED_STONE_PICKAXE:  
            return "Stone Pickaxe";  
        case CRAFTED_IRON_PICKAXE:  
            return "Iron Pickaxe";  
        default:  
            return "Unknown";  
    }  
}
```

Pseudocode

```
BEGIN

IF `<Integer> craftedItem` == `<Integer> wooden planks`
    RETURN "Wooden Planks";
ELSE IF `<Integer> blockType` == `<Integer> stick`
    RETURN "Stick";
ELSE IF `<Integer> blockType` == `<Integer> iron ingot`
    RETURN "Iron Ingot";
ELSE IF `<Integer> blockType` == `<Integer> stone pickaxe`
    RETURN "Stone Pickaxe";
ELSE IF `<Integer> blockType` == `<Integer> iron pickaxe`
    RETURN "Iron Pickaxe";
ELSE
    RETURN "Unknown";

END
```

Flowchart



void loadGame(String fileName)

Documentation

loadGame

```
public static void loadGame(StringⒺ fileName)
```

Loads the game.

This method loads the game from a file.

Parameters:

fileName - The file name

Catched Exceptions:

- On IOException: Prints error with message when I/O exception of some sort has occurred.
- On ClassNotFoundException: Prints error with message when no definition for the class with the specified name could be found.

Java

```
public static void loadGame(String fileName) {  
    // Implementation for loading the game state from a file goes here  
    try (ObjectInputStream inputStream = new ObjectInputStream(new  
        FileInputStream(fileName))) {  
        // Deserialize game state data from the file and load it into the  
        program  
        NEW_WORLD_WIDTH = inputStream.readInt();  
        NEW_WORLD_HEIGHT = inputStream.readInt();  
        world = (int[][]) inputStream.readObject();  
        playerX = inputStream.readInt();  
        playerY = inputStream.readInt();  
        inventory = (List<Integer>) inputStream.readObject();  
        craftedItems = (List<Integer>) inputStream.readObject();  
        unlockMode = inputStream.readBoolean();  
        System.out.println("Game state loaded from file: " + fileName);  
    } catch (IOException | ClassNotFoundException e) {  
        System.out.println("Error while loading the game state: " +  
            e.getMessage());  
    }  
    waitForEnter();  
}
```

Pseudocode

```
BEGIN

TRY TO
    Set `<stream> inputStream` = `<stream> of contents from file matching
    <String> fileName relative to current working directory`;
    Set `<Integer> NEW_WORLD_WIDTH` = `<Integer> get next line containing
    serialized <Integer> in <stream> inputStream`;
    Set `<Integer> NEW_WORLD_HEIGHT` = `<Integer> get next line containing
    serialized <Integer> in <stream> inputStream`;
    Set `<two dimensional Integer array> world` = `<two dimensional Integer
    array> get next line containing any serialized object in <stream>
    inputStream`;
    Set `<Integer> playerX` = `<Integer> get next line containing
    serialized <Integer> in <stream> inputStream`;
    Set `<Integer> playerY` = `<Integer> get next line containing
    serialized <Integer> in <stream> inputStream`;
    Set `<Integer list> inventory` = `<Integer list> get next line
    containing any serialized object in <stream> inputStream` and cast to
    <Integer list>;
    Set `<Integer list> craftedItems` = `<Integer list> get next line
    containing any serialized object in <stream> inputStream` and cast to
    <Integer list>;
    Set `<boolean> unlockMode` = `<boolean> get next line containing
    serialized <boolean> in <stream> inputStream`;
    PRINT INFO "Game state loaded from file: " + `<String> fileName` +
    "\n";
    Close `<stream> inputStream`;
ON EXCEPTION
    PRINT ERROR "Error while loading the game state: " + `errorMessage` +
    "\n";
    Close `<stream> inputStream`;
Wait on player to press ENTER;

END
```

Flowchart



void lookAround()

Documentation

lookAround

```
private static void lookAround()
```

Prints all blocks surrounding the player.

This method prints all blocks surrounding the player. This is meant to make the players life easier.

Java

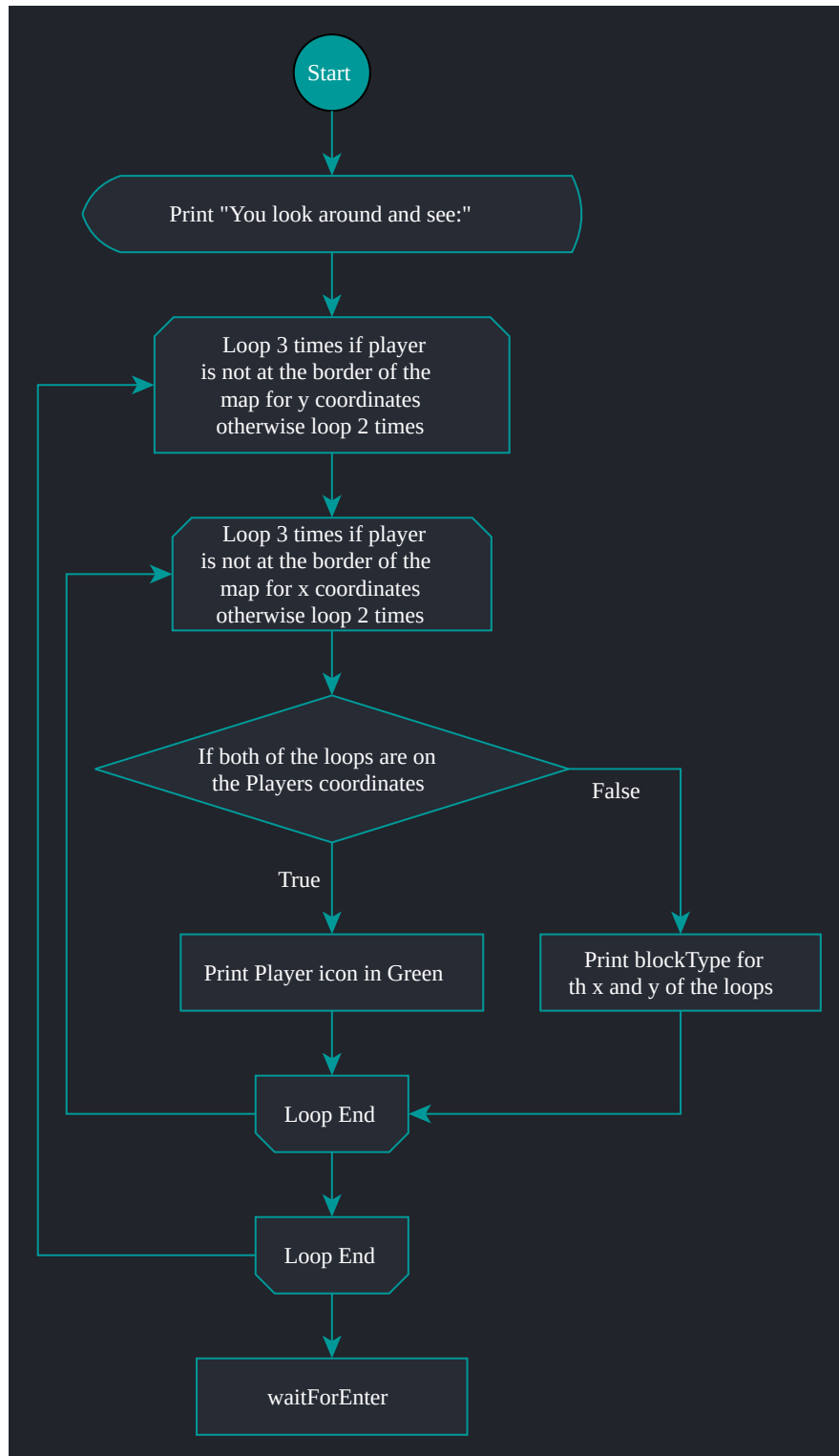
```
private static void lookAround() {
    System.out.println("You look around and see:");
    for (int y = Math.max(0, playerY - 1); y <= Math.min(playerY + 1,
worldHeight - 1); y++) {
        for (int x = Math.max(0, playerX - 1); x <= Math.min(playerX + 1,
worldWidth - 1); x++) {
            if (x == playerX && y == playerY) {
                System.out.print(ANSI_GREEN + "P" + ANSI_RESET);
            } else {
                System.out.print(getBlockSymbol(world[x][y]) + ANSI_RESET);
            }
        }
        System.out.println();
    }
    System.out.println();
    waitForEnter();
}
```

Pseudocode

```
BEGIN

PRINT INFO "You look around and see:";
FOR `
```

Flowchart



void placeBlock(int blockType)

Documentation

placeBlock

```
public static void placeBlock(int blockType)
```

Places a block.

This method places a block that is of blockType 0 to 9 and removes it from the players inventory if the players inventory contains that block.

Parameters:

blockType - The type of block

Java

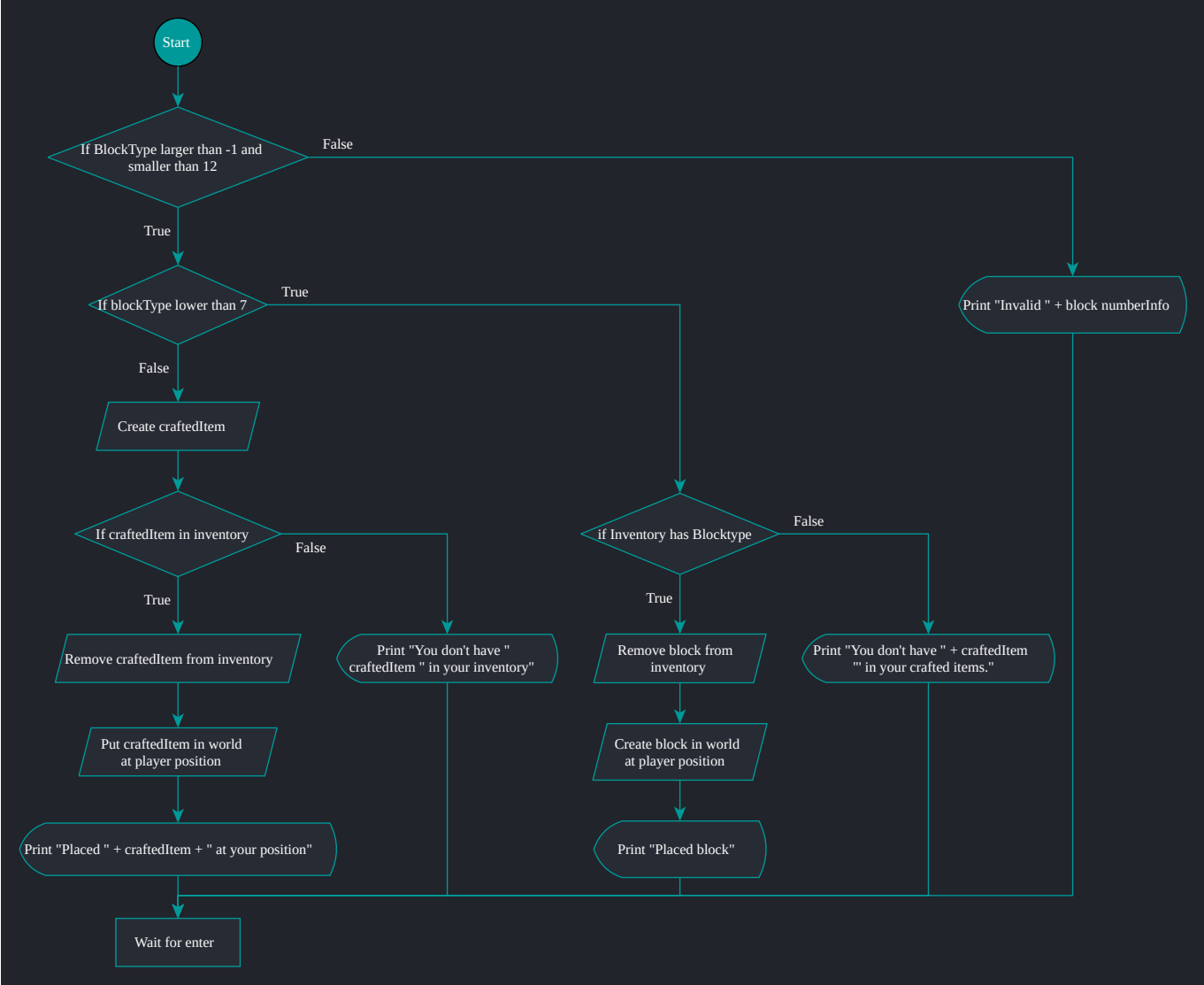
```
public static void placeBlock(int blockType) {
    if (blockType >= 0 && blockType <= 11) {
        if (blockType <= 6) {
            if (inventory.contains(blockType)) {
                inventory.remove(Integer.valueOf(blockType));
                world[playerX][playerY] = blockType;
                System.out.println("Placed " + getBlockName(blockType) + "
at your position.");
            } else {
                System.out.println(
                    "You don't have " + getBlockName(blockType) + " in
your inventory.");
            }
        } else {
            int craftedItem = getCraftedItemFromBlockType(blockType);
            if (craftedItems.contains(craftedItem)) {
                craftedItems.remove(Integer.valueOf(craftedItem));
                world[playerX][playerY] = blockType;
                System.out.println(
                    "Placed " + getCraftedItemName(craftedItem) + " at
your position.");
            } else {
                System.out.println("You don't have " +
getCraftedItemName(craftedItem)
                    + " in your crafted items.");
            }
        }
    } else {
        System.out.println("Invalid block number. Please enter a valid
block number.");
        System.out.println(BLOCK_NUMBERS_INFO);
    }
    waitForEnter();
}
```

Pseudocode

```
BEGIN

IF `
```


Flowchart



Additional documentation

addCraftedItem
<pre>public static void addCraftedItem(int craftedItem)</pre> <p>Adds a crafted item to craftedItems.</p> <p>This method adds a crafted item to craftedItems that are part of the players inventory.</p> <p>Parameters: craftedItem - The crafted item</p>
craftedItemsContains
<pre>public static boolean craftedItemsContains(int craftedItem)</pre> <p>Queries craftedItems for an item.</p> <p>This method queries the players crafted item inventory for an item.</p> <p>Parameters: craftedItem - The item to query the crafted item inventory for</p> <p>Returns: boolean true if craftedItems contains item, false in any other case</p>
craftedItemsContains
<pre>public static boolean craftedItemsContains(int craftedItem, int count)</pre> <p>Queries craftedItems for if it has enough of an crafted item.</p> <p>This method queries the players craftedItems for an crafted item and if it contains at least as much as the supplied count.</p> <p>Parameters: craftedItem - The crafted item to query the crafted items inventory for count - The count that the crafted items inventory should contain of the item</p> <p>Returns: boolean true if craftedItems contains crafted item at least as many times as the supplied count, false in any other case</p>
craftIronPickaxe
<pre>public static void craftIronPickaxe()</pre> <p>Crafts CRAFTED_IRON_PICKAXE.</p> <p>This method crafts CRAFTED_IRON_PICKAXE from 1 Stick and 3 Iron Ingots that are taken form the players inventory.</p> <p>Prints message if the player doesn't have the correct items in his inventory.</p>
craftStonePickaxe
<pre>public static void craftStonePickaxe()</pre> <p>Crafts CRAFTED_STONE_PICKAXE.</p> <p>This method crafts CRAFTED_STONE_PICKAXE from 1 Stick and 3 Stone that are taken form the players inventory.</p> <p>Prints message if the player doesn't have the correct items in his inventory.</p>
displayLegend
<pre>public static void displayLegend()</pre> <p>Prints a legend.</p> <p>This method prints a legend of items on the map.</p>
displayWorld
<pre>public static void displayWorld()</pre> <p>Prints the world as ASCII text.</p> <p>This method is responsible for displaying the world.</p> <p>Part of secret door logic.</p>
generateEmptyWorld
<pre>private static void generateEmptyWorld()</pre> <p>Generates an empty world.</p> <p>This method generates an empty world which only contains Sri Lanka's flag.</p> <p>Part of secret door logic.</p>
getCountryAndQuoteFromServer
<pre>public static void getCountryAndQuoteFromServer()</pre> <p>Gets country and quote from server.</p> <p>This method gets country and quote from server via a POST request.</p> <p>Catched Exceptions:</p> <ul style="list-style-type: none">On Exception: Prints an error for any encountered exception.

getCraftedItemColor

```
private static StringⒺ getCraftedItemColor(int craftedItem)
```

Returns item color.

This method returns the items color.

Defaults to empty String

Parameters:

craftedItem - The crafted item

Returns:

String The human readable name of craftedItem

getCraftedItemFromBlockType

```
private static int getCraftedItemFromBlockType(int blockType)
```

Returns the crafted item of blockType.

This method returns the crafted item of blockType.

Defaults to -1.

Parameters:

blockType - The type of block

Returns:

int The crafted item of blockType

getRequiredItemForMining

```
public static int getRequiredItemForMining(int blockType)
```

Returns the crafted item that is required to mine blockType.

This method returns the crafted item that is required to mine blockType.

Defaults -1.

Parameters:

blockType - The type of block

Returns:

int The crafted Item required to mine blockType

initGame

```
public static void initGame(int worldWidth,  
                           int worldHeight)
```

Initializes the game.

This method sets worldWidth, JworldHeight, world, playerX, playerY and initializes inventory.

Parameters:

worldWidth - The width of world in blocks

worldHeight - The height of world in blocks

interactWithWorld

```
public static void interactWithWorld()
```

Handles interaction with the game world.

This method handles interaction with the game world and prints messages for blocks that the player can interact with. It also adds certain blocks to the players inventory if he interacts with them.

inventoryContains

```
public static boolean inventoryContains(int item)
```

Queries inventory for an item.

This method queries the players inventory for an item.

Parameters:

item - The item to query the inventory for

Returns:

boolean true if inventory contains item, false in any other case

inventoryContains

```
public static boolean inventoryContains(int item,  
                                       int count)
```

Queries inventory for if it has enough of an item.

This method queries the players inventory for an item and if it contains at least as much as the supplied count.

Parameters:

item - The item to query the inventory for

count - The count that the inventory should contain of the item

Returns:

boolean true if inventory contains item at least as many times as the supplied count, false in any other case

main

```
public static void main(StringⒺ[] args)
```

Main method.

This method is called upon execution of the game.

Parameters:

args - The supplied commandline arguments

mineBlock

```
public static void mineBlock()
```

Mines a block.

This method mines a block and adds it to the players inventory if it is not AIR.

movePlayer

```
public static void movePlayer(String2 direction)
```

Moves the player

This method moves the player UP/DOWN/LEFT/RIGHT depending on the supplied direction.

Parameters:

direction - The direction the player should be moved towards.

removeItemFromCraftedItems

```
public static void removeItemFromCraftedItems(int craftedItem,
                                              int count)
```

Removes a count of item from craftedItem.

This method removes a count of an item from the players crafted items inventory.

Parameters:

craftedItem - The item to remove from the crafted items inventory

count - The count that should be removed from the crafted items inventory

removeItemsFromInventory

```
public static void removeItemsFromInventory(int item,
                                           int count)
```

Removes a count of item from inventory.

This method removes a count of an item from the players inventory.

Parameters:

item - The item to remove from the inventory

count - The count that should be removed from the inventory

resetWorld

```
private static void resetWorld()
```

Resets the world to an empty world.

This method resets the world to an empty world via generating an empty world and resetting the players position.

Part of secret door logic.

saveGame

```
public static void saveGame(String2 fileName)
```

Saves the game.

This method saves the game in a file.

Parameters:

fileName - The file name

Catched Exceptions:

- On IOException: Prints error with message when I/O exception of some sort has occurred.

startGame

```
public static void startGame()
```

Starts the game.

This method handles the following:

- Printing of initial UI, instructions and informational messages
- Player input
- Secret door logic

Part of secret door logic.

waitForEnter

```
private static void waitForEnter()
```

Waits for input ENTER.

This method waits for player to input ENTER.

References

- [Template](#) - Canvas task on which this document is based
- [yEd](#) - Graph Editor we used to make the flowcharts
- [Flags API](#) - API to get a flag