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

Students

Student Name	Student ID
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JavaCraft's Workflow

Class JavaCraft

Pseudocode

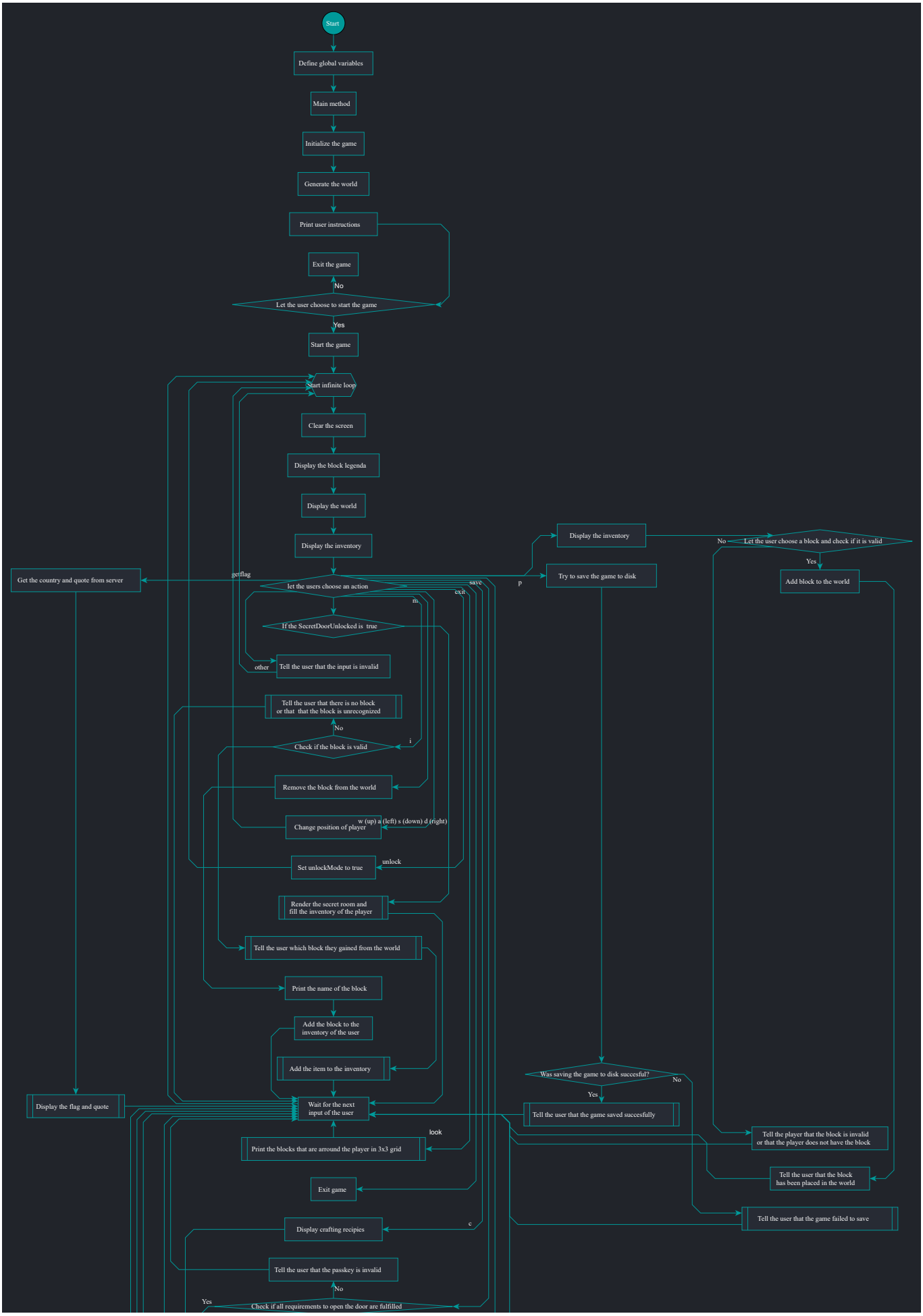
```
BEGIN

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 `<String> READ user input` == y (caseless check)
    Set `<boolean> unlockMode` = false;
    Set `<boolean> craftingCommandEntered` = false;
    Set `<boolean> miningCommandEntered` = false;
    Set `<boolean> movementCommandEntered` = false;
    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 `<String> READ user input` == "w" OR "up" OR "s" OR "down" OR "a" OR
"left" OR "d" OR "right" (caseless check)
            IF `<boolean> unlockMode` == true
                Set `<boolean> movementCommandEntered` = true;
            Move player;
        ELSE IF `<String> READ user input` == "m" (caseless check)
            IF `<boolean> unlockMode` == true
                Set `<boolean> miningCommandEntered` = true;
            Mine block;
        ELSE IF `<String> READ user input` == "p" (caseless check)
            PRINT INFO `players inventory`;
            PRINT INFO "Enter the block type to place: ";
            Place block `<String> READ user input`;
        ELSE IF `<String> READ user input` == "c" (caseless check)
            PRINT INFO `crafting recipes`;
            PRINT INFO "Enter the recipe number to craft: ";
            Craft item `<String> READ user input`;
        ELSE IF `<String> READ user input` == "i" (caseless check)
            Interact with world;
        ELSE IF `<String> READ user input` == "save" (caseless check)
            PRINT INFO "Enter the file name to save the game state: ";
            Save game as `<String> READ user input`;
        ELSE IF `<String> READ user input` == "load" (caseless check)
            PRINT INFO "Enter the file name to load the game state: ";
            Load game from `<String> READ user input`;
        ELSE IF `<String> READ user input` == "exit" (caseless check)
```

```
            PRINT INFO "Exiting the game. Goodbye!\n";
            Exit game;
        ELSE IF `<String> READ user input` == "look" (caseless check)
            Print all blocks sorrounding 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
```

Flowchart


Start
Define global variables
Main method
Initialize the game
Generate the world
Print user instructions
Exit the game
No
Let the user choose to start the game
Yes
Start the game
Start infinite loop
Clear the screen
Display the block legenda
Display the world
Display the inventory
Get the country and quote from server
getflag
let the users choose an action
save
exit
m
p
Display the inventory
No
Let the user choose a block and check if it is valid
Yes
Add block to the world
Try to save the game to disk
If the SecretDoorUnlocked is true
other
Tell the user that the input is invalid
Tell the user that there is no block
or that that the block is unrecognized
No
Check if the block is valid
i
Remove the block from the world
Change position of player
w (up) a (left) s (down) d (right)
Set unlockMode to true
unlock
Render the secret room and
fill the inventory of the player
Tell the user which block they gained from the world
Print the name of the block
Add the block to the
inventory of the user
Add the item to the inventory
Was saving the game to disk succesful?
No
Yes
Display the flag and quote
Wait for the next
input of the user
Tell the user that the game saved succesfully
look
Print the blocks that are arround the player in 3x3 grid
Tell the player that the block is invalid
or that the player does not have the block
Tell the user that the block
has been placed in the world
Exit game
Tell the user that the game failed to save
Display crafting recipies
c
Tell the user that the passkey is invalid
No
Yes
Check if all requirements to open the door are fulfilled

Functionality Exploration

Documentation of functions

Additional Info

See Appendix for flowcharts and pseudocodes of 16 functions.

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

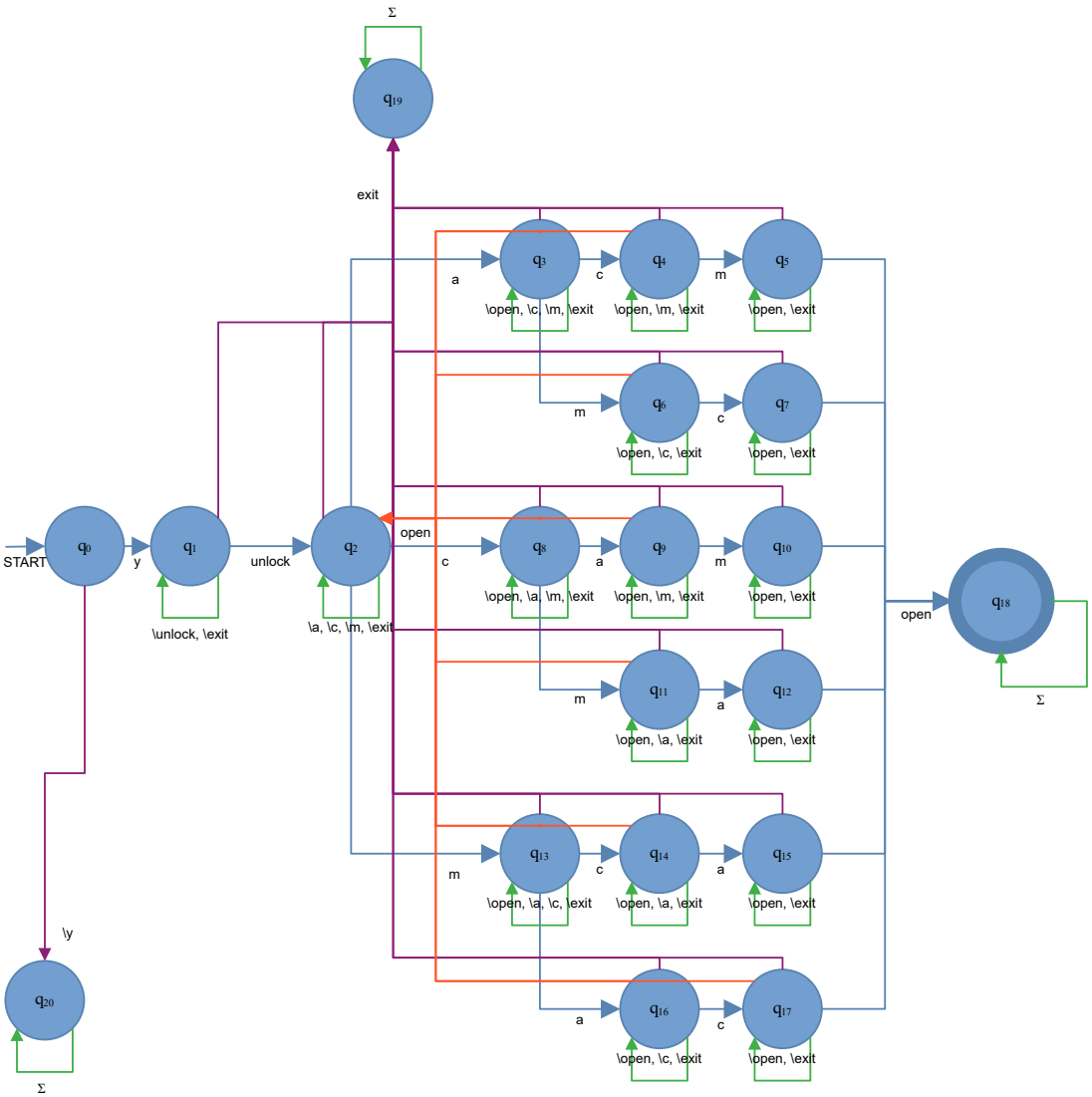
$$D=(Q, \Sigma, \delta, q_0, F)$$

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

Σ={y, unlock, a, c, m, open, exit} (caseless check)
δ: Transition Function

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



Table

State	y	unlock	a	c	m	open	exit
$^{\rightarrow}q_{0}$	q_{1}	q_{20}	q_{20}	q_{20}	q_{20}	q_{20}	q_{20}
q_{1}	q_{1}	q_{2}	q_{1}	q_{1}	q_{1}	q_{1}	q_{19}
q_{2}	q_{2}	q_{2}	q_{3}	q_{8}	q_{13}	q_{2}	q_{19}
q_{3}	q_{3}	q_{3}	q_{3}	q_{4}	q_{6}	q_{2}	q_{19}
q_{4}	q_{4}	q_{4}	q_{4}	q_{4}	q_{5}	q_{2}	q_{19}
q_{5}	q_{5}	q_{5}	q_{5}	q_{5}	q_{5}	q_{18}	q_{19}
q_{6}	q_{6}	q_{6}	q_{6}	q_{7}	q_{6}	q_{2}	q_{19}
q_{7}	q_{7}	q_{7}	q_{7}	q_{7}	q_{7}	q_{18}	q_{19}
q_{8}	q_{8}	q_{8}	q_{9}	q_{8}	q_{11}	q_{2}	q_{19}
q_{9}	q_{9}	q_{9}	q_{9}	q_{9}	q_{10}	q_{2}	q_{19}
q_{10}	q_{10}	q_{10}	q_{10}	q_{10}	q_{10}	q_{18}	q_{19}
q_{11}	q_{11}	q_{11}	q_{12}	q_{11}	q_{11}	q_{2}	q_{19}
q_{12}	q_{12}	q_{12}	q_{12}	q_{12}	q_{12}	q_{18}	q_{19}
q_{13}	q_{13}	q_{13}	q_{16}	q_{14}	q_{13}	q_{1}	q_{19}
q_{14}	q_{14}	q_{14}	q_{15}	q_{14}	q_{14}	q_{2}	q_{19}
q_{15}	q_{15}	q_{15}	q_{15}	q_{15}	q_{15}	q_{18}	q_{19}
q_{16}	q_{16}	q_{16}	q_{16}	q_{17}	q_{16}	q_{2}	q_{19}
q_{17}	q_{17}	q_{17}	q_{17}	q_{17}	q_{17}	q_{18}	q_{19}
$^{*}q_{18}$	q_{18}	q_{18}	q_{18}	q_{18}	q_{18}	q_{18}	q_{18}
q_{19}	q_{19}	q_{19}	q_{19}	q_{19}	q_{19}	q_{19}	q_{19}
q_{20}	q_{20}	q_{20}	q_{20}	q_{20}	q_{20}	q_{20}	q_{20}

Git Collaboration & Version Control

Who Did What

Task	Who worked on the task	Participation in percentages

Task	Who worked on the task	Participation in percentages
Creating the initial pseudocode and flowcharts	Leopold Anton Tristan Sian	Even across all participants
Setting up the Gitlab repository	Leopold	100%
Creating the documentation for the JavaCraft code	Leopold Anton Tristan Sian	Even across all participants
Creating the flowchart and pseudocode for the global game	Tristan	100%
Creating FSA for automaton	Leopold Tristan	90% 10%
Creating the table for automaton	Leopold	100%
Converting ODF Flowcharts to .graphml	Tristan	100%
Deciding on the uniform format for the flowcharts	Leopold Anton Tristan Sian	Even across all participants
Deciding on the uniform format for the pseudocode	Leopold Anton Tristan Sian	70% 10% 10% 10%
Converting flowcharts to uniform format	Sian Tristan Anton	80% 10% 10%
Converting pseudocode to uniform format	Leopold	100%
Updating the documentation	Leopold	100%
Cleaning up the repository folders	Sian	100%
Exporting flowcharts to SVG format	Sian	100%
Implenting two blocks and two crafting items to the game	Anton	100%
Updating the functions involved with new blocks and crafting items	Anton	100%

Task	Who worked on the task	Participation in percentages
Creating the provisional report document	Leo Tristan Anton Sian	70% 10% 10% 10%
Merging the flowchart images with the report document int one PDF	Sian	100%
Setting repository naming of folders to industry standard	Leopold	100%

Overview

- UM Gitlab Repository, Branch Group 18
- 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.
- PLACEHOLDER

Appendix

void clearScreen()

Java

```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();
    }
}
```

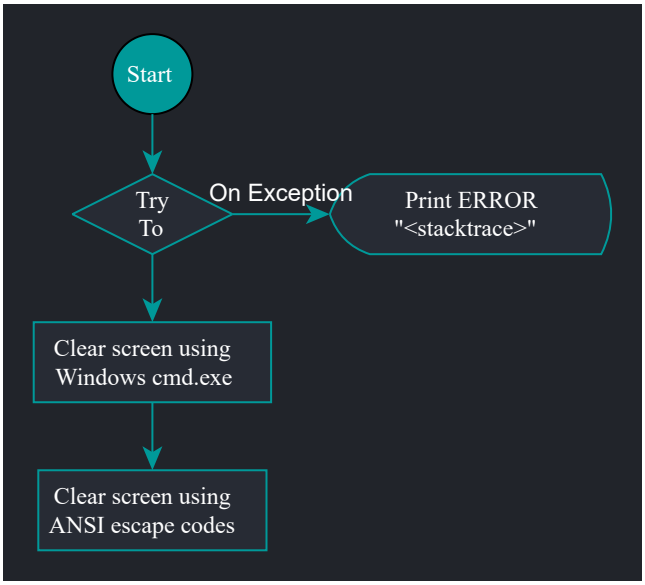
Pseudocode

```
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


Start
Try
To
On Exception
Print ERROR
"<stacktrace>"
Clear screen using
Windows cmd.exe
Clear screen using
ANSI escape codes

void craftIronIngot()

Java

```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.");
    }
}
```

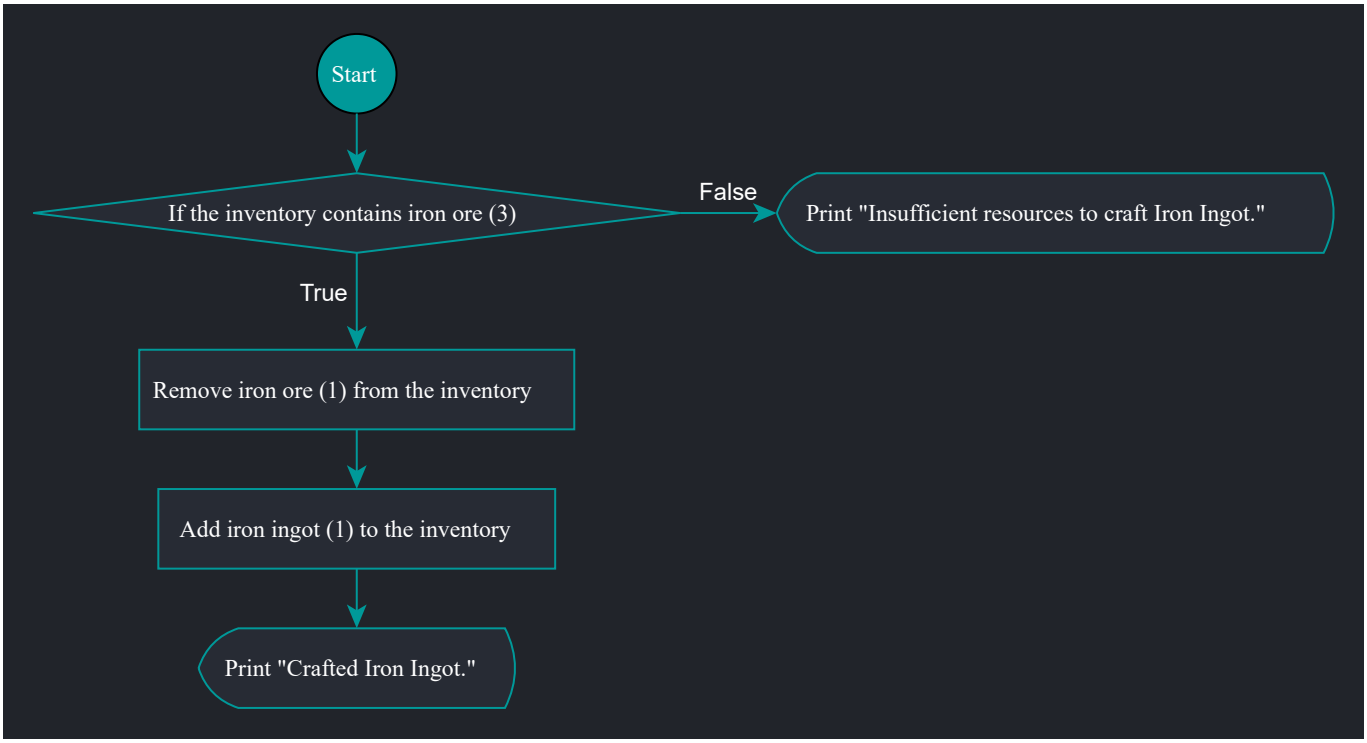
Pseudocode

```
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


Start
If the inventory contains iron ore (3)
False
Print "Insufficient resources to craft Iron Ingot."
True
Remove iron ore (1) from the inventory
Add iron ingot (1) to the inventory
Print "Crafted Iron Ingot."

void craftItem(int recipe)

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();
}
```

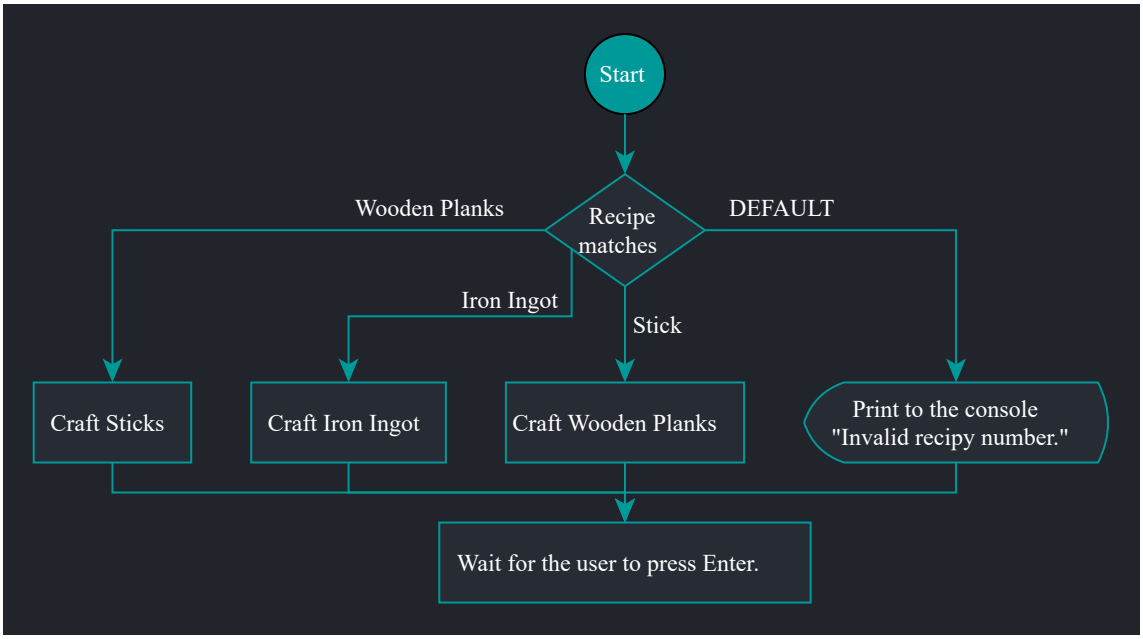
Pseudocode

```
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


Start
Recipe matches
Wooden Planks
DEFAULT
Iron Ingot
Stick
Craft Sticks
Craft Iron Ingot
Craft Wooden Planks
Print to the console "Invalid recipy number."
Wait for the user to press Enter.

void craftStick()

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.");
    }
}
```

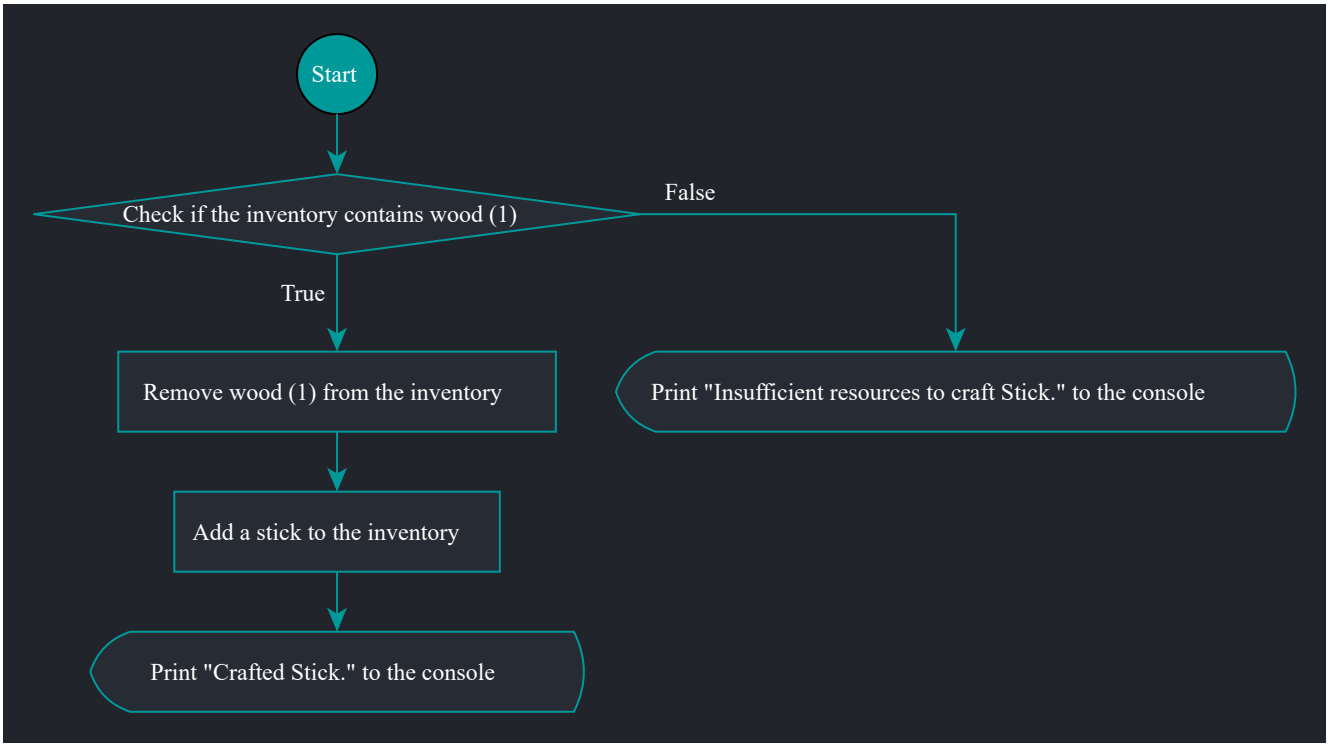
Pseudocode

```
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


Start
Check if the inventory contains wood (1)
False
True
Remove wood (1) from the inventory
Print "Insufficient resources to craft Stick." to the console
Add a stick to the inventory
Print "Crafted Stick." to the console

void craftWoodenPlanks()

Java

```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.");
    }
}
```

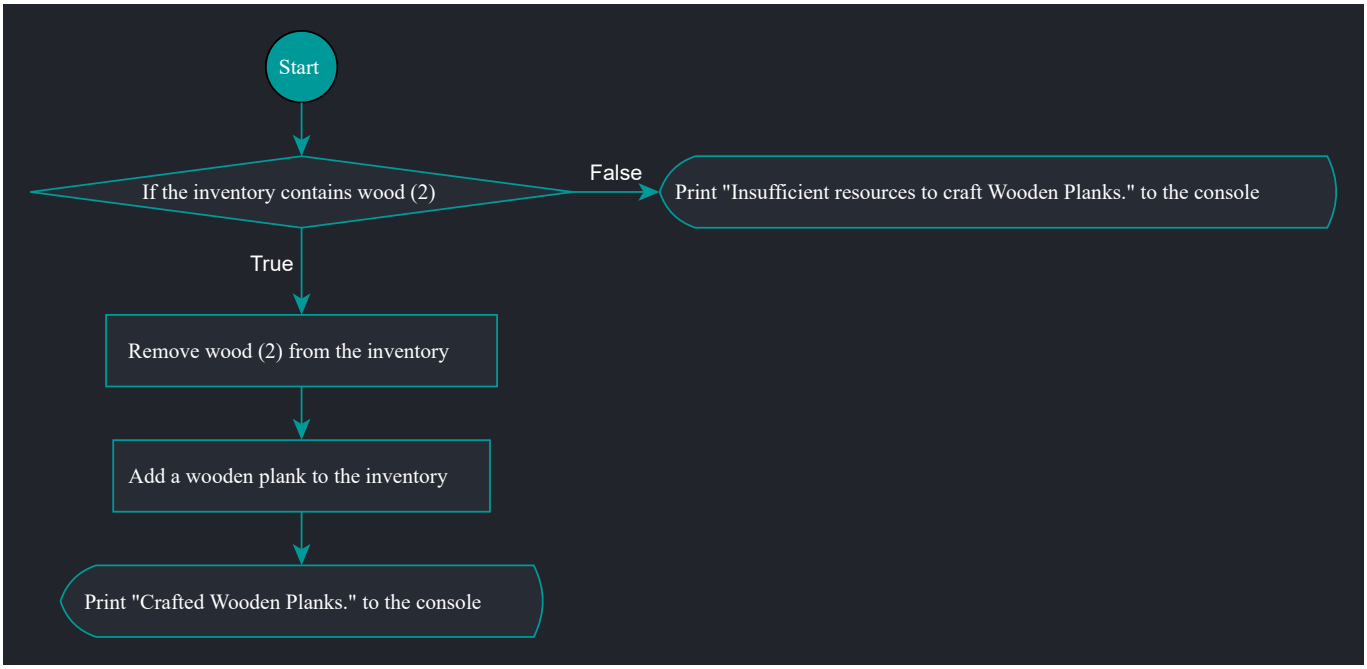
Pseudocode

```
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


Start
If the inventory contains wood (2)
False
Print "Insufficient resources to craft Wooden Planks." to the console
True
Remove wood (2) from the inventory
Add a wooden plank to the inventory
Print "Crafted Wooden Planks." to the console

void displayCraftingRecipes()

Java

```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");
}
```

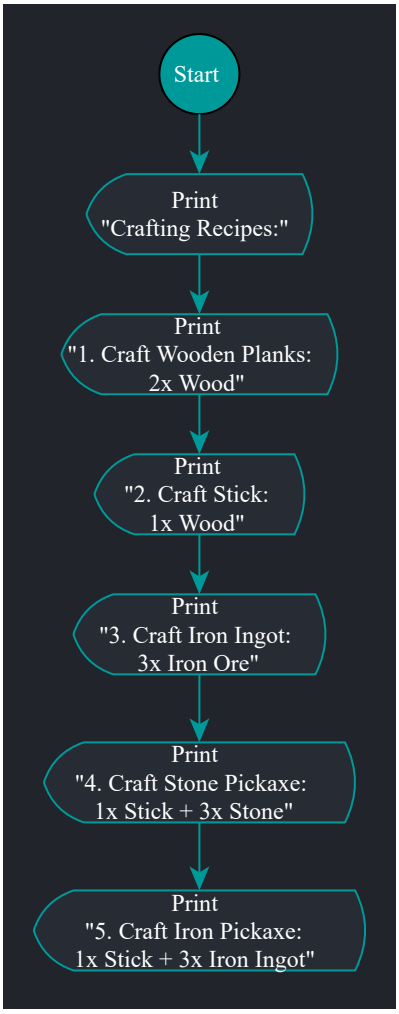
Pseudocode

```
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


Start
Print "Crafting Recipes:"
Print "1. Craft Wooden Planks: 2x Wood"
Print "2. Craft Stick: 1x Wood"
Print "3. Craft Iron Ingot: 3x Iron Ore"
Print "4. Craft Stone Pickaxe: 1x Stick + 3x Stone"
Print "5. Craft Iron Pickaxe: 1x Stick + 3x Iron Ingot"

void displayInventory()

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();
}
```

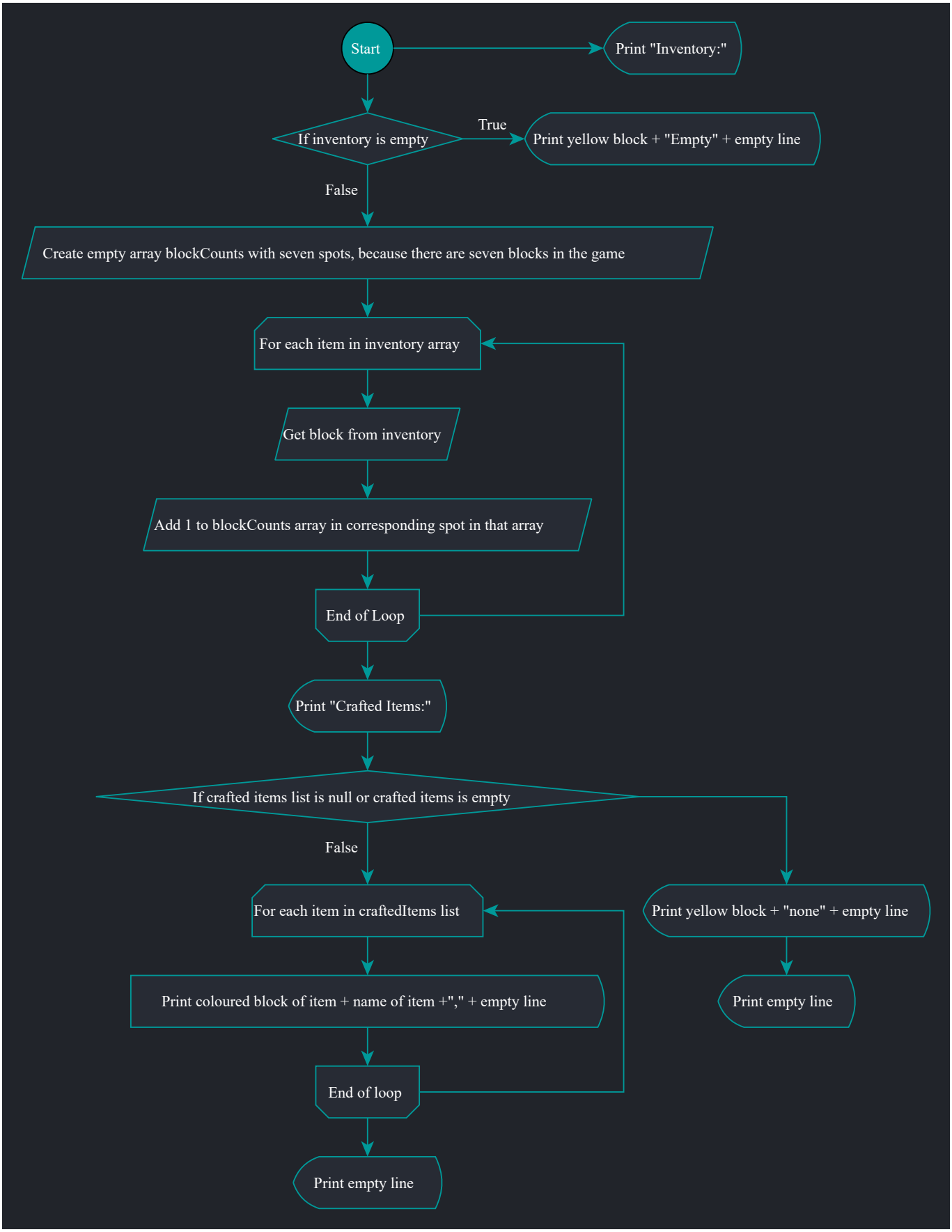
Pseudocode

```
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> occurences` = `<Integer array> blockCounts @ index
<Integer> blockType`;
        IF `<Integer> occurences` > 0
            PRINT INFO `<String> get block name matching <Integer> blockType` + "
- " + `<Integer> occurences\n`;
        Set `<Integer> blockType` += 1;
PRINT INFO "Crafted Items:\n";
IF `<Integer list> craftedItems` is non-existant 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


Start
Print "Inventory:"
If inventory is empty
True
Print yellow block + "Empty" + empty line
False
Create empty array blockCounts with seven spots, because there are seven blocks in the game
For each item in inventory array
Get block from inventory
Add 1 to blockCounts array in corresponding spot in that array
End of Loop
Print "Crafted Items:"
If crafted items list is null or crafted items is empty
False
For each item in craftedItems list
Print coloured block of item + name of item +"," + empty line
End of loop
Print empty line
Print yellow block + "none" + empty line
Print empty line

void fillInventory()

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);
        }
    }
}
```

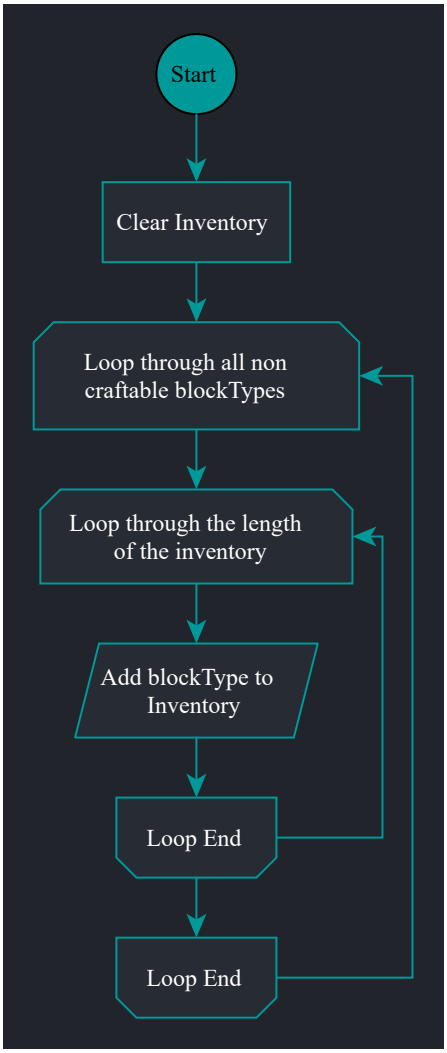
Pseudocode

```
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


Start
Clear Inventory
Loop through all non craftable blockTypes
Loop through the length of the inventory
Add blockType to Inventory
Loop End
Loop End

void generateWorld()

Java

```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;
            }
        }
    }
}
```

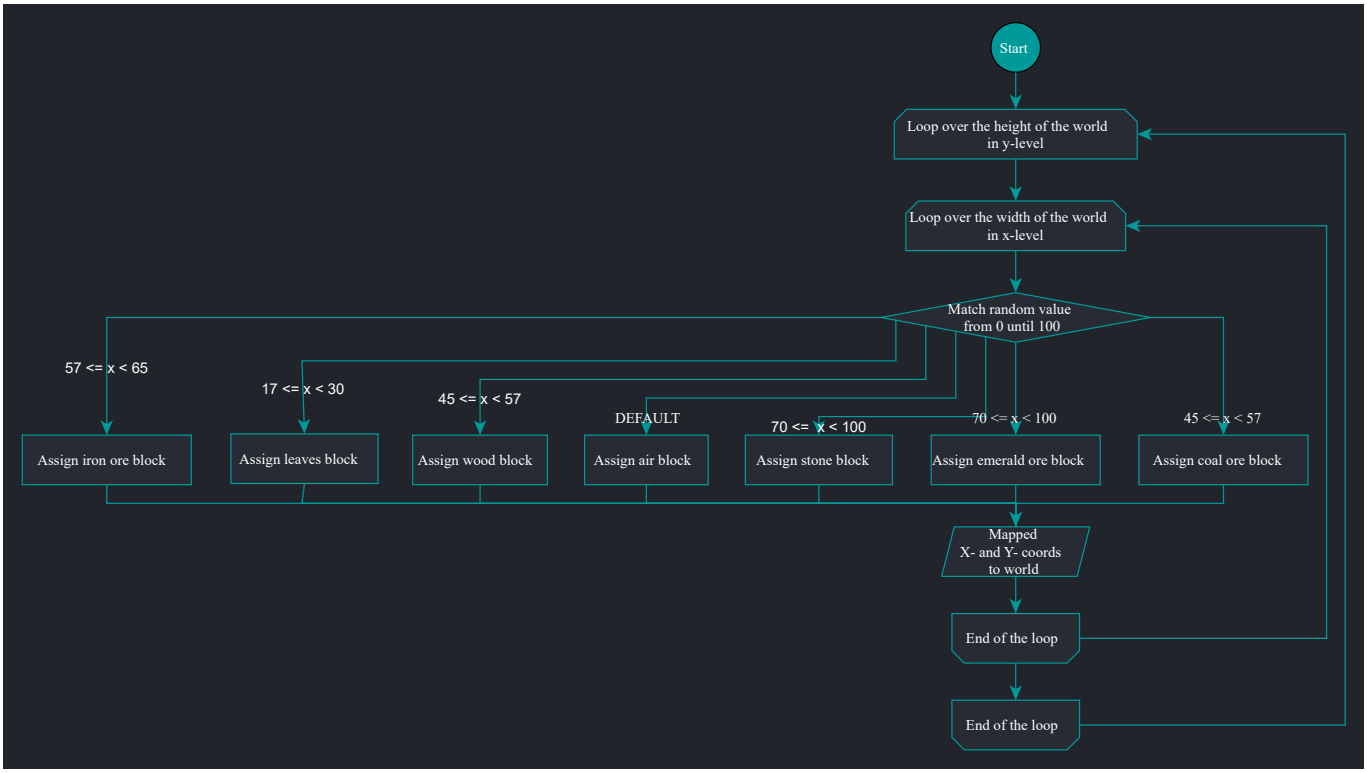
Pseudocode

```
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


Start
Loop over the height of the world in y-level
Loop over the width of the world in x-level
Match random value from 0 until 100
57 <= x < 65
17 <= x < 30
45 <= x < 57
DEFAULT
70 <= x < 100
45 <= x < 57
Assign iron ore block
Assign leaves block
Assign wood block
Assign air block
Assign stone block
Assign emerald ore block
Assign coal ore block
Mapped X- and Y- coords to world
End of the loop
End of the loop

char getBlockChar(int 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 '-';
    }
}
```

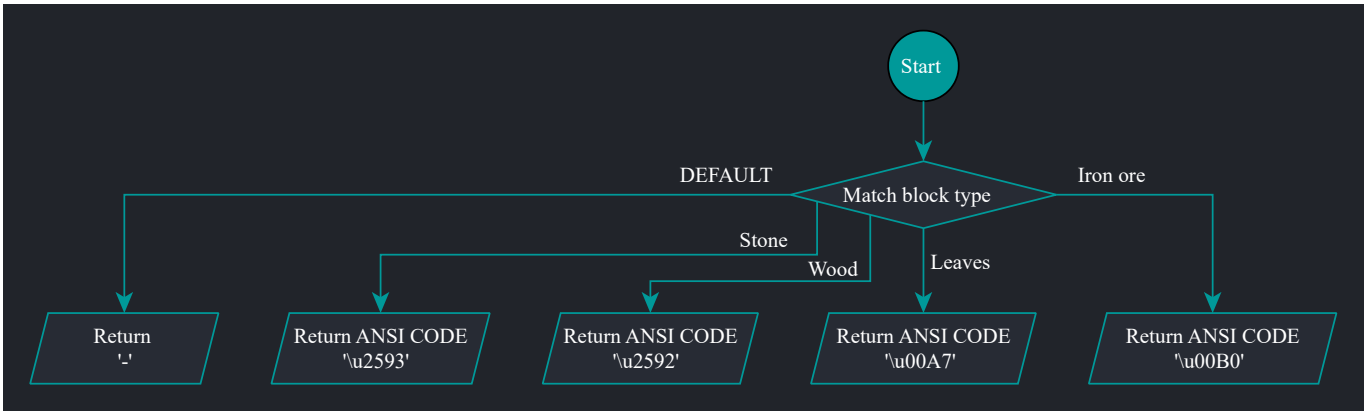
Pseudocode

```
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


Start
Match block type
DEFAULT
Iron ore
Stone
Wood
Leaves
Return '-'
Return ANSI CODE '\u2593'
Return ANSI CODE '\u2592'
Return ANSI CODE '\u00A7'
Return ANSI CODE '\u00B0'

String getBlockName(int blockType)

Java

```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";
    }
}
```

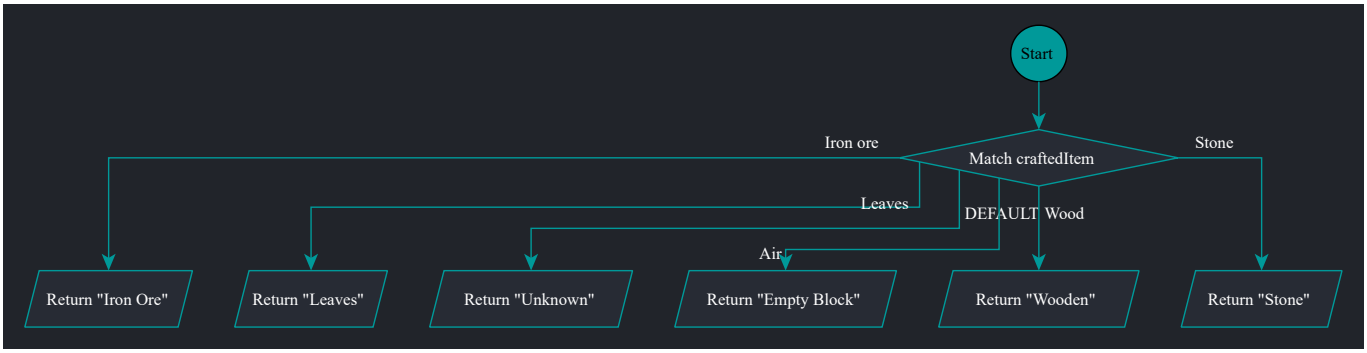
Pseudocode

```
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


Start
Match craftedItem
Iron ore
Leaves
Air
DEFAULT
Wood
Stone
Return "Iron Ore"
Return "Leaves"
Return "Unknown"
Return "Empty Block"
Return "Wooden"
Return "Stone"

String getBlockSymbol(int 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) + " ";
}
```

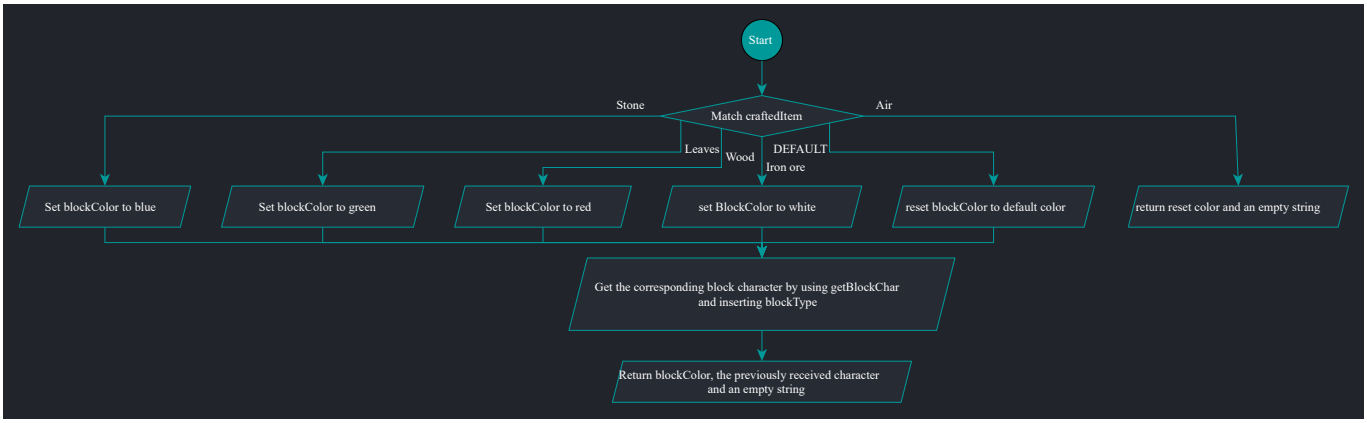
Pseudocode

```
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


Start
Match craftedItem
Stone
Air
Leaves
Wood
Iron ore
DEFAULT
Set blockColor to blue
Set blockColor to green
Set blockColor to red
set BlockColor to white
reset blockColor to default color
return reset color and an empty string
Get the corresponding block character by using getBlockChar and inserting blockType
Return blockColor, the previously received character and an empty string

String getCraftedItemName(int craftedItem)

Java

```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


Start
compare craftedItem to hardcoded values
in the case that BlockName AIR
in the case that blockType is WOOD
in the case that blockType LEAVES
in the case that blockType STONE
in the case that blockType does not correspond to any hardcoded values
in the case that blockType IRON_ORE
return "Empty Block"
return "Wooden"
return "Leaves"
return "Stone"
return "Unknown"
return "Iron Ore"

void loadGame(String fileName)

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();
}
```

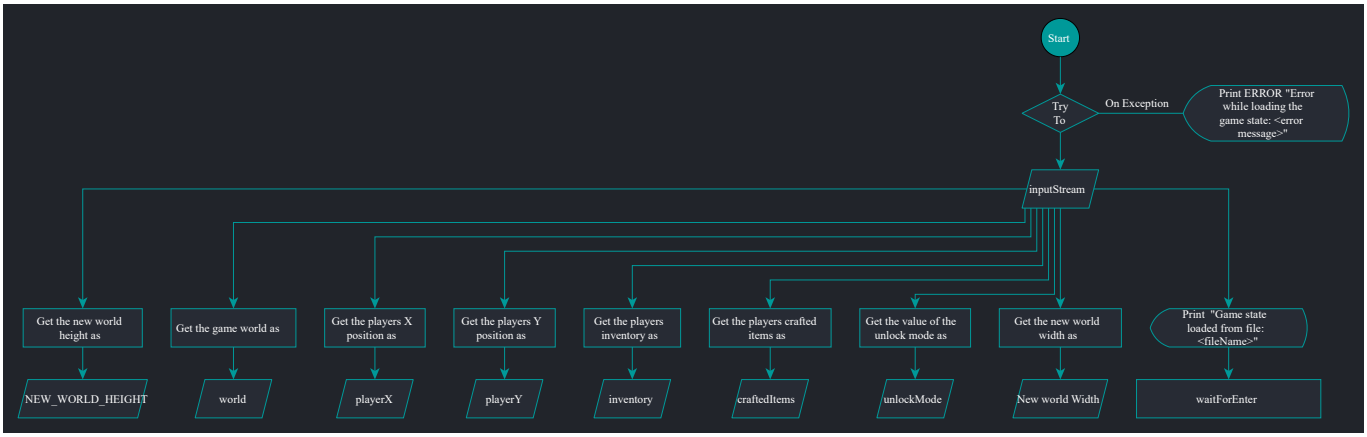
Pseudocode

```
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


Start
Try To
On Exception
Print ERROR "Error while loading the game state: <error message>"
inputStream
Get the new world height as
Get the game world as
Get the players X position as
Get the players Y position as
Get the players inventory as
Get the players crafted items as
Get the value of the unlock mode as
Get the new world width as
Print "Game state loaded from file: <fileName>"
NEW_WORLD_HEIGHT
world
playerX
playerY
inventory
craftedItems
unlockMode
New world Width
waitForEnter

void lookAround()

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();
}
```

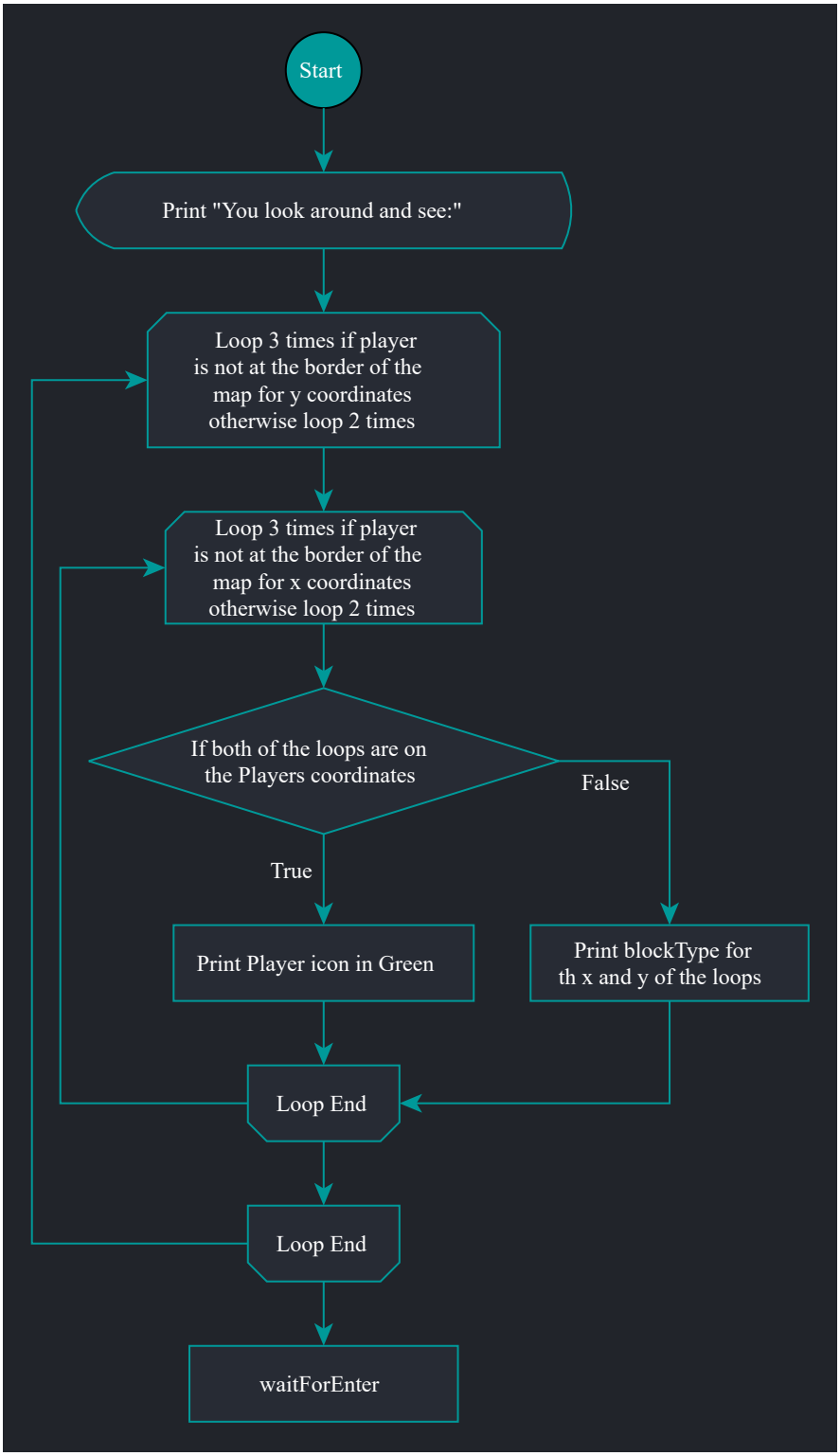
Pseudocode

```
BEGIN

PRINT INFO "You look around and see:";
FOR `<Integer> y` = `Maximum of (0) and (<Integer> playerY - 1)`; `<Integer> y` <=
`Minimum of (<Integer> playerY + 1) and (<Integer> worldHeight - 1)`
    FOR `<Integer> x` = `Maximum of (0) and (<Integer> playerX - 1)`; `<Integer>
x` <= `Minimum of (<Integer> playerX + 1) and (<Integer> worldWidth - 1)`
        IF `<Integer> x` == `<Integer> playerX` AND `<Integer> y` == `<Integer>
playerY`
            PRINT INFO "P " (colored green);
        ELSE
            PRINT INFO `get block symbol from <two dimensional Integer array>
world @ indexes <Integer> x, <Integer> y`;
        Set `<Integer> x` += 1;
    PRINT INFO "\n";
    Set `<Integer> y` += 1;
PRINT INFO "\n";
Wait on player to press ENTER;

END
```

Flowchart


Start
Print "You look around and see:"
Loop 3 times if player is not at the border of the map for y coordinates otherwise loop 2 times
Loop 3 times if player is not at the border of the map for x coordinates otherwise loop 2 times
If both of the loops are on the Players coordinates
False
True
Print Player icon in Green
Print blockType for th x and y of the loops
Loop End
Loop End
waitForEnter

void placeBlock(int blockType)

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();
}
```

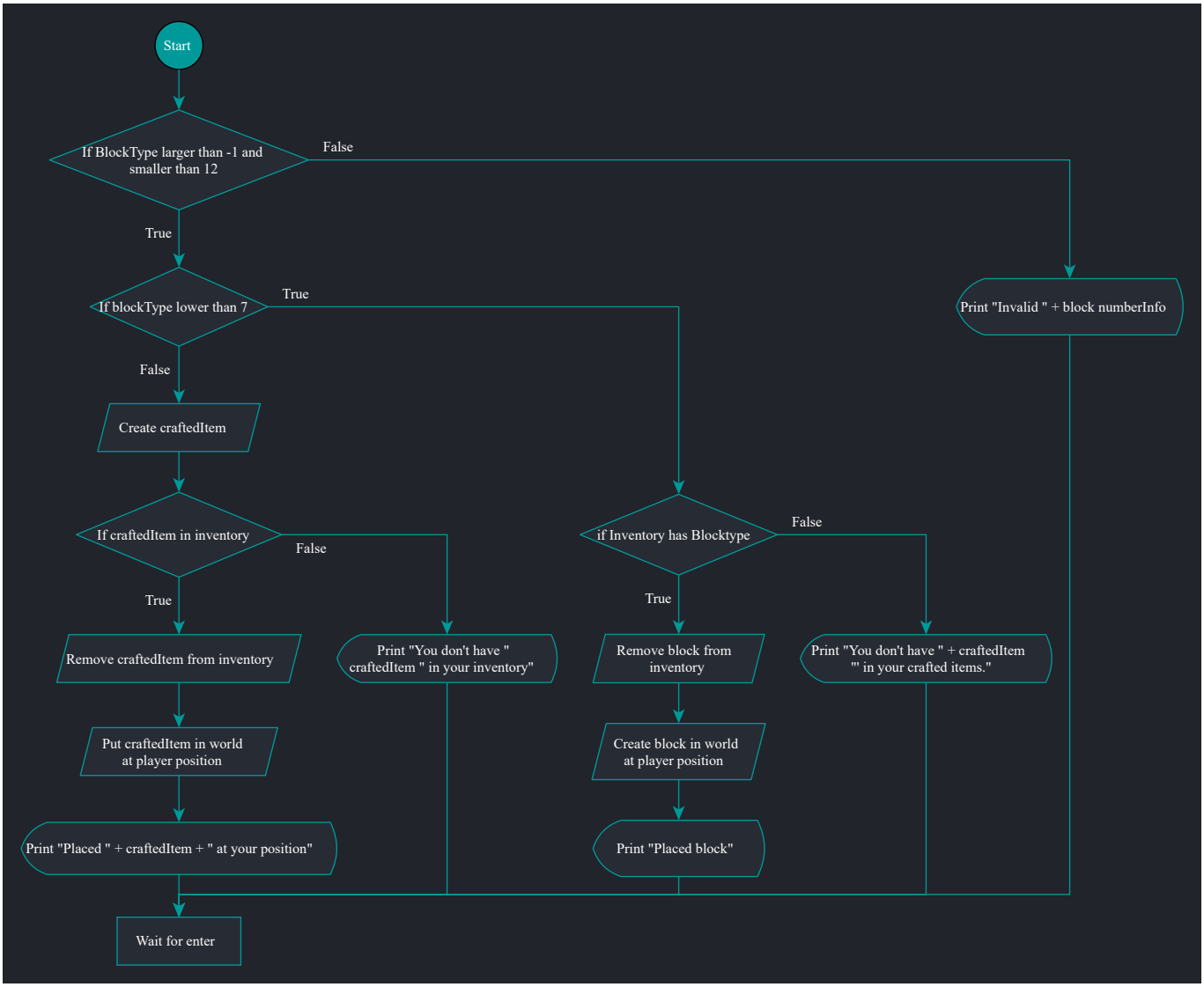
Pseudocode

```
BEGIN

IF `<Integer> blockType` >= 0 AND `<Integer> blockType` <= 11
    IF `<Integer> blockType` <= 6
        IF `<Integer list> inventory` contains `<Integer>` blockType
            Remove member `<Integer>` blockType from `<Integer list> inventory`;
            Set `<two dimensional Integer array> world @ indexes <Integer>
playerX, <Integer> playerY` = `<Integer>` blockType;
            PRINT INFO "Placed " + `<String> get block name matching <Integer>
blockType` + " at your position.";
        ELSE
            PRINT WARNING "You don't have " + `<String> get block name matching
<Integer> blockType` + " in your inventory.";
    ELSE
        Assign `<Integer> craftedItem` = `<Integer> get crafted item of <Integer>
blockType`;
        IF `<Integer list> craftedItems` contains `<Integer>` craftedItem
            Remove member `<Integer>` craftedItem from `<Integer list>
craftedItems`;
            Set `<two dimensional Integer array> world @ indexes <Integer>
playerX, <Integer> playerY` = `<Integer>` blockType;
            PRINT INFO "Placed " + `<String> get block name matching <Integer>
craftedItem` + " at your position.";
        ELSE
            PRINT WARNING "You don't have " + `<String> get block name matching
<Integer> craftedItem` + " in your crafted items.";
ELSE
    PRINT WARNING "Invalid block number. Please enter a valid block number.\n";
    PRINT WARNING `<String> BLOCK_NUMBERS_INFO` + "\n";
Wait on player to press ENTER;

END
```

Flowchart



References

- Template - Canvas task on which this document is based
- yEd - Graph Editor we used to make the flowcharts