
# Coffee Vending Machine

Real Times System

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**GitHub link:** https://github.com/ragrag/Coffee-Vending-Machine-RTS

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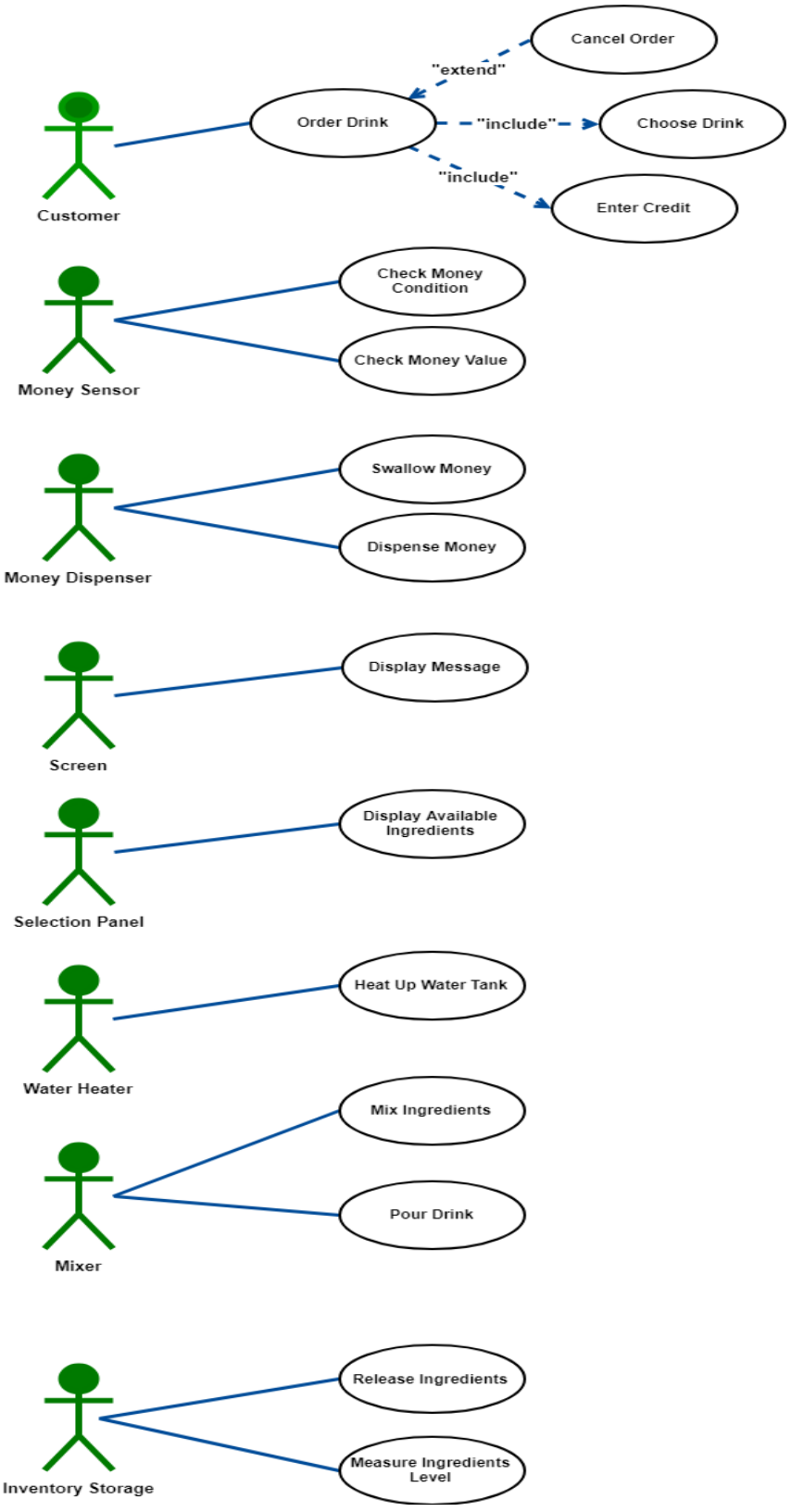
# USE CASE DIAGRAM



# USE CASE SCENARIOS

**First Use Case**: Order Drink

| | |
|---|---|
| ID | UC-01 |
| Title | Order Drink. |
| Description | This is Considered the most fundamental use case as the user goes through the process of selecting the specifications (Type-Sugar-Size) of his drink |
| Primary Actor | Customer |
| Supporting Actor(s) | Money Sensor<br>Money Dispenser<br>Selection Panel<br>Screen |
| Preconditions | Power on to the system coffee vending machine |
| Basic Flow of Events | 1.The User enters his credit<br>2.The user selects the Specifications of his drink |
| Extensions | 2.a.If the user inputs orders something he didn't enter proper amount of credit for<br>1. The system displays current credit<br>2. No drink is provided for the user |
| Post Conditions | A drink will be served to the user |
| Priority | High |

**Second Use Case**: Enter Credit

| | |
|---|---|
| ID | UC-02 |
| Title | Enter Credit |
| Description | The User inputs his money in the Dispenser |
| Primary Actor | Customer |
| Supporting Actor(s) | Money Sensor<br>Money Dispenser |
| Preconditions | Power on to the system vending machine |
| Basic Flow of Events | 1. The user inputs his money in the Dispenser<br>2. The Money sensor authenticates the money |
| Extensions | 1.a. The User does not Input his money properly<br>1.The System doesn't update the Balance Value |
| Post Conditions | The User Balance Will be updated |
| Priority | High |

**Third Use Case**: Choose Drink

| | |
|---|---|
| ID | UC-03 |
| Title | Choose Drink |
| Description | The User is selecting the specifications for his drink from the selection panel |
| Primary Actor | Customer |
| Supporting Actor(s) | Selection Panel<br>Screen |
| Preconditions | The User Enters Credit in the Machine |
| Basic Flow of Events | 1. The selection panel allows the user to select the type of drink he wants.<br>2. The selection panel allows the user to select the size of drink he wants.<br>3. The selection panel allows the user to select the amount of sugar in his drink.<br>4. The user clicks start |
| Extensions | 1.a. If the user did not specify a type<br>1.The system do not begin the transaction and display a message "Please select drink first"<br>2.a. If the user did not specify a size<br>1.The system puts default size of small<br>3.a.If the user did not specify amount of sugar<br>1.The system puts a default value of none |
| Post Conditions | The Process of preparing the Drink is initiated |
| Priority | High |

**Fourth Use Case**: Cancel order

| | |
|---|---|
| ID | UC-04 |
| Title | Cancel order |
| Description | The User wishes to cancel his order |
| Primary Actor | Customer |
| Supporting Actor(s) | Selection panel<br>Screen |
| Preconditions | The User enters credit in the machine |
| Basic Flow of Events | 1. The users select the cancel button on the selection panel |
| Extensions | 1.a. If the user selects the cancel button after pressing start<br>1.The System will continue the process of preparing the drink as the cancel button is disabled |
| Post Conditions | The Machine will dispense money equal to the customer balance |
| Priority | High |

**Fifth Use Case**: Check Money Condition

| | |
|---|---|
| ID | UC-05 |
| Title | Check Money Condition |
| Description | The Sensor is checking the quality of the money to be added to the user balance |
| Primary Actor | Money Sensor |
| Supporting Actor(s) | Money Dispenser |
| Preconditions | The User Inputted Credit in the Machine |
| Basic Flow of Events | 1. The Sensor checks the quality of the money inputted |
| Extensions | None |
| Post Conditions | The money will be accepted by the dispenser and added to the customer balance or rejected and dispensed back. |
| Priority | Medium |

**Sixth Use Case**: Check Money Value

| | |
|---|---|
| ID | UC-05 |
| Title | Check Money Value |
| Description | The Sensor is checking the amount of the money that the users input. |
| Primary Actor | Money Sensor |
| Supporting Actor(s) | Money Dispenser |
| Preconditions | The User Inputted Credit in the Machine |
| Basic Flow of Events | 1. The Sensor Check the amount of the money inputted |
| Extensions | None |
| Post Conditions | The money will be accepted by the dispenser and added to the customer balance or rejected and dispensed back. |
| Priority | Medium |

**Seventh Use Case**: Swallow Money

| ID | UC-07 |
|---|---|
| Title | Swallow Money |
| Description | The Dispenser Swallows the money of the user |
| Primary Actor | Money Dispenser |
| Supporting Actor(s) | None |
| Preconditions | The User Inputted money in the Machine |
| Basic Flow of Events | 1. The Dispenser swallows the money from the user. |
| Extensions | None |
| Post Conditions | The money will be authenticated |
| Priority | Medium |

**Eighth Use Case**: Dispense Money

| ID | UC-08 |
|---|---|
| Title | Dispense Money |
| Description | The machine returns money to the user either due to rejection of quality or as change from his order or if the user cancels his order. |
| Primary Actor | Money Dispenser |
| Supporting Actor(s) | None |
| Preconditions | The User Must have inputted money |
| Basic Flow of Events | 1. The dispenser dispenses the money to the user |
| Extensions | None |
| Post Conditions | The Customer balance will remain to zero. |
| Priority | High |

**Ninth Use Case**: Display message

| ID | UC-09 |
|---|---|
| Title | Display Message |
| Description | The message requested by the system is displayed to the user |
| Primary Actor | Screen |
| Supporting Actor(s) | Selection panel<br>Mixer |
| Preconditions | Power on to the vending machine system |
| Basic Flow of Events | 1. A certain system message is displayed in the screen. |
| Extensions | None |
| Post Conditions | A message will be displayed for the user to read it. |
| Priority | Low |

**Tenth Use Case**: Display Available Ingredients

| ID | UC-10 |
|---|---|
| Title | Display Available Ingredients |
| Description | The selection panel receives which ingredients are available, and shows it to the user by showing green lights next to the available drinks |
| Primary Actor | Selection panel |
| Supporting Actor(s) | Inventory Storage |
| Preconditions | Power on to the vending machine system |
| Basic Flow of Events | 1. The selection panel displays the available Drinks ready to be served. |
| Extensions | None |
| Post Conditions | 1. Green light will be displayed next to the available drink due to presence of ingredients.<br>2. Red light will be displayed next to the unavailable drink due to lack of Ingredients. |
| Priority | Medium |

**Eleventh Use Case**: Heat Up Water Tank

| ID | UC-11 |
|---|---|
| Title | Heat Up Water Tank |
| Description | The water tank heats up the water to maintain the temperature |
| Primary Actor | Water Heater |
| Supporting Actor(s) | None |
| Preconditions | Power on to the vending machine system |
| Basic Flow of Events | 1. The heater increases the temperature of the tank until it reaches 80°C<br>2. The heater stops when the tank temperature is at 80°C<br>3. When the temperature drops to 40°C, it restarts the heating process |
| Extensions | None |
| Post Conditions | The water tank temperature will be sustained between 40°C and 80°C. |
| Priority | High |

**Twelfth Use Case**: Mix Ingredients

| ID | UC-12 |
|---|---|
| Title | Mix Ingredients |
| Description | The mixer allocates required Ingredients and mixes them together |
| Primary Actor | Mixer |
| Supporting Actor(s) | Inventory Storage |
| Preconditions | 1. The User must have selected a drink along with its specifications.<br>2. The user selected start. |
| Basic Flow of Events | 1. The Mixer Allocates ingredients from Inventory.<br>2. The mixer mixes the ingredients. |
| Extensions | None |
| Post Conditions | The Drink will be ready to be poured. |
| Priority | High |

**Thirteenth Use Case**: Pour Drink

| ID | UC-13 |
|---|---|
| Title | Pour Drinks |
| Description | The mixer pours the drink to the user |
| Primary Actor | Mixer |
| Supporting Actor(s) | None |
| Preconditions | The Drink is allocated and mixed. |
| Basic Flow of Events | 1.The Drink is poured from the machine. |
| Extensions | None |
| Post Conditions | The Drink will be poured. |
| Priority | Medium |

**Fourteenth Use Case**: Release Ingredients

| ID | UC-14 |
|---|---|
| Title | Release Ingredients |
| Description | The Inventory Storage release the ingredient for drink preparation |
| Primary Actor | Inventory Storage |
| Supporting Actor(s) | None |
| Preconditions | The mixer requests ingredients. |
| Basic Flow of Events | 1.The Ingredients are released to the mixer |
| Extensions | None |
| Post Conditions | The Ingredients reach the mixer. |
| Priority | Medium |

**Fifteenth Use Case**: Measure Ingredients level

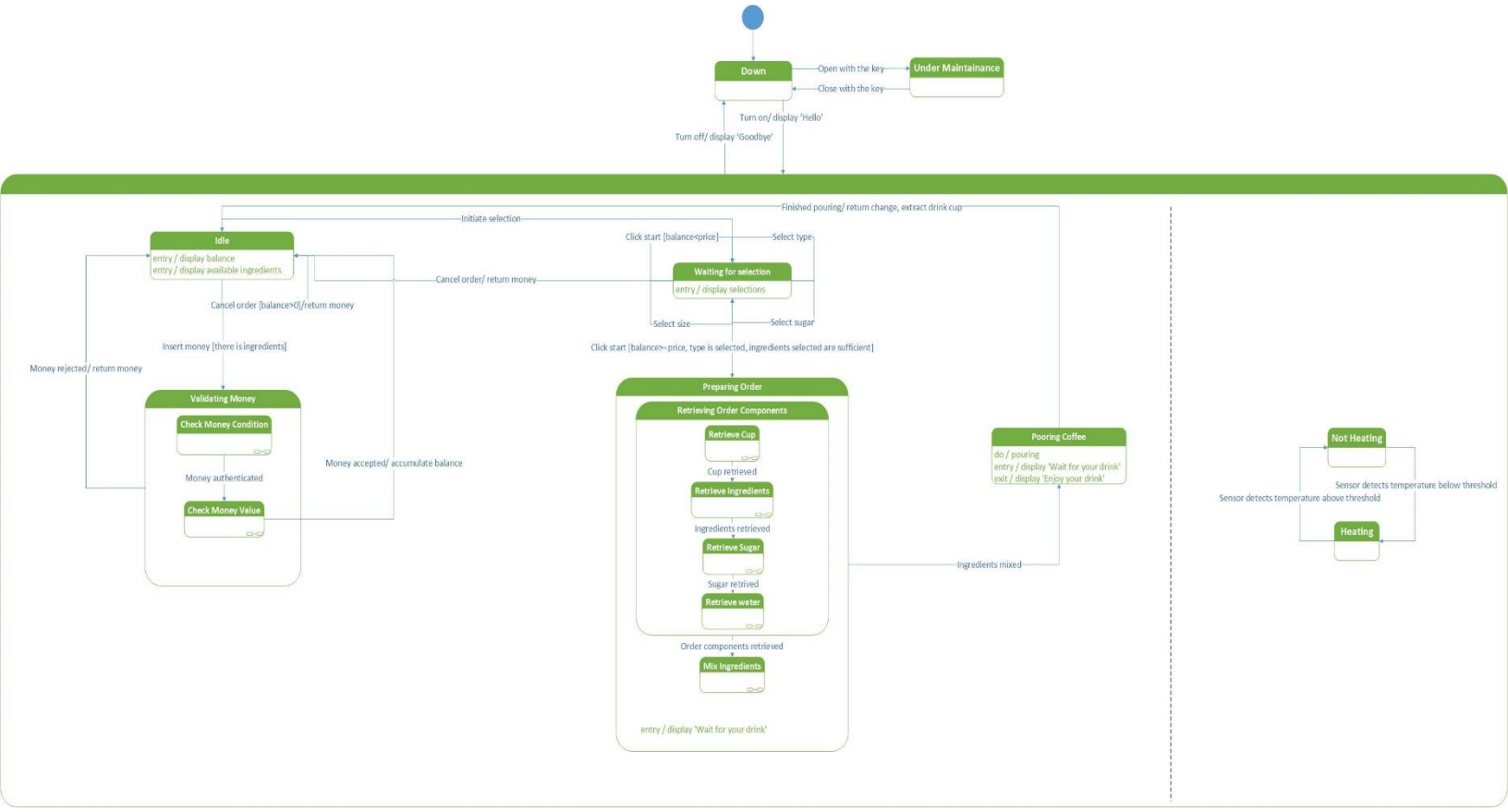
| | |
|---|---|
| ID | UC-15 |
| Title | Measure Ingredients Level |
| Description | The Inventory Storage detects the levels of each ingredient. |
| Primary Actor | Inventory Storage |
| Supporting Actor(s) | None |
| Preconditions | Power on to the vending machine system |
| Basic Flow of Events | 1.The Ingredients are assessed |
| Extensions | None |
| Post Conditions | The Ingredients levels are displayed for illustration |
| Priority | Medium |

# STIMULI-RESPONSE TABLE

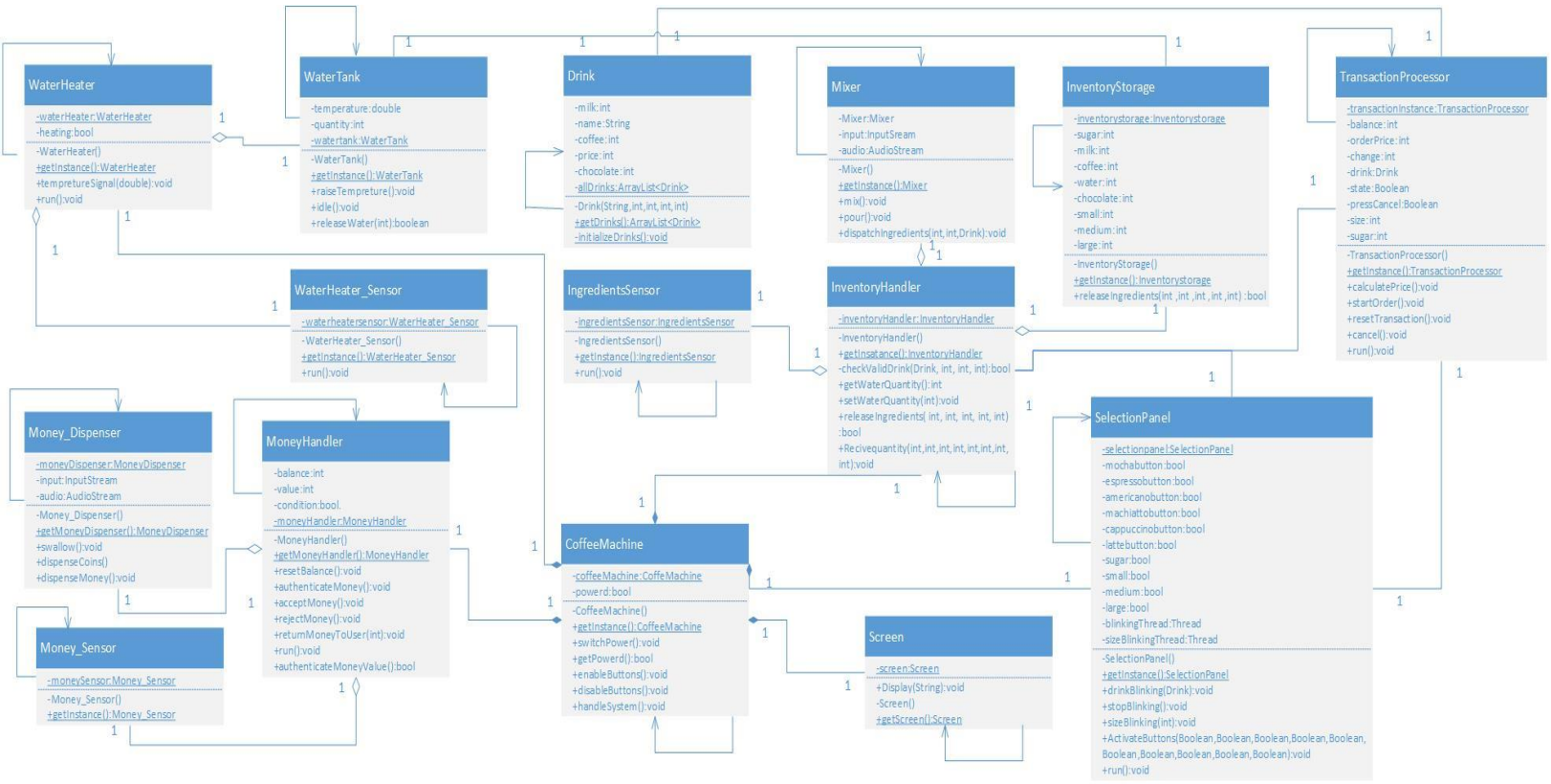
| Stimuli | Response | Response Time |
|---|---|---|
| Open with key | Transition from (Down) state to (Under maintenance) state. | <5 seconds |
| Close with key | Transition from (Under maintenance) state to (Down) state. | <5 seconds |
| Turn on | Transition from (Down) state to (Idle) state<br>Action: display “Hello”, display balance, display available ingredients.<br>Turn on water heater. | <1 second |
| Turn off | Transition from any state to (Down) state.<br><br>Action: display “Thank you Goodbye :)” | <2 seconds |
| Insert money | Transition from (Idle) state to (Validating money) state. | <3 seconds |
| Money authenticated | Transition from (Checking money condition) sub-state to (Checking money value) sub-state. | <5 seconds |
| Money valid | Transition from (Validating money) state to (Idle) state.<br><br>Action: display balance, display available ingredients, accumulate balance. | <2 seconds |
| Money invalid | Transition from (Validating money) state to (Idle) state.<br>Action: display balance, display “Bad money condition”, display available ingredients, return money. | <3 seconds |
| Initiate selection | Transition from (Idle) state to (Waiting for selection) state. | <2 seconds |
| Cancel order | Transition from (Waiting for selection) state to (Idle) state.<br>Action: display balance, display available ingredients, return money. | <5 seconds |
| Select type | Transition from (Waiting for selection) state to (Waiting for selection) state.<br>Activity: display selections. | <1 second |

| | | |
|---|---|---|
| Select size | Transition from (Waiting for selection) state to (Waiting for selection) state.<br>Activity: display selections. | <1 second |
| Select sugar | Transition from (Waiting for selection) state to (Waiting for selection) state.<br>Activity: display selections. | <1 second |
| Click start [balance<price, coffee type is not selected, ingredients selected are not sufficient] | Transition from (Waiting for selection) state to (Waiting for selection) state. | <1 second |
| Click start [balance>=price, coffee type is selected, ingredients selected are sufficient] | Transition from (Waiting for selection) state to (Preparing coffee) state.<br>Action: display “Wait for your drink”<br>Activity: retrieving cup. | <1 second |
| Cup retrieved | Transition from (Retrieve cup) sub-state to (Retrieve coffee) sub-state.<br>Activity: retrieving coffee. | <1 second |
| Coffee retrieved | Transition from (Retrieve coffee) sub-state to (Retrieve sugar) sub-state.<br>Activity: retrieving sugar. | <1 second |
| Sugar retrieved | Transition from (Retrieve sugar) sub-state to (Retrieve water) sub-state.<br>Activity: retrieving water. | <1 second |
| Order components retrieved | Transition from (Extract needs) sub-state to (Mixing ingredients) sub-state.<br>Activity: mix ingredients. | <3 seconds |
| Ingredients mixed | Transition from (Mixing ingredients) sub-state to ( Pouring coffee) state.<br>Activity: pouring coffee. | <2 seconds |
| Pouring finished | Transition from (Pouring) state to (Idle) state.<br>Action: return change (if any), extract drink, display balance, display available ingredients. | <5 seconds |
| Sensor detects temperature below threshold | Transition from (Not heating) state to (Heating) state.<br>Activity: heat water tank. | <2 minutes |
| Sensor detects temperature above threshold | Transition from (Heating) state to (Not heating) state.<br>Action: stop heating. | <2 minutes |

# STATE MACHINE DIAGRAM



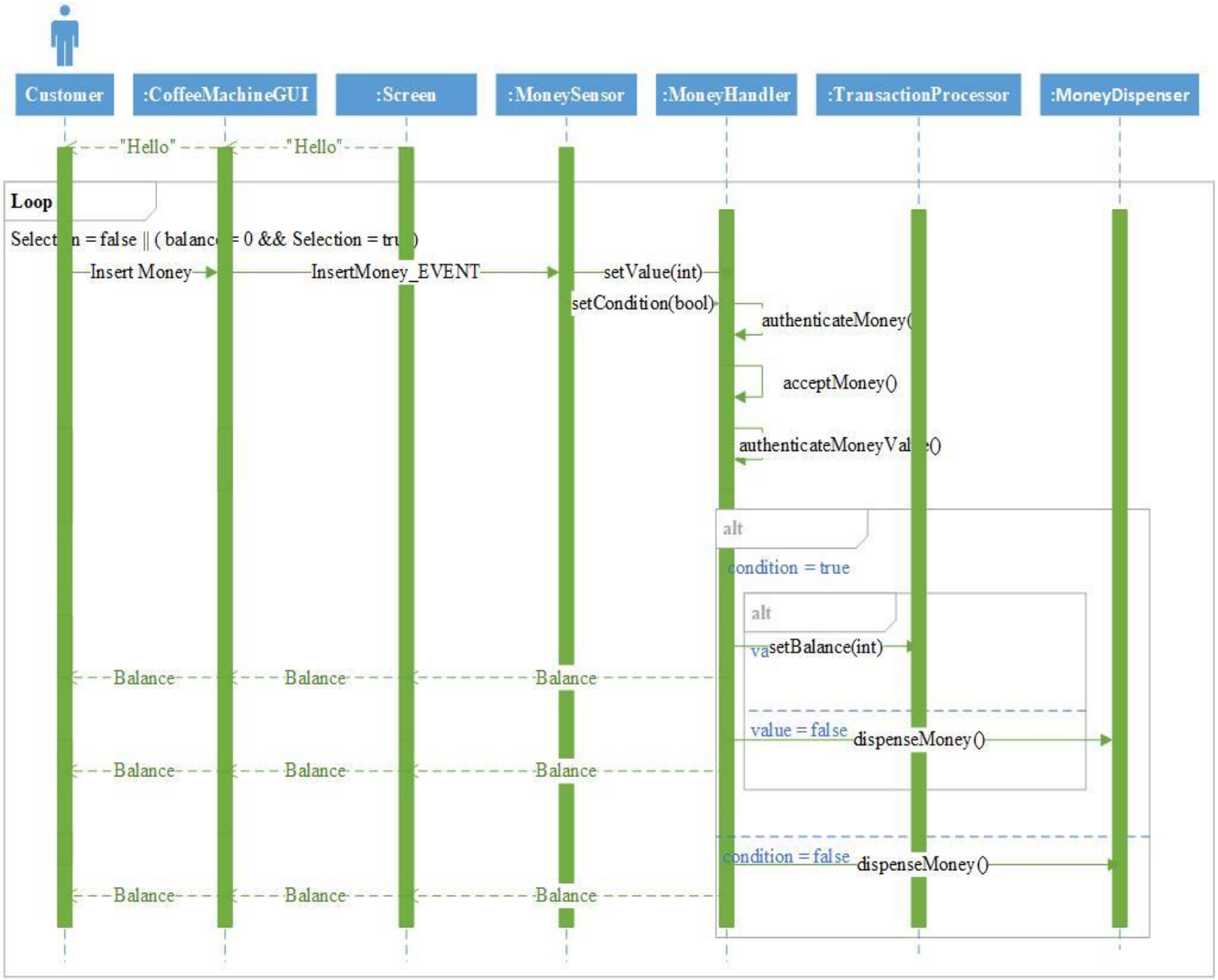
# CLASS DIAGRAM



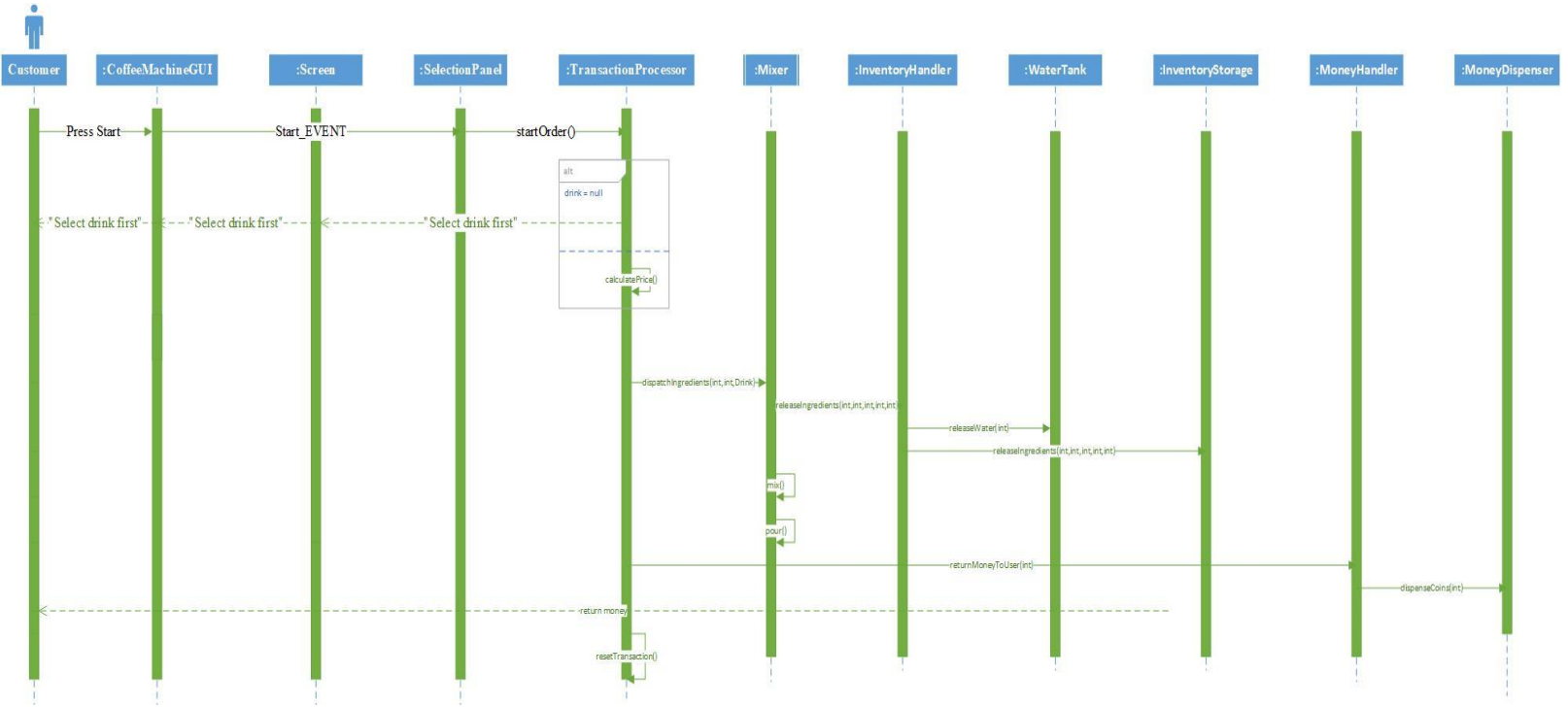
# SEQUENCE DIAGRAMS

## CHOOSE DRINK

**ENTER CREDIT**



## ORDER DRINK




## CANCEL ORDER