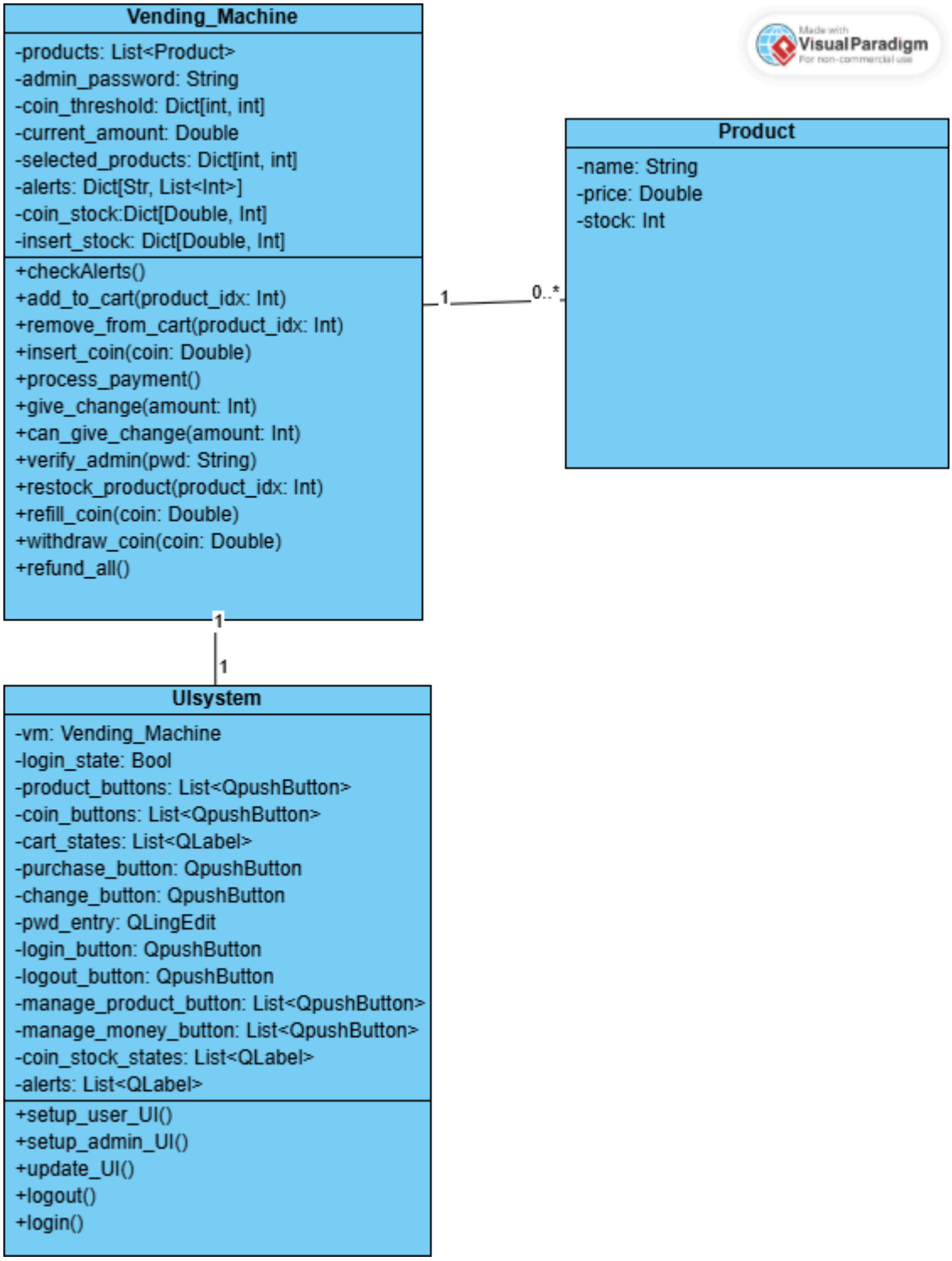
Class Diagram:



Specifications

1. Vending Machine

1.1 checkAlerts

- Check if the storage of product is lower than 5 and update alerts

- Check if the storage of the coins(1, 0.5) is lower than their threshold and update alerts
- Check if the storage of the bills(5, 10, etc.) is lower than their threshold and update alerts
- Check if the storage of the money is greater than their threshold and update alerts

1.2 add_to_cart

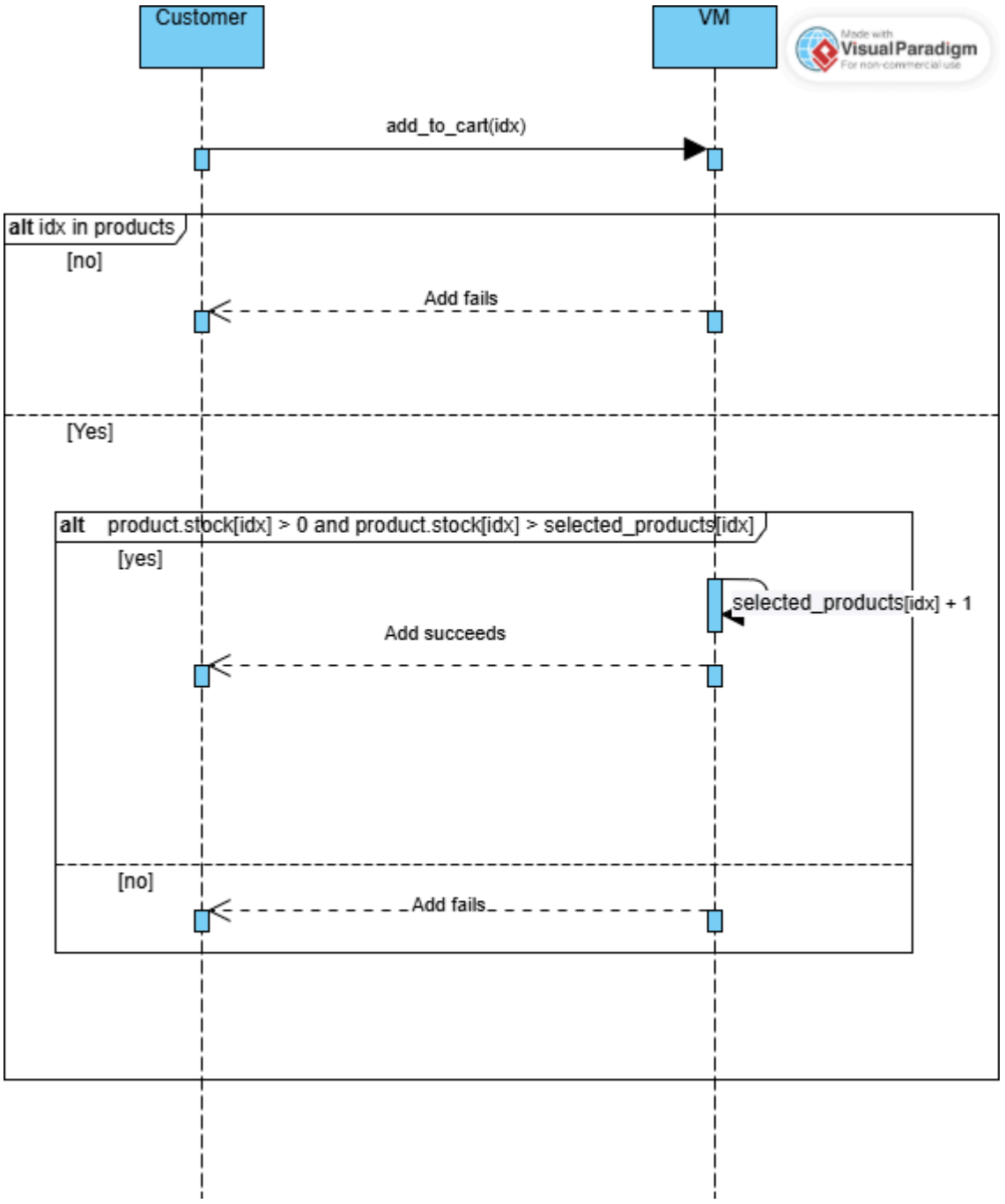
- Check if the index of product exists in product lists.

  If not, report action failure.

- Check if the stock of the product is greater than 0 and if the stock is still greater than the amount that has already be chosen.

  If so, add the product into the cart and return success.

- return failure.



1.3 remove_from_cart

- Check if the index of product exists in product lists.

  If not, report action failure.

- Check if the product has been selected

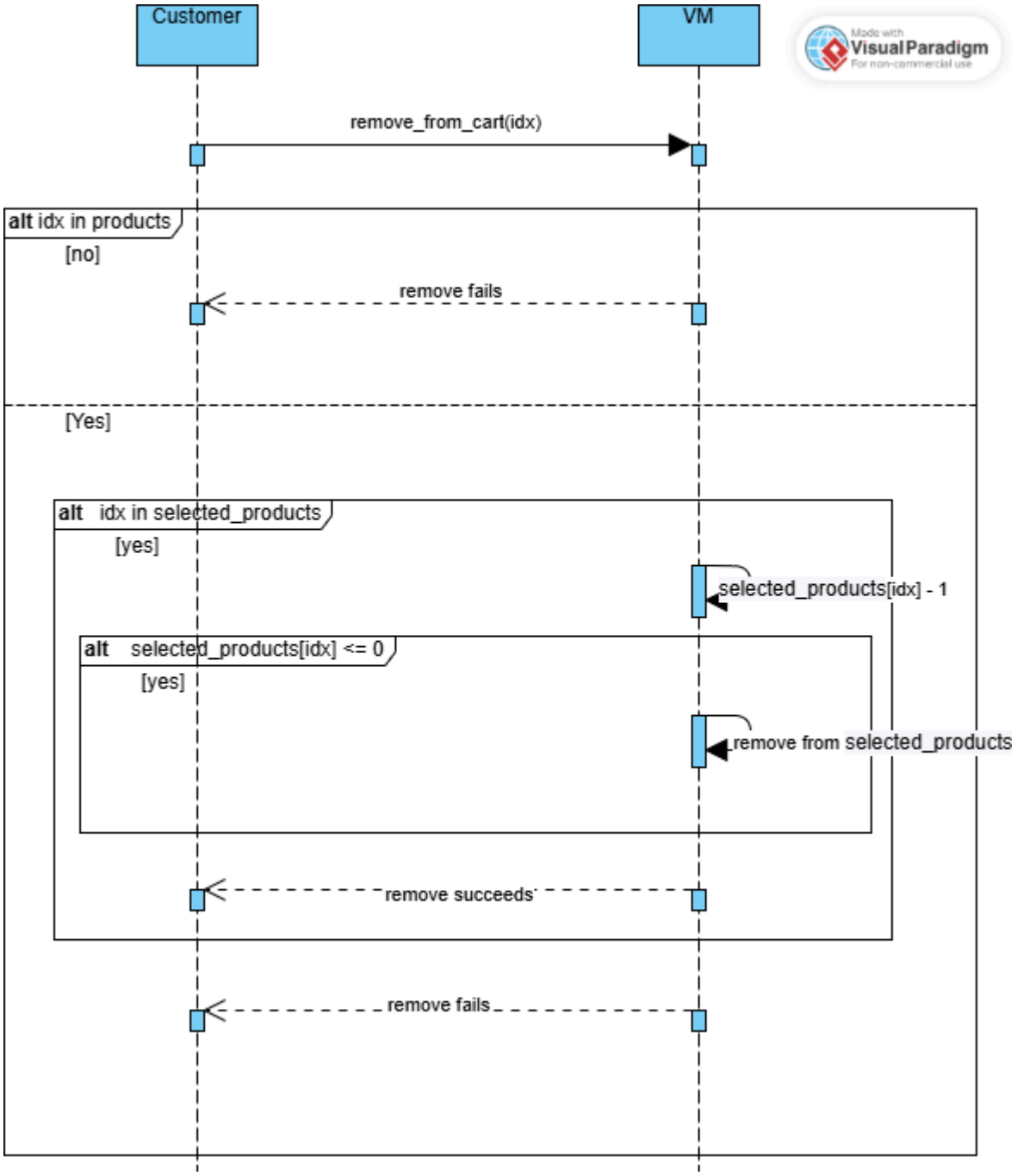
  If so, decrease the selected number.

  - Check if the selected number is decreased to 0

    If so, remove the selected product.

  return removal success.

- return failure.



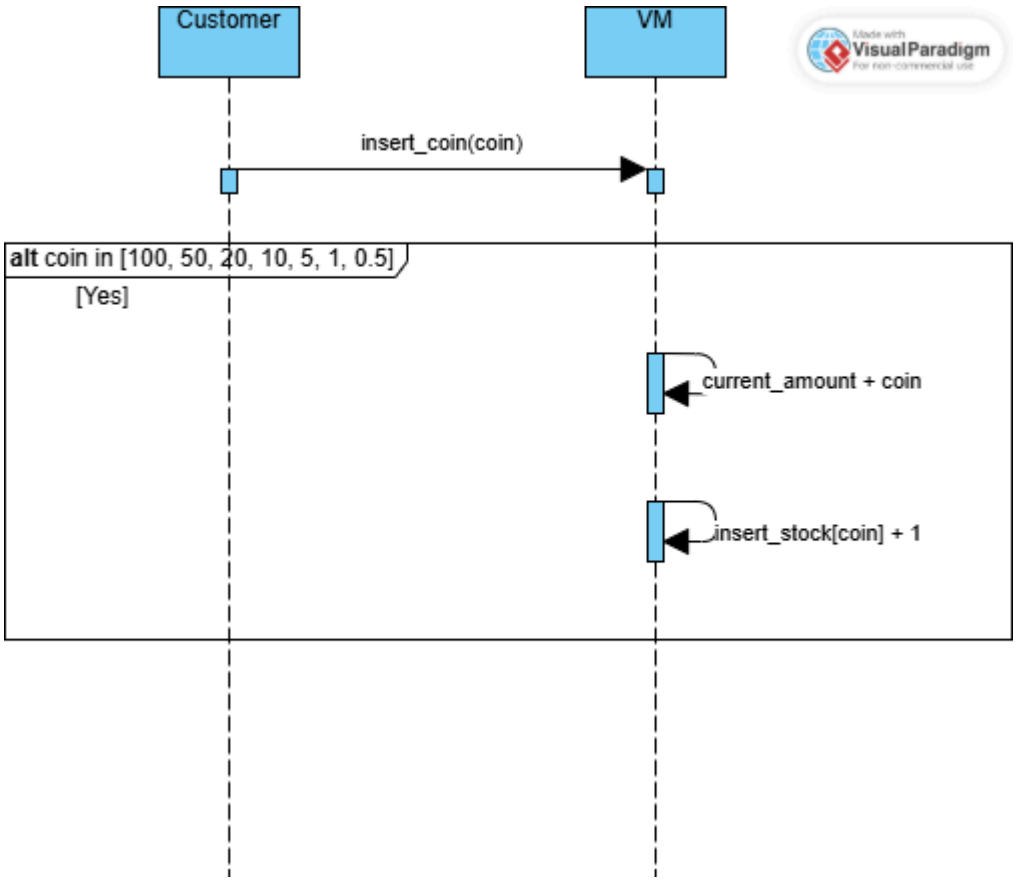
1.4 insert_coin

- Check if the coin is valid

  if so :

  Add the value of coin into total value

  Increase the number of the coin inserted by 1



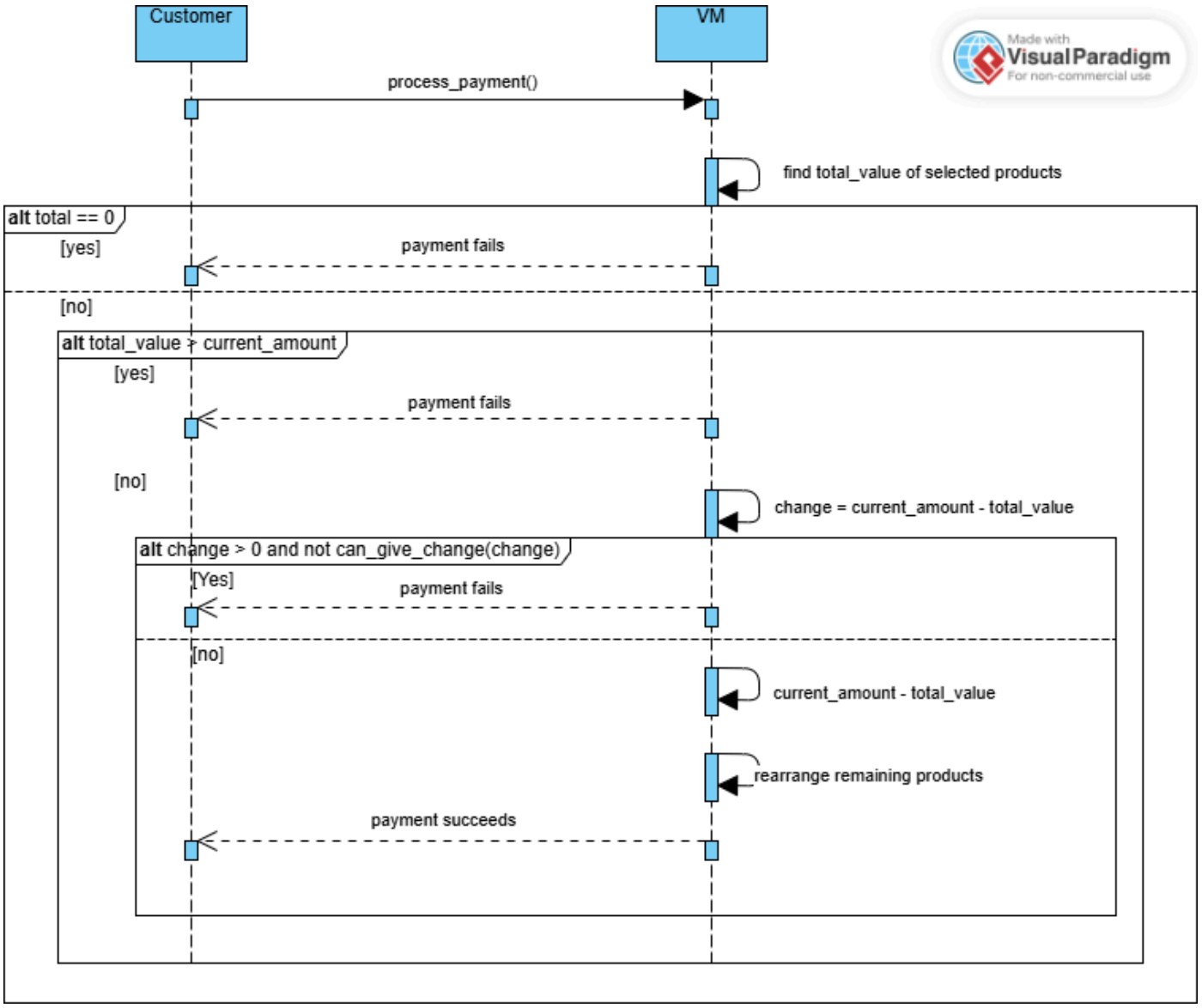
1.5 process_payment

- Get total value of selected products.
- If the value is 0

  return payment failure
- If the value is greater than inserted amount,

  return payment failure
- change = inserted amount - total value
- If change > 0 and cannot give change

  return payment failure
- Current_amount subtracts total value
- Rearrange the remaining products.
- return payment success

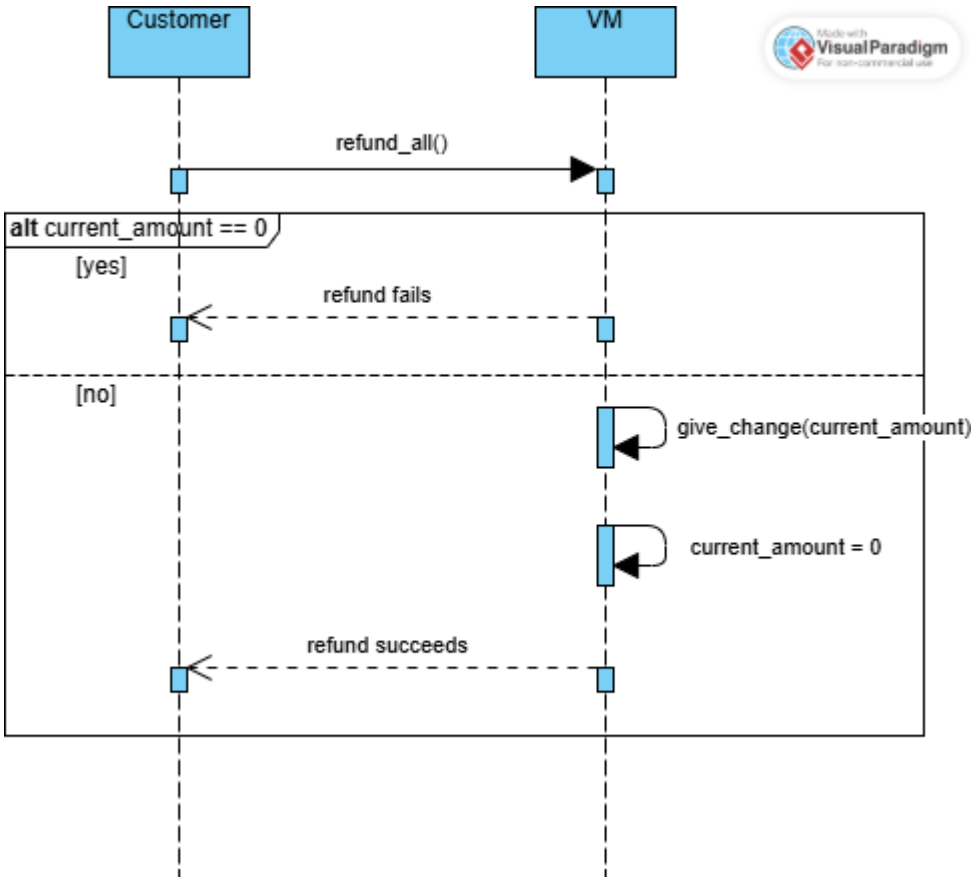


1.6 refund_all

- Check if current_amount is 0

  If so, return failure.

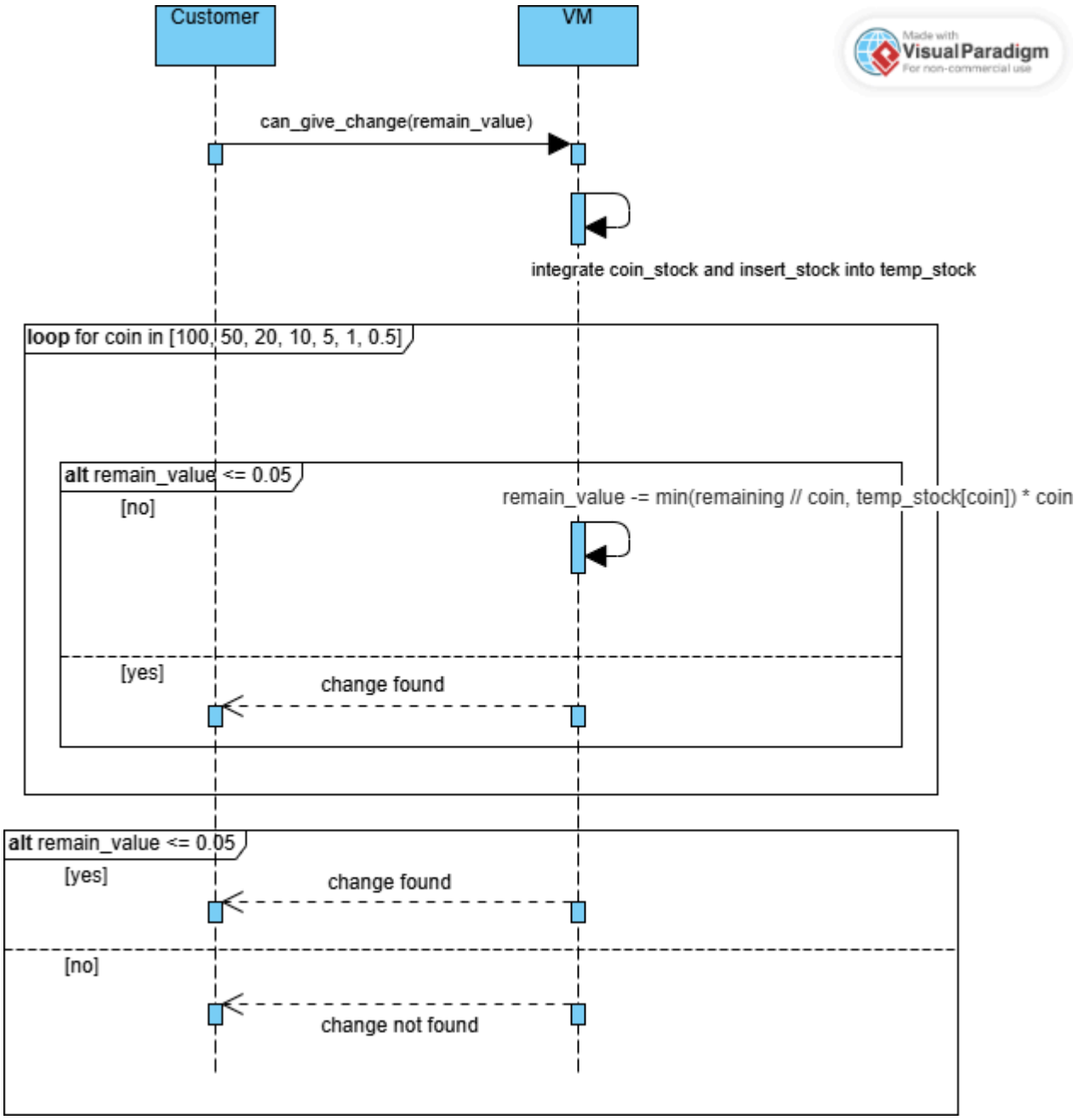
- Apply give_change
- set current_amount to 0
- return success



1.7 can_give_change

- Integrate coin_stock and insert_stock
- For every possible value that coins can represents, subtracts the maximum value within range of [0, remain_value] it can provide

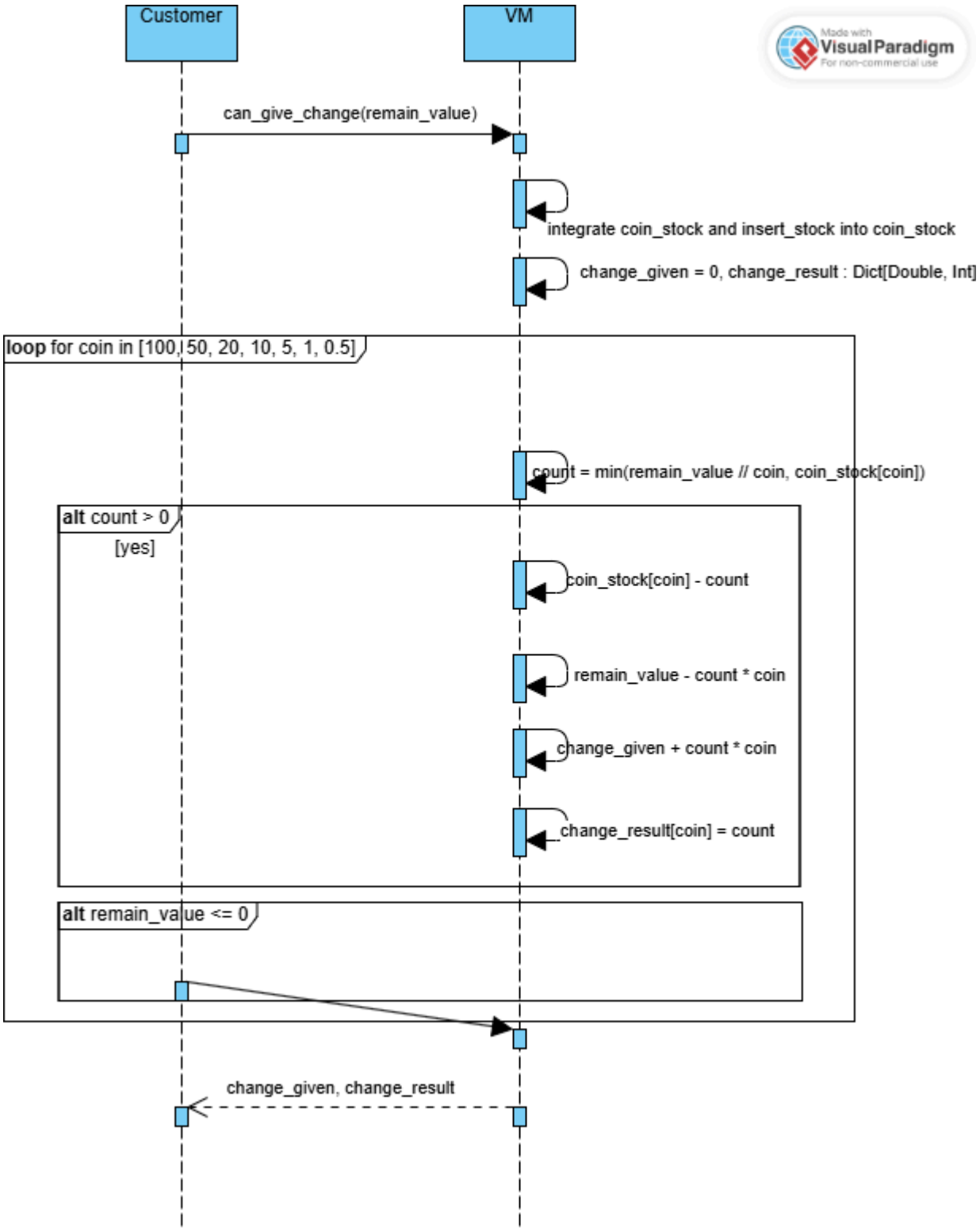
  If remain_value is not greater than 0.05, the solution of change is found



1.8 give_change

This function carries out the same way of can_give_change for finding the solution.

However, it provide specific solution with greedy algorithm.



1.9 verify_admin

The logic is very simple

- If input password correct, return true.
- otherwise, return false.

1.10 restock_product

- Check if the product is in the list

  If not, return failure

- set the number of corresponding product to 20

1.11 refill_coin

- Check if coin is valid

  If so:

  - Check if the number of the money is less than threshold

    If so, refill them to threshold number.

  otherwise, return refill failure.

- update alert and return refill success

1.12 withdraw_coin

- The opposite logic against 1.11 refill_coin
- The money will only be withdrawn when the number of it is greater than the threshold.

2. UI system

2.1 setup_user_UI

Customer UI initialization.

2.2 setup_admin_UI

Administrator UI panel initialization.

Notice that it's set to be invisible initially.

2.3 update_display

Update the text and panel state every movement, ensuring all the labels correct.

2.4 login

Set log-in state, set admin panel visible, set password entry disabled and set login button disabled.

2.5 logout

Set log-out state, set admin panel invisible, set password entry enabled and set login button enabled.