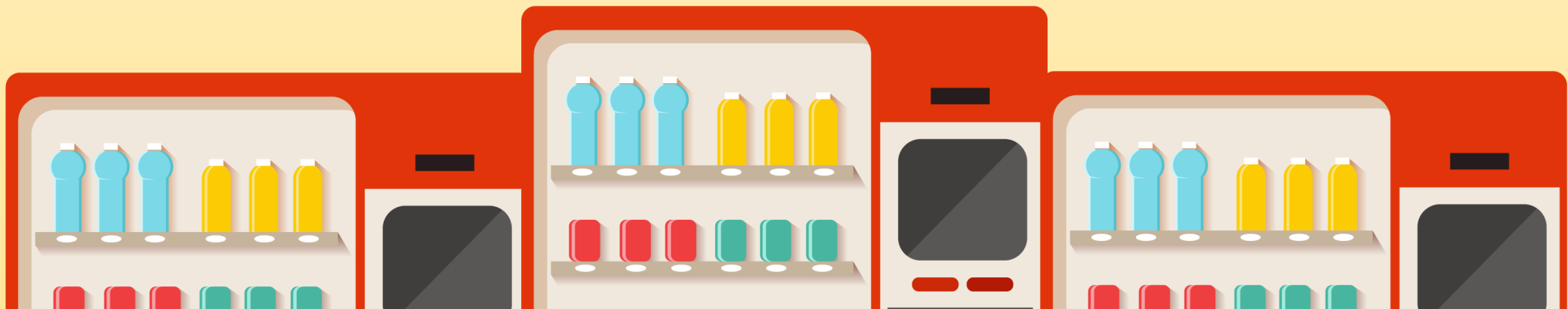


DISTRIBUTED VENDING MACHINE

객체지향개발방법론 [T2]

- 201711391 류근범
- 201711436 홍운표
- 202282050 조문충
- 202013557 하지라



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2131 DEFINE ESSENTIAL USE CASES



Use Case	1. Main Menu Display
Actor	Administrator
Purpose	display item type sold in the VM
Overview	System displays item type upon starting the machine.
Type	Evident
Cross Reference	Functions: R 1.1
Pre-requisites	N/A
Typical Courses of Events	(A) Administrator (S) System (A) turns the machine on. (S) displays item type upon starting the machine.
Alternative Courses of Events	N/A
Exceptional Courses of Events	N/A

2131 DEFINE ESSENTIAL USE CASES



Use Case	2. Item Selection
Actor	User
Purpose	select item User want to buy
Overview	User chooses the type of item and select quantity of items. System checks stock of items user chosen. If stocks are available, System goes to use case (3. Payment). Otherwise, goes to use case (4. Request Stock of Other VM).
Type	Evident
Cross Reference	Function R 1.2
Pre-requisites	Function R 1.1 needs to be executed before.
Typical Courses of Events	(U) User (S) System (U) selects type of items and quantity of items. (S) checks the stock of selected item. (S) If stocks are available, goes to use case (3. Payment) [E1].
Alternative Courses of Events	(U) selects type of items and quantity of items. (S) checks the stock of selected item. (S) If stocks are unavailable, goes to use case (4. Request Stock of Other VM) .
Exceptional Courses of Events	[E1](S) If stocks are available but not sufficient in quantity, sends error message to user and System goes to use case (1. Main menu display).

2131 DEFINE ESSENTIAL USE CASES



Use Case	3. Payment
Actor	User
Purpose	proceed payment on VM
Overview	System displays order sheet. User inserts card, then System checks card's validity and if validation is successful, completes the payment.
Type	Evident
Cross Reference	Function R 2.1
Pre-requisites	Function R 1.1 to 1.2 need to be executed before.
Typical Courses of Events	(U) User (S) System (S) display the order sheet. (U) inserts card to the card holder. (S) checks card's validity[E1]. (S) completes the payment.
Alternative Courses of Events	N/A
Exceptional Courses of Events	[E1] System returns the card to user and shows message to user "Error in payment. Please try again". If payment failure happened more than three times, return to use case (1. Main menu display).

2131 DEFINE ESSENTIAL USE CASES



Use Case	4. Request Stock of Other VM
Actor	System
Purpose	request stock of other VM to check stock availability.
Overview	As System does not have the stock user chose, requests stock from the other VM.
Type	Hidden
Cross Reference	Function R 3.1
Pre-requisites	Executed as Alternative Courses of Events of use case (2. Item Selection)
Typical Courses of Events	(S) System (OVM) Other VM (S) sends stock message of selected item. (OVM) responds message of stock information[E1].
Alternative Courses of Events	N/A
Exceptional Courses of Events	N/A

2131 DEFINE ESSENTIAL USE CASES



Use Case	5. Provide Stock Information to Other VM
Actor	Other VM
Purpose	provide stock information to Other VM
Overview	Other VM sends stock check message to System. System sends message if has stock of requested item.
Type	Evident
Cross Reference	Function R 3.2
Pre-requisites	N/A
Typical Courses of Events	(S) System (OVM) Other VM (OVM) sends stock message to System. (S) If System has stock of requested items, sends message[E1].
Alternative Courses of Events	N/A
Exceptional Courses of Events	[E1] If System doesn't have stock of requested item, System doesn't send message.

2131 DEFINE ESSENTIAL USE CASES



Use Case	6. Provide Product Information to Other VM
Actor	Other VM
Purpose	provide product information to the Other VM.
Overview	Other VM sends product check message to System. System sends message if has product data of requested item.
Type	Evident
Cross Reference	Function R 3.3
Pre-requisites	N/A
Typical Courses of Events	(S) System (OVM) Other VM (OVM) sends product check message to System. (S) If System has product data of requested items, sends message[E1].
Alternative Courses of Events	N/A
Exceptional Courses of Events	[E1] If System doesn't have any product data, System doesn't send message.

2131 DEFINE ESSENTIAL USE CASES



Use Case	7. Provide Prepayment Information to Other VM
Actor	System
Purpose	provide prepayment information to other VM
Overview	After prepayment happens and verification was made, send info of prepayment.
Type	Hidden
Cross Reference	Function R 3.4
Pre-requisites	Function R 4.1 need to be executed before.
Typical Courses of Events	(S) System (S) sends verification and item info to Other VM.
Alternative Courses of Events	N/A
Exceptional Courses of Events	N/A

2131 DEFINE ESSENTIAL USE CASES



Use Case	8. Prepayment
Actor	User
Purpose	User can prepay items they wanted to buy at other VM.
Overview	System gives options to user to prepay the stocks they chose which are available at other VM. User may proceed with prepayment if they agree to proceed with the transaction.
Type	Evident
Cross Reference	Function R 4.1
Pre-requisites	Function R 3.1 need to be executed before.
Typical Courses of Events	(U) User (S) System (S) gives out the order. (U) inserts card to the card holder. (S) checks card's validity [E1]. (S) completes the prepayment. (S) Creates verification for this order
Alternative Courses of Events	N/A
Exceptional Courses of Events	[E1] System returns the card to user and show message to user "Error in prepayment. Please try again". If payment failure happened more than three times, return to use case (1. Main menu display).

2131 DEFINE ESSENTIAL USE CASES



Use Case	9. Synchronize Information of Prepayment
Actor	Other VM
Purpose	synchronize prepayment information.
Overview	If Other VM sends prepayment information, System synchronizes prepayment information.
Type	Evident
Cross Reference	Function R 4.2
Pre-requisites	N/A
Typical Courses of Events	(OVM) Other VM (S) System (OVM) sends prepayment information. (S) synchronizes stock information[E1].
Alternative Courses of Events	N/A
Exceptional Courses of Events	[E1] If stock is unavailable cancel the prepayment .

2131 DEFINE ESSENTIAL USE CASES



Use Case	10. Go Main
Actor	User
Purpose	Send User to the main page if user want to go to the main page.
Overview	After the User click the home button, System displays main page
Type	Evident
Cross Reference	Function R 6.0
Pre-requisites	User must know the location of the home button on display.
Typical Courses of Events	(U) User (S) System (U) Click home button. Home button is available on every windows. (S) go back to main page.
Alternative Courses of Events	N/A
Exceptional Courses of Events	N/A

2131 DEFINE ESSENTIAL USE CASES



Use Case	11. Confirm Verification
Actor	User
Purpose	give out items legitimately and successfully
Overview	User inputs the Verification and System checks it if it is correct or not.
Type	Evident
Cross Reference	Function R 4.4
Pre-requisites	Function R 4.1 and 4.3 need to be executed first
Typical Courses of Events	(U) User (S) System (U) inputs the verification (S) verifies that it is the same as in local storage [E1] (S) If verification is successful, removes the verification code and item comes out.
Alternative Courses of Events	N/A
Exceptional Courses of Events	[E1]If the User enters an incorrect verification , System displays to the user "Your verification is incorrect, please enter again", and returns to the input Verification interface.

2131 DEFINE ESSENTIAL USE CASES



Use Case	12. Administrator Login
Actor	Administrator
Purpose	let administrator to login to the system.
Overview	Administrator may choose to login to the system by clicking a login button on the screen.
Type	Evident
Cross Reference	Function R 5.1
Pre-requisites	<ol style="list-style-type: none">1. Administrator must know the location of the login button.2. Administrator must have login ID and password to access the system.
Typical Courses of Events	(A) Administrator (S) System (A) presses the login button. (S) A login interface appears. (A) needs to insert login ID and password. [E1] (S) If the login ID and password match with the administrator's login ID and password in the local storage, goes to use case (14. Change Stock Quantity).
Alternative Courses of Events	N/A
Exceptional Courses of Events	[E1] If the login ID and password does not match with the administrator's login ID and password in the local storage, System sends an error message. The process is repeated three times. if login failed on the third time, System goes to use case (1. Main menu display)

2131 DEFINE ESSENTIAL USE CASES



Use Case	13. Administrator Logout
Actor	Administrator
Purpose	let administrator to logout of the system.
Overview	Administrator may choose to logout of the system by clicking a logout button on the screen.
Type	Evident
Cross Reference	Function R 5.2 Use case 1. Main menu display
Pre-requisites	1. Function R 5.1 needs to be executed first. 2. Administrator must know the location of the logout button.
Typical Courses of Events	(A) Administrator (S) System (A) presses the logout button. (S) moves to use case (1. Main menu display).
Alternative Courses of Events	N/A
Exceptional Courses of Events	N/A

2131 DEFINE ESSENTIAL USE CASES

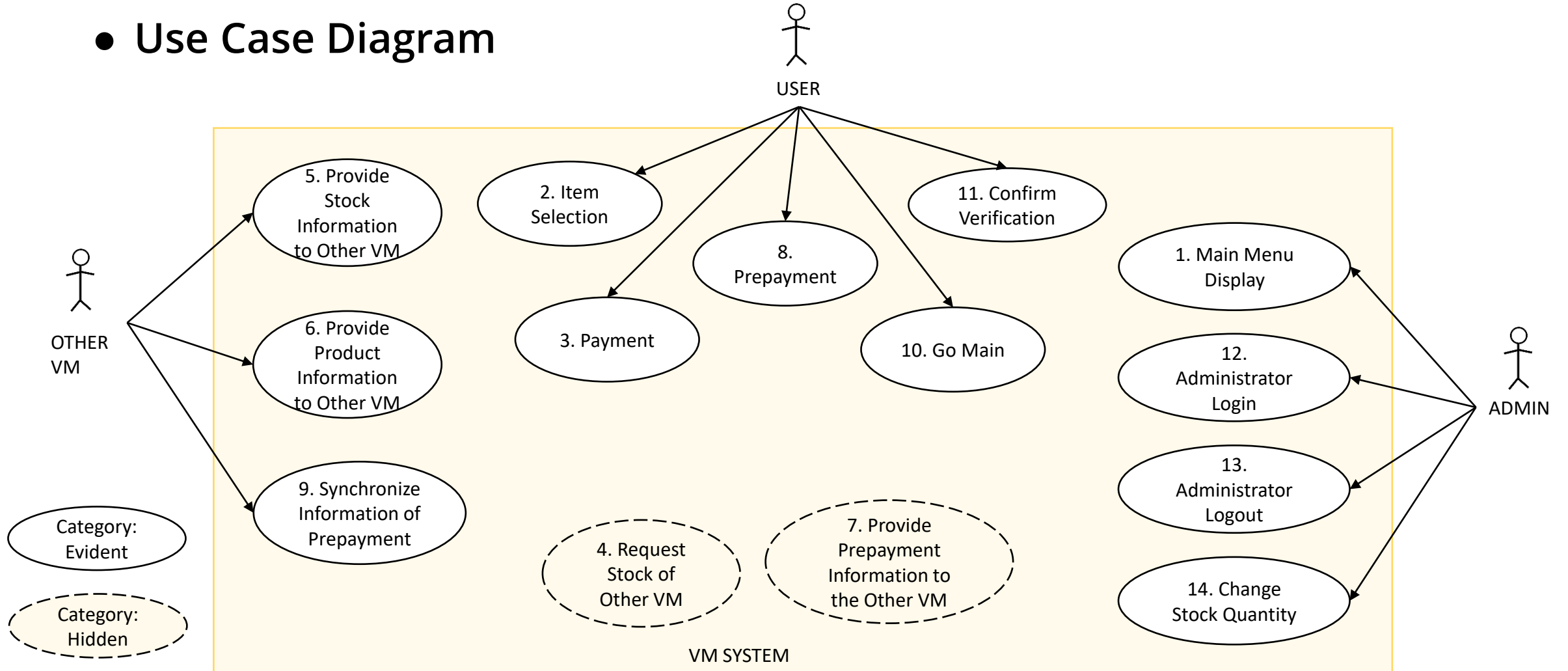


Use Case	14. Change Stock Quantity
Actor	Administrator
Purpose	change the stock quantity sold in the VM.
Overview	Administrator can add any available stock to the VM or remove any expired stock from the VM.
Type	Evident
Cross Reference	Function R 5.3
Pre-requisites	<ol style="list-style-type: none">1. Function 5.1 needs to be executed first.2. Administrator must login successfully into the system to execute this use case.
Typical Courses of Events	(A) Administrator (S) System (A) changes the stock quantity in the VM (S) updates the change to the local storage of VM.
Alternative Courses of Events	N/A
Exceptional Courses of Events	N/A

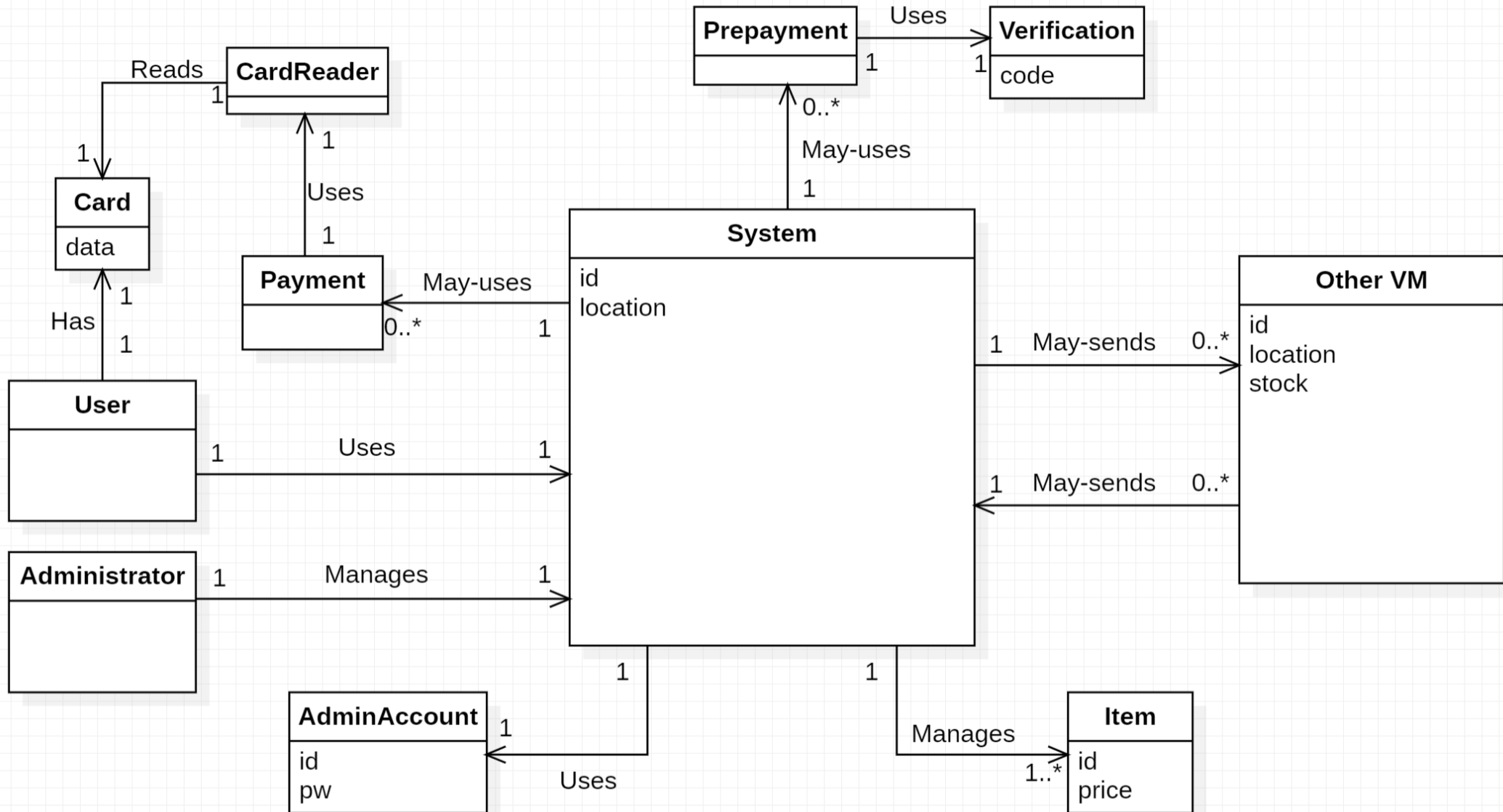
2132 REFINE USE CASE DIAGRAMS



• Use Case Diagram



2133 DEFINE DOMAIN MODEL



2134 REFINE GLOSSARY



Term	Category	Comments
System	Class	The current VM user is using
OtherVM	Class	Other vending machine
Item	Class	Different kinds of drinks
User	Class	The person who is using VM
Administrator	Class	The manager of system
vmId	Attribute	VM's ID
vmLocation	Attribute	The specific location of VM which has stock of specific drink
itemId	Attribute	Item's ID
itemQuantity	Attribute	drink's quantity
verificationCode	Attribute	Verification that can get drinks from other VM
adminId	Attribute	Administrator' login ID
adminPwd	Attribute	Administrator's login password
distance	Attribute	The distance between current VM and chosen VM
Prepayment	Operation	The prepayment for drinks which are in other VM
Payment	Operation	User makes payment on current VM

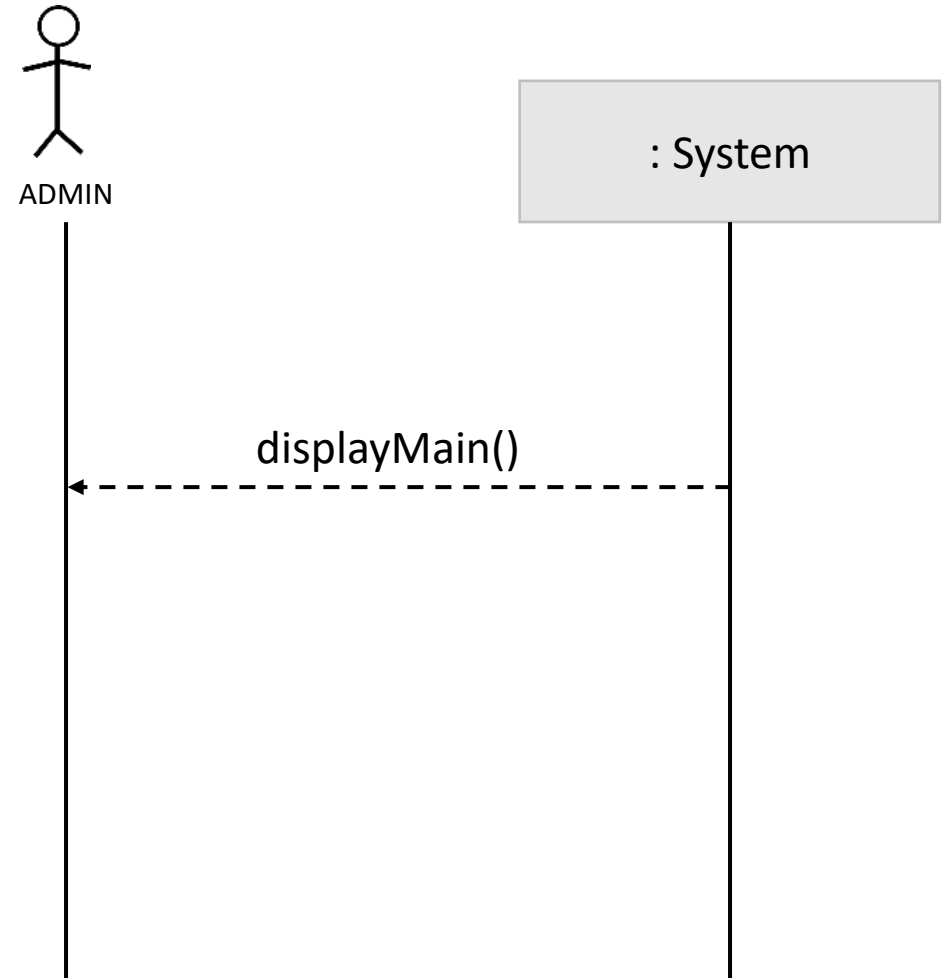
2135 DEFINE SYSTEM SEQUENCE DIAGRAMS



Use case: 1. Main Menu Display

Typical courses of event:

1. Administrator turns the machine on.
2. System displays item type upon starting the machine.



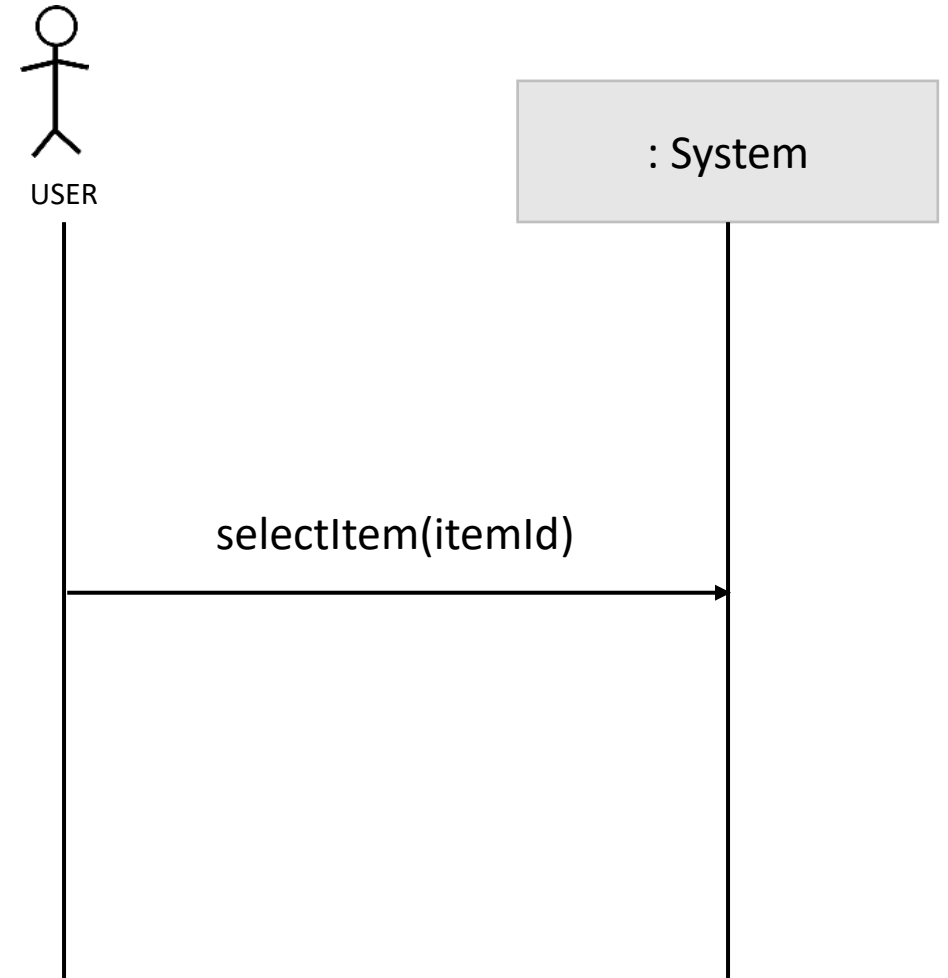
2135 DEFINE SYSTEM SEQUENCE DIAGRAMS



Use case: 2. Item Selection

Typical courses of event:

1. User selects type of items and quantity of items.
2. System checks the stock of selected item.
3. If stocks are available, System goes to use case (3. Payment).
4. If stocks are unavailable, System goes to use case (4. Request Stock of Other VM).



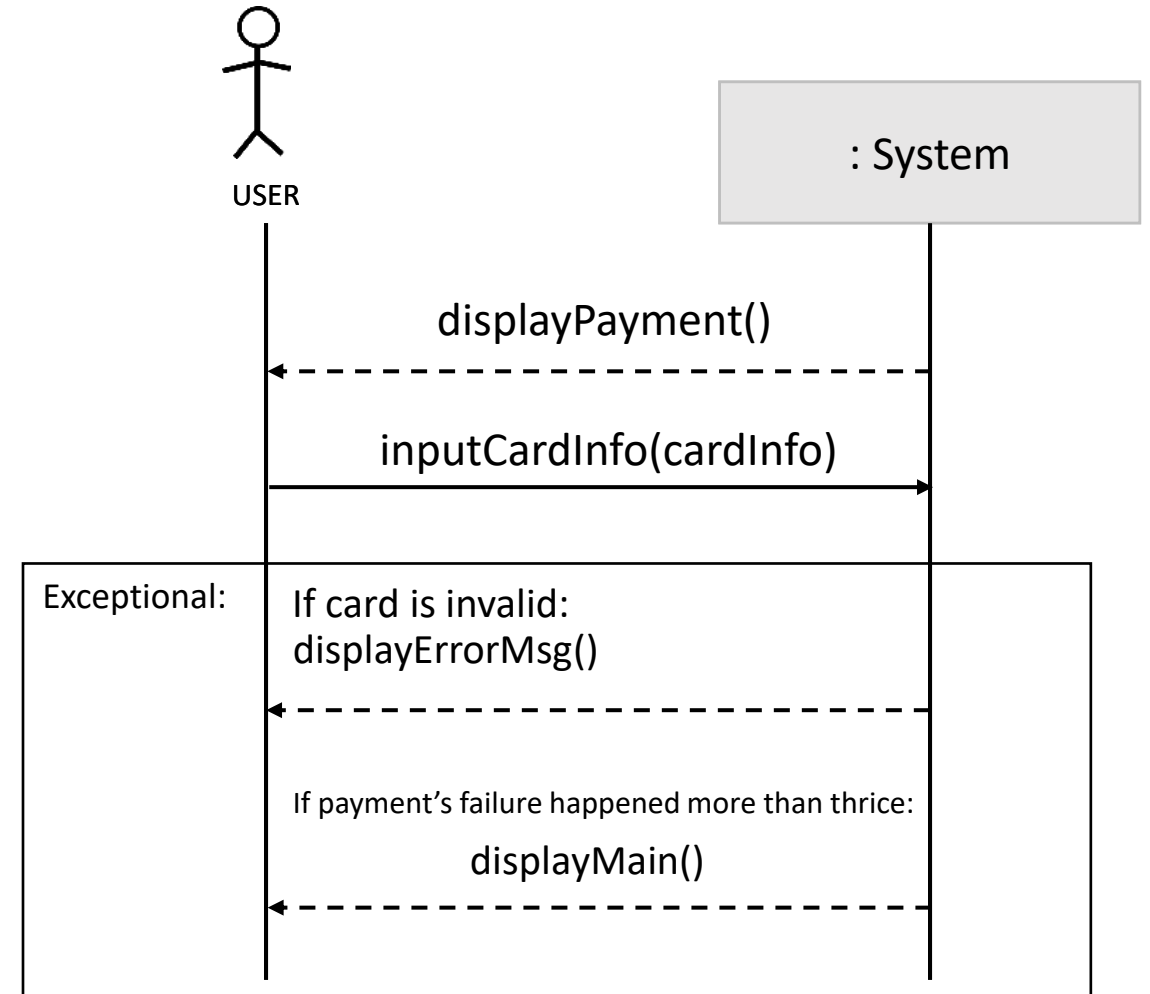
2135 DEFINE SYSTEM SEQUENCE DIAGRAMS



Use case: 3. Payment

Typical courses of event:

1. System gives out the order sheet.
2. User inserts card to the card reader.
3. System checks card's validity.
4. Complete the payment.



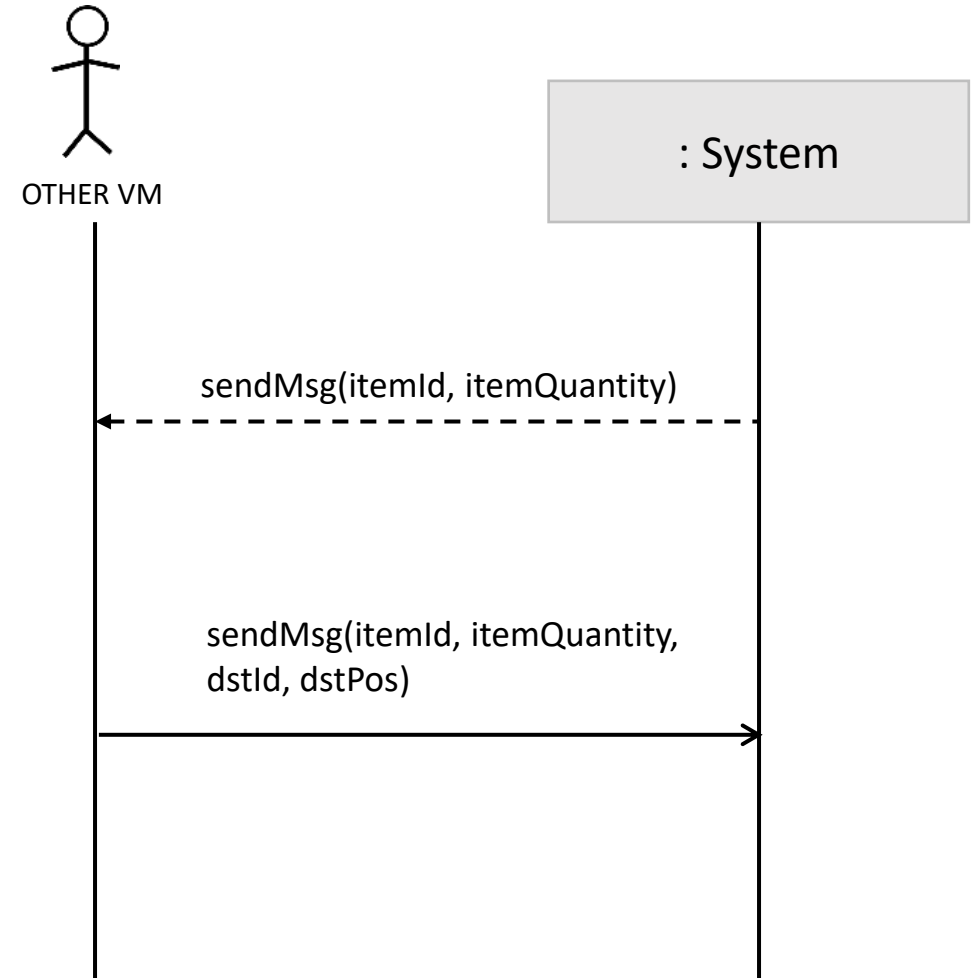
2135 DEFINE SYSTEM SEQUENCE DIAGRAMS



Use case: 4. Request Stock of Other VM

Typical courses of event:

1. System sends stock message about selected item.
2. Other VM responds message of stock information.



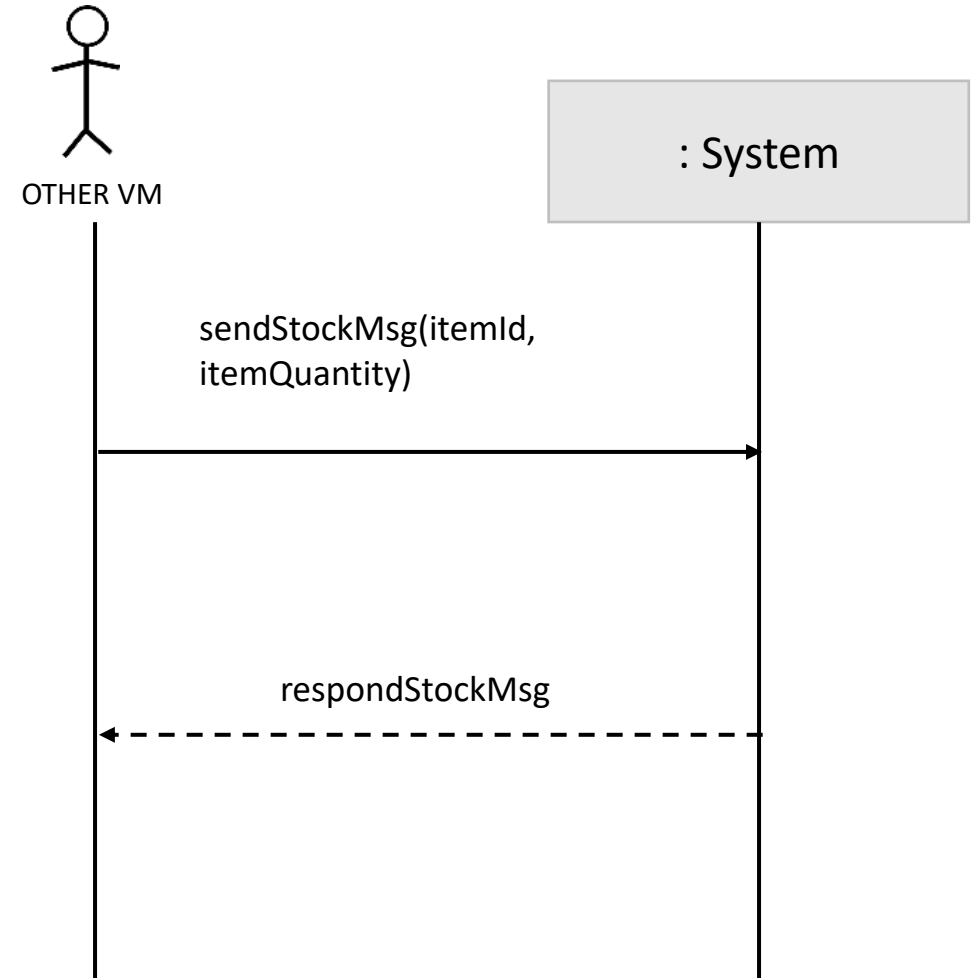
2135 DEFINE SYSTEM SEQUENCE DIAGRAMS



Use case: 5. Provide Stock Information to Other VM

Typical courses of event:

1. Other VM sends stock message to System.
2. If System has stock of requested items, sends message.



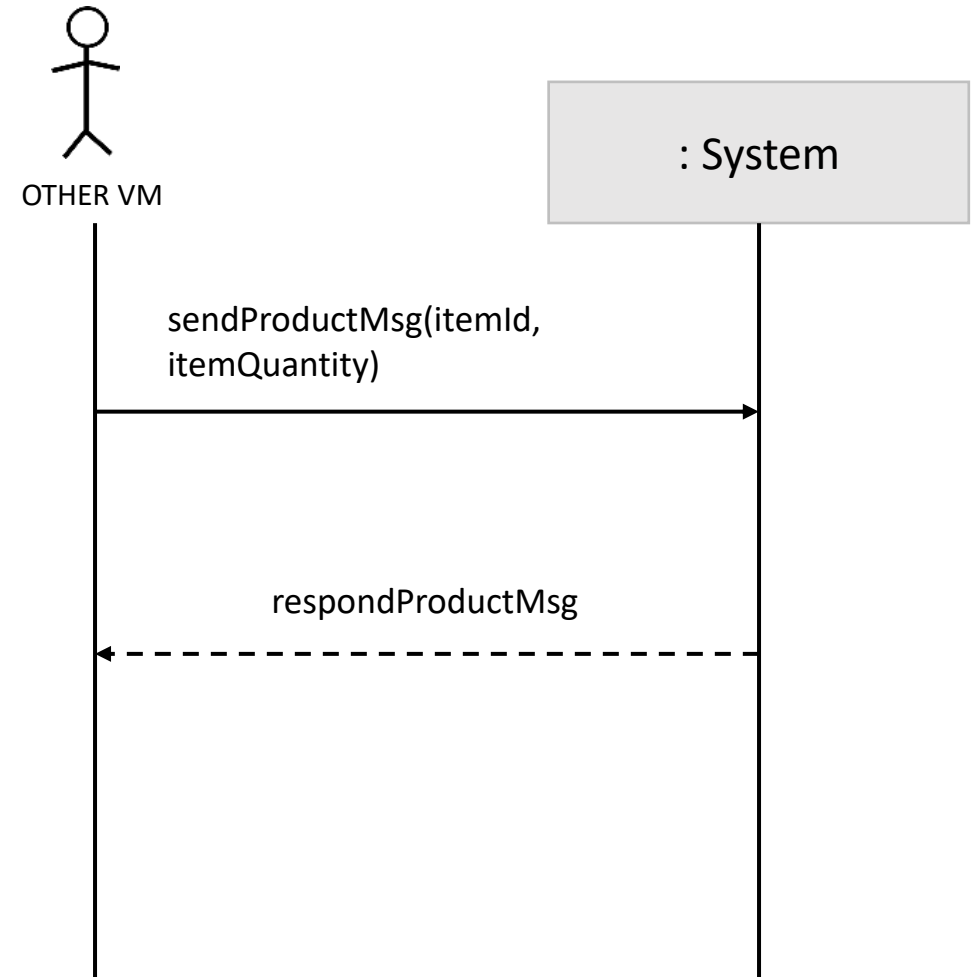
2135 DEFINE SYSTEM SEQUENCE DIAGRAMS



Use case: 6. Provide Product Information to Other VM

Typical courses of event:

1. This use case begins when the items User want to buy are not available at the other vending machine.
2. Other VM sends the product information request to the System.
3. If requested item is available at the Current VM, System responds the message.



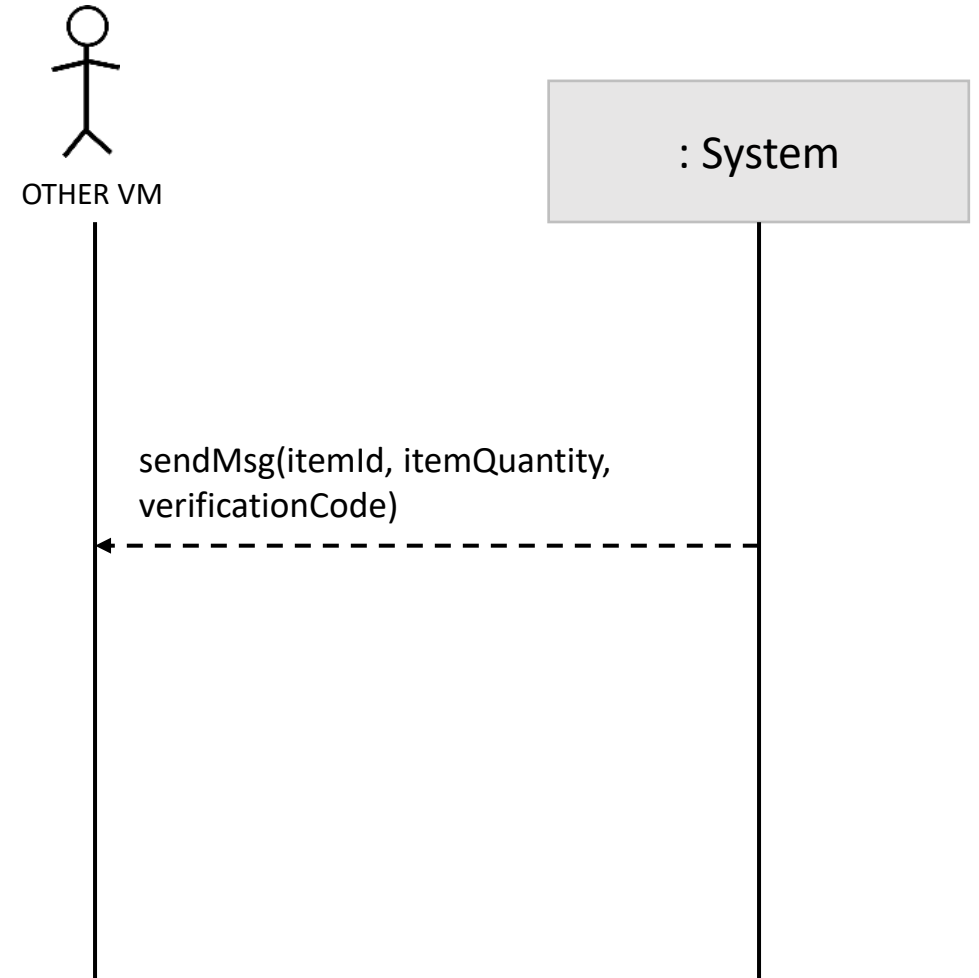
2135 DEFINE SYSTEM SEQUENCE DIAGRAMS



Use case: 7. Provide Prepayment Information to Other VM

Typical courses of event:

1. This use case begins after prepayment was successfully done and verification code was created.
2. System sends verification code and items data to the Other VM.



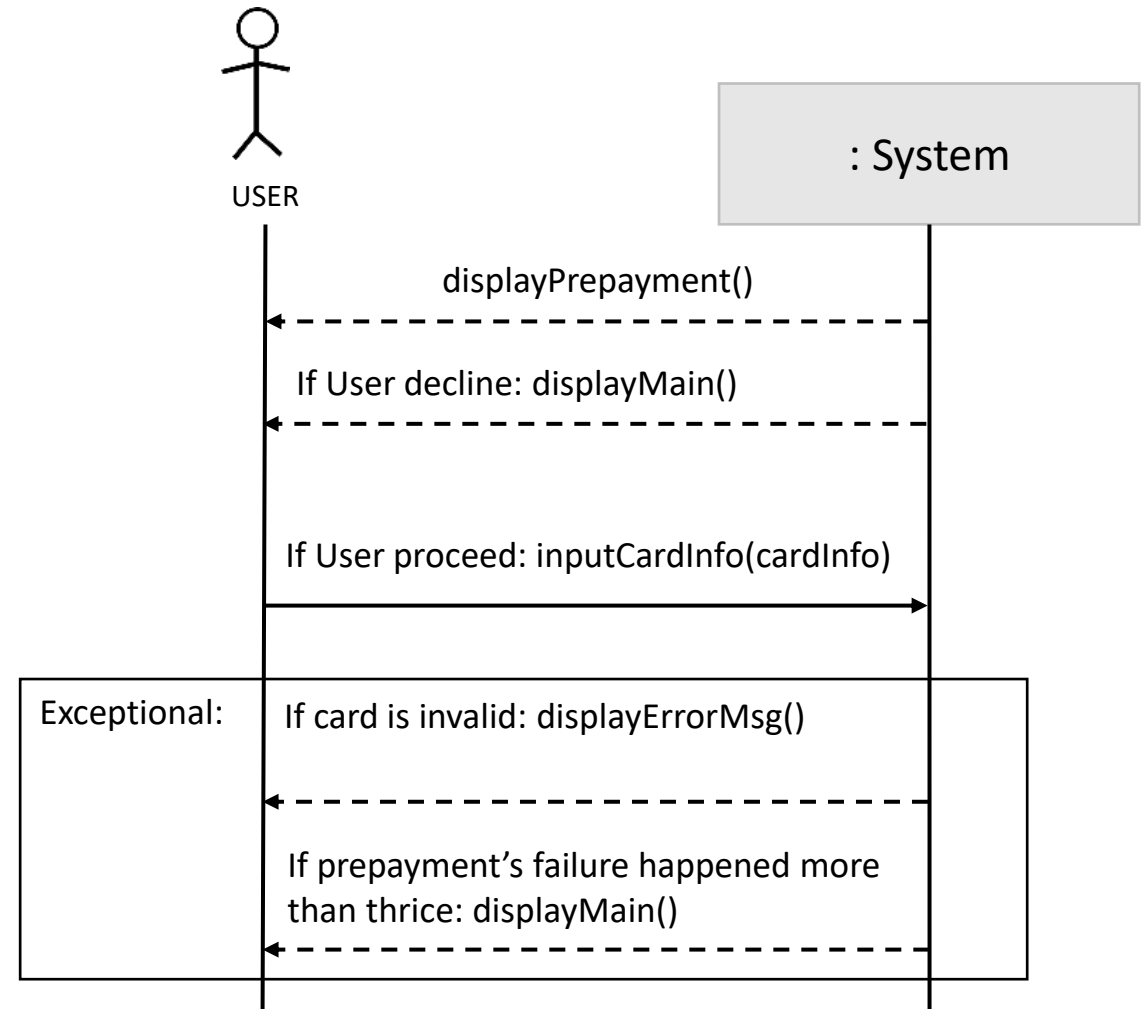
2135 DEFINE SYSTEM SEQUENCE DIAGRAMS



Use case: 8. Prepayment

Typical courses of event:

1. This use case begins when the items User wants to buy are sold at the other vending machine.
2. System gives option to prepay the items to User.
3. User may choose to proceed with the prepayment or cancel it.
4. System gives out the order sheet.
5. User inserts card to the card holder.
6. System checks the card's validity(card reader).
7. After the prepayment complete, System creates verification code for this order.



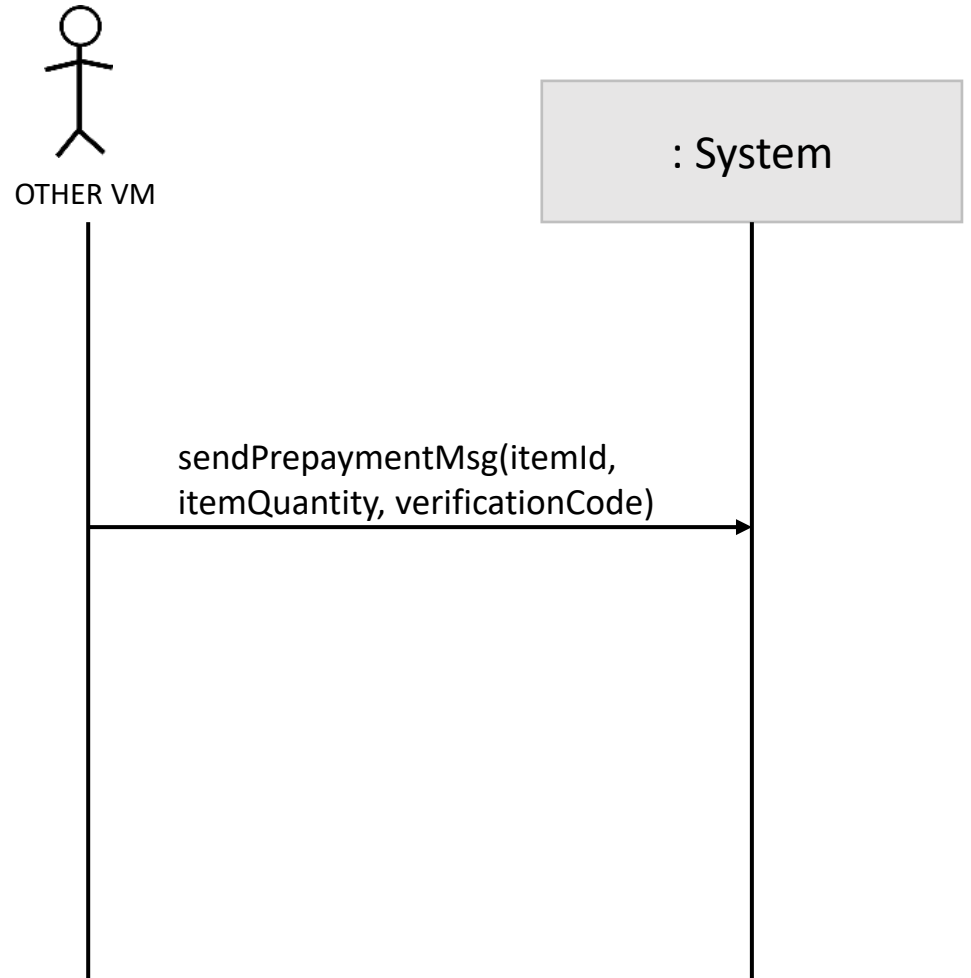
2135 DEFINE SYSTEM SEQUENCE DIAGRAMS



Use case: 9. Synchronize Information of Prepayment

Typical courses of event:

1. Other VM sends a prepayment message.
2. System synchronizes stock information.



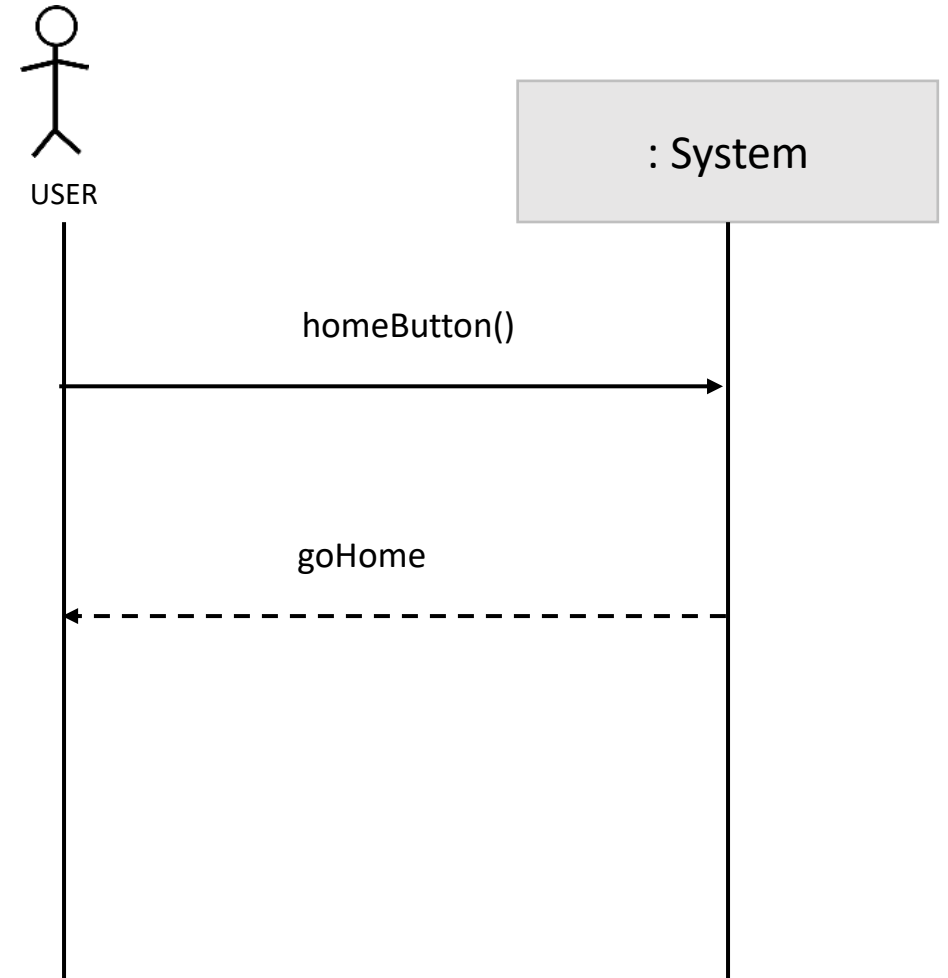
2135 DEFINE SYSTEM SEQUENCE DIAGRAMS



Use case: 10. Go Main

Typical courses of event:

1. This use case begins when user clicks the HOME button on the display screen.
2. System will move to main page.



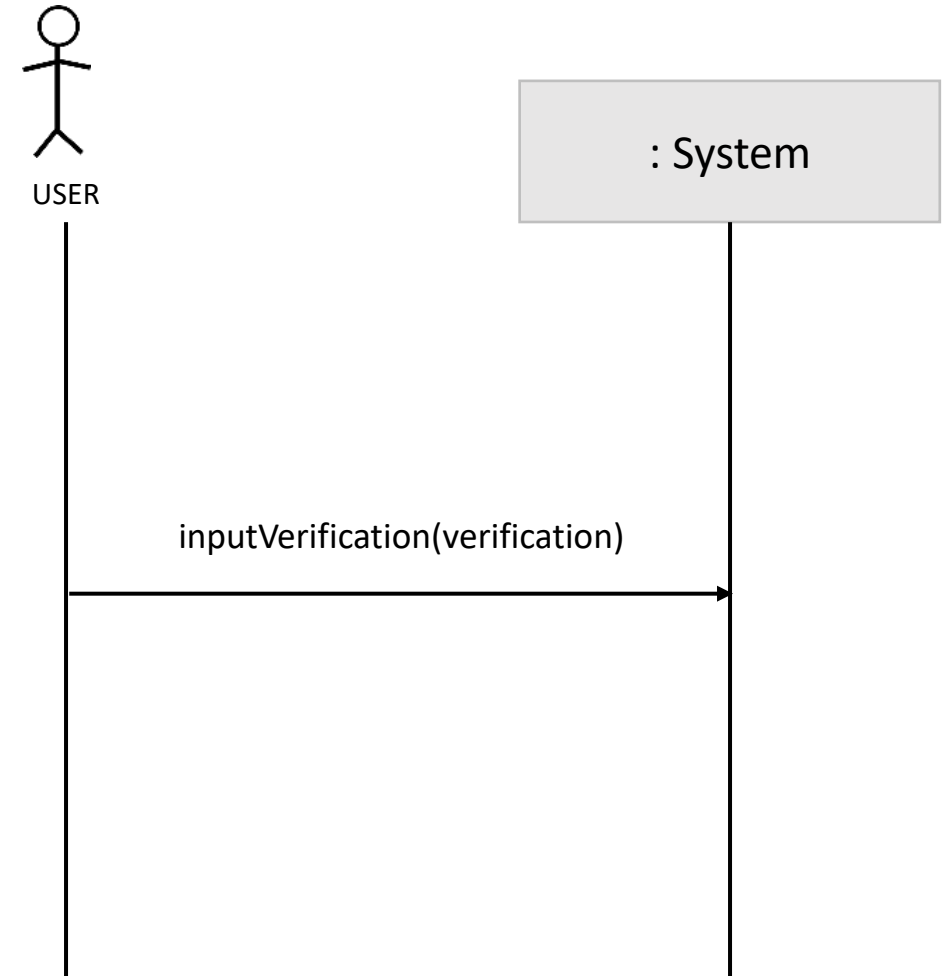
2135 DEFINE SYSTEM SEQUENCE DIAGRAMS



Use case: 11. Confirm Verification

Typical courses of event:

1. User inputs the verification
2. System verifies that it is same as in the database
3. If Verification is successful, System removes the verification and item comes out.



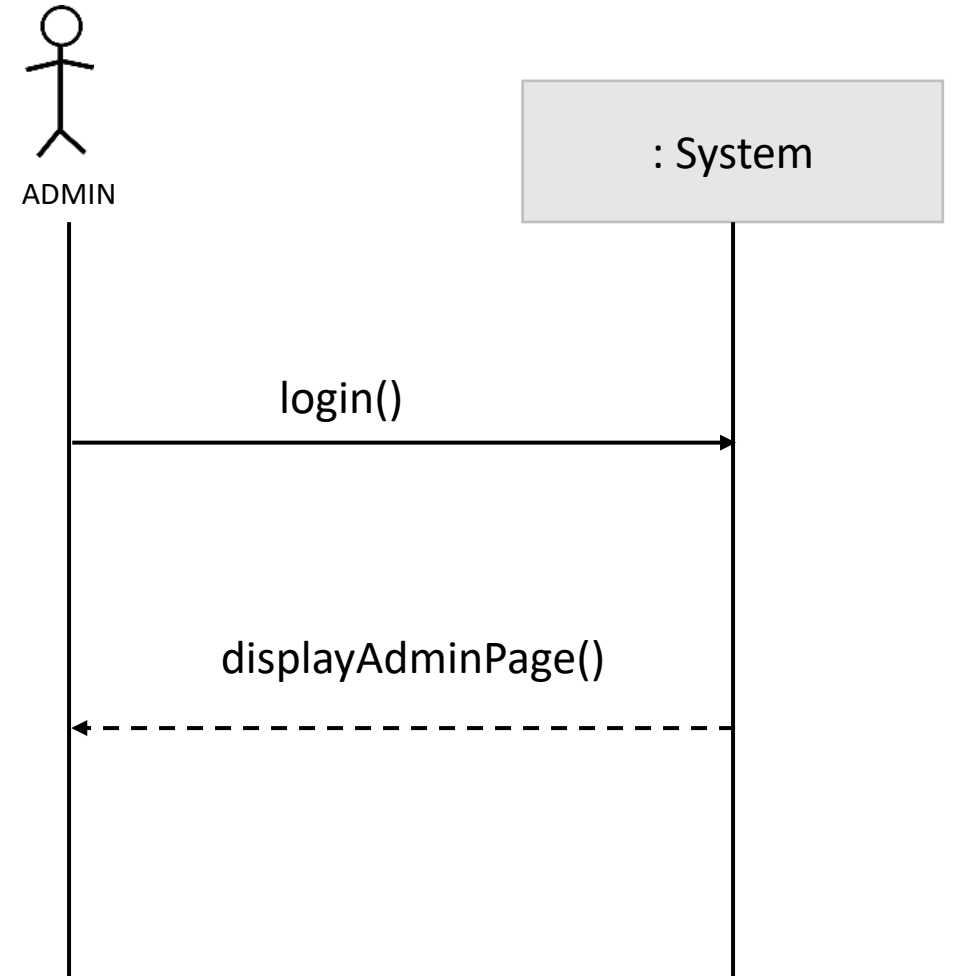
2135 DEFINE SYSTEM SEQUENCE DIAGRAMS



Use case: 12. Administrator Login

Typical courses of event:

1. Administrator presses the login button.
2. A login interface appears.
3. Administrator needs to insert login ID and password.
4. If the login ID and password match with the administrator's login ID and password in the local storage, System goes to use case (14. Change of Stock Quantity).



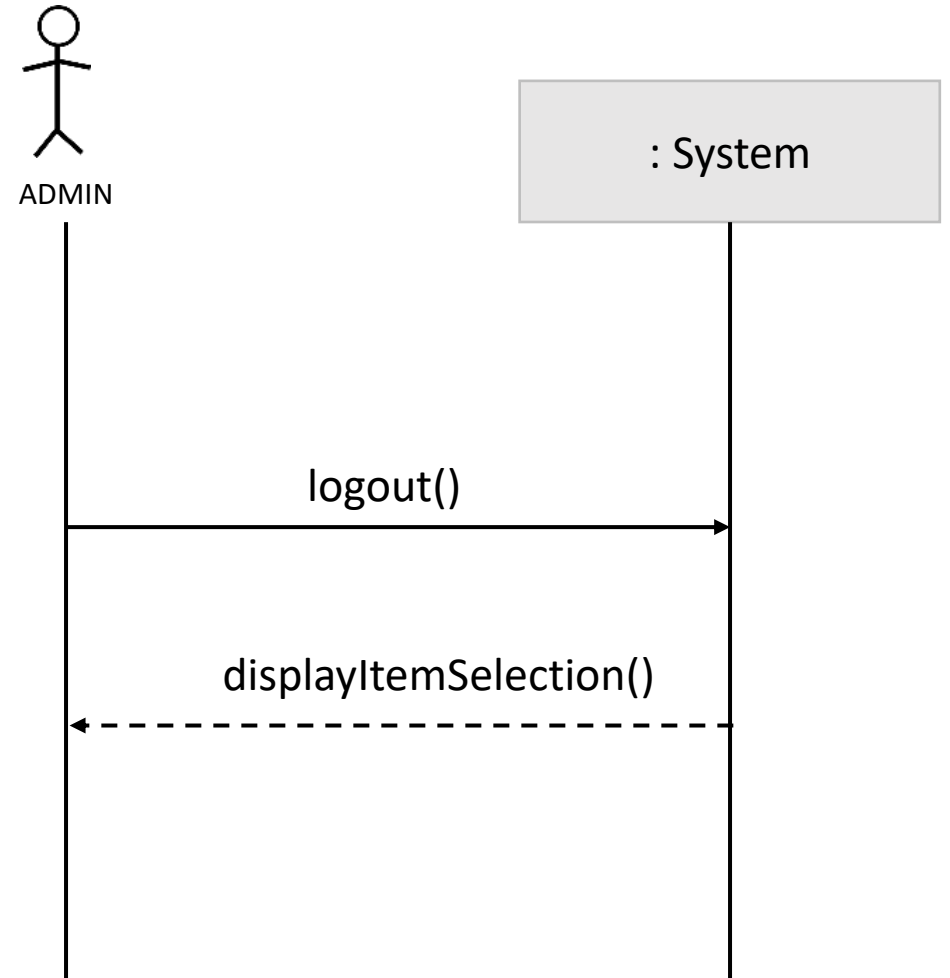
2135 DEFINE SYSTEM SEQUENCE DIAGRAMS



Use case: 13. Administrator Logout

Typical courses of event:

1. Administrator presses the logout button.
2. System logs off and move to item selection page.



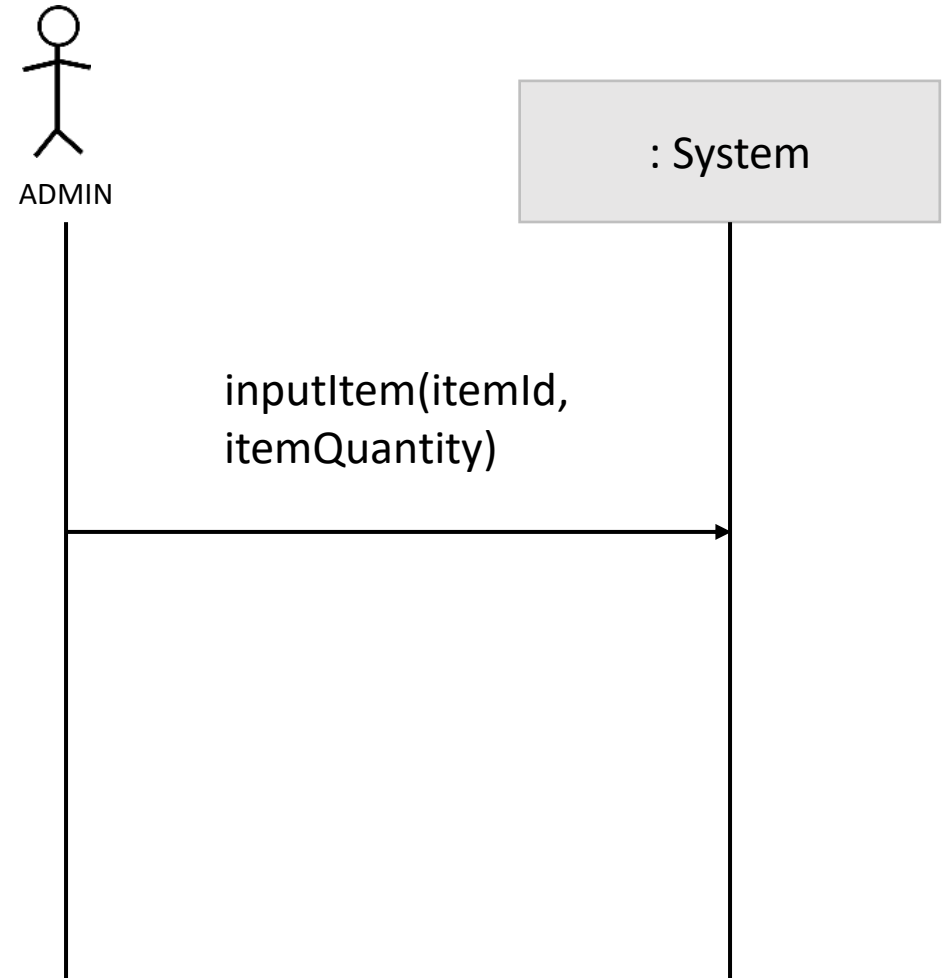
2135 DEFINE SYSTEM SEQUENCE DIAGRAMS



Use case: 14. Change Stock Quantity

Typical courses of event:

1. Admin changes the stock quantity in the System.
2. The change is updated into the local storage of System.



SYSTEM TEST CASE



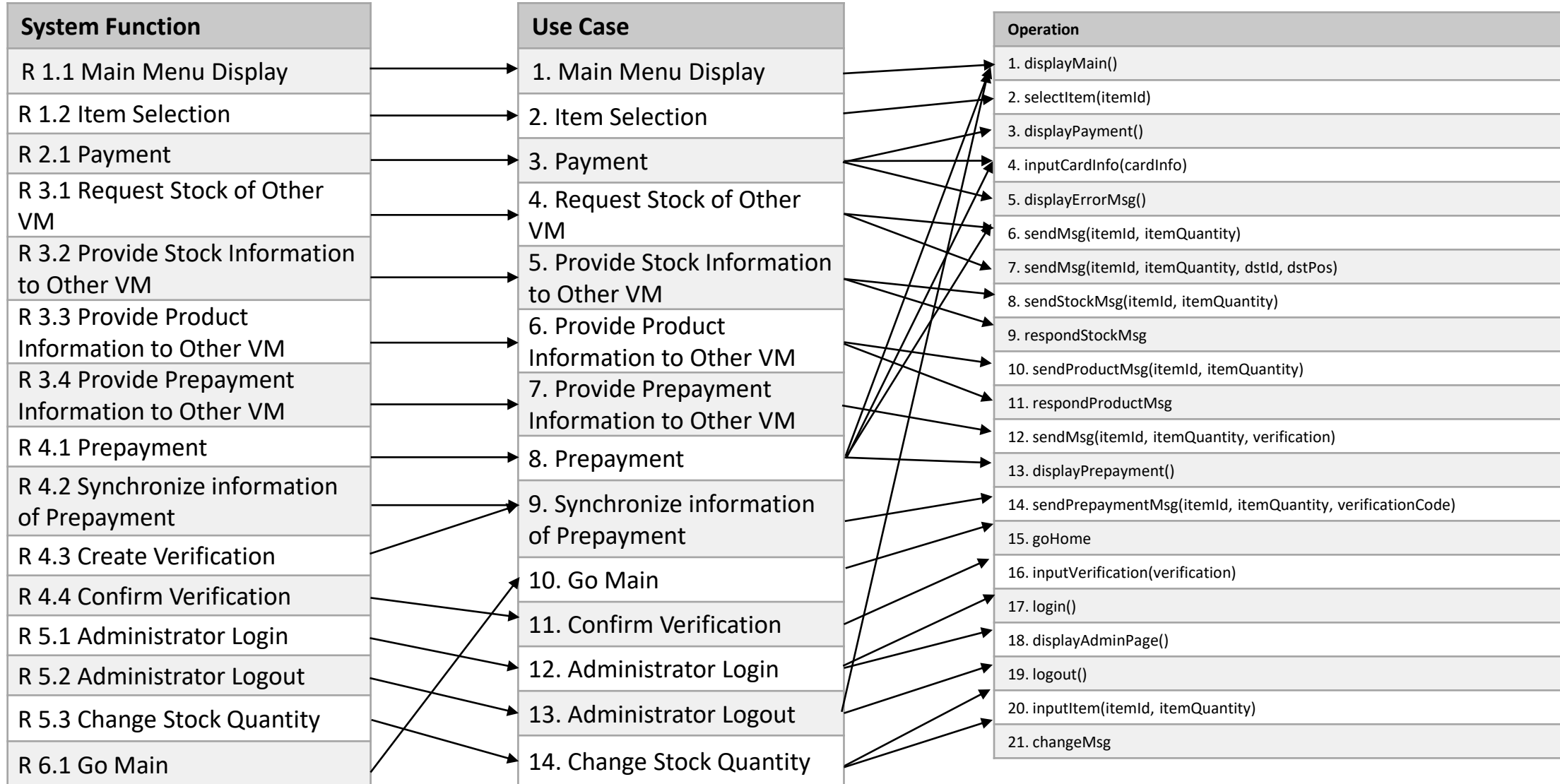
Test Number	Test 항목	Use Case	System Function	Description
1	Main Menu Display	1. Main Menu Display	R 1.1	- 시스템을 켜올 때 정상적으로 UI가 노출되는지 확인한다.
2	Item Selection	2. Item Selection	R 1.2	- 음료의 재고가 충분할 때 결제창으로 넘어가는지 확인한다. - 음료의 재고가 불충분할 때 Other VM의 재고를 파악하는지 확인한다.
3	Payment	3. Payment	R 2.1	- 유효한 카드를 입력 받았을 때 정상적으로 결제가 진행되는지 확인한다. - 유효하지 않은 카드를 입력 받았을 때 경고창을 노출하는지 확인한다. - 일정 시간 이벤트가 없으면 display 화면으로 돌아가는지 확인한다.
4	Message Request	4. Request Stock of OtherVM	R 3.1	- 현 자판기의 데이터 구조를 메시지의 각 요소별로 정확히 변환하는지 확인한다. - 정확한 주소로 메시지를 보내는지 확인한다. - 재고 정보 요청 메시지를 정상적으로 모든 자판기에 보내는지 확인한다.
5	Message Respond	5 & 6 & 7	R 3.2, R 3.3, R 3.4	- 놓치는 메시지가 있는지 확인한다. - 받은 메시지를 현 자판기의 데이터 구조에 맞게 각 요소별로 정확히 변환하는지 확인한다. - 현 자판기의 데이터를 확인할 때 동기화 문제가 없는지 확인한다.
6	Prepayment	8. Prepayment	R 4.1	- 현 자판기의 데이터 구조를 메시지의 각 요소별로 정확히 변환하는지 확인한다. - 받은 메시지를 현 자판기의 데이터 구조에 맞게 각 요소별로 정확히 변환하는지 확인한다. - 가장 가까운 자판기를 출력하는지 확인한다. - 유효한 카드를 입력 받았을 때 정상적으로 결제가 진행되는지 확인한다. - 유효하지 않은 카드를 입력 받았을 때 경고창을 노출하는지 확인한다. - 일정 시간 이벤트가 없으면 display 화면으로 돌아가는지 확인한다.

SYSTEM TEST CASE



Test Number	Test 항목	Use Case	System Function	Description
7	Synchronize Information	9. Synchronize Information of Prepayment	R 4.2, R 4.3	<ul style="list-style-type: none"> - 재고 정보를 수신 받은 메시지에 맞게 수정하는지 확인한다. - 재고가 없으면 무효한 인증으로 처리되는지 확인한다. - 중복되지 않은 10자리의 인증코드를 정상적으로 생성하는지 확인한다.
8	Go Main	10. Go Main	R 6.1	<ul style="list-style-type: none"> - 메인 메뉴로 다시 돌아오는지 확인한다.
9	Manage Verification	11. Confirm Verification	R 4.4	<ul style="list-style-type: none"> - 유효한 인증코드를 입력 받았을 때 정상적으로 음료를 제공하는지 확인한다. - 유효하지 않은 인증코드를 입력 받았을 때 에러 메시지를 출력하는지 확인한다. - 인증된 인증코드를 삭제하는지 확인한다. - 무효한 인증 코드의 결제 건을 취소하는지 확인한다. - 취소된 결제의 인증코드를 삭제하는지 확인한다.
10	Administrator Login	12. Administrator Login	R 5.1	<ul style="list-style-type: none"> - 관리자 로그인 버튼을 눌렀을 때 계정 입력 화면이 뜨는지 확인한다. - 유효한 아이디와 비밀번호를 입력 받았을 때 관리자 화면으로 전환되는지 확인한다. - 유효하지 않은 아이디와 비밀번호가 입력되었을 때 에러 메시지를 출력하는지 확인한다.
11	Administrator Logout	13. Administrator Logout	R 5.2	<ul style="list-style-type: none"> - 관리자 로그아웃 버튼을 누르면 로그인 정보가 없어지고 홈 화면으로 전환되는지 확인한다.
12	Change Stock Quantity	14. Change Stock Quantity	R 5.3	<ul style="list-style-type: none"> - 판매 중인 품목들을 정확하게 제시하는지 확인한다. - 관리자가 선택한 판매의 재고가 선택한 수량만큼 데이터에 반영되는지 확인한다.

2139 ANALYZE (2030) TRACEABILITY ANALYSIS



QnA

