

**OOPT 2040 : Design**

**Distributed Vending Machine**

**TEAM 1**

팀장 정연수

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## 2141. Define Essential Use Cases

|                               |  |
|-------------------------------|--|
| Use Case                      | 1. Set Up  |
| Actor                         | None   |
| Purpose                       | (business use case에 포함)  |
| Overview                      | (business use case에 포함)  |
| Type                          | Hidden   |
| Cross Reference               | System Functions: R1.1, R1.2, R4.1, R2.4, R4.1<br>Use Case: “Message Request”, “Update Stock”, “Select Mode”   |
| Pre-Requisites                | N/A  |
| Typical Courses of Events     | (A1): User, (A2): Manager, (A3): Other DVM, (S): System<br>1. (S): (A3)들의 <i>id</i> 를 받아온다.<br>2. (S): (A3)들의 <i>Item</i> 들에 대한 <i>count</i> 를 받아온다.<br>3. (S): <i>Item</i> 들의 <i>count</i> 를 업데이트 한다.<br>4. (S): “ <i>showMode</i> ”를 실행한다. |
| Alternative Courses of Events | Line 1. (A3)의 응답이 3번 이상 오지 않을 경우, 해당 (A3)은 재고가 없다고 설정한다.   |
| Exceptional Courses of Events | N/A  |

|                           |   |
|---------------------------|---|
| Use Case                  | 2. Select Mode  |
| Actor                     | User, Manager   |
| Purpose                   | (business use case에 포함)   |
| Overview                  | (business use case에 포함)   |
| Type                      | Evident   |
| Cross Reference           | System Functions: R1.2, R1.1, R1.3, R2.1, R3.1<br>Use Case: “Set Up”, “Manage Stock”, “Show Item”, “Read Verification Code” |
| Pre-Requisites            | N/A   |
| Typical Courses of Events | (A1): User, (A2): Manager, (A3): Other DVM, (S): System<br>1.1. (A1): 현장구매모드를 선택한다.   |

|                               |  |
|-------------------------------|--|
|                               | <p>// mode = 0 : showMode 상태</p> <p>// mode = 1 : 현장구매</p> <p>// mode = 2 : 선구매 코드사용</p> <p>// mode = 3 : 재고 관리</p> <p>1.2. (S): “showItem”을 실행한다.</p> <p>2.1 (A1): 선결제코드 입력모드를 선택한다.</p> <p>2.2 (S): “inputVerificationCode”를 실행한다.</p> <p>3.1 (A2): 재고 관리를 선택한다.</p> <p>3.2 (S): “manageStock”을 실행한다</p> |
| Alternative Courses of Events | Line 1. 세 가지 모드를 동시에 선택할 경우 현장구매 모드로 진입한다.   |
| Exceptional Courses of Events | N/A  |

|                               |  |
|-------------------------------|--|
| Use Case                      | 3. Manage Stock  |
| Actor                         | Manager  |
| Purpose                       | (business use case에 포함)  |
| Overview                      | (business use case에 포함)  |
| Type                          | Evident  |
| Cross Reference               | System Functions: R1.3, R1.2, R2.4<br>Use Case: “Select Mode”, “Update Stock”  |
| Pre-Requisites                | N/A  |
| Typical Courses of Events     | (A1): User, (A2): Manager, (A3): Other DVM, (S): System<br>1. (A2): 추가된 Item의 재고를 입력한다.<br>2. (S): 해당 Item에 대해 “updateStock”을 실행한다.<br>3. (S): “showMode”를 실행한다. |
| Alternative Courses of Events | Line 1. 기존에 해당 자판기에 없던 Item를 추가할 경우, 새로운 Item을 추가하여 업데이트 한다.<br>Line 2. 재고를 감소시킬 경우, count를 감소시킨다.   |
| Exceptional Courses of Events | Line 1. 음료 종류가 7개를 초과하는 경우 에러를 발생시킨다.<br>Line 2. count < 0이면 [잘못 된 값]이라는 내용의 printe를 실행한다.   |

|          |              |
|----------|--------------|
| Use Case | 4. Show Item |
|----------|--------------|

|                               |  |
|-------------------------------|--|
| Actor                         | None   |
| Purpose                       | (business use case에 포함)  |
| Overview                      | (business use case에 포함)  |
| Type                          | Hidden   |
| Cross Reference               | System Functions: R2.1, R1.2<br>Use Case: “Select Mode”                                      |
| Pre-Requisites                | <i>mode</i> 값이 1 이다.   |
| Typical Courses of Events     | (A1): User, (A2): Manager, (A3): Other DVM, (S): System<br>1. (S): 모든 <i>Item</i> 을 모두 보여준다. |
| Alternative Courses of Events | Line 1. 취소 버튼을 누르면 “ <i>showMode</i> ”를 실행한다.  |
| Exceptional Courses of Events | N/A  |

|                               |   |
|-------------------------------|---|
| Use Case                      | 5. Select Item  |
| Actor                         | User  |
| Purpose                       | (business use case에 포함)   |
| Overview                      | (business use case에 포함)   |
| Type                          | Evident   |
| Cross Reference               | System Functions: R2.2, R1.2, R2.1, R2.3<br>Use Case: “Select Mode”, “Check Stock Count”, “Show Item”   |
| Pre-Requisites                | “ <i>showItem</i> ”이 실행됨  |
| Typical Courses of Events     | (A1): User, (A2): Manager, (A3): Other DVM, (S): System<br>1. (A1): 사용자가 구매하고자 하는 <i>Item</i> 을 선택한다.<br>2. (S): 선택한 <i>Item</i> 에 대해 “ <i>checkStockCount</i> ”를 실행한다.<br>3-1. (S): 재고가 현재자판기에 있으면 “Purchase”를 실행한다.<br>3-2.1. (S): 재고가 (A3)에 있으면 “Select Advance Payment”를 실행한다.<br>3-2-2. (S): 선구매 설정에 성공했으면 “Advance Purchase”를 실행한다. |
| Alternative Courses of Events | Line 1. 취소 버튼을 누르면 “ <i>showMode</i> ”를 실행한다.   |

|                               |     |
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| Exceptional Courses of Events | N/A |
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|                               |   |
|-------------------------------|---|
| Use Case                      | 6. Check Stock Count  |
| Actor                         | None  |
| Purpose                       | (business use case에 포함)   |
| Overview                      | (business use case에 포함)   |
| Type                          | Hidden  |
| Cross Reference               | System Functions R2.3, R2.2, R4.1<br>Use Case: “Select Item”, “Message Request”   |
| Pre-Requisites                | <i>Item</i> 이 선택되었다.  |
| Typical Courses of Events     | (A1): User, (A2): Manager, (A3): Other DVM, (S): System<br>1. (S): 선택된 <i>Item</i> 에 대해 현재 자판기에 <i>count</i> > 0인지 확인한다.<br>2. (S): 현재 자판기에 재고가 없다면 “ <i>sendMessage</i> ”를 통해 (A3)으로부터 재고를 받아온다. |
| Alternative Courses of Events | N/A   |
| Exceptional Courses of Events | Line 1. 현재 자판기와 다른 모든 자판기에도 <i>count</i> 가 0일 경우 [품절입니다.]이라는 내용의 <i>printe</i> 를 실행한다.  |

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|---------------------------|---|
| Use Case                  | 7. Update Stock   |
| Actor                     | None  |
| Purpose                   | (business use case에 포함)   |
| Overview                  | (business use case에 포함)   |
| Type                      | Hidden  |
| Cross Reference           | System Functions: R2.4, R1.1, R1.3<br>Use Case: “Set Up”, “Manage Stock”                                    |
| Pre-Requisites            | 최신화 해야되는 <i>Item</i> 정보와 최신화 값이 입력됨   |
| Typical Courses of Events | (A1): User, (A2): Manager, (A3): Other DVM, (S): System<br>1. (S) : <i>Item</i> 에 대해 <i>count</i> 를 최신화 한다. |

|                               |     |
|-------------------------------|-----|
| Alternative Courses of Events | N/A |
| Exceptional Courses of Events | N/A |

|                               |   |
|-------------------------------|---|
| Use Case                      | 8. Purchase   |
| Actor                         | User  |
| Purpose                       | (business use case에 포함)   |
| Overview                      | (business use case에 포함)   |
| Type                          | Evident   |
| Cross Reference               | System Functions: R2.5, R2.7<br>Use Case: “Check Payment”   |
| Pre-Requisites                | 1. <i>Item</i> 이 선택되었고 <i>mode</i> 값이 1 이다.<br>2. <i>count</i> > 0 이다.  |
| Typical Courses of Events     | (A1): User, (A2): Manager, (A3): Other DVM, (S): System<br>1. (A1): 카드를 삽입한다.<br>2. (S): “ <i>getPaymentResult</i> ”를 실행하여 결과를 받아 반환한다. |
| Alternative Courses of Events | N/A   |
| Exceptional Courses of Events | Line 2. 결제 실패시 [결제 실패]이라는 내용의 <i>prine</i> 를 실행한다.  |

|                 |   |
|-----------------|---|
| Use Case        | 9.Advance Purchase  |
| Actor           | User  |
| Purpose         | (business use case에 포함)   |
| Overview        | (business use case에 포함)   |
| Type            | Evident   |
| Cross Reference | System Functions: R2.6, R2.3, R2.7<br>Use Case: “Select Advance Payment”, “Check Payment” |
| Pre-Requisites  | 1. <i>Item</i> 이 선택되었고 <i>isAdvance</i> 가 <i>true</i> 이다.                                 |

|                               |   |
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|                               | 2. <i>count</i> > 0 이다.   |
| Typical Courses of Events     | (A1): User, (A2): Manager, (A3): Other DVM, (S): System<br>1. (A1): 카드를 삽입한다.<br>2. (S): “ <i>getPaymentResult</i> ”를 실행하여 결과를 받아 반환한다. |
| Alternative Courses of Events | N/A   |
| Exceptional Courses of Events | Line 2. 결제 실패시 [결제 실패]이라는 내용의 <i>printe</i> 를 실행한다.   |

|                               |   |
|-------------------------------|---|
| Use Case                      | 10. Check Payment   |
| Actor                         | None  |
| Purpose                       | (business use case에 포함)   |
| Overview                      | (business use case에 포함)   |
| Type                          | Hidden  |
| Cross Reference               | System Functions: R2.7, R2.5, R2.6<br>Use Case: “Purchase”, “Advance Purchase”                                      |
| Pre-Requisites                | 카드가 삽입됨   |
| Typical Courses of Events     | (A1): User, (A2): Manager, (A3): Other DVM, (S): System<br>1. (S): “ <i>getResult</i> ”를 실행하여 <i>result</i> 를 받아온다. |
| Alternative Courses of Events | N/A   |
| Exceptional Courses of Events | Line 1. 정상적인 결제 카드가 아니라면, [잘못된 카드]이라는 내용의 <i>info</i> 를 실행한다.   |

|                 |  |
|-----------------|--|
| Use Case        | 11. Select Advance Payment                     |
| Actor           | User   |
| Purpose         | (business use case에 포함)                        |
| Overview        | (business use case에 포함)                        |
| Type            | Evident  |
| Cross Reference | System Functions: R2.8, R2.3, R2.6, R4.1, R1.2 |



|                               |  |
|-------------------------------|--|
|                               | Use Case: “Check Stock Count”, “Advance Purchase”, “Message Request”, “Select Mode”  |
| Pre-Requisites                | <i>Item</i> 이 선택됨  |
| Typical Courses of Events     | (A1): User, (A2): Manager, (A3): Other DVM, (S): System<br>1. (A1): 선택한 <i>Item</i> 에 대해 선구매를 선택한다.<br>2. (S): 선택된 <i>Item</i> 에 대해 “ <i>sendMessage</i> ”로 재고를 확인한다.<br>3. (S): 여전히 재고가 남아있다면 “ <i>sendMessage</i> ”로 다른 자판기에 있는 <i>Item</i> 의 <i>count</i> 를 깎는다.<br>4. (S): “ <i>advancePurchase</i> ”를 실행한다. |
| Alternative Courses of Events | 1. 확인과 취소를 둘다 누를 경우 사용자로 부터 재입력 받는다.   |
| Exceptional Courses of Events | Line 1. 취소를 누를 경우 “ <i>showMode</i> ”로 돌아간다.<br>Line 1. 위치보기를 누를 경우 “ <i>showLocation</i> ”을 실행한다.<br>Line 3. 재고가 없다면 [품절]이라는 내용의 <i>print</i> 를 실행하고, “ <i>showMode</i> ”로 돌아간다.  |

|                               |   |
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| Use Case                      | 12. Inform Location   |
| Actor                         | None  |
| Purpose                       | (business use case에 포함)   |
| Overview                      | (business use case에 포함)   |
| Type                          | Hidden  |
| Cross Reference               | System Functions: R2.9, R2.8, R4.1<br>Use Case: “Select Advance Payment”, “Message Request”                         |
| Pre-Requisites                | <i>Item</i> 이 선택됨<br>Other DVM의 정보를 알고 있음   |
| Typical Courses of Events     | (A1): User, (A2): Manager, (A3): Other DVM, (S): System<br>1. (S): <i>Item</i> 을 갖고있는 (A3)의 <i>location</i> 를 보여준다. |
| Alternative Courses of Events | N/A   |
| Exceptional Courses of Events | N/A   |

|                               |  |
|-------------------------------|--|
| Use Case                      | 13. Create Verification Code   |
| Actor                         | None   |
| Purpose                       | (business use case에 포함)  |
| Overview                      | (business use case에 포함)  |
| Type                          | Hidden   |
| Cross Reference               | System Functions: R2.10, R2.6<br>Use Case: “Advance Purchase”                              |
| Pre-Requisites                | <i>Purchase</i> 의 <i>result</i> 가 <i>true</i> 이다.<br><i>isAdvance</i> 가 <i>true</i> 이다.    |
| Typical Courses of Events     | (A1): User, (A2): Manager, (A3): Other DVM, (S): System<br>1. (S): 새로운 <i>code</i> 를 생성한다. |
| Alternative Courses of Events | N/A  |
| Exceptional Courses of Events | N/A  |

|                               |  |
|-------------------------------|--|
| Use Case                      | 14. Show Verification Code   |
| Actor                         | None   |
| Purpose                       | (business use case에 포함)  |
| Overview                      | (business use case에 포함)  |
| Type                          | Hidden   |
| Cross Reference               | System Functions: R2.11, R2.10<br>Use Case: “Create Verification Code”                     |
| Pre-Requisites                | <i>code</i> 가 생성됨  |
| Typical Courses of Events     | (A1): User, (A2): Manager, (A3): Other DVM, (S): System<br>1. (S): 생성된 <i>code</i> 를 보여준다. |
| Alternative Courses of Events | N/A  |
| Exceptional Courses of Events | N/A  |

|                               |   |
|-------------------------------|---|
| Use Case                      | 15. Item Out  |
| Actor                         | None  |
| Purpose                       | (business use case에 포함)   |
| Overview                      | (business use case에 포함)   |
| Type                          | Hidden  |
| Cross Reference               | System Functions: R2.12, R2.5, R3.1<br>Use Case: “Purchase”, “Read Verification Code”                     |
| Pre-Requisites                | <i>Purchase</i> 의 <i>result</i> 가 <i>true</i> 이거나, “ <i>checkVerificationCode</i> ”의 결과값이 <i>true</i> 이다. |
| Typical Courses of Events     | (A1): User, (A2): Manager, (A3): Other DVM, (S): System<br>1. (S): 선택된 <i>Item</i> 를 제공한다.                |
| Alternative Courses of Events | N/A   |
| Exceptional Courses of Events | N/A   |

|                               |  |
|-------------------------------|--|
| Use Case                      | 16. Read Verification Code   |
| Actor                         | User   |
| Purpose                       | (business use case에 포함)  |
| Overview                      | (business use case에 포함)  |
| Type                          | Evident  |
| Cross Reference               | System Functions: R3.1, R1.2, R3.2, R3.3, R2.12<br>Use Case: “Select Mode”, “Check Verification Code”, “Reset Verification Code”, ”Item Out” |
| Pre-Requisites                | N/A  |
| Typical Courses of Events     | (A1): User, (A2): Manager, (A3): Other DVM, (S): System<br>1. (A1): <i>code</i> 를 입력한다.  |
| Alternative Courses of Events | Line 1.. 동시에 여러가지 숫자를 누를 경우 아무것도 입력받지 않는다.   |
| Exceptional Courses of Events | Line 1. 취소를 누를경우 “ <i>showMode</i> ”로 돌아간다.  |

|                               |  |
|-------------------------------|--|
| Use Case                      | 17. Check Verification Code  |
| Actor                         | None   |
| Purpose                       | (business use case에 포함)  |
| Overview                      | (business use case에 포함)  |
| Type                          | Hidden   |
| Cross Reference               | System Functions: R3.2, R3.1<br>Use Case: “Read Verification Code”                                 |
| Pre-Requisites                | N/A  |
| Typical Courses of Events     | (A1): User, (A2): Manager, (A3): Other DVM, (S): System<br>1. (S): 입력된 <i>code</i> 를 가지고 있는지 검사한다. |
| Alternative Courses of Events | N/A  |
| Exceptional Courses of Events | Line 1. 잘못된 <i>code</i> 를 입력한 경우 [코드 오류]이라는 내용의 <i>printe</i> 를 실행한다.                              |

|                                |   |
|--------------------------------|---|
| Use Case                       | 18. Reset Verification Code   |
| Actor                          | None  |
| Purpose                        | (business use case에 포함)   |
| Overview                       | (business use case에 포함)   |
| Type                           | Hidden  |
| Cross Reference                | System Functions: R3.3, R3.1, R4.1<br>Use Case: “Read Verification Code”, “Message Request”   |
| Pre-Requisites (Pre condition) | 선구매 코드를 갖고있음  |
| Typical Courses of Events      | (A1): User, (A2): Manager, (A3): Other DVM, (S): System<br>1. (S): 사용한 <i>code</i> 의 정보를 삭제한다.<br>2. (S): “ <i>sendMessage</i> ”를 통해 모든 자판기에게 해당 <i>code</i> 가 사용되었음을 Broadcast 한다. |
| Alternative Courses of Events  | N/A   |

|                               |     |
|-------------------------------|-----|
| Exceptional Courses of Events | N/A |
|-------------------------------|-----|

|                               |   |
|-------------------------------|---|
| Use Case                      | 19. Message Request   |
| Actor                         | None  |
| Purpose                       | (business use case에 포함)   |
| Overview                      | (business use case에 포함)   |
| Type                          | Hidden  |
| Cross Reference               | System Functions: R4.1, R2.3, R2.6, R2.8, R2.9, R3.3<br>Use Case: “Check Stock Count”, “Advance Purchase”, “Select Advance Payment”, “Inform Location”, “Reset Verification Code”   |
| Pre-Requisites                | <i>Message</i> 의 <i>type</i> 을 알고있음   |
| Typical Courses of Events     | (A1): User, (A2): Manager, (A3): Other DVM, (S): System<br>1.1. (S): Broadcast의 경우, 네트워크에 등록된 모든 (A3)에게 보내고자 하는 <i>Message</i> 를 전달한다.<br>1.2. (S): 돌려받은 응답을 반환한다.<br>2.1. (S): 특정 (A3)에게 <i>Message</i> 를 보낼 경우, 해당 (A3)에게 <i>Message</i> 를 전달한다.<br>2.2 (S): 돌려받은 응답을 반환한다. |
| Alternative Courses of Events | Line 2.1. 대상 자판기로부터 일정 시간이 지나도 응답이 없을 경우, <i>Message</i> 를 폐기하고 새로운 요청을 보낸다.  |
| Exceptional Courses of Events | Line 2.1. 대상 자판기를 찾을 수 없을 경우, 연결을 끊고 Info 를 출력한다.   |

|                 |   |
|-----------------|---|
| Use Case        | 20. Message Response  |
| Actor           | None  |
| Purpose         | (business use case에 포함)                                     |
| Overview        | (business use case에 포함)                                     |
| Type            | Hidden  |
| Cross Reference | System Functions: R4.2, R4.1<br>Use Case: “Message Request” |

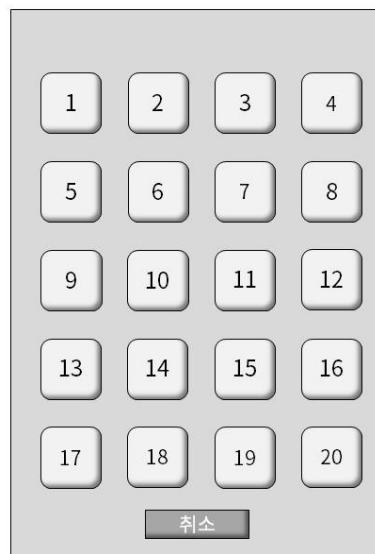
|                               |   |
|-------------------------------|---|
| Pre-Requisites                | <i>Message</i> 의 <i>type</i> 과 <i>src_id</i> 를 알고있음   |
| Typical Courses of Events     | (A1): User, (A2): Manager, (A3): Other DVM, (S): System<br>1. (S): 전달받은 Message Protocol에 따라 응답을 만든다.<br>2. (S): <i>Message</i> 를 보내온 (A3)에게 응답을 보낸다. |
| Alternative Courses of Events | N/A   |
| Exceptional Courses of Events | 1. 알 수 없는 종류의 <i>Message</i> 를 전달받을 경우, 알수 없음을 응답한다.  |

## 2142. Define Reports, UI, and Storyboards

(1) Select Mode



(2) Show Item



### (3) Purchase, Advance Purchase

카드를 삽입해주세요

결제금액 : 0000원

2021-04-29 00:00

취소

### (4) Read Verification Code

인증번호를 입력하세요

|   |   |   |
|---|---|---|
| 1 | 2 | 3 |
| 4 | 5 | 6 |
| 7 | 8 | 9 |

취소      확인



(5) Manage Stock

음료 :   
콜라  
사이다  
환타  
...

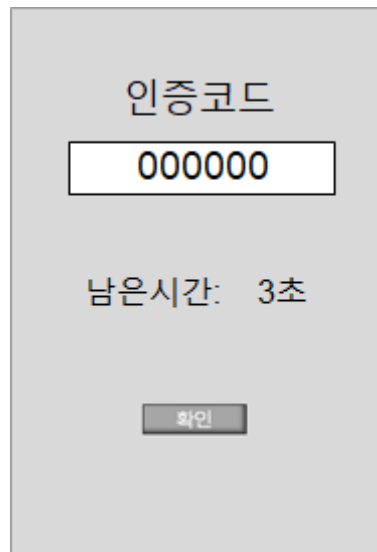
수량 :

6) Select Advance Purchase

음료 :

금액 : 0000원

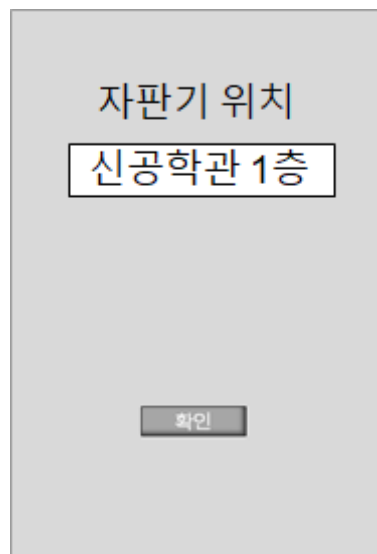
7) Show Verification Code



A gray rectangular screen with the following content:

- Text: 인증코드 (Verification Code)
- Text in a white box: 000000
- Text: 남은시간: 3초 (Remaining time: 3 seconds)
- Button: 확인 (Confirm)

8) Inform Location

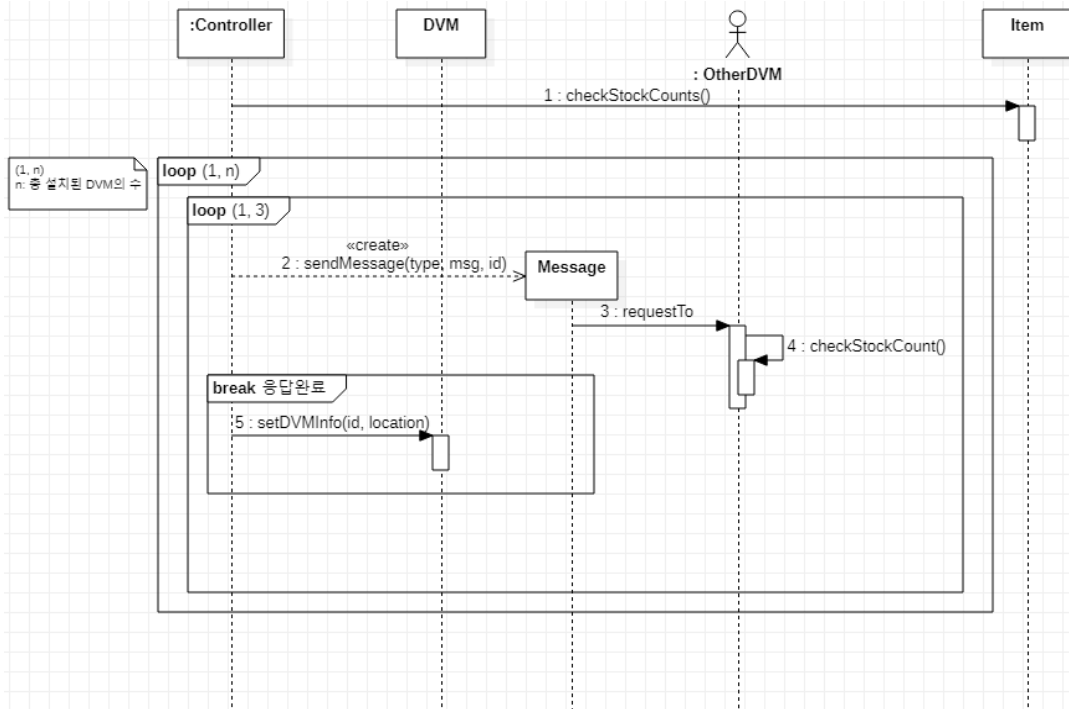


A gray rectangular screen with the following content:

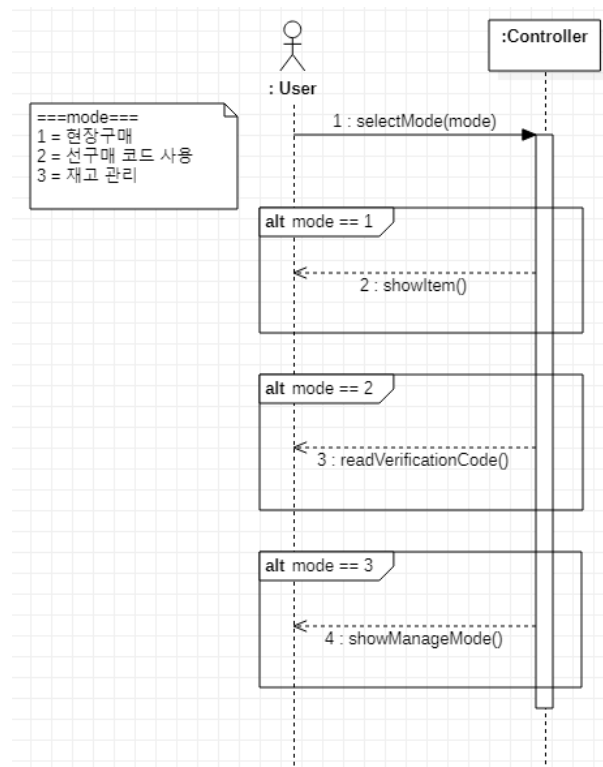
- Text: 자판기 위치 (Vending Machine Location)
- Text in a white box: 신공학관 1층 (New Engineering Building 1st Floor)
- Button: 확인 (Confirm)

## 2143. Define Interaction Diagrams

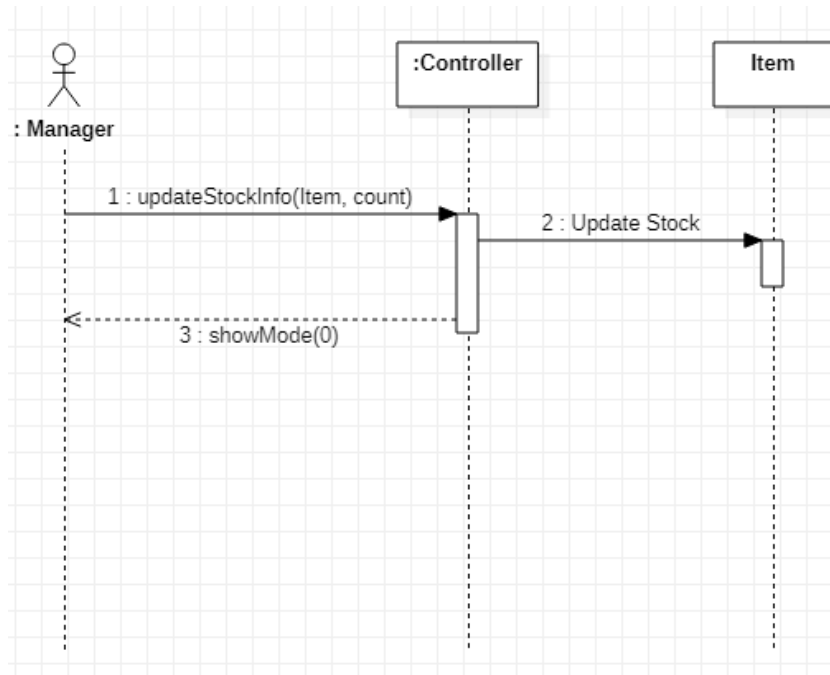
### (1) Set Up



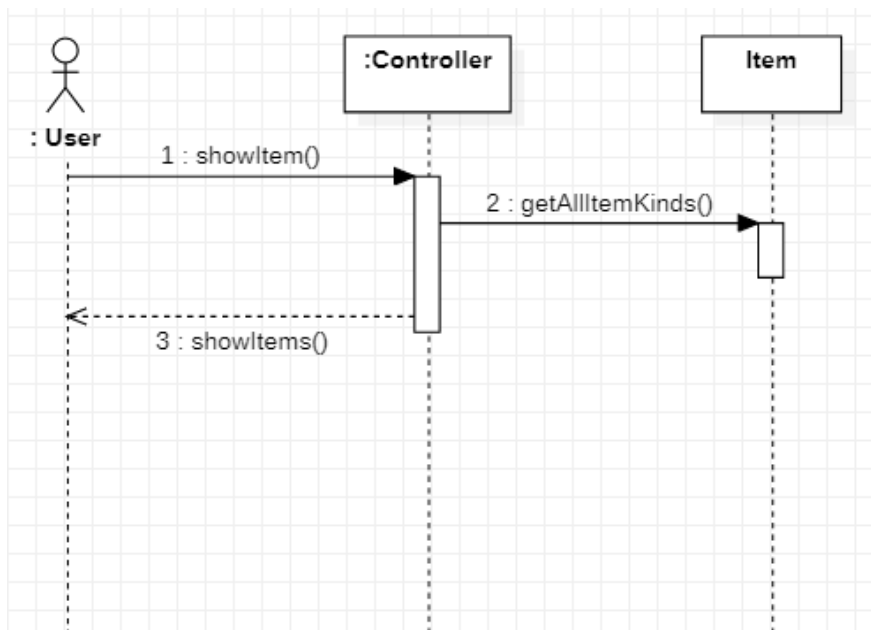
### (2) Select Mode



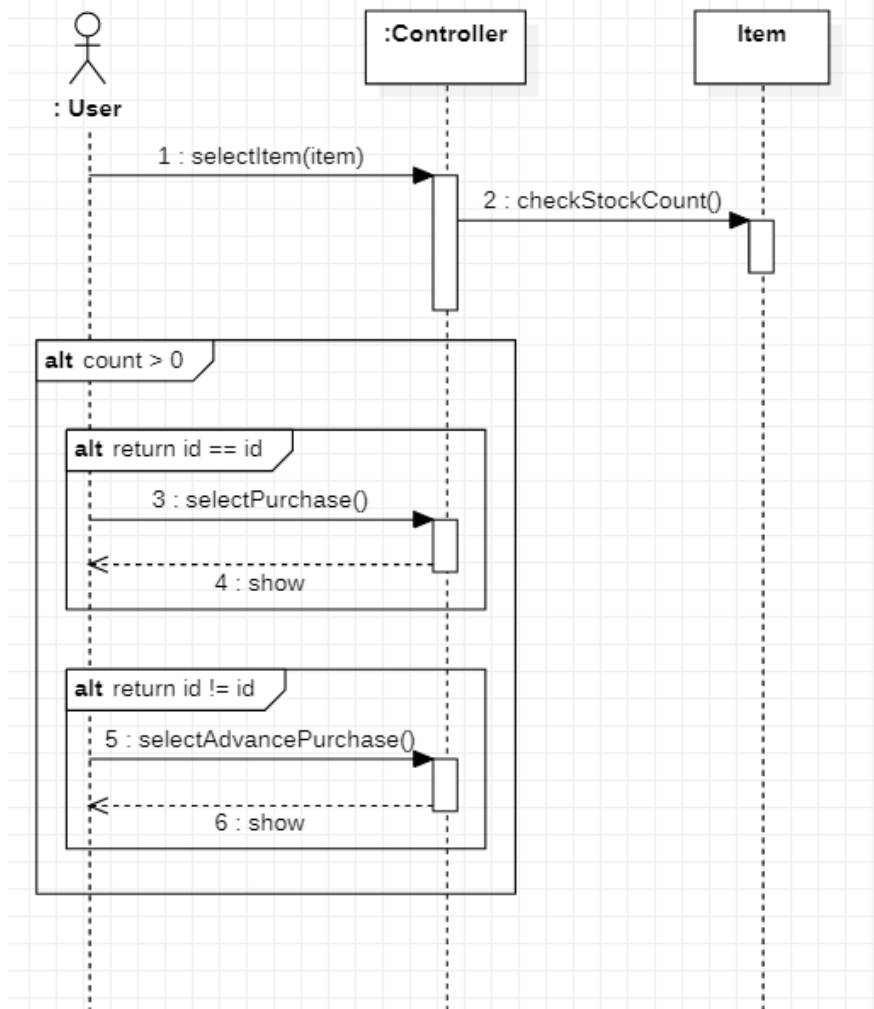
### (3) Manage Stock



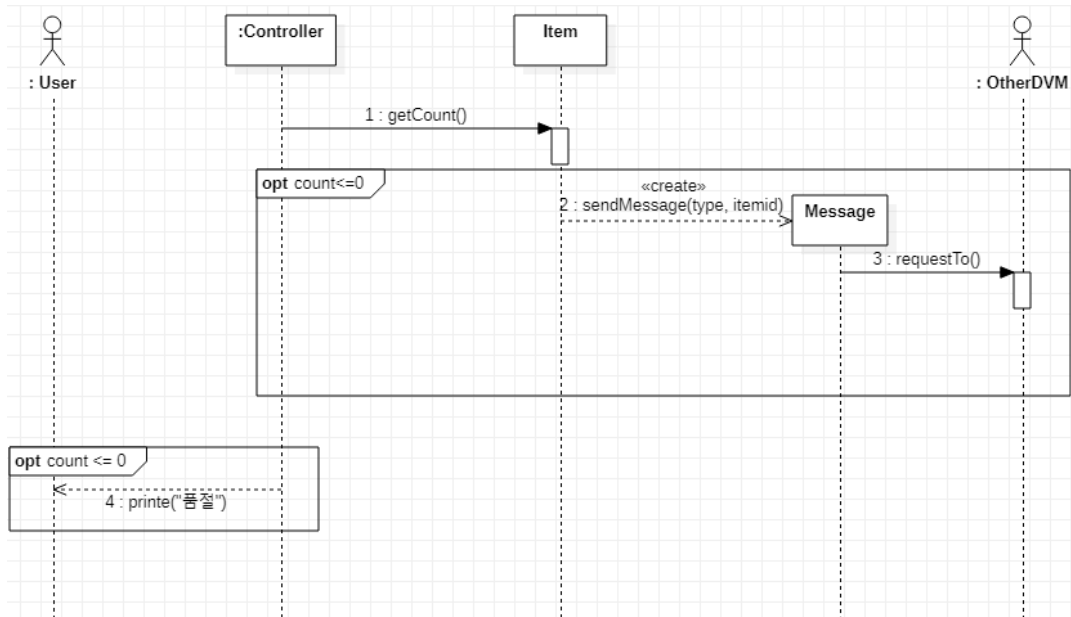
### (4) Show Item



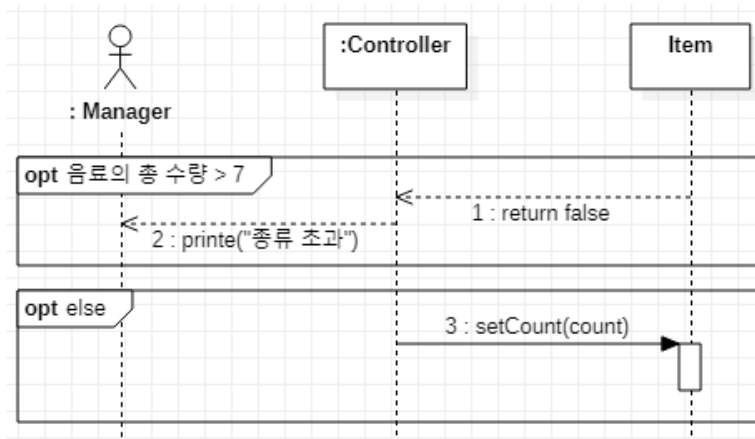
(5) Select Item



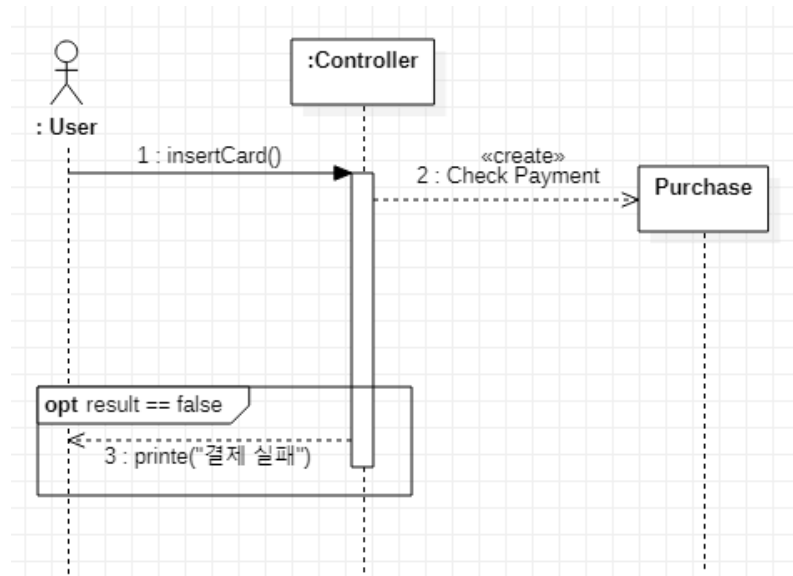
(6) Check Stock Count



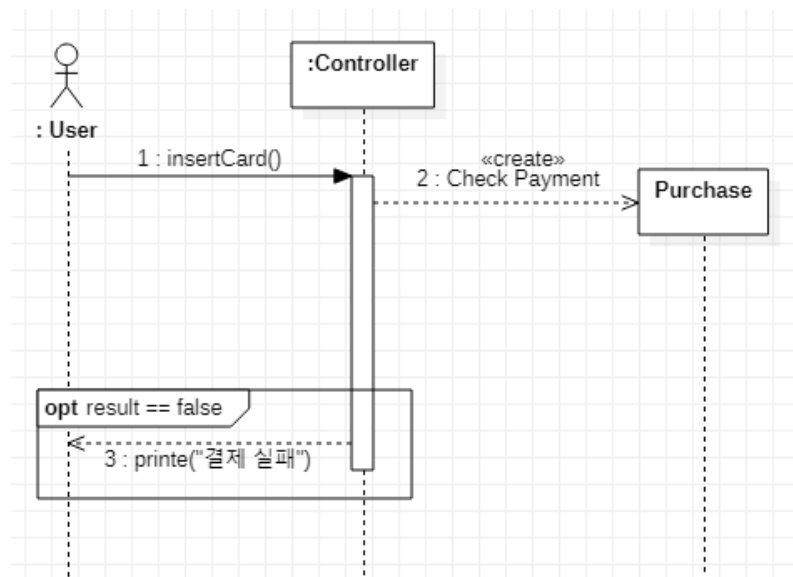
(7) Update Stock



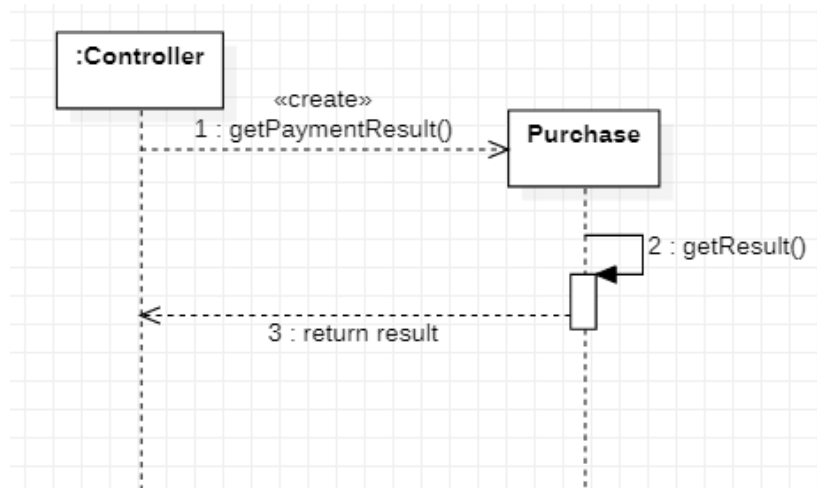
(8) Purchase



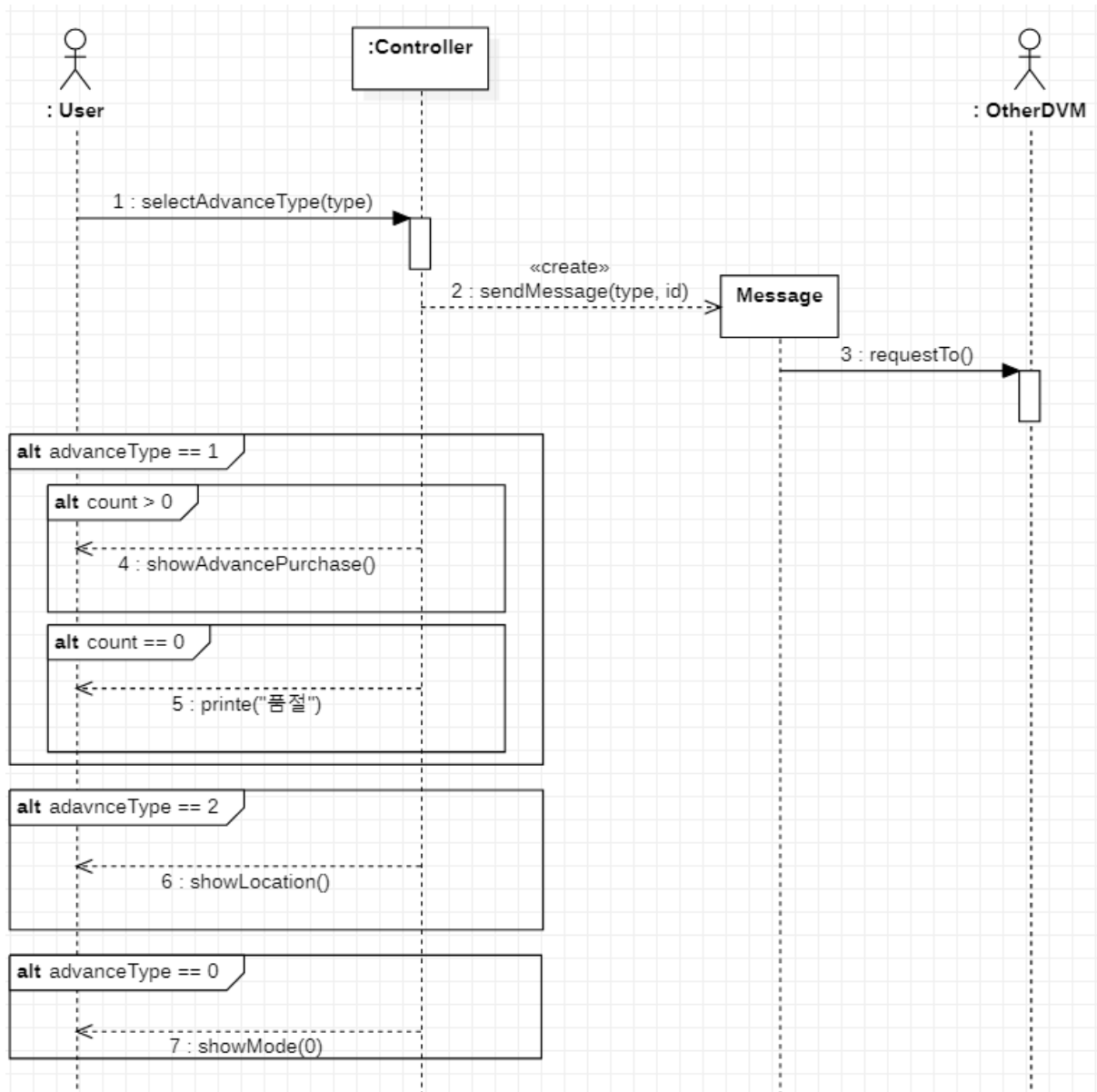
(9) Advance Purchase



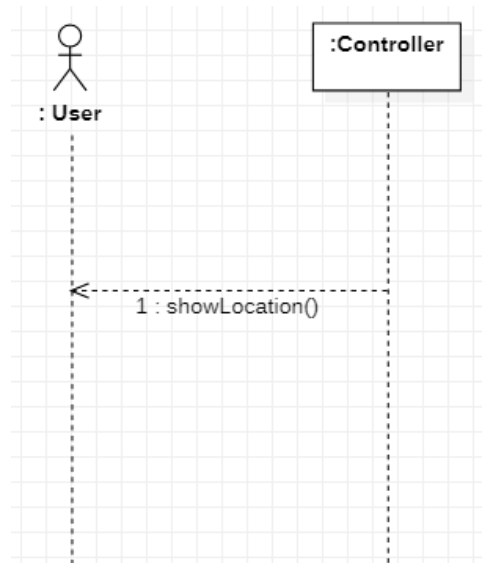
(10) Check Payment



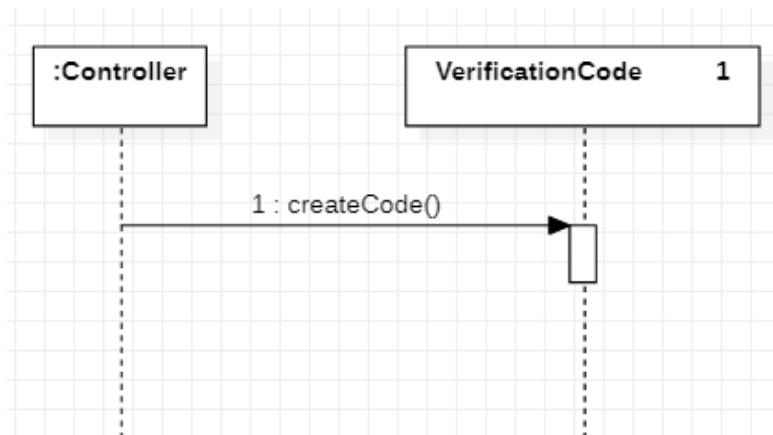
(11) Select Advance Payment



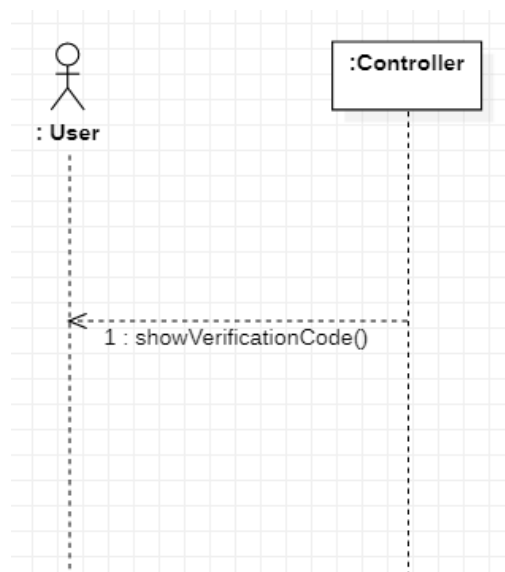
(12) Inform Location



(13) Create Verification Code

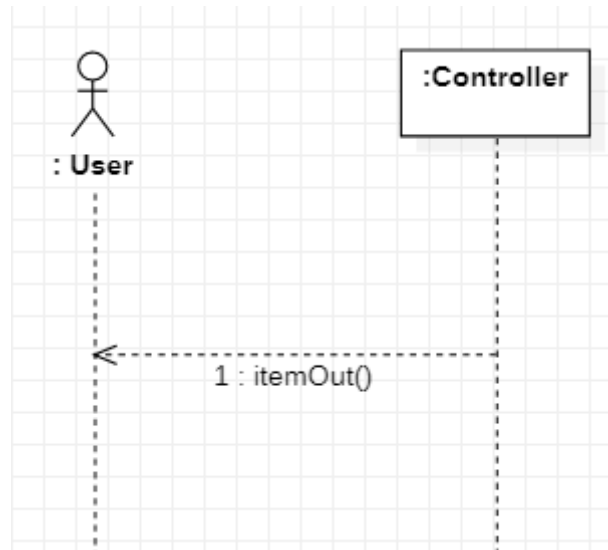


(14) Show Verification Code

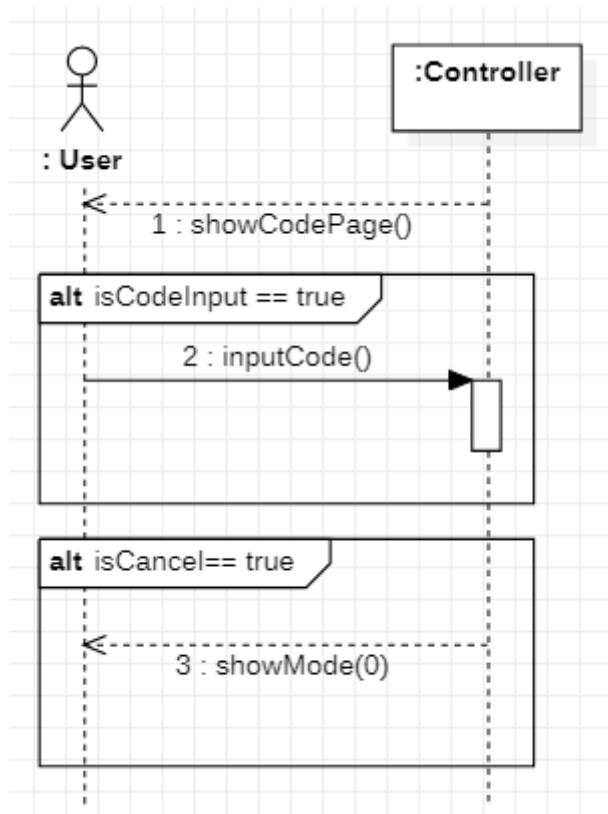




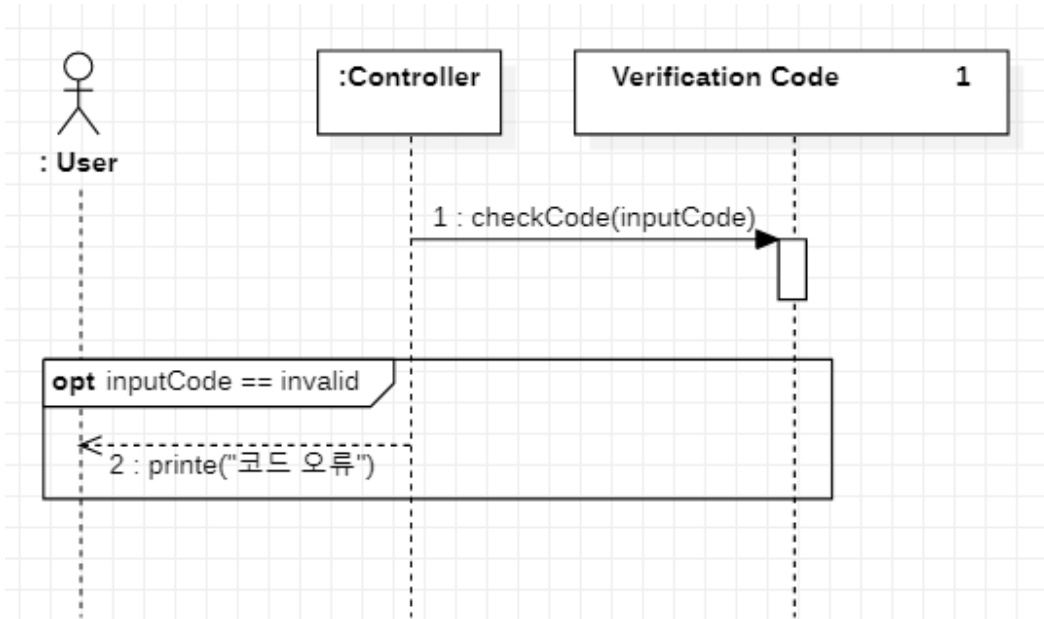
(15) Item Out



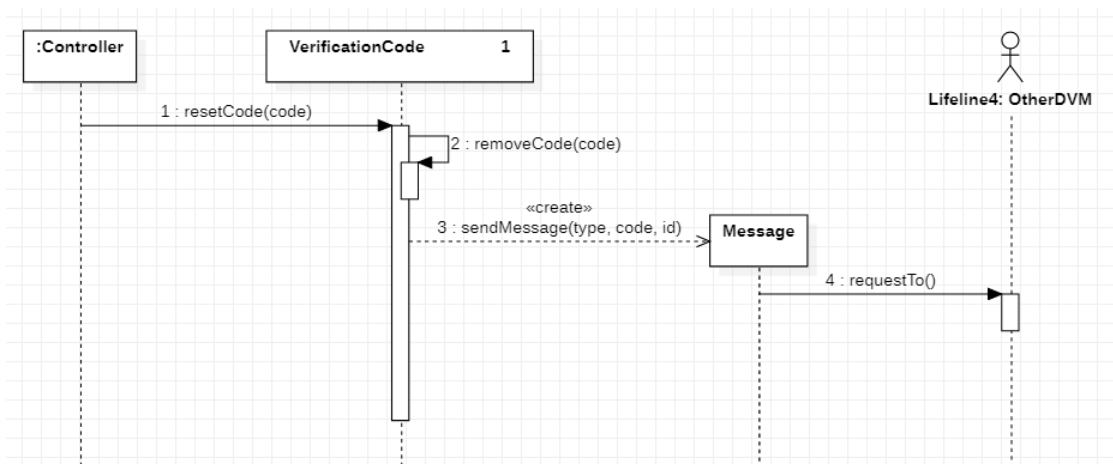
(16) Read Verification Code



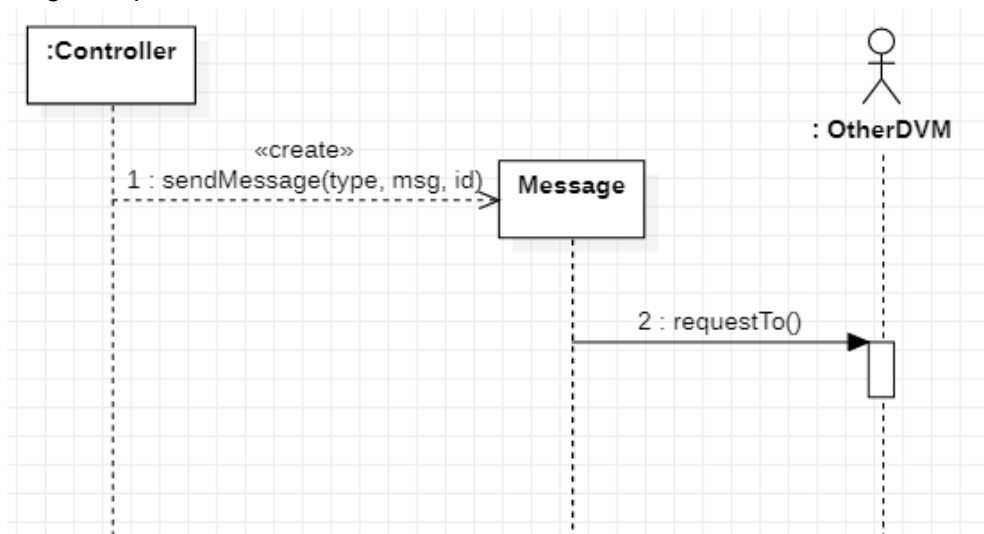
(17) Check Verification Code



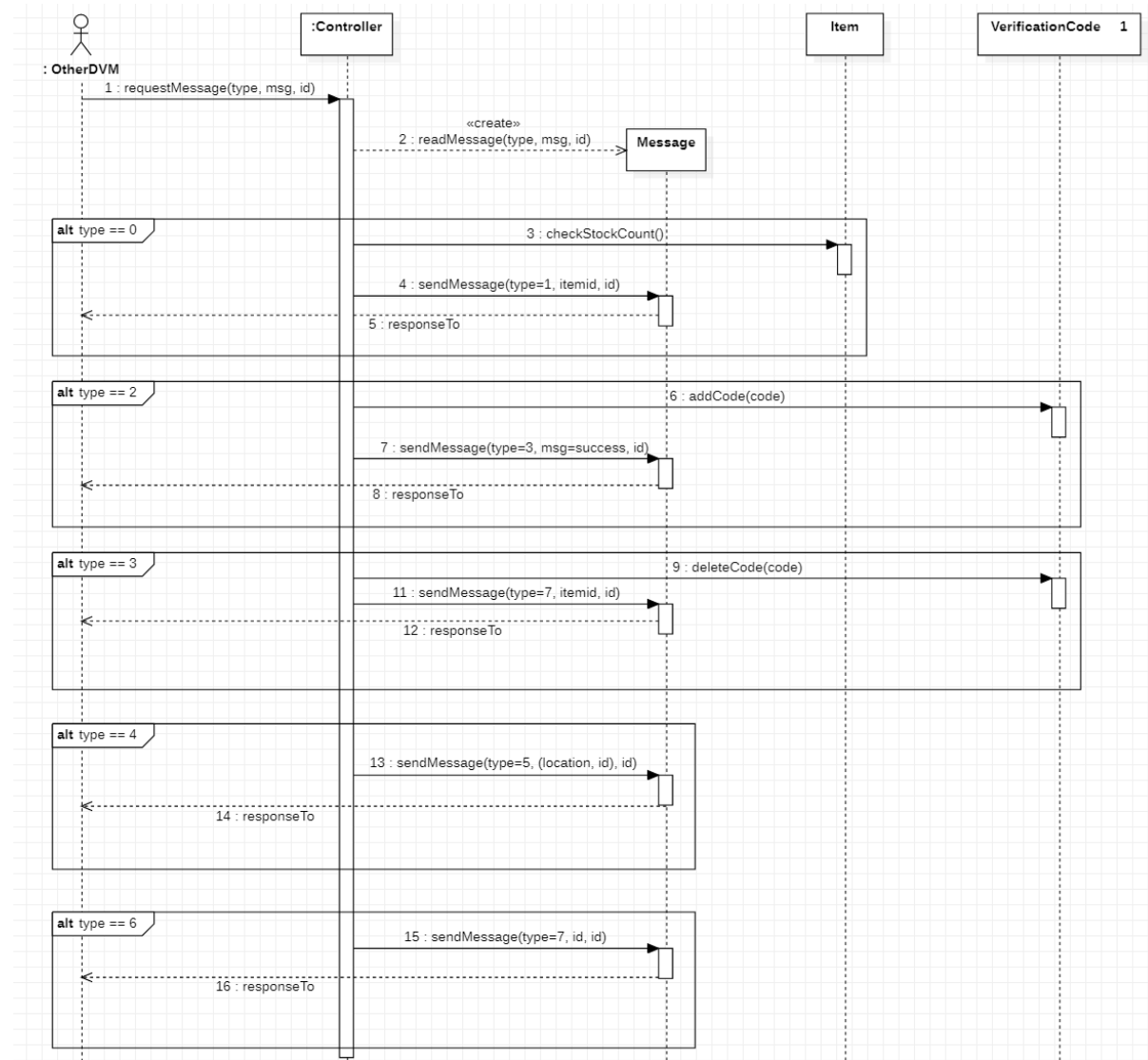
(18) Reset Verification Code



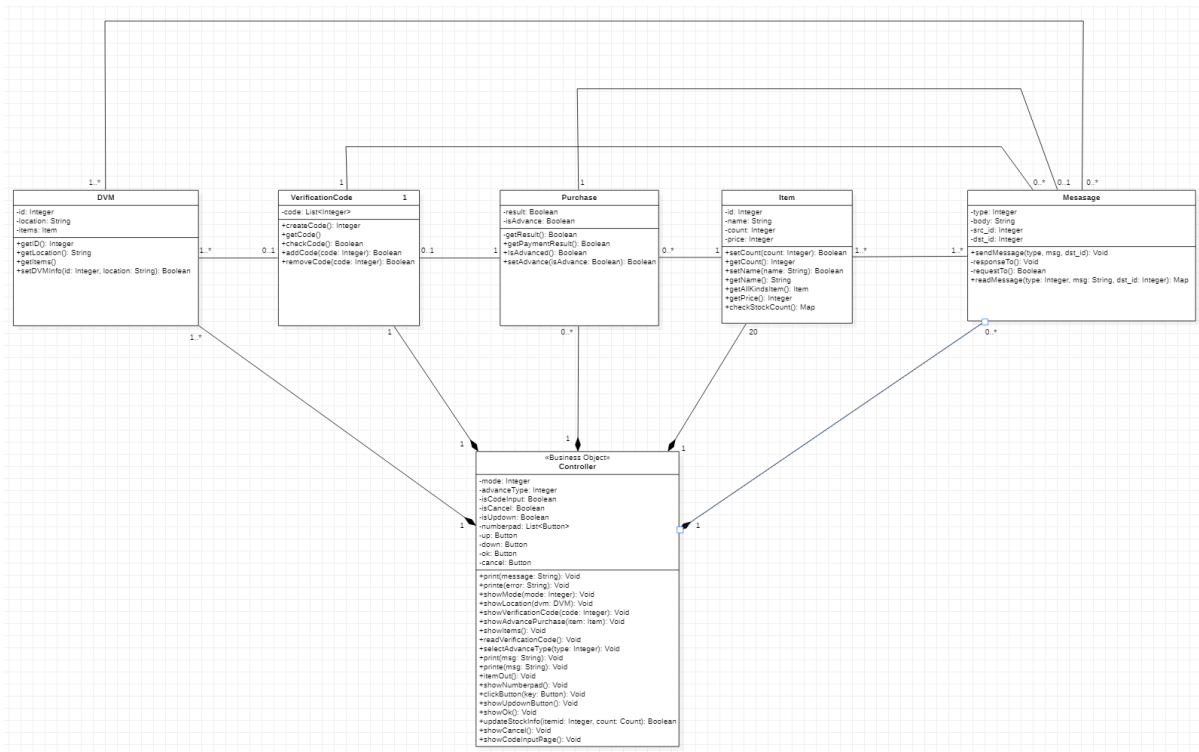
(19) Message Request



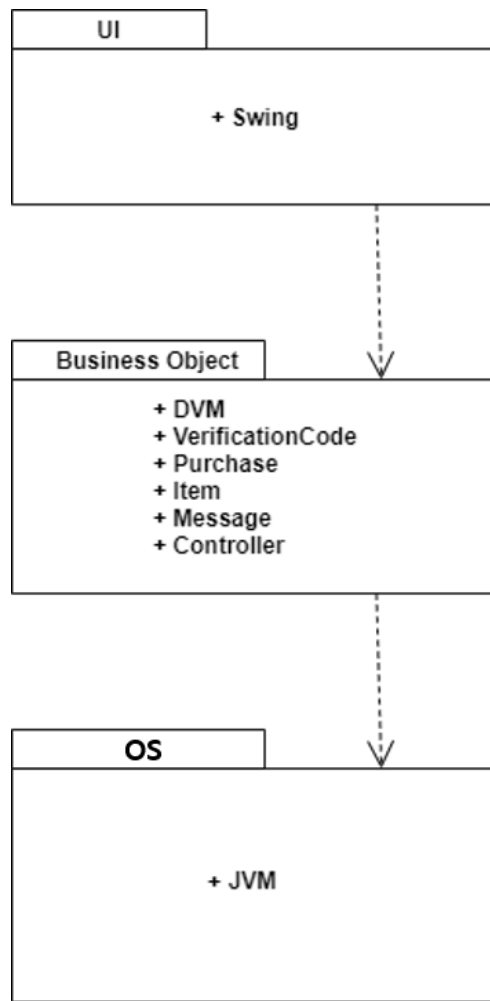
## (20) Message Response



## 2144. Define Design Class Diagrams



## 2145. Refine System Architecture



## 2147. Perform 2040 Traceability Analysis

