

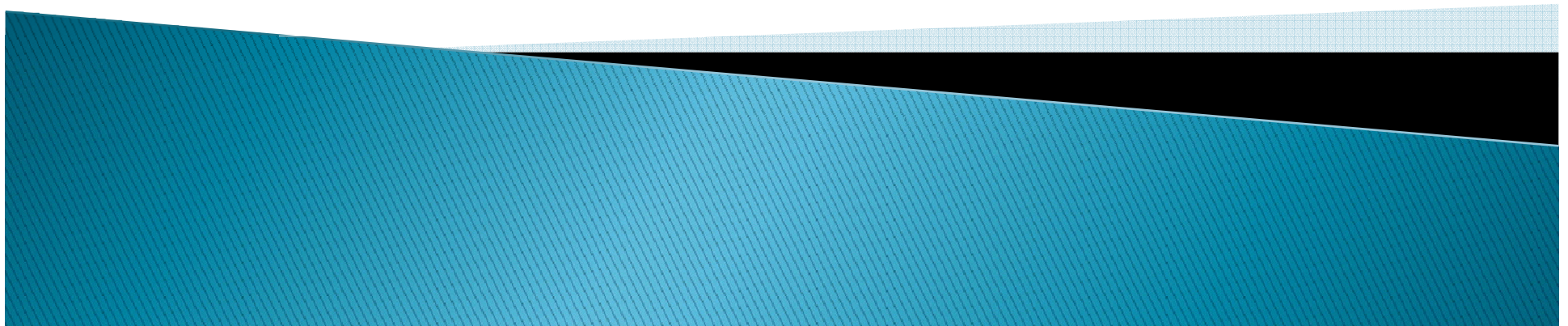
ERS (Elevator Reservation System)

OSP 2040 Design

Team : T1

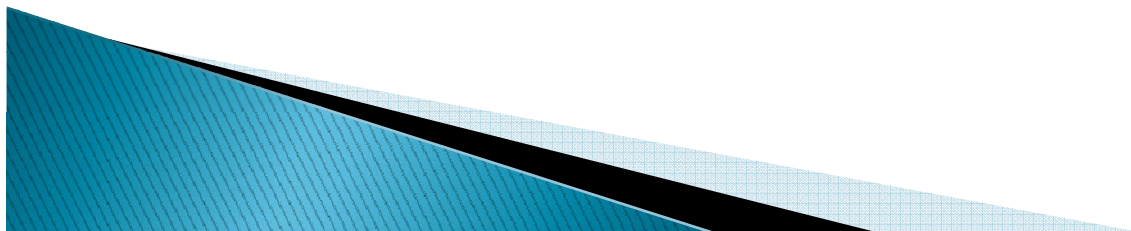
Member : 김영훈, 남장우, 황규원

Presenter : 남장우



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2041. Design Real Use Cases

▶ 1. Reservation

Use Case	1. Reservation
Actor	Admin, Guest
Purpose	Enter information in the system
Overview	To use the elevator, enter the information will be essential.
Type	Primary
Cross Reference	System Functions: R1.1, R1.2, R12.1 Use Case: "Reservation", "Cancel", "Login Admin"
Pre-Requisites	None
Typical Courses of Events	(A) : Actor, (S) : System 1. (A) Actor input Guest.goal to system. 2. (S) Compare ctrl_panel.max_floor and Guest.goal 3. (S) If Guest.goal is on domain of ctrl_panel.max_floor, Guest.goal save in ctrl_panel.goal
Alternative Courses of Events	N/A
Exceptional Courses of Events	Line 1: If Guest.goal is not on domain of ctrl_panel.max_floor, Print out error message to LCD

2041. Design Real Use Cases

▶ 2. Cancel

Use Case	2. Cancel
Actor	admin, guest
Purpose	Cancellation of the schedule for the elevator
Overview	To cancel the elevator, enter the information will be essential.
Type	Primary
Cross Reference	System Functions: R1.2, R2.1 Use Case: "Cancel", "Calculate Wait time and Wait person"
Pre-Requisites	None
Typical Courses of Events	(A) : Actor, (S) : System 1. (A) Actor input Guest.goal for cancel reservation 2. (S) Compare Guest.goal and wait_calculate.schedule 3. (S) If the input received Guest.goal exist in this wait_calculate.schedule Abandoned by sending Guest.goal.
Alternative Courses of Events	N/A
Exceptional Courses of Events	Line 1: Print reservation menu, if Guest.goal is not on wait_calculate.schedule

2041. Design Real Use Cases

▶ 3. Calculate Wait time for Wait person

Use Case	3. Calculate Wait time for Wait person
Actor	None
Purpose	A fair allocation of the elevators to provide men and latency information
Overview	In the control panel, input the value of the information collected shall be calculated based on the latency.
Type	Primary
Cross Reference	System Functions: R2.1, R2.2, R3, R4, R5 Use Case: "Calculate Wait time for Wait person", "Display", "Alloc Elevator", "Move Cavin", "Speed Control"
Pre-Requisites	Data , Information of cavin's position and speed
Typical Courses of Events	(A) : Actor, (S) : System 1. (S) ctrl_annel.goal, ctrl_annel.current brings to the wait_calculate.schedule. 2. (S) MTA ¹⁾ calculated with updated information 3. (S) Calculated results are stored in wait_calculate.cal_time.
Alternative Courses of Events	N/A
Exceptional Courses of Events	N/A

1) MTA(Minimum Time calculate Algorithm) :
 $((\text{Distance} * \text{constant_time}) / \text{speed}) + (\text{delay_time}) + (\text{schedule}[n] * c)$

2041. Design Real Use Cases

▶ 4. Display

Use Case	4. Display
Actor	None
Purpose	Shows the calculated information to the guest
Overview	Control panel LCD window, users will know the the elevator's information.
Type	Primary
Cross Reference	System Functions: R2.2, R3 Use Case: "Display", "Alloc Elevator"
Pre-Requisites	Data , Information of cavin's position and speed
Typical Courses of Events	(A) : Actor, (S) : System 1. (S) Print out to LCD display for Display.current, Display.goal, Display.full, Display.wait_time, Display.checking 2. (A) Guest gen up about the information printed.
Alternative Courses of Events	N/A
Exceptional Courses of Events	N/A

2041. Design Real Use Cases

▶ 5. Alloc Elevator

Use Case	5. Alloc Elevator
Actor	None
Purpose	Short waiting time for users will be allocated to the elevator.
Overview	Calculated the weight using assigned to the elevator.
Type	Primary
Cross Reference	System Functions: R3, R2.1, R2.2 Use Case: "Alloc Elevator", "Calculate Wait time for wait person", "Display"
Pre-Requisites	Calculated weight(MTA)
Typical Courses of Events	(A) : Actor, (S) : System 1. (S) Save elevator's number that is shorter wait_calculate.cal_time to allocate.alternative 2. (S) Elevator's number register in reservation.reserve_data
Alternative Courses of Events	N/A
Exceptional Courses of Events	Line 2 : If fail to register because of lo_sensor.weight_sens is -1, will be allocated to another elevator.

2041. Design Real Use Cases

▶ 6. Move Cabin

Use Case	6. Move Cabin
Actor	None
Purpose	Transfer guest to floor when is guest want to.
Overview	According to the following schedule shall move the cabin.
Type	Primary
Cross Reference	System Functions: R4, R2.1, R7, R8, R9, R10, R10.1 Use Case: "Move Cabin", "Calculate Wait time for Wait person", "Warn over weight", "Sense fire", "Sign of Emergency", "Stop", "Sense interruption of electric power"
Pre-Requisites	Schedule information of the elevator
Typical Courses of Events	(A) : Actor, (S) : System 1. (S) Read reservation.reserv_data to cabin_move.next. 2. (S) Cabin move to cabin_move.next.
Alternative Courses of Events	N/A
Exceptional Courses of Events	Line 2: If cabin_move.next is NULL, speed_control.speed set to 0.

2041. Design Real Use Cases

▶ 7. Speed Control

Use Case	7. Speed Control
Actor	None
Purpose	To service more quickly with quickly move cabin.
Overview	Adjust speed by distance and not available floor for elevation service more quickly
Type	Primary
Cross Reference	System Functions: R5, R2.1 Use Case: "Speed Control", "Calculate Wait time for wait person"
Pre-Requisites	Schedule information of the elevator .
Typical Courses of Events	(A) : Actor, (S) : System 1. (S) Get data from reservation.reserv_data. 2. (S) Get data from lo_sensor.weight_sens. 3. (S) Increase speed_control.speed if lo_sensor.weight_sens is 0 and reservation.forbid minus cabin_move.next is over than 3.
Alternative Courses of Events	N/A
Exceptional Courses of Events	N/A

2041. Design Real Use Cases

▶ 8. Sense Passenger

Use Case	8. Sense Passenger
Actor	None
Purpose	Sends a signal to the elevator door opens and shuts quickly.
Overview	People through the human body detection sensor sending the signal to the system .
Type	Primary
Cross Reference	System Functions: R6.1, R4, R6.2 Use Case: "Sense Passenger", "Move Cabin", "Open and shut door"
Pre-Requisites	N/A
Typical Courses of Events	(A) : Actor, (S) : System 1. (S) Human body detection sensor sending the signal to system 2. (S) lo_sensor.door_sens set to TRUE. 3. (S) Human body detection sensor stop sending the signal to system 4. (S) lo_sensor.door_sens set to FALSE.
Alternative Courses of Events	N/A
Exceptional Courses of Events	N/A

2041. Design Real Use Cases

▶ 9. Open and shut door

Use Case	9. Open and shut door
Actor	None
Purpose	If when the number of people is board and get off at the door will open else door should be close.
Overview	The signal comes through the human body detection sensor signal does not leave the door open and close the door after 3 seconds.
Type	Primary
Cross Reference	System Functions: R6.1, R6.2 Use Case: "Sense Passenger", "Open and shut door"
Pre-Requisites	Human body detection sensor signal
Typical Courses of Events	(A) : Actor, (S) : System 1. (S) Get data from lo_sensor.door_sens, if door.open is true. 2. (S) Door open, if lo_sensor.door_sens is true. 3. (S) If 3 seconds more of the lo_sensor.door_sens value is false, door.open change to false.
Alternative Courses of Events	N/A
Exceptional Courses of Events	N/A

2041. Design Real Use Cases

▶ 10. Warn Over Weight

Use Case	10. Warn Over Weight
Actor	None
Purpose	Lead to get off passenger, if too many passenger boarding to cabin
Overview	Passenger's weight compared to set weight in system and Warn to passenger if passenger's weight more weight than set in system.
Type	Primary
Cross Reference	System Functions: R4, R7, R10, R11 Use Case: "Cabin Move", "Warn Over Weight", "Stop", "Telephone for emergency"
Pre-Requisites	Maximum weight that set in admin mode, Passenger's weight
Typical Courses of Events	(A) : Actor, (S) : System 1. (S) Get data from lo_sensor.weight_sense and compare with ctrl_panel. max_weight. 2. (S) Lead to get off passenger, if lo_sensor.weight_sense more weight than ctrl_panel. max_weight . 3. (S) Stop warn if lo_sensor.weight_sense less than ctrl_panel. max_weight.
Alternative Courses of Events	N/A
Exceptional Courses of Events	N/A

2041. Design Real Use Cases

▶ 11. Sense fire

Use Case	11. Sense fire
Actor	None
Purpose	To ensure the safety of users to monitor the fire.
Overview	Fire through the fire detection sensor sending the signal to the system .
Type	Primary
Cross Reference	System Functions: R4, R8, R10, R11 Use Case: "Cabin Move", "Sense fire", "Stop", "Telephone for emergency"
Pre-Requisites	N/A
Typical Courses of Events	(A) : Actor, (S) : System 1. (S) lo_sensor.fire_sens set TRUE, if fire detection sensor sending signal to the system. 2. (S) Call to a control office about fire warning.
Alternative Courses of Events	N/A
Exceptional Courses of Events	N/A

2041. Design Real Use Cases

▶ 12. Sign of Emergency

Use Case	12. Sign of Emergency
Actor	Guest
Purpose	Passengers within the elevator announces emergency.
Overview	Push Emergency button in cabin, send emergency signal to system
Type	Primary
Cross Reference	System Functions: R4, R9, R10, R11 Use Case: "Cabin Move", "Sign of Emergency", "Stop", "Telephone for Emergency"
Pre-Requisites	N/A
Typical Courses of Events	(A) : Actor, (S) : System 1. (A) When an emergency occurs, press the emergency button. 2. (S) lo_sensor.emergency set to TRUE.
Alternative Courses of Events	N/A
Exceptional Courses of Events	N/A

2041. Design Real Use Cases

▶ 13. Stop

Use Case	13. Stop
Actor	None
Purpose	Stop the cabin.
Overview	Stop the cabin, if receive stop signal.
Type	Primary
Cross Reference	System Functions: R7, R8, R9, R10, R10.1 Use Case: "Warn Over weight", "Sense fire", "Sign of emergency", "Stop", "Sense interruption of electric power"
Pre-Requisites	System receive stop signal
Typical Courses of Events	(A) : Actor, (S) : System 1. (S) Get data from lo_sensor.emergency and lo_sensor.fire_sens. 2. (S) speed_control.speed set to 0 if data is true that is get from lo_sensor.
Alternative Courses of Events	N/A
Exceptional Courses of Events	N/A

2041. Design Real Use Cases

▶ 14. Sense interruption of electric power

Use Case	14. Sense interruption of electric power
Actor	None
Purpose	Announces to the system detects a power outage.
Overview	Announces to the system detects a power outage.
Type	Primary
Cross Reference	System Functions: R10, R10.1, R10.2, R11 Use Case: "Stop", "Sense interruption of electric power", "Switchover to secondary power", "Telephone for Emergency"
Pre-Requisites	None
Typical Courses of Events	(A) : Actor, (S) : System 1. (S) Detect power outage. 2. (S) lo_sensor.electric_sens set to TRUE.
Alternative Courses of Events	N/A
Exceptional Courses of Events	N/A

2041. Design Real Use Cases

▶ 15. Switchover to secondary power

Use Case	15. Switchover to secondary power
Actor	None
Purpose	Set to main power from secondary power. If main power is outage
Overview	Set to main power from secondary power. If main power is outage
Type	Primary
Cross Reference	System Functions: R10.1, R10.2 Use Case: "Sense interruption of electric power", "Switchover to secondary power"
Pre-Requisites	Signal of main power outage
Typical Courses of Events	(A) : Actor, (S) : System 1. (S) Main power outage signal from system. 2. (S) Switchover to secondary power if lo_sensor.electric_sens is TRUE
Alternative Courses of Events	N/A
Exceptional Courses of Events	N/A

2041. Design Real Use Cases

▶ 16. Telephone for Emergency

Use Case	16. Telephone for Emergency
Actor	Guest
Purpose	Generated from inside the elevator when an emergency situation will be sent to the administrator for phone.
Overview	Situation occurs when an emergency call from inside the elevator emergency button, the manager and the call will be available. .
Type	Primary
Cross Reference	System Functions: R7, R8, R9, R10.1, R11 Use Case: "Warn over weight", "Sense fire", "Sign of Emergency", "Sense interruption of electric power", "Telephone for Emergency"
Pre-Requisites	None
Typical Courses of Events	(A) : Actor, (S) : System 1. (A) An emergency occurs, press the emergency call button. 2. (S) Administrator to request an emergency call came signals. 3. (A) Responding to calls by users and administrators.
Alternative Courses of Events	N/A
Exceptional Courses of Events	Line 3: Passenger sent a request to call an emergency, but admin is not response more than 30seconds, will automatically call the rescue

2041. Design Real Use Cases

▶ 17. Login admin

Use Case	17. Login admin
Actor	Admin
Purpose	The LCD window can be easily managed admin.
Overview	Control Panel LCD window push Login button and Password number input admin mode enter Login.
Type	Primary
Cross Reference	System Functions: R1.1, R12.1, R12.2.1, R12.2.2, R12.3.1, R12.3.2 Use Case: "Reservation", "Login admin" "View cabin's maximum boarding weight", "Modify cabin's maximum boarding weight", "View elevator's not available floor", "Modify elevator's not available floor"
Pre-Requisites	None
Typical Courses of Events	(A) : Actor, (S) : System 1. (A) Push login button 2. (A) Input password number 3. (S) Password number compare to ctrl_annel.admin_pwd and if two value is same, enter to Admin mode. 4. (S) Admin mode screen output to Control Panel
Alternative Courses of Events	N/A
Exceptional Courses of Events	Line 2: Printout error message if password incorrect, and return to main screen.

2041. Design Real Use Cases

▶ 18. View cabin's maximum boarding weight

Use Case	18. View cavin's maximum boarding weight
Actor	Admin
Purpose	View maximum boarding weight
Overview	Admin ensure the boarding weight.
Type	Primary
Cross Reference	System Functions: R12.1, R12.2.1, R12.2.2 Use Case: "Login admin", "View cabin's maximum boarding weight", "Modify cabin's maximum boarding weight"
Pre-Requisites	Admin mode Login
Typical Courses of Events	(A) : Actor, (S) : System 1. (A) In Admin mode, push View cavin's maximum boarding weight button 2. (S) Load ctrl_ pannel.max_weight value. 3. (S) Load value display LCD window and Admin send information.
Alternative Courses of Events	N/A
Exceptional Courses of Events	N/A

2041. Design Real Use Cases

▶ 19. Modify cabin's maximum boarding weight

Use Case	19. Modify cavin's maximum boarding weight
Actor	Admin
Purpose	Admin modify elevator maximum boarding weight.
Overview	Set elevator maximum boarding weight using control panel
Type	Primary
Cross Reference	System Functions: R12.1, R12.2.1, R12.2.2 Use Case: "Login admin", "View cavin's maximum boarding weight", "Modify cavin's maximum boarding weight"
Pre-Requisites	Admin mode Login
Typical Courses of Events	(A) : Actor, (S) : System 1. (A) In Admin mode, push Modify cavin's maximum boarding weight button. 2. (S) Display maximum boarding weight to LCD (with display elevator maximum available boarding weight) 3. (S) Admin enter maximum boarding weight 4. (S) Enterted maximum boarding weight save ctrl_panel.max_weight
Alfernative Courses of Events	N/A
Exceptional Courses of Events	Line 3:the input range exceeds output Error message after reenter

2041. Design Real Use Cases

▶ 20. View elevator's not available floor

Use Case	20. View elevator's not available floor
Actor	Admin
Purpose	Admin view not available floor.
Overview	Admin push View elevator's not available floor button and view result.
Type	Primary
Cross Reference	System Functions: R12.1, R12.3.1, R12.3.2 Use Case: "Login admin", "View elevator's not available floor", "Modify elevator's not available floor"
Pre-Requisites	Admin mode Login
Typical Courses of Events	(A) : Actor, (S) : System 1. (A) In Admin mode, push View elevator's not available floor button. 2. (S) Load reservation.forbid. 3. (S) Display data to Control Panel LCD and admin gain information.
Alternative Courses of Events	N/A
Exceptional Courses of Events	N/A

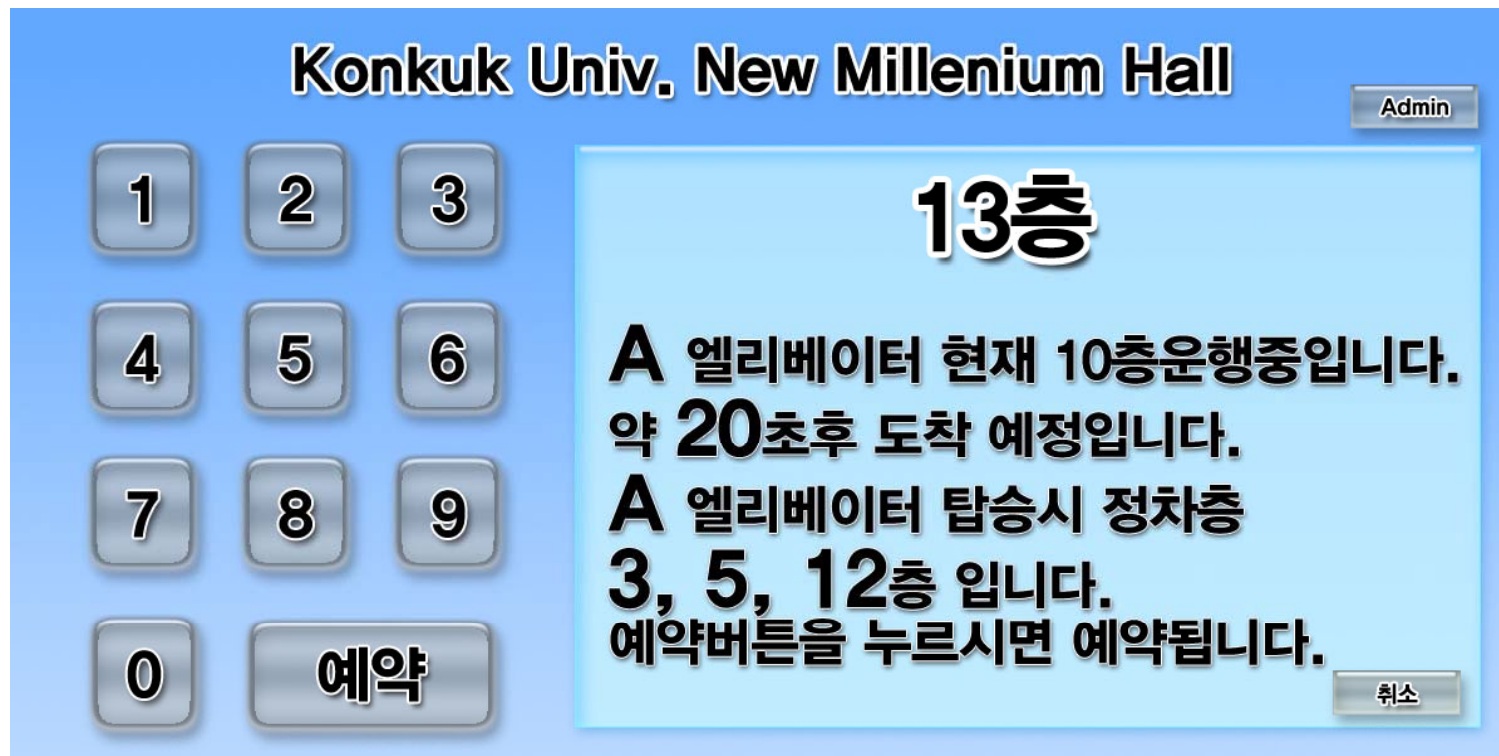
2041. Design Real Use Cases

▶ 21. Modify elevator's not available floor

Use Case	21. Modify elevator's not available floor
Actor	Admin
Purpose	Building Downstairs set to elevator not available floor and elevator's helped Convenience of use
Overview	Admin used Control Panel and set to elevator not available floor.
Type	Primary
Cross Reference	System Functions: R12.1, R12.3.1, R12.3.2 Use Case: "Login admin", "View elevator's not available floor", "Modify elevator's not available floor"
Pre-Requisites	Admin Login
Typical Courses of Events	(A) : Actor, (S) : System 1. (A) In Admin mode, push not available floor button 2. (A) Enter data that is set to elevator not available floor. 3. (S) Entered the Section save reservation.forbid
Alternative Courses of Events	N/A
Exceptional Courses of Events	Line 1: the input range exceeds output Error message after reenter

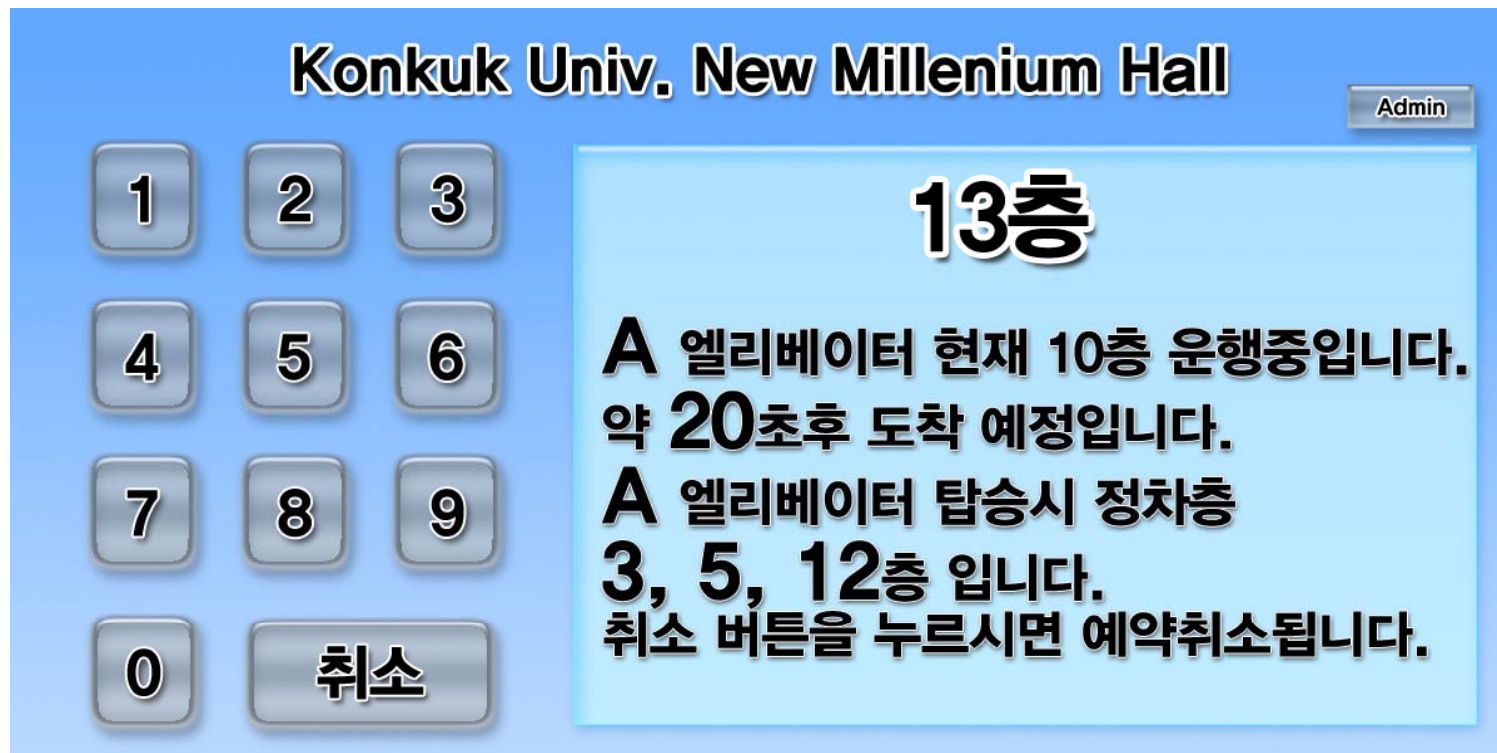
2042. Define Reports, UI and Storyboards

▶ 1. Main(Reservation)



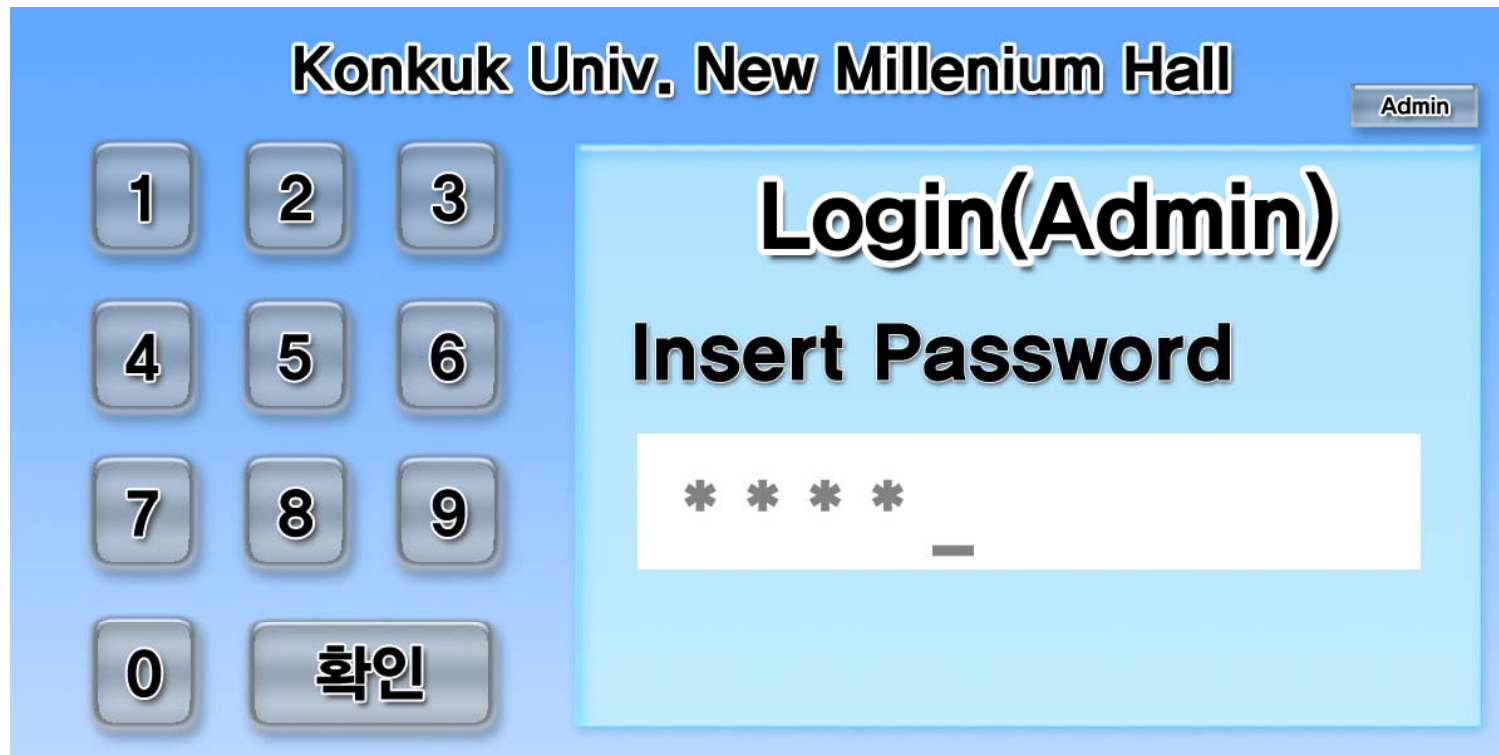
2042. Define Reports, UI and Storyboards

▶ 2. Cancel



2042. Define Reports, UI and Storyboards

- ▶ 3. Login to Admin



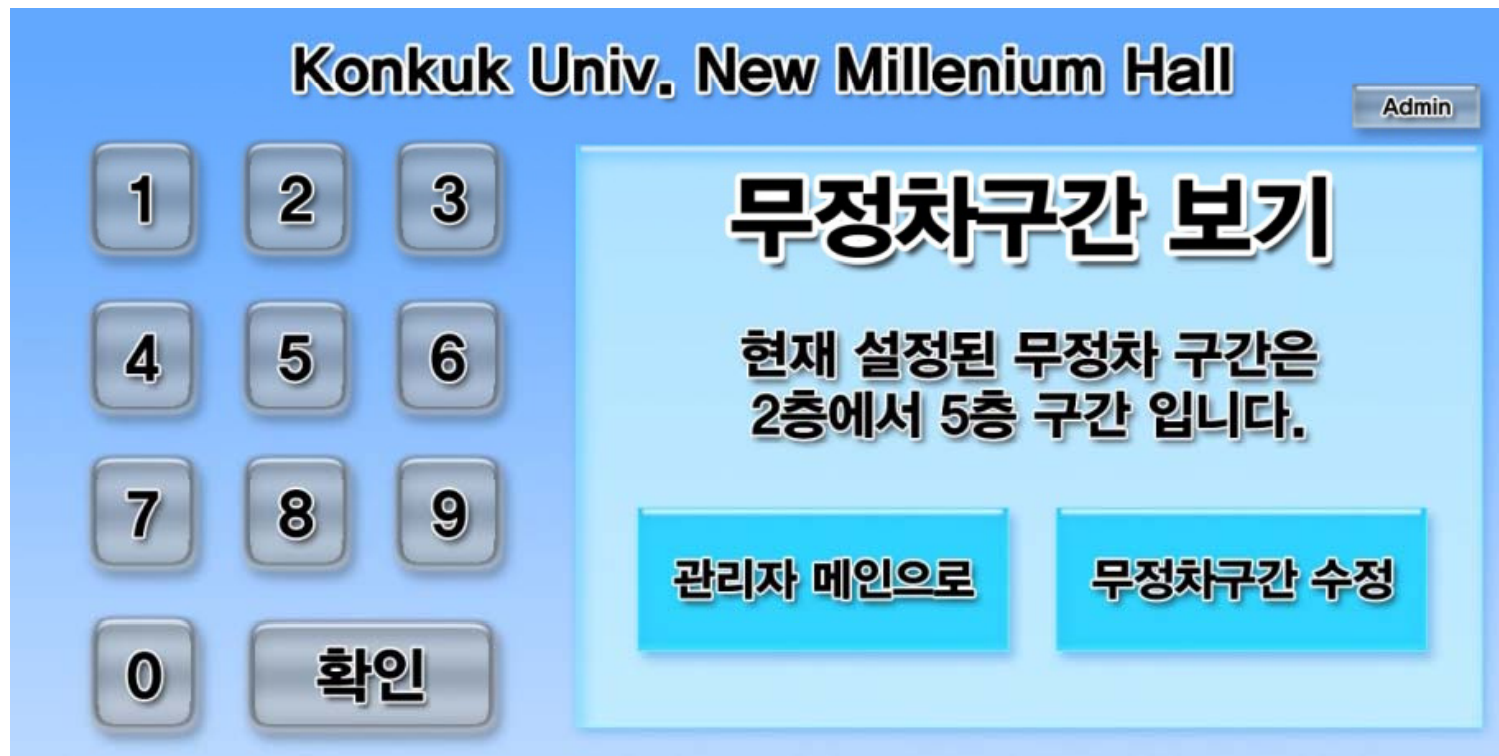
2042. Define Reports, UI and Storyboards

▶ 4. Admin Main



2042. Define Reports, UI and Storyboards

- ▶ 5. View Not available floor



2042. Define Reports, UI and Storyboards

- ▶ 6. Modify Not available floor

Konkuk Univ. New Millenium Hall Admin

무정차구간 수정
최소 층 최대층 입력후 확인버튼을 눌러주세요

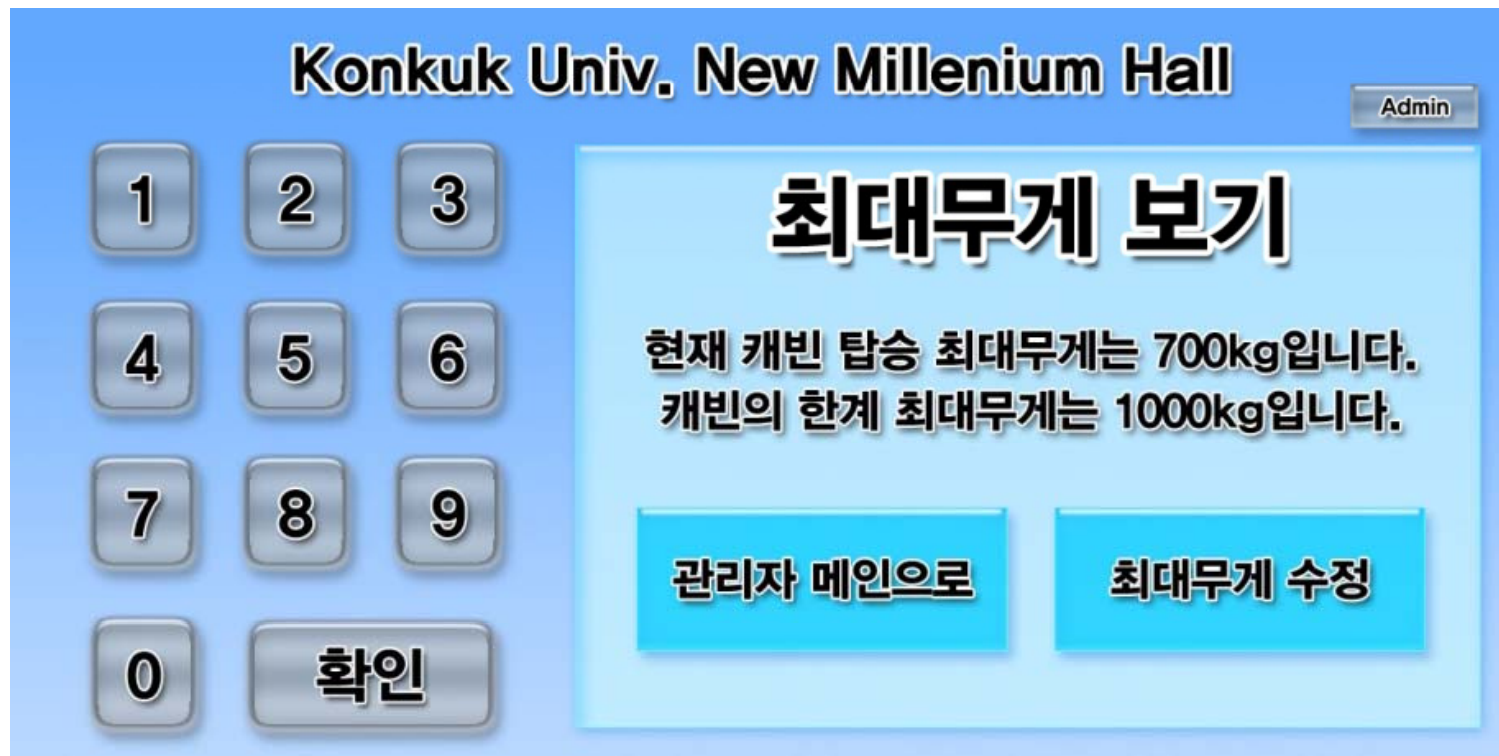
최소층 최대층

[관리자 메인으로](#) [무정차구간 보기](#)

0 **확인**

2042. Define Reports, UI and Storyboards

▶ 7. View Max weight



2042. Define Reports, UI and Storyboards

- ▶ 8. Modify Max weight

Konkuk Univ. New Millenium Hall Admin

1 2 3
4 5 6
7 8 9
0 **확인**

최대무게 수정

캐빈의 한계 최대무게는 1000kg입니다.

설정 최대무게 kg

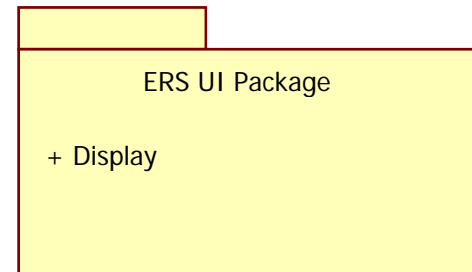
관리자 메인으로 **최대무게 보기**

The image shows a web application interface for managing cabin weight limits. It features a blue header with the text 'Konkuk Univ. New Millenium Hall' and an 'Admin' button. On the left is a numeric keypad with buttons for digits 1-9, 0, and a '확인' (Confirm) button. The main content area is a light blue box titled '최대무게 수정' (Modify Max Weight). It contains the text '캐빈의 한계 최대무게는 1000kg입니다.' (The cabin's limit max weight is 1000kg). Below this, it shows '설정 최대무게' (Set Max Weight) followed by a text input field containing '800' and 'kg'. At the bottom of the box are two buttons: '관리자 메인으로' (Back to Admin Main) and '최대무게 보기' (View Max Weight).

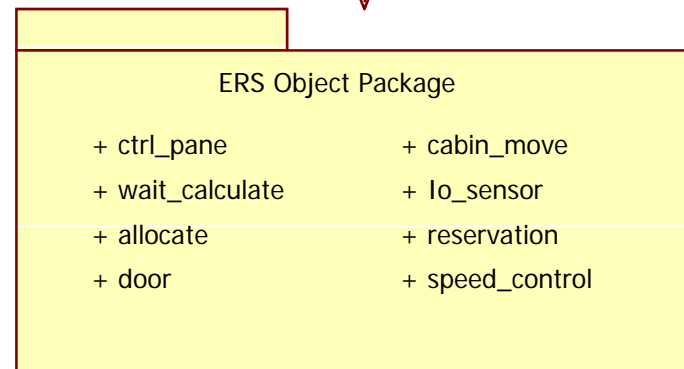
2043. Refine System Architecture

▶ Refine System Architecture

Application Layer

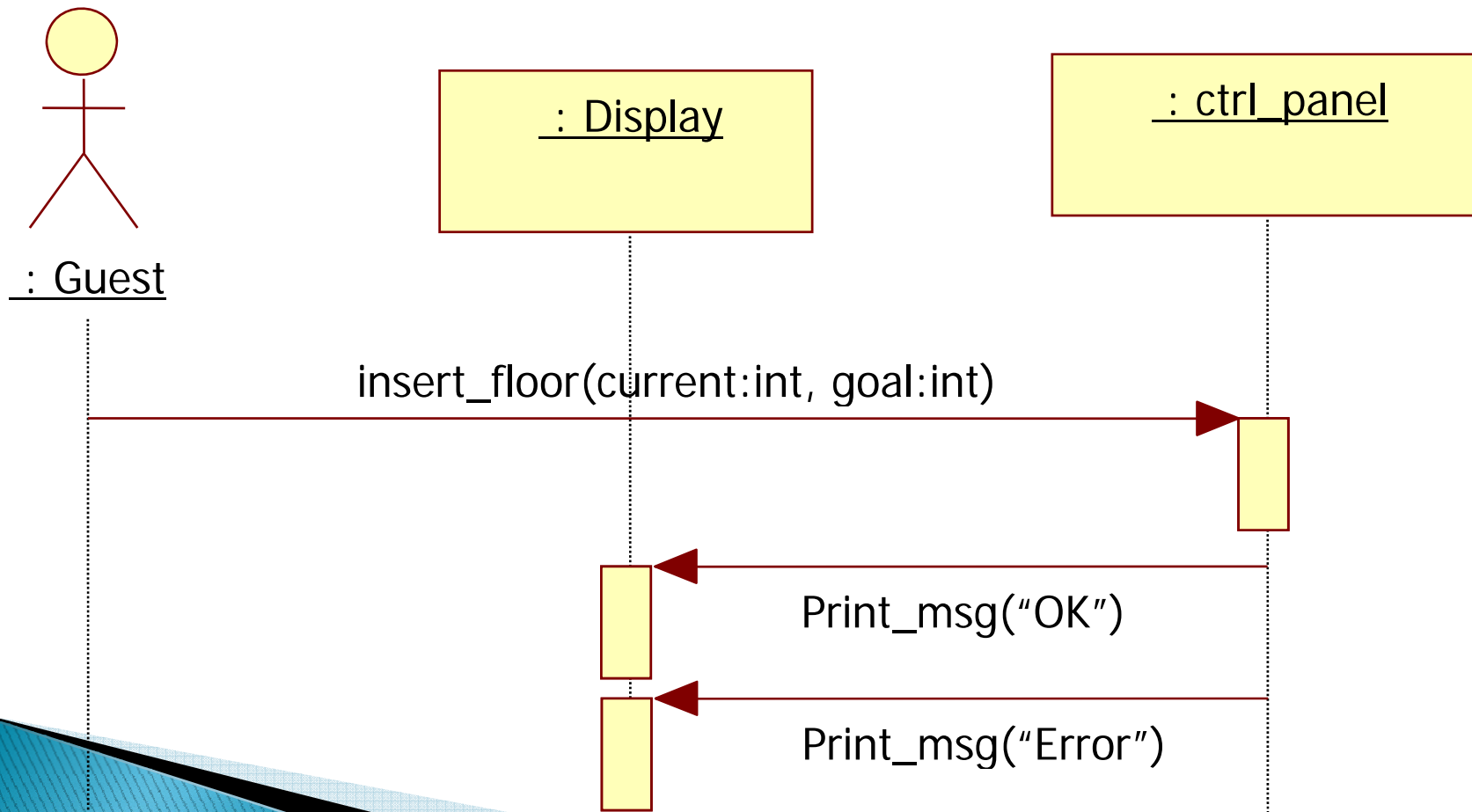


System Layer



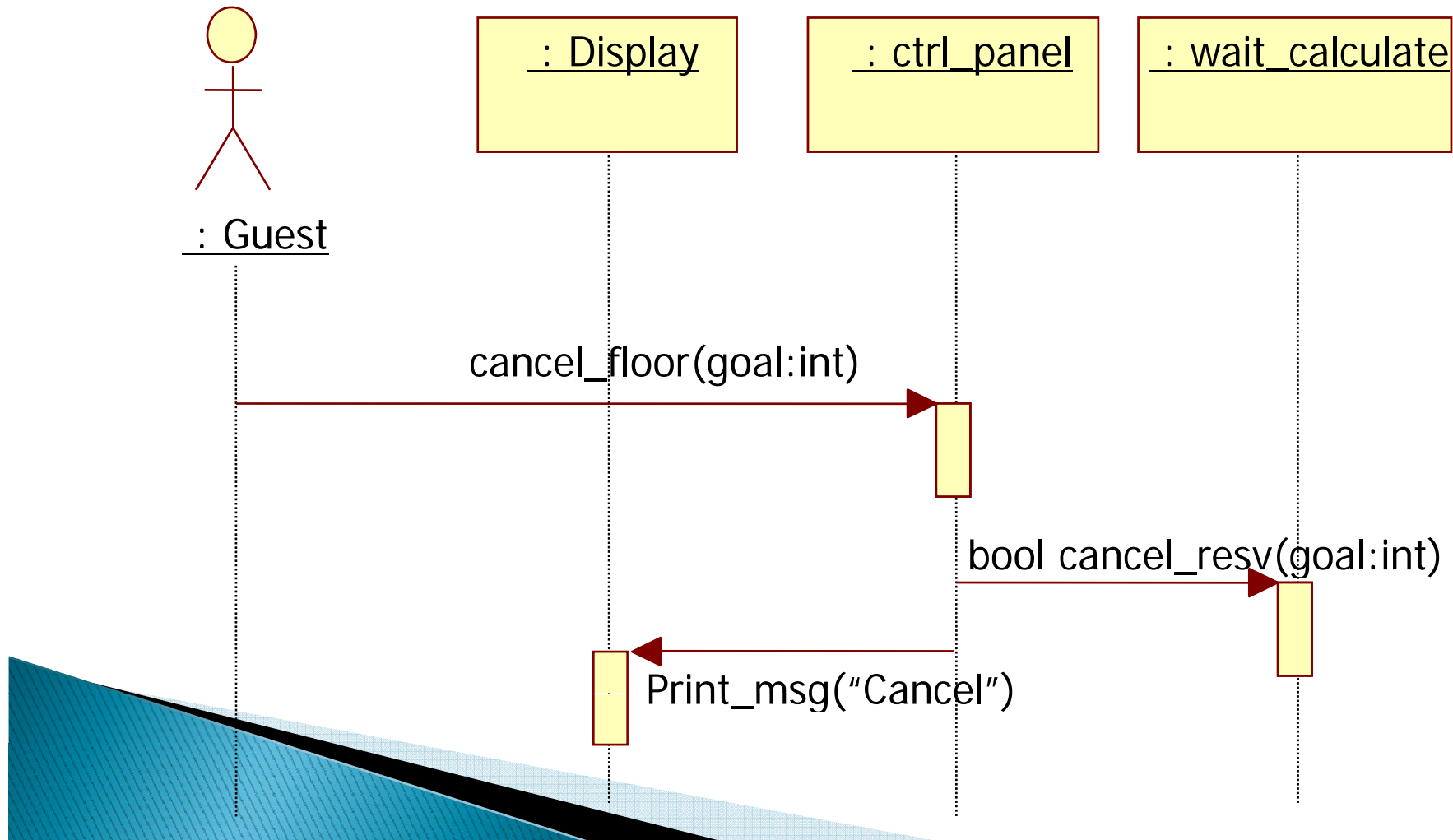
2044. Define Interaction Diagrams

▶ 1. Reservation



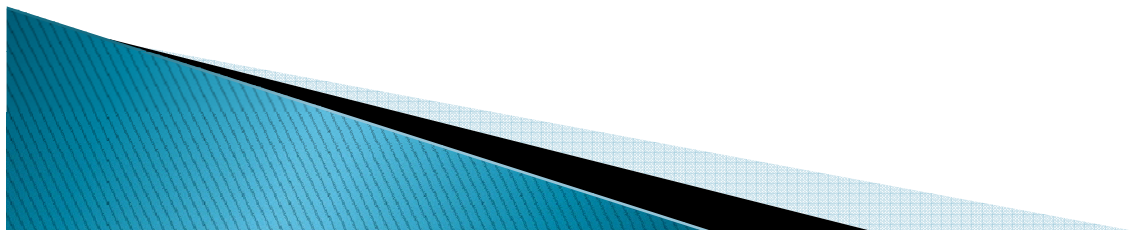
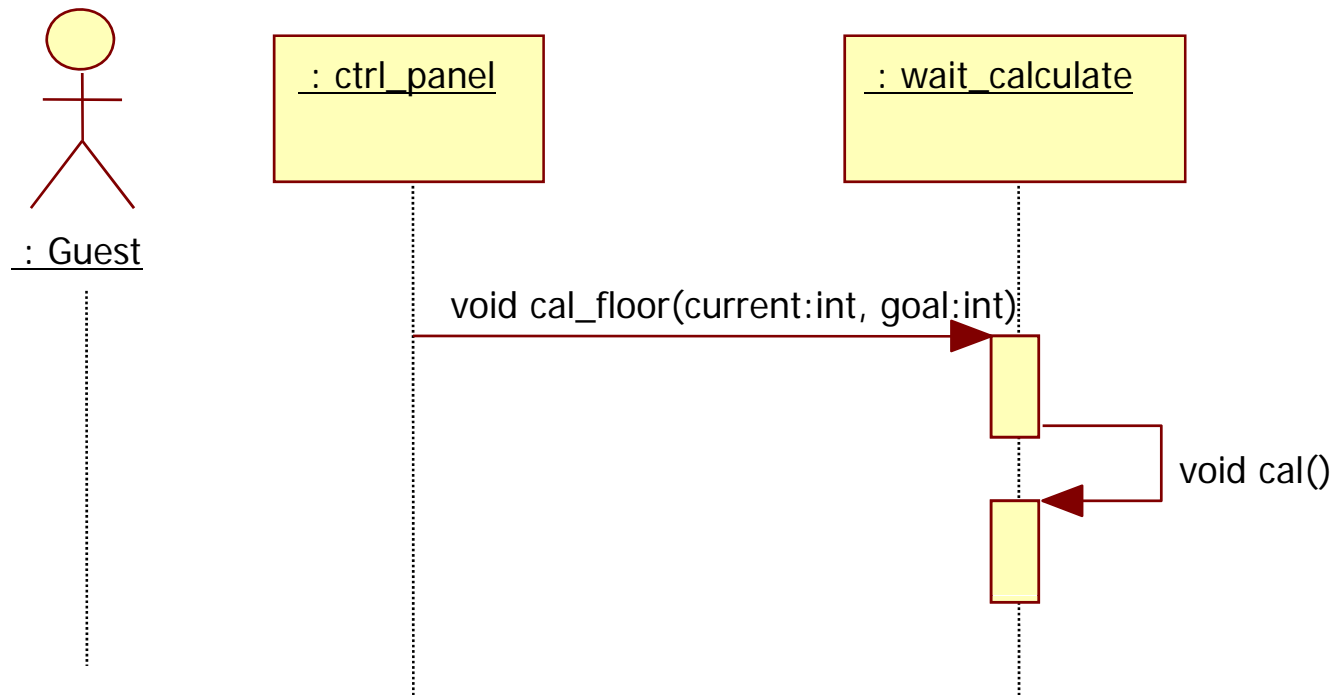
2044. Define Interaction Diagrams

▶ 2. Cancel



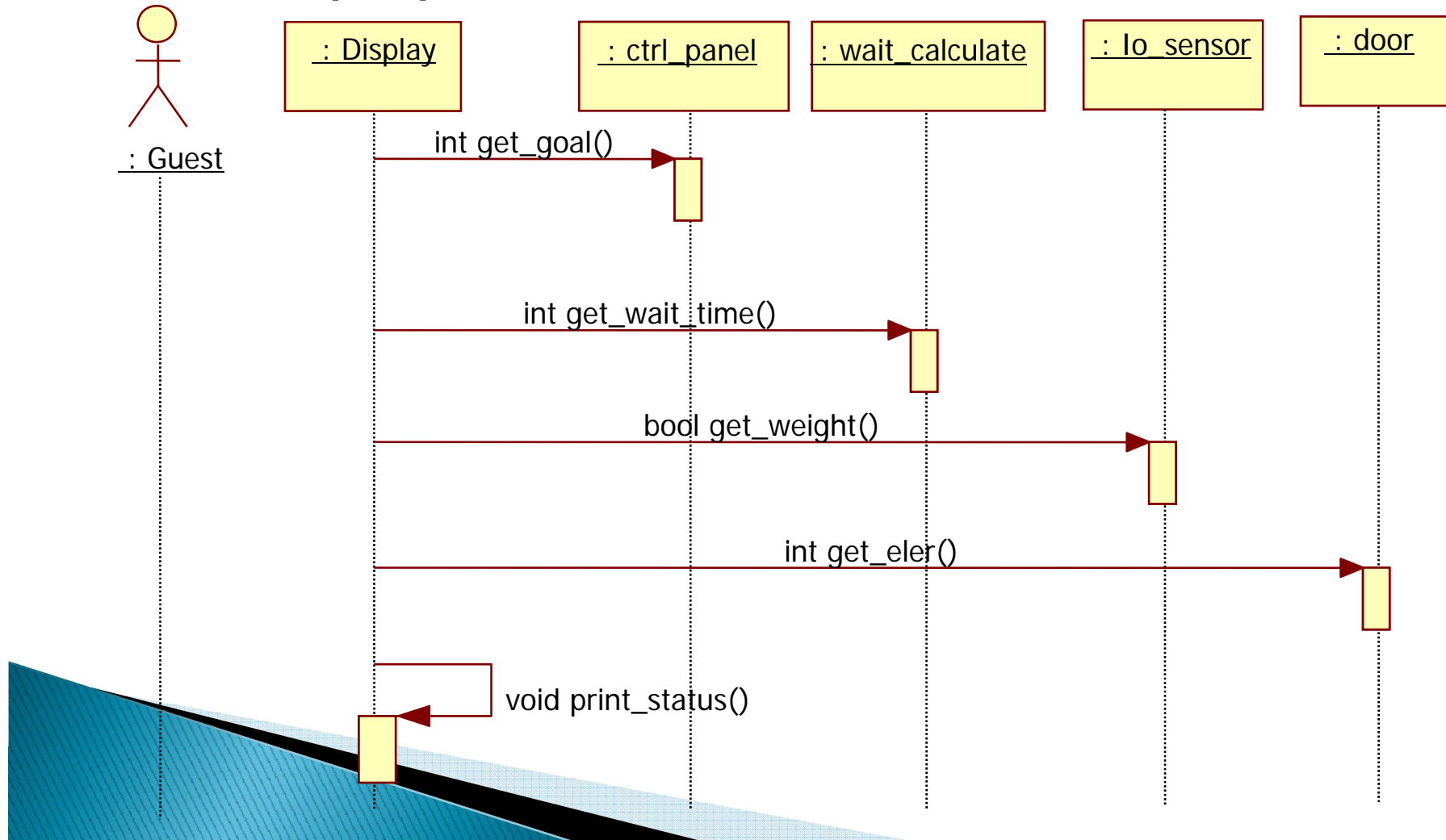
2044. Define Interaction Diagrams

- ▶ 3. Calculate Wait time for Wait person



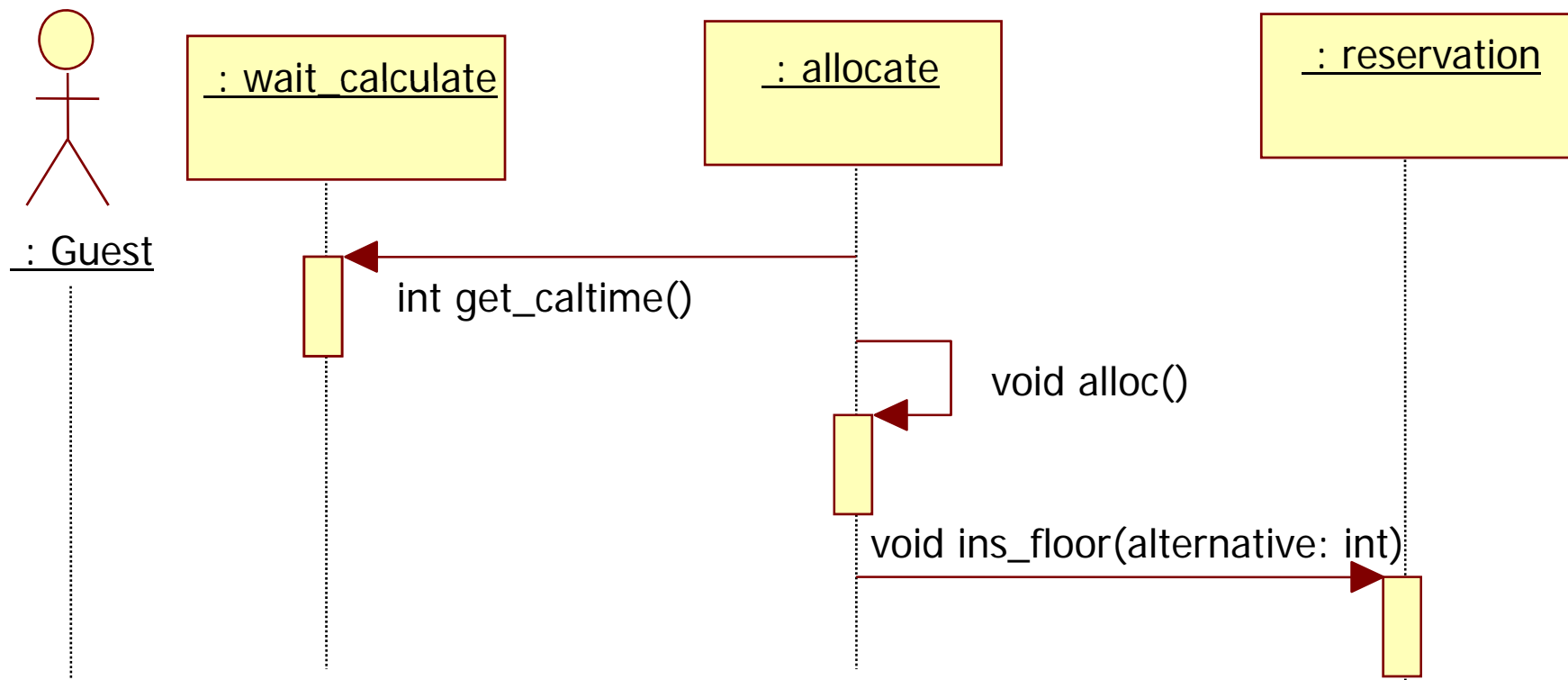
2044. Define Interaction Diagrams

▶ 4. Display



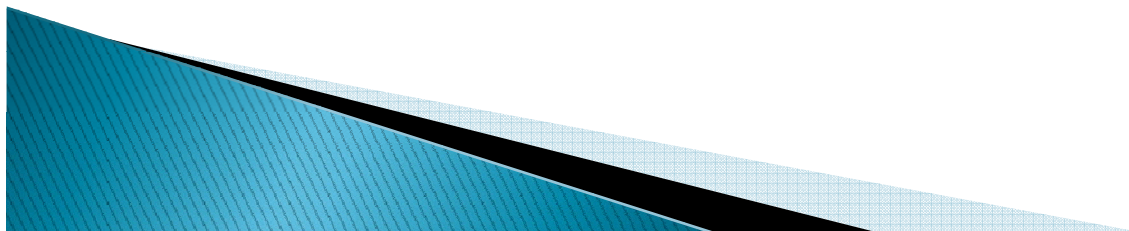
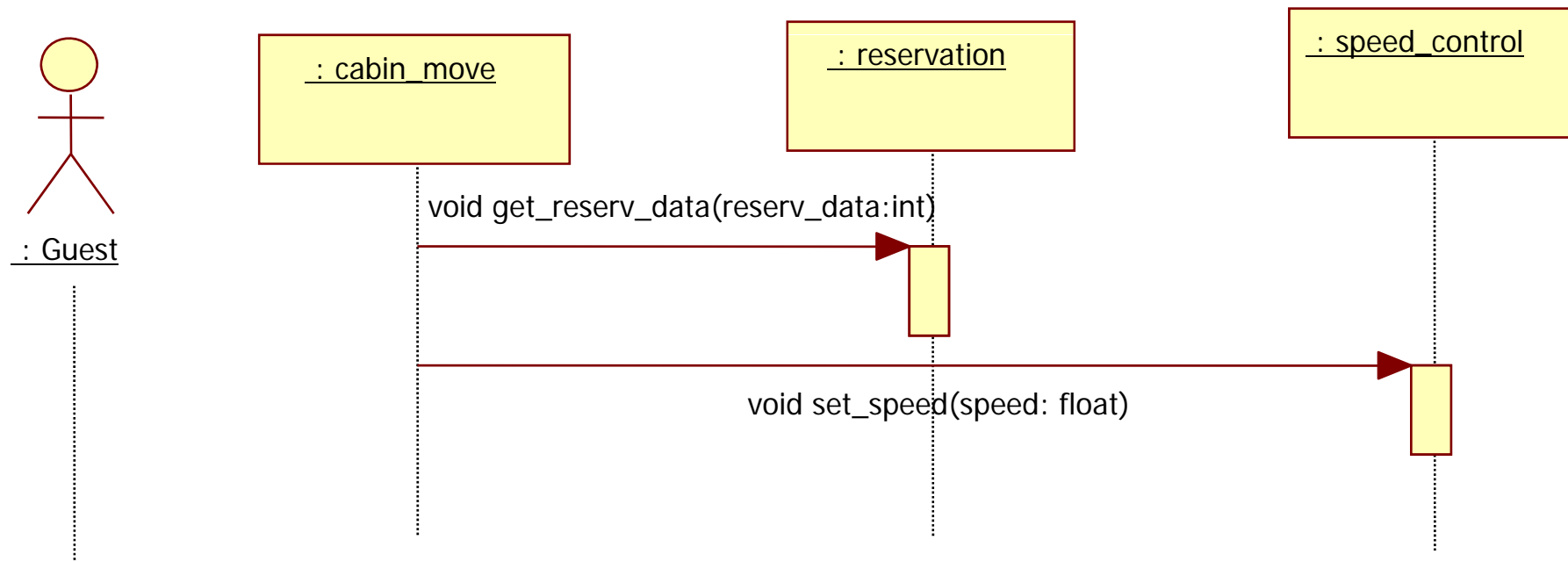
2044. Define Interaction Diagrams

▶ 5. Alloc cabin



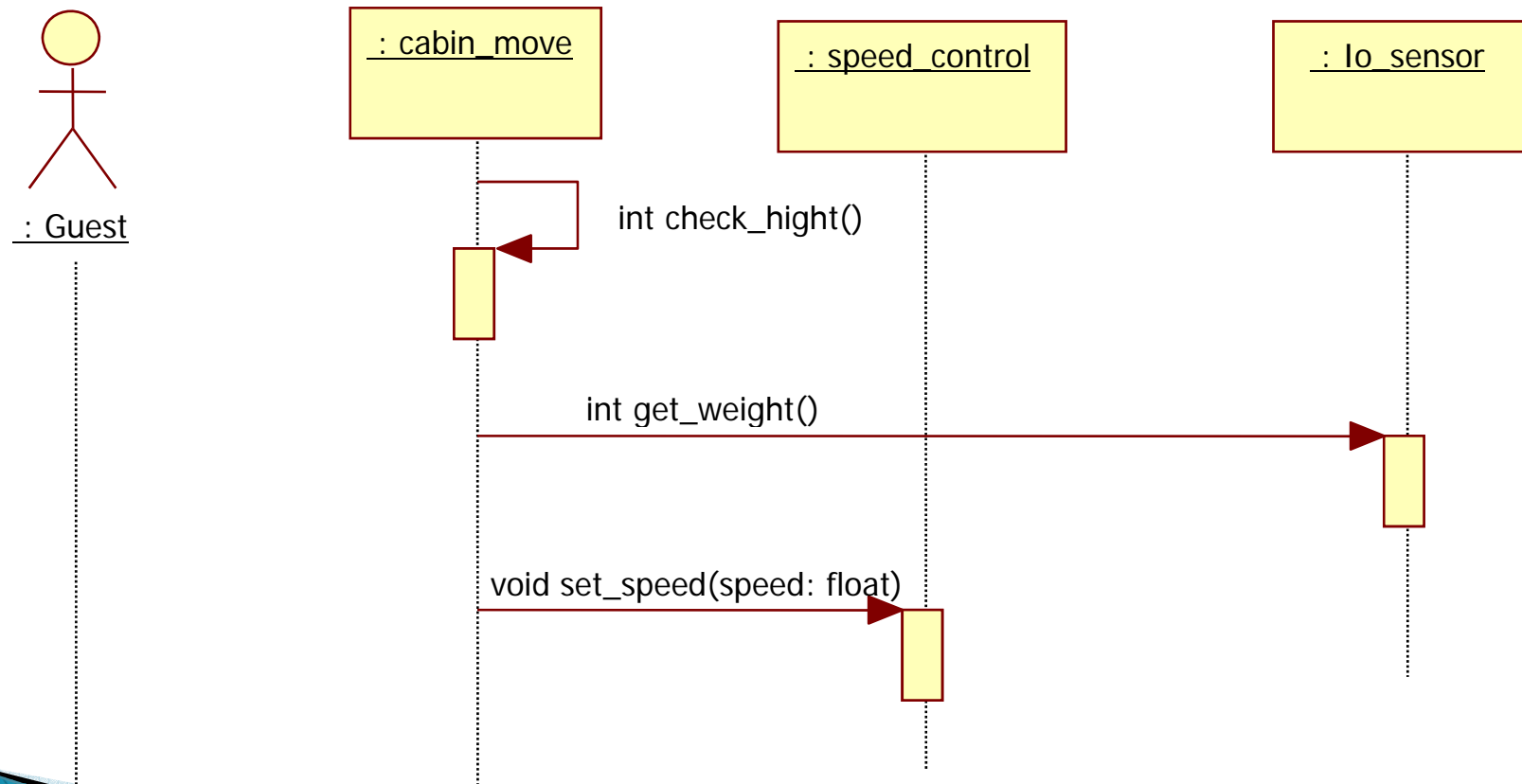
2044. Define Interaction Diagrams

▶ 6. Move Cabin



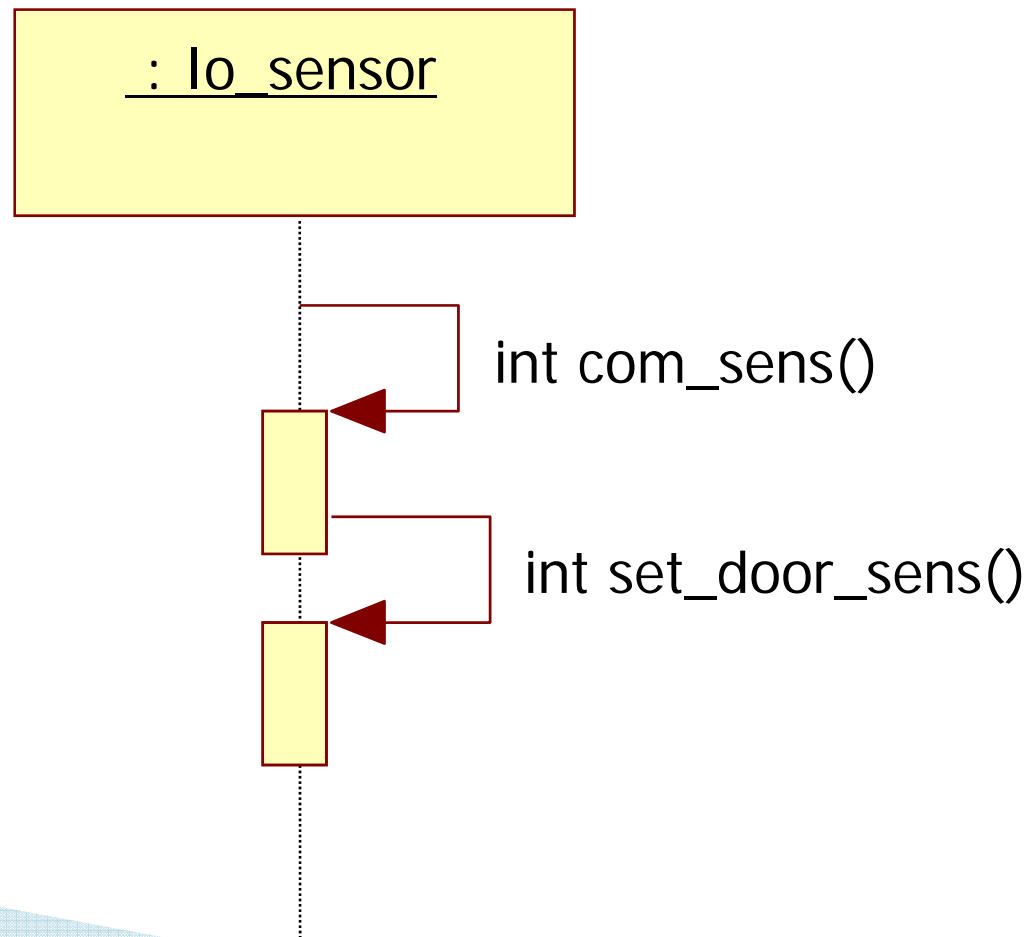
2044. Define Interaction Diagrams

▶ 7. Speed Control



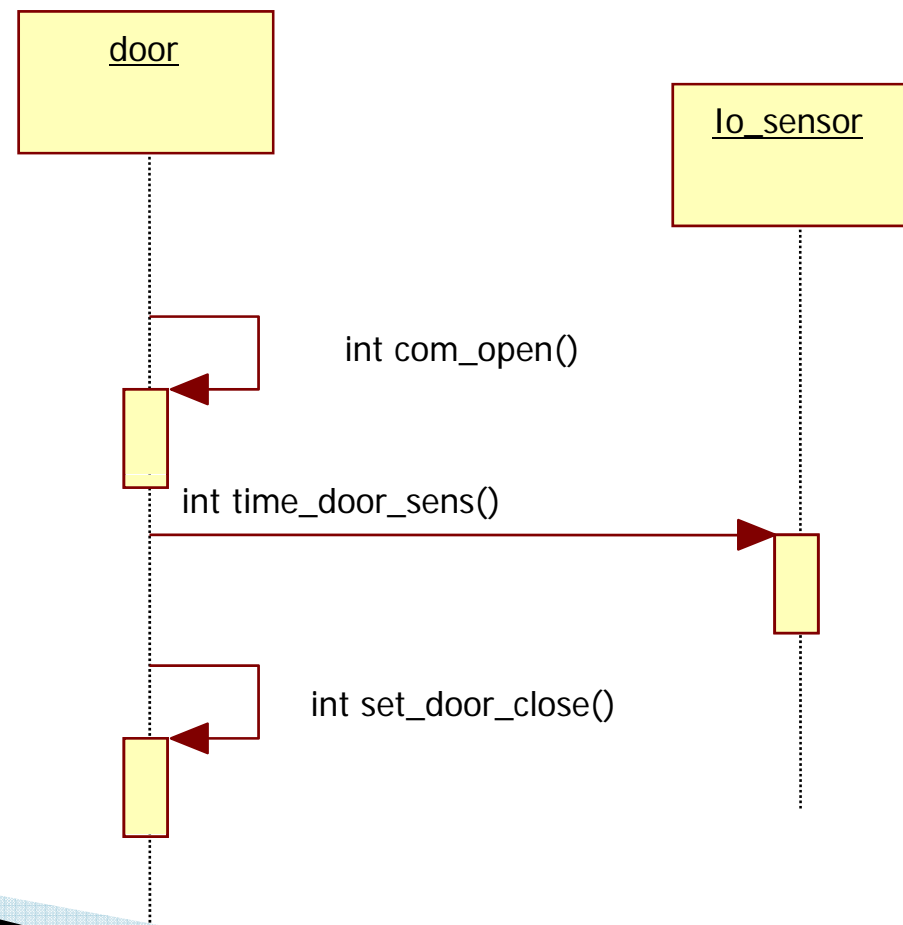
2044. Define Interaction Diagrams

- ▶ 8. Sense passenger



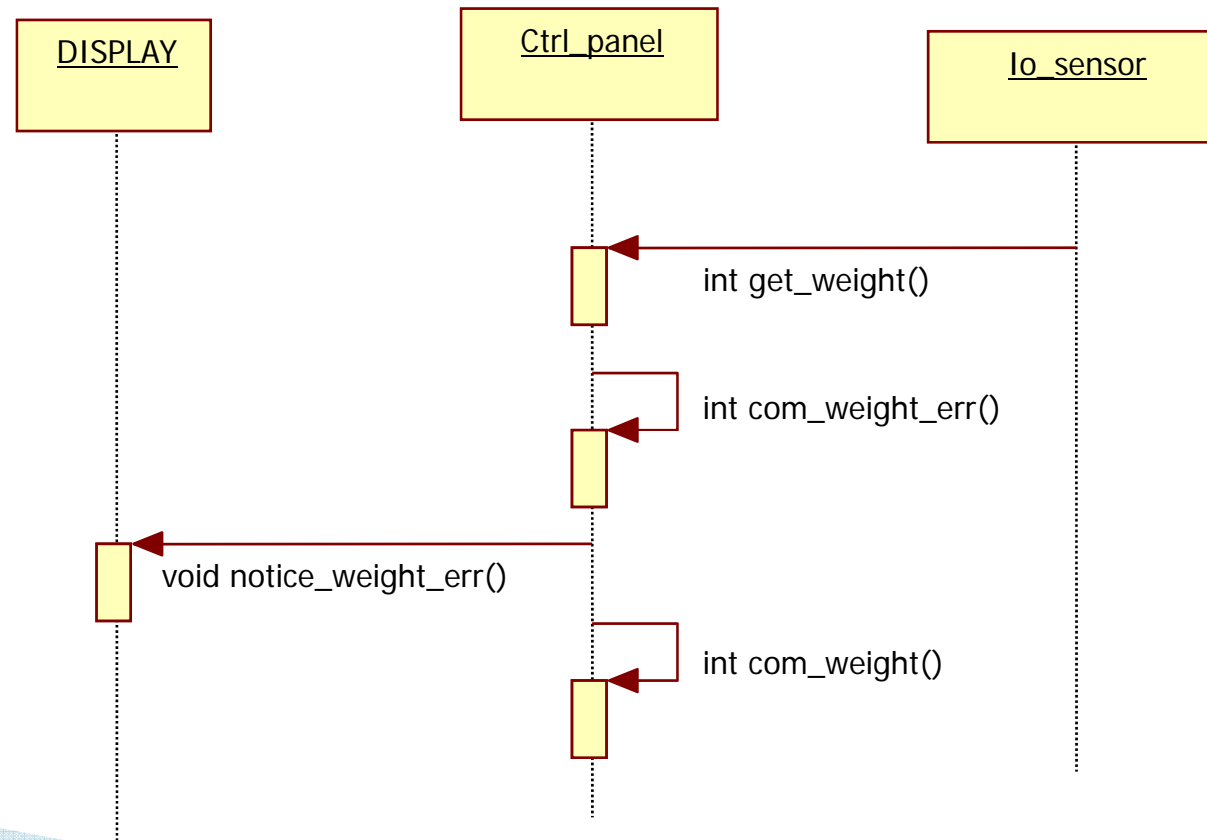
2044. Define Interaction Diagrams

▶ 9. Open and shut door



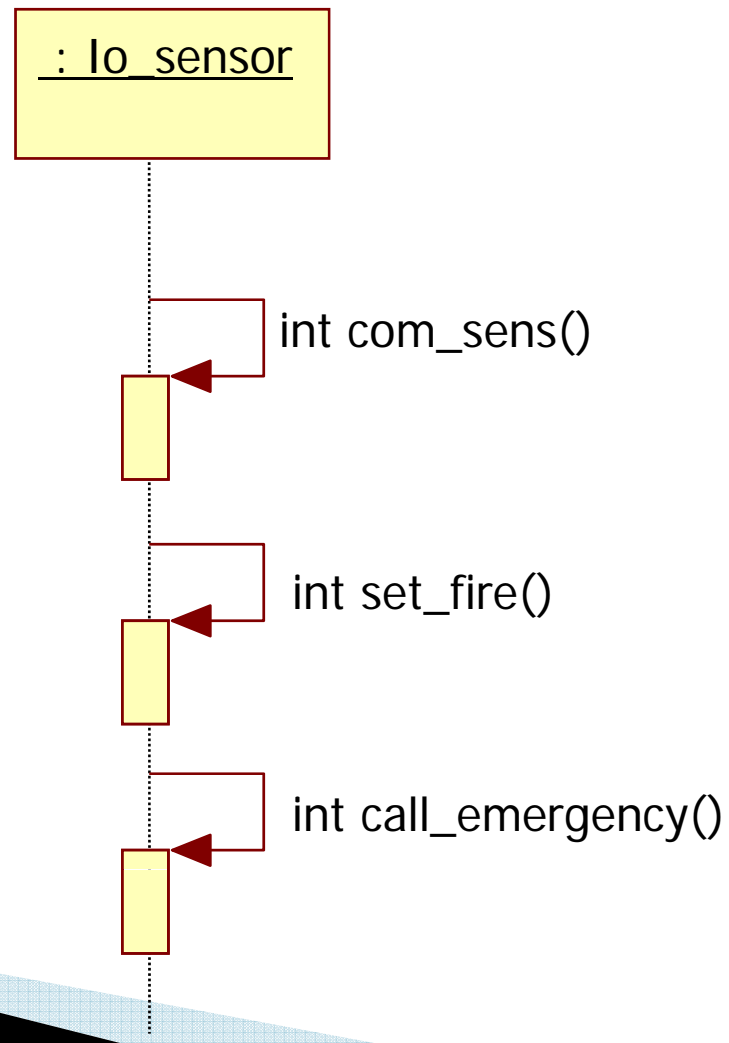
2044. Define Interaction Diagrams

▶ 10. Warn Over Weight



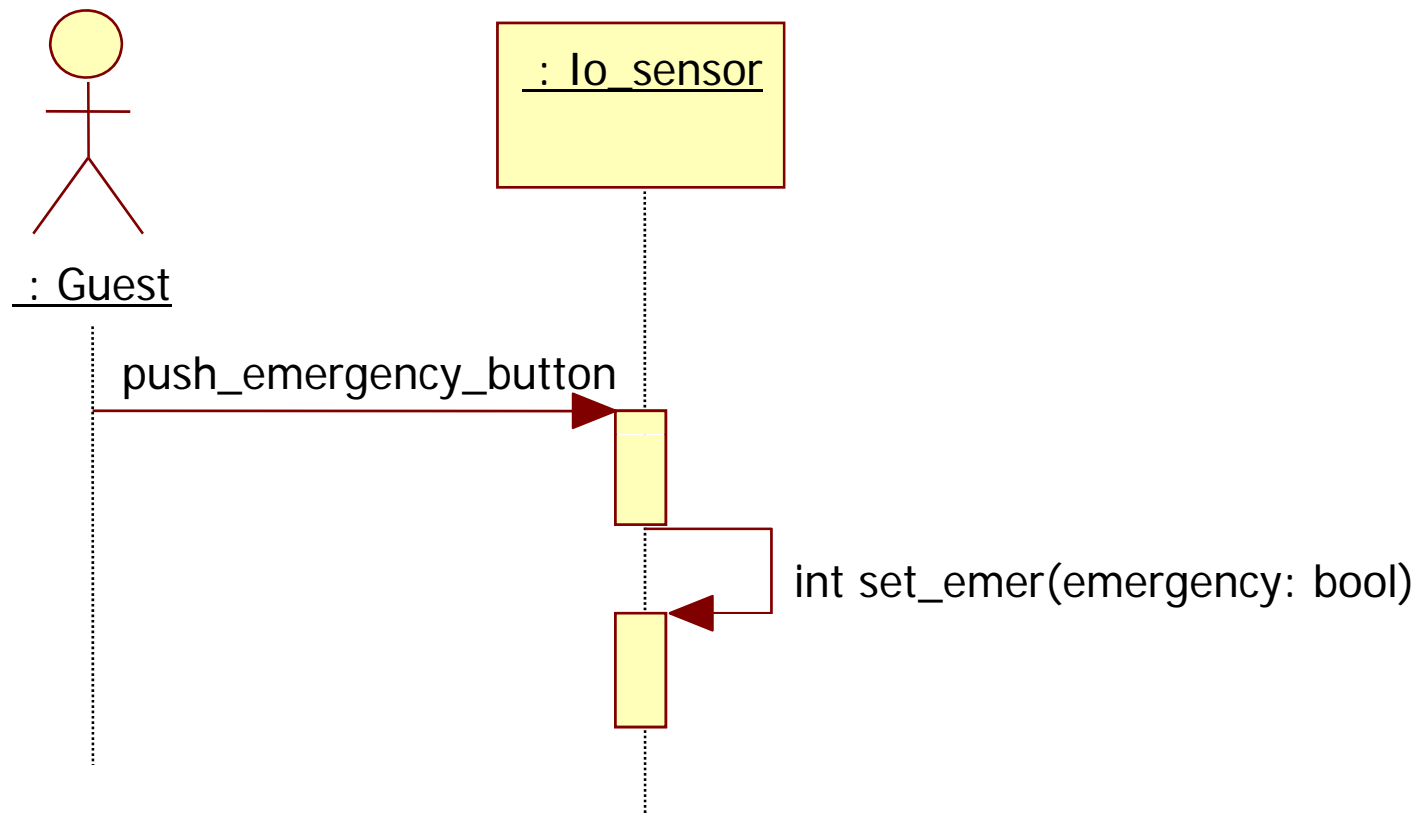
2044. Define Interaction Diagrams

▶ 11. Sense fire



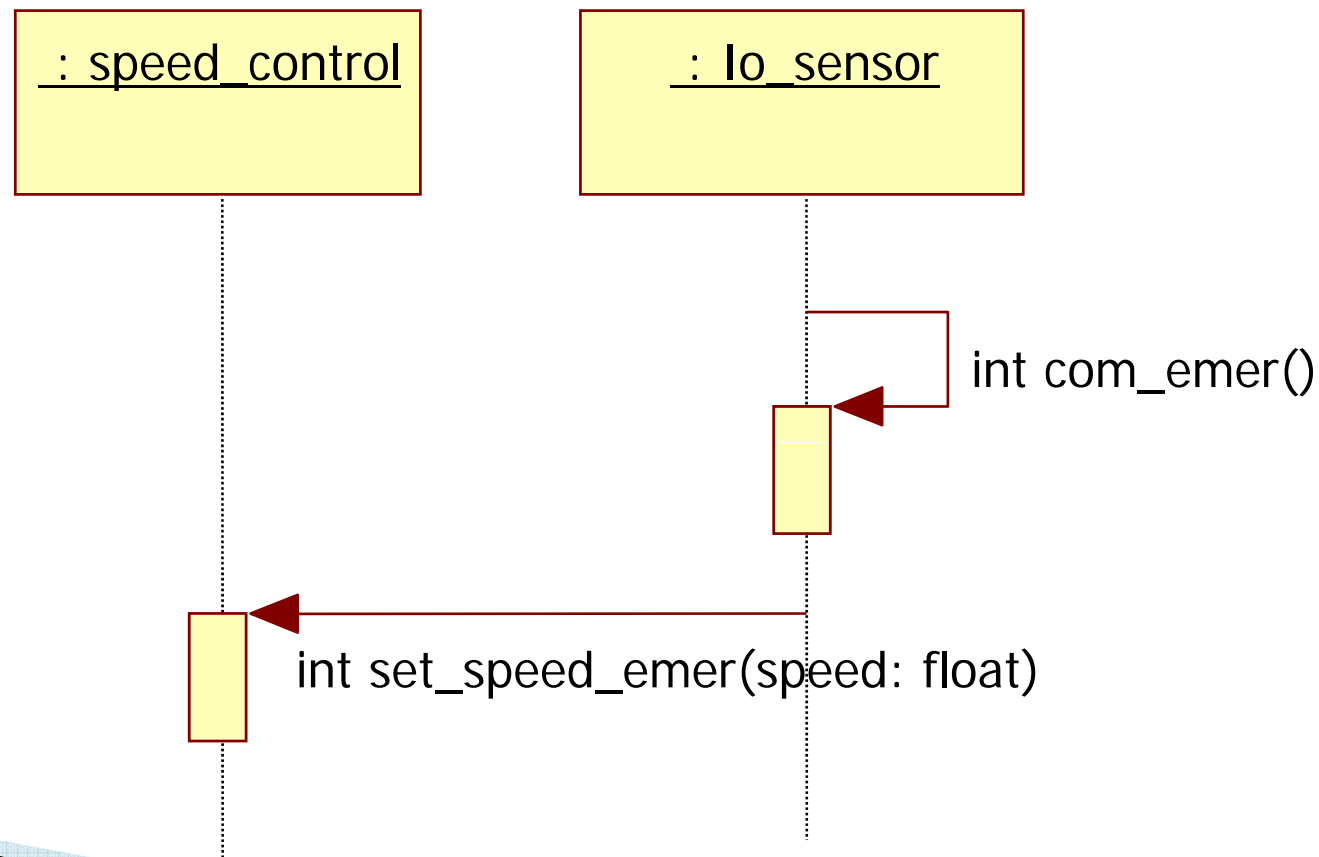
2044. Define Interaction Diagrams

▶ 12. Sign of Emergency



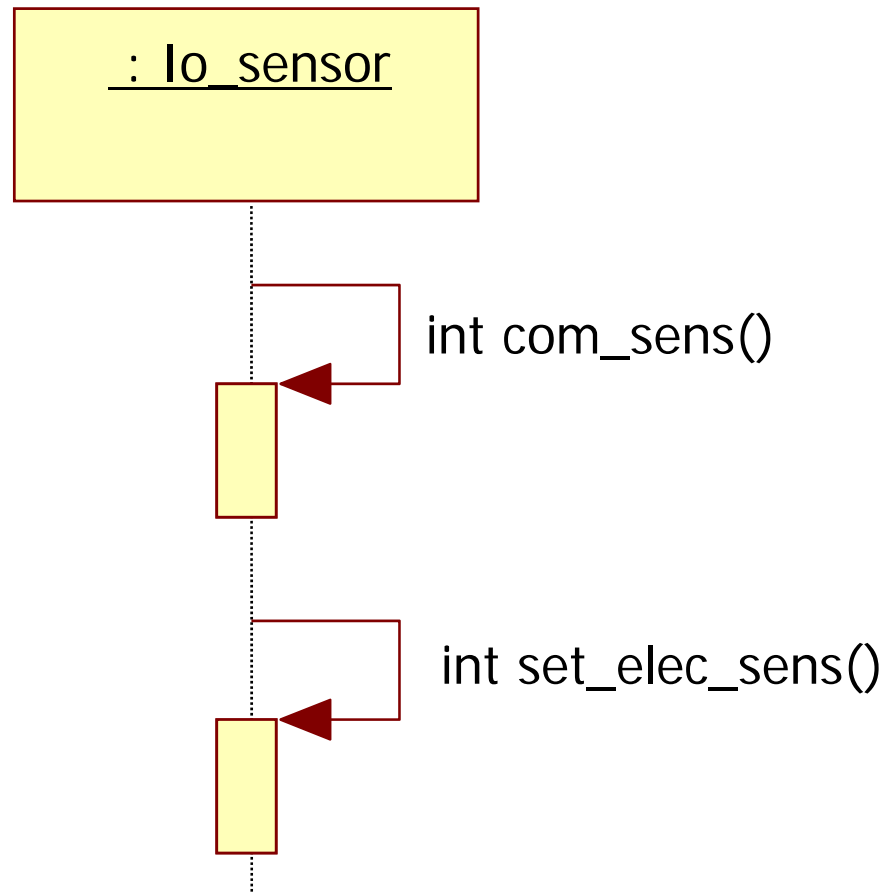
2044. Define Interaction Diagrams

▶ 13. Stop



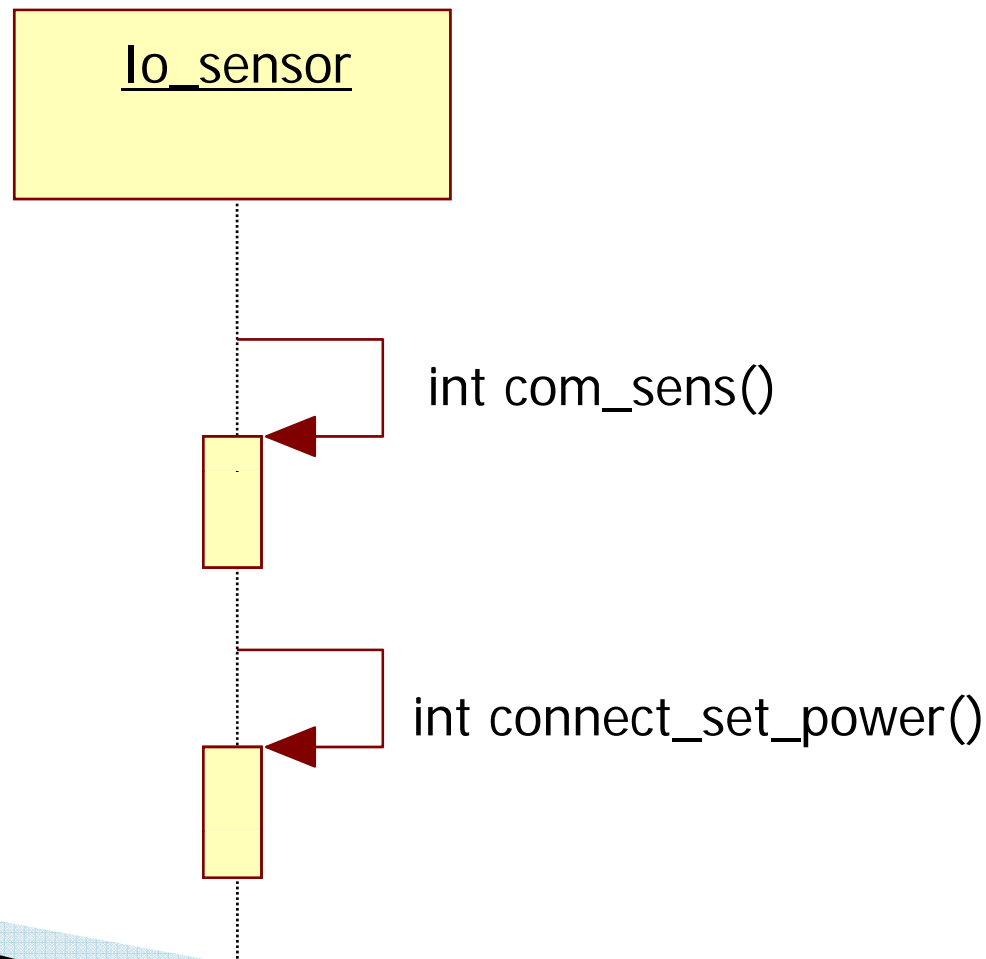
2044. Define Interaction Diagrams

- ▶ 14. Sense interruption of electric power



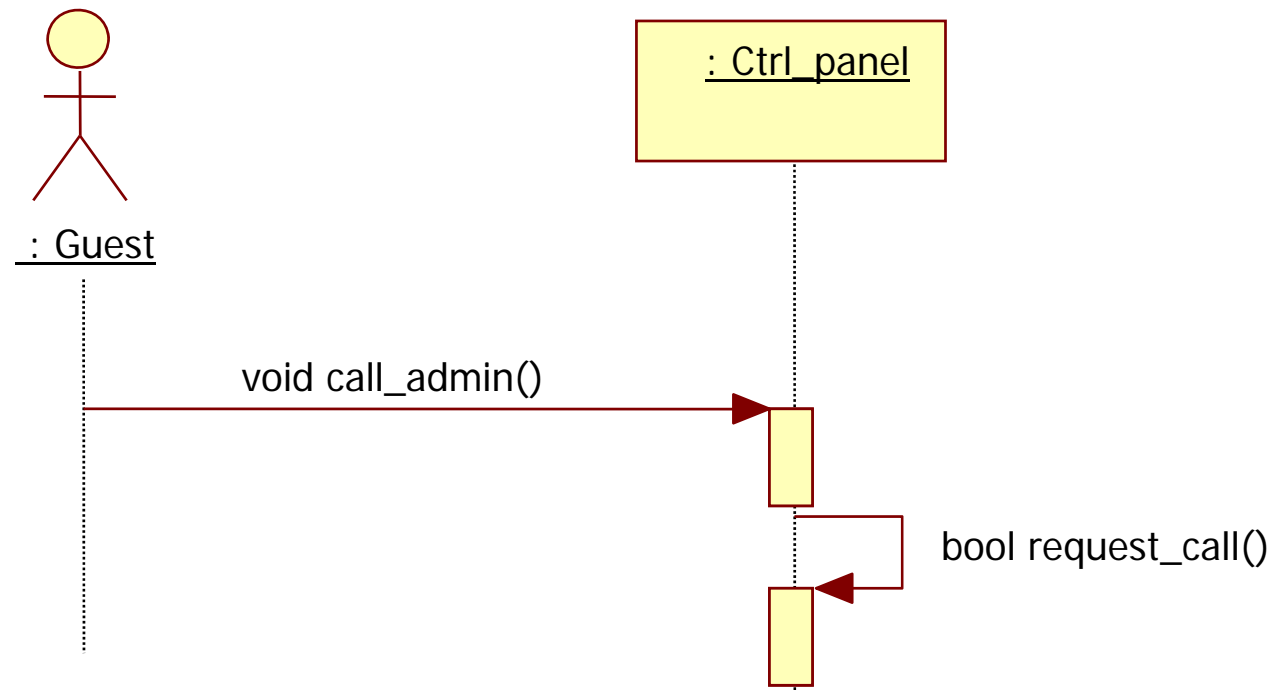
2044. Define Interaction Diagrams

- ▶ 15. Switchover to secondary power



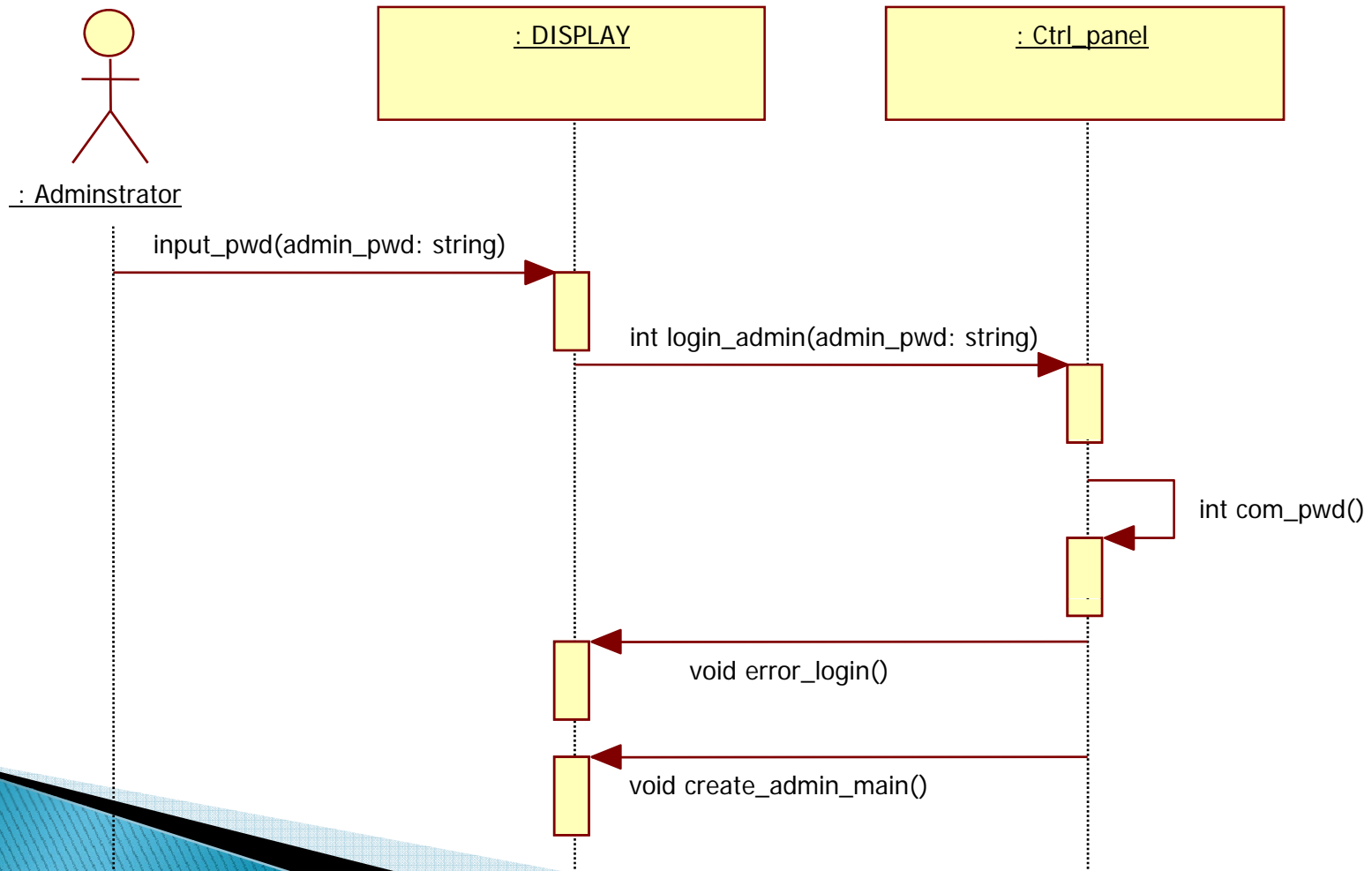
2044. Define Interaction Diagrams

▶ 16. Telephone for Emergency



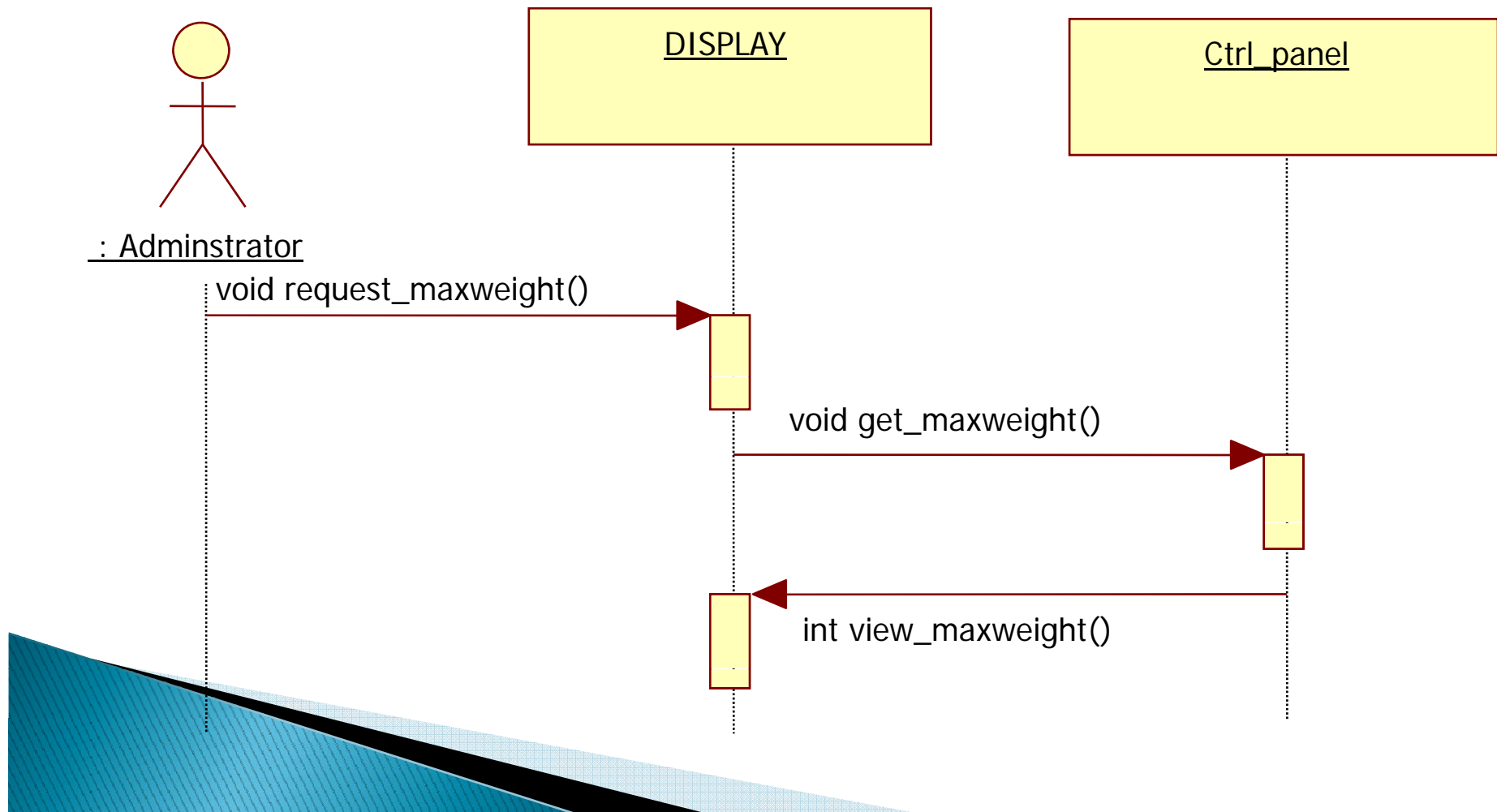
2044. Define Interaction Diagrams

▶ 17. Login admin



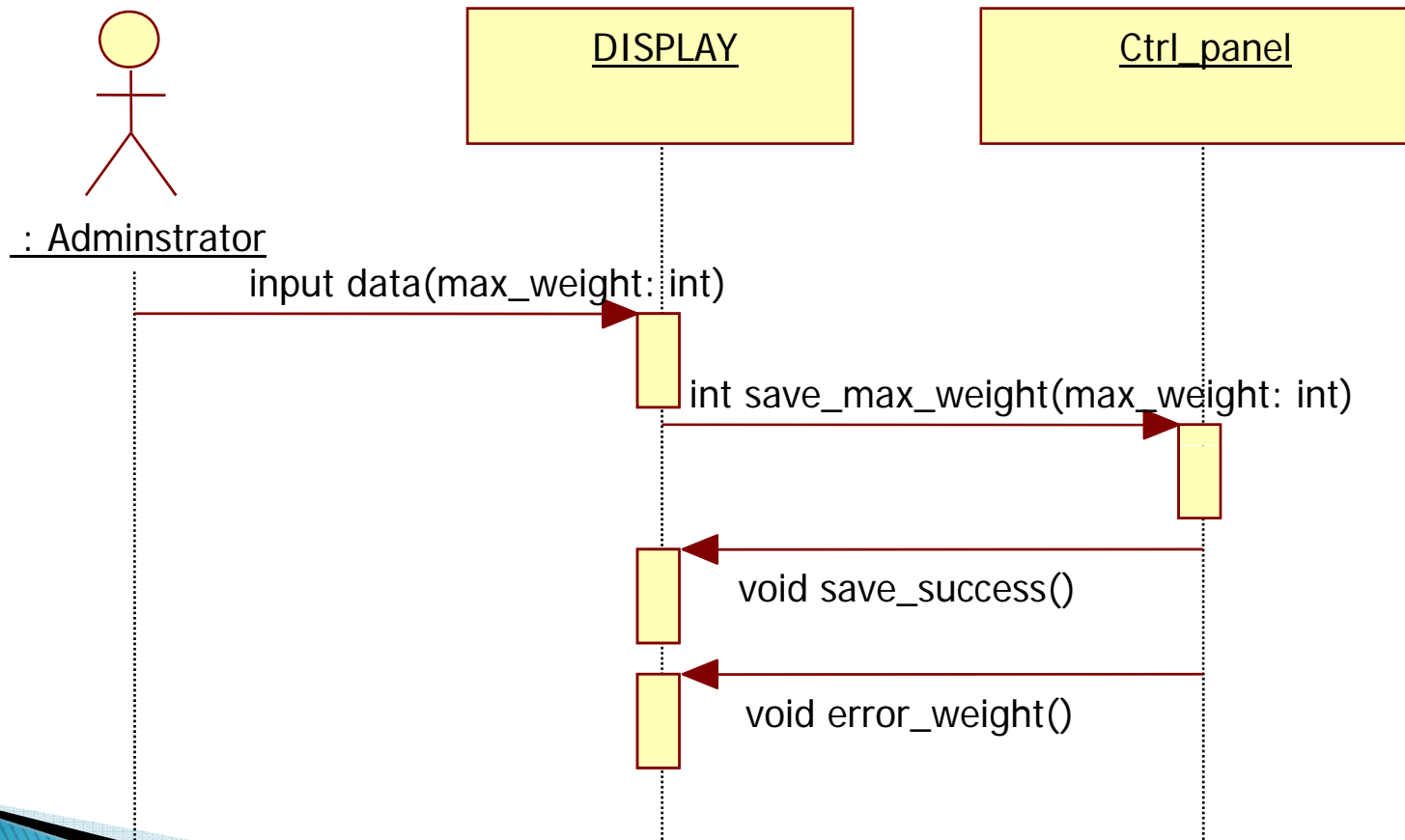
2044. Define Interaction Diagrams

- ▶ 18. View cabin's maximum boarding weight



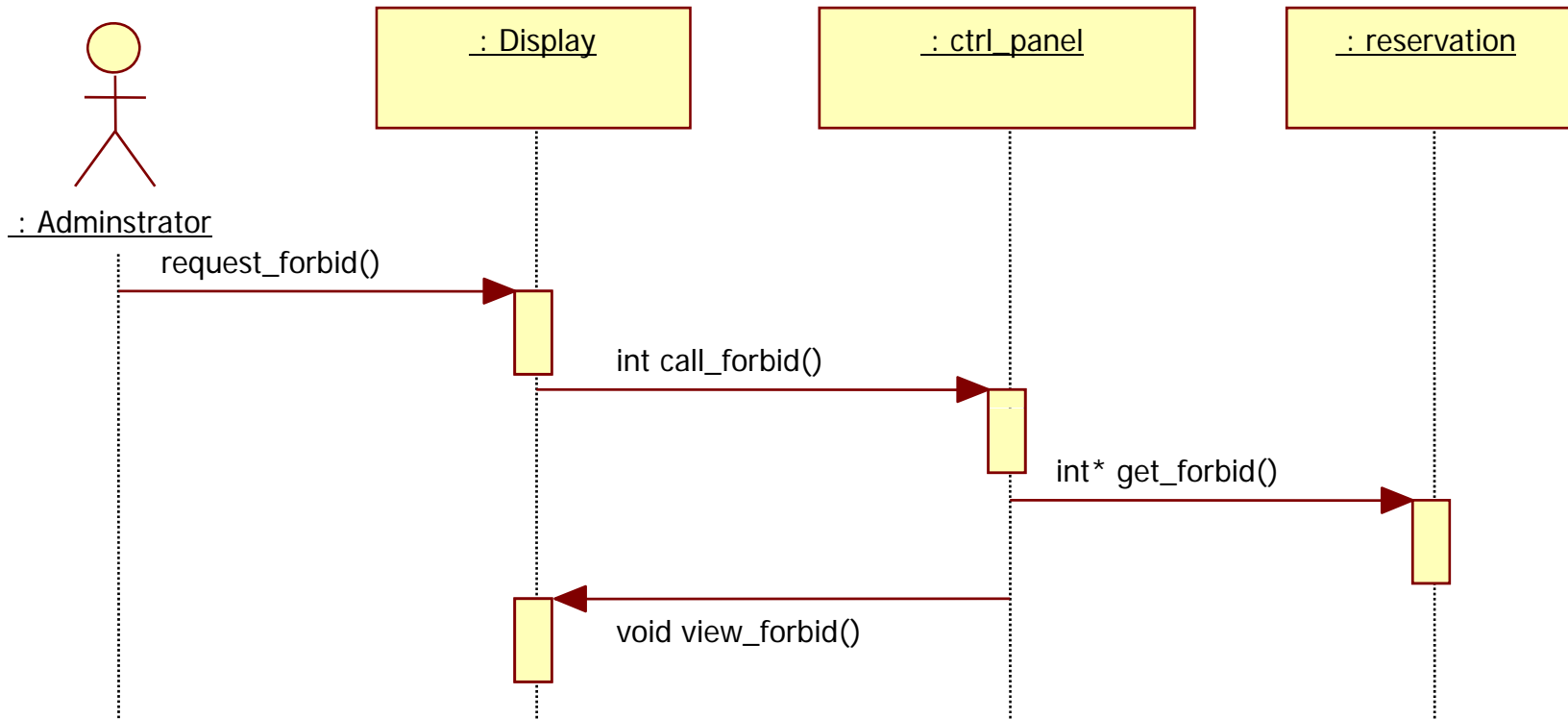
2044. Define Interaction Diagrams

- ▶ 19. Modify cabin's maximum boarding weight



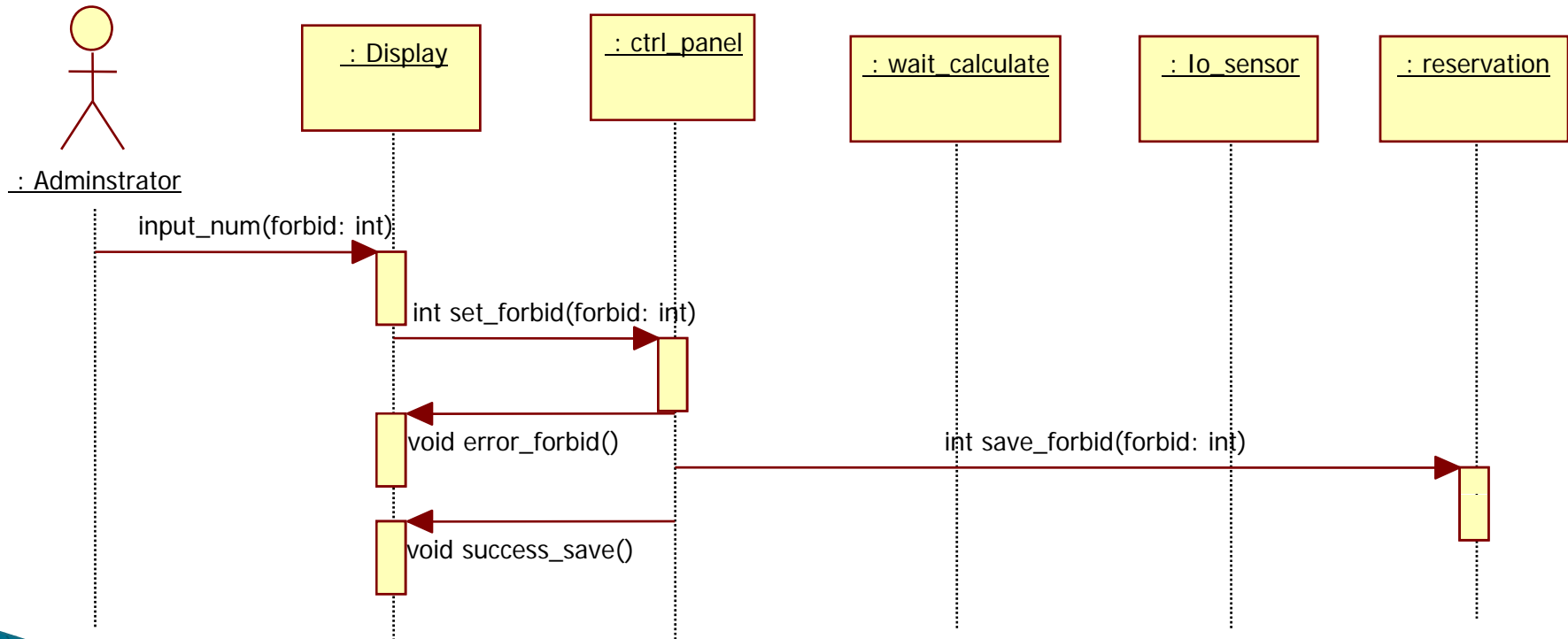
2044. Define Interaction Diagrams

- ▶ 20. View elevator's not available floor

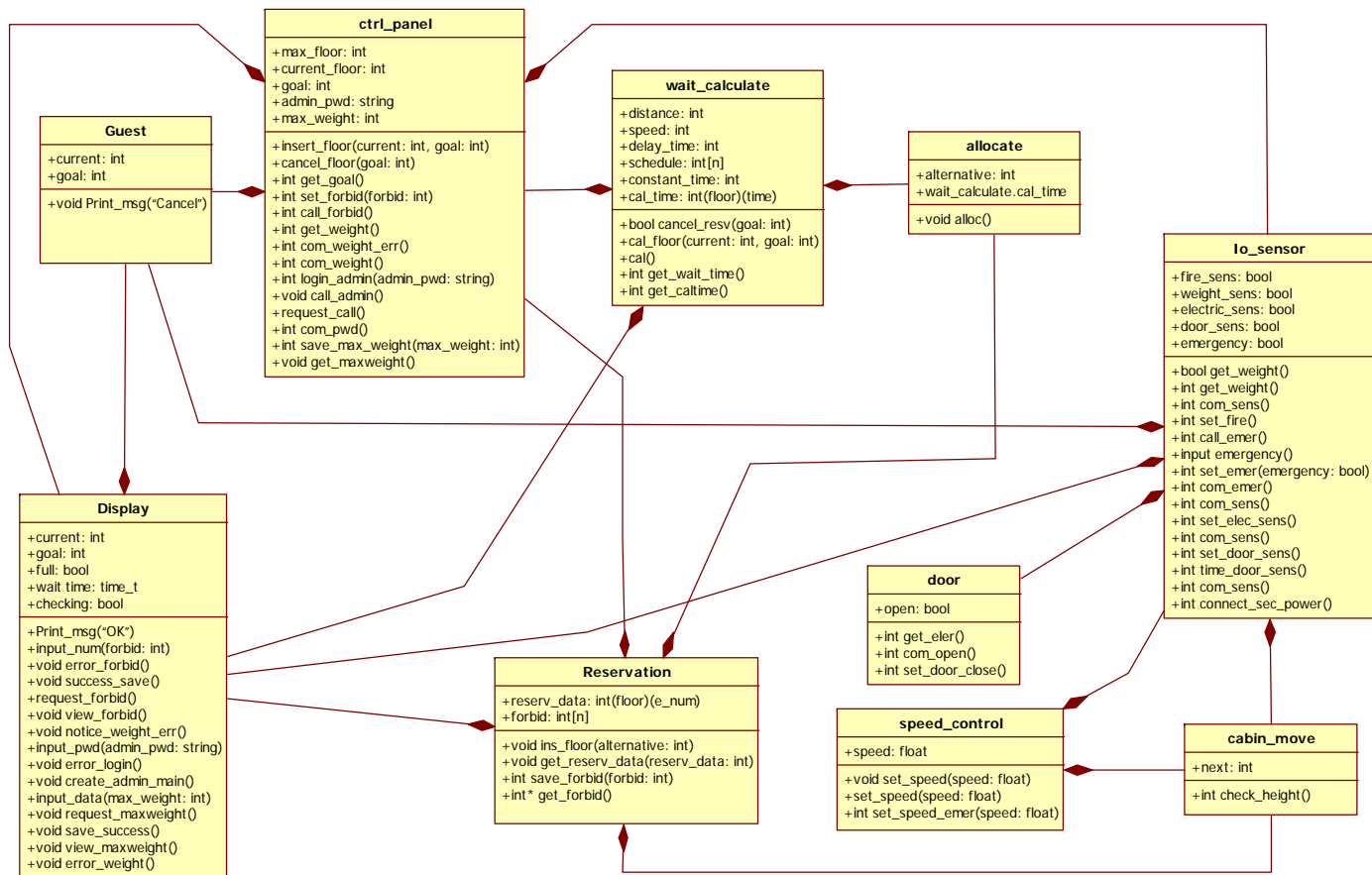


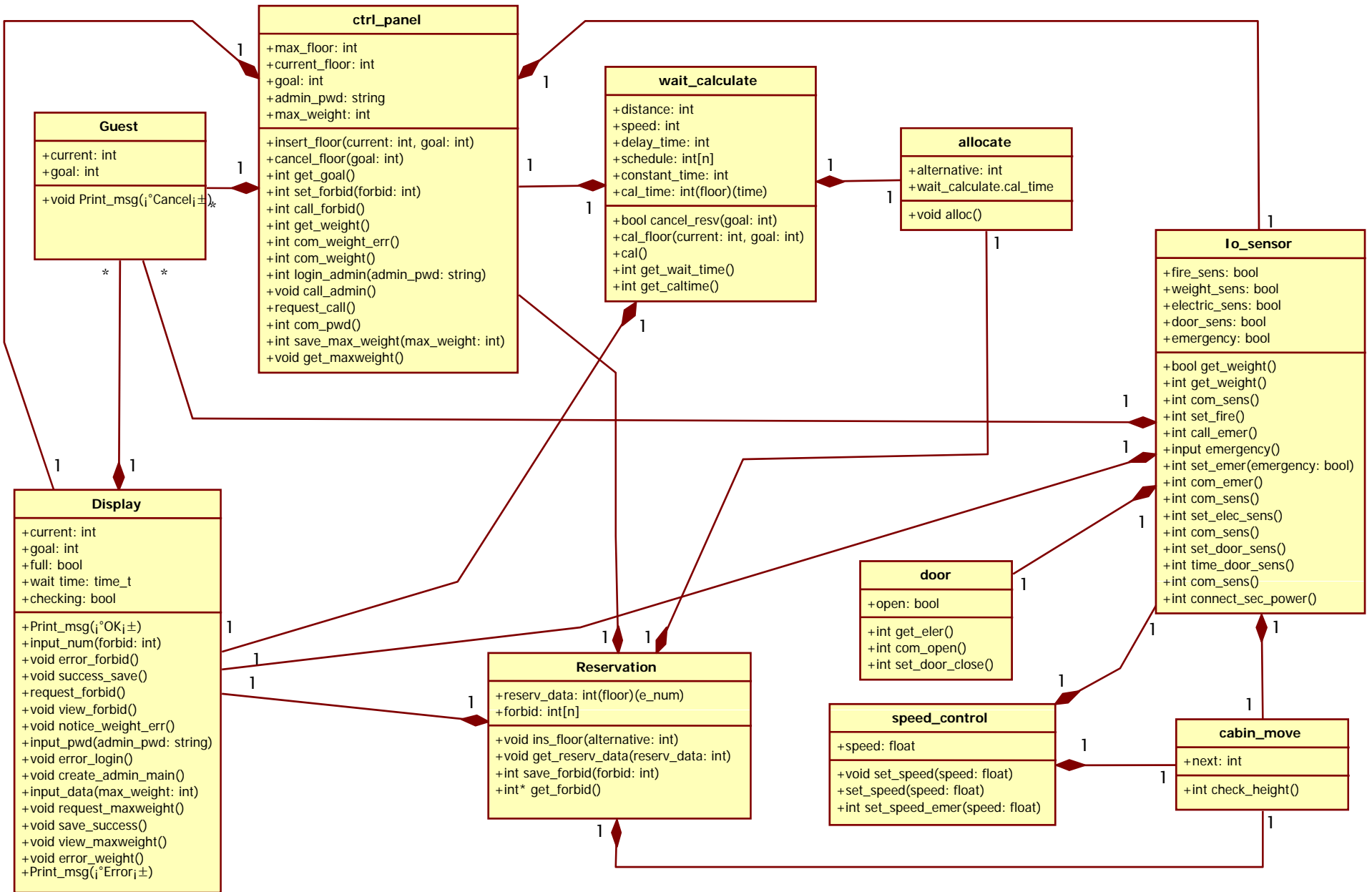
2044. Define Interaction Diagrams

▶ 21. Modify elevator's not available floor



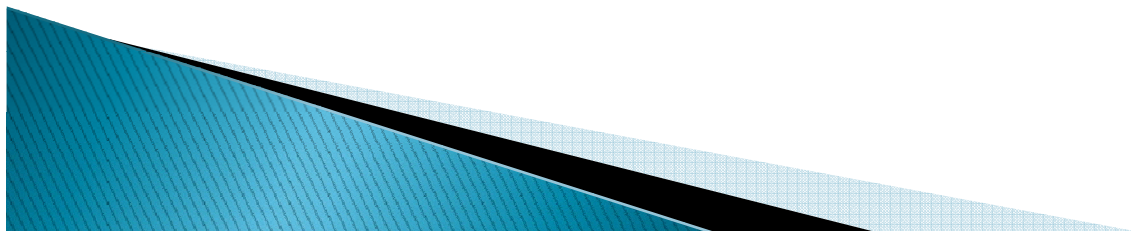
2045. Define Design Class Diagrams





2046. Define Database Schema

- ▶ ERS is not use any Database
- ▶ Thus, ERS is not have any contents about 2046 Define Database Schema.



Q/A

