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SP20-BSE-010

Schemas

Format methods

Assignment 03

1.

[TotalRooms]

(introducing sets)

2.

ROOM_STATUS ::= VACANT | OCCUPIED

RESPONSE ::= success | already-added | already-occupied | already-vacant | not-In-System

(declaring free types)

3.

(use case scenarios)

 $\therefore \text{commission} \hat{=} \text{commission OK} \vee \text{already-added}$ $\therefore \text{occupy} \hat{=} \text{occupy OK} \vee \text{not-In-System} \vee \text{already-occupied}$ $\therefore \text{vacate} \hat{=} \text{vacate OK} \vee \text{not-In-System} \vee \text{already-vacant}$

4.

(state schema)

System

Rooms : IP TotalRooms

RoomSpecification : Rooms \rightarrow ROOM_STATUS

5.

(Init state)

Init

System

Rooms = \emptyset (roomSpecification is automatically NULL since Rooms = \emptyset)

6.

(use case : commission)

CommissionOK

 Δ system

newRoom? : TotalRooms; Yes! : RESPONSE

newRoom? \notin TotalRoomsroomSpecification' = roomSpecification \cup (newRoom? \rightarrow VACANT)

Yes! = success

House

7.

(Use case : occupy)

OccupiedOK	
Δ System	
room? : TotalRooms	yes! : RESPONSE
room? ∈ TotalRooms	
RoomSpecification(room?) = VACANT	
RoomSpecification' = RoomSpecification ⊕ (room? → occupied)	
yes! = success	

8.

(Use case : vacate)

VacateOK	
Δ System	
inputRoom? : TotalRooms	
yes! : RESPONSE	
inputRoom? ∈ TotalRooms	
RoomSpecification(inputRoom?) = OCCUPIED	
RoomSpecification' = RoomSpecification ⊕ (inputRoom? → VACANT)	
yes! = success	

9.

(query to count occupied rooms)

OccupiedCount	
□ System	
occupiedRooms : P	TotalRooms
occupiedCount : N	
occupiedCount = # (RoomSpecification(occupiedRooms) = OCCUPIED)	

Error Scenarios :

1:

Already Added

System

Room? : Total Rooms

yes! : RESPONSE

Room? ∈ Total Rooms

yes! = Already Added

2:

not In System

System

Room? : Total Rooms

yes! : RESPONSE

Room? ∉ Total Rooms

yes! = not In System

3:

Already Vacant

System

Room? : Total Rooms

yes! : RESPONSE

RoomSpecification (Room?) = VACANT

yes! = Already Vacant

4:

Already Occupied

System

Room? : Total Rooms

yes! : RESPONSE

RoomSpecification (Room?) = OCCUPIED

yes! = already Occupied