

## CIS 28-061 Homework #3: FBN Seat Event / State Diagram

### Submit the State / Event Diagram for a Seat

Consider carefully all the possible states of a specific seat on a Flight Instance, from the time the Flight Instance is created to (hopefully!) successful arrival of the Flight Instance at its Destination Gate.

This should include the type of Events that can occur to transition the object between states. Additional factors for real airlines should be considered. For FBN:

The FBN “Seat” E/S diagram is like the Enrollment System “Section” E/S diagram. It is broken into phases.

#### Ticketing Phase:

- The creation of a Flight Instance 90 days before departure creates all the Seats in the Seat Chart in the “Available” state.
- During this phase, a specific Seat on the Flight Instance (ex: 22B) may be ticketed (for a passenger with a reservation), in which case the Seat becomes “Taken”.
- Reservations can get cancelled, invalidating the Ticket and freeing the Seat.
- If the Flight Instance itself is cancelled, every Taken Seat must notify its Ticket.

#### Plane Assignment Phase

- A Seat starts out as either Available or Taken.
- The plane assigned to the Flight Instance could have a broken seat, in which case the corresponding Seat in the Seat Chart for this Flight Instance receives a “YouAreBroken” event. If the Seat state had been “Taken”, the ticketed Passenger is put at the front of the Flight Instance’s “Wait List”. Regardless of its previous state, the new state of the Seat is then set to “Broken”
- If the Flight Instance is cancelled, a Taken Seat must notify its Ticket.
- If the Flight Instance is delayed, a Taken Seat must notify its Ticket.
- Once a Ticket is scanned at the Gate and the Passenger enters the Plane, the corresponding “Taken” Seat is notified that the “Passenger Onboard” event has occurred, and the Seat state is set to “Occupied”.
- The phase ends once the “InitialBoardingComplete” event is received, at which point things get interesting if there is a wait list of Passengers hoping to get on this Plane (including any Passengers holding a Ticket for a broken Seat).

#### In the InitialBoardingComplete Phase

- A Seat starts out as either Available, Broken, Taken or Occupied.
  - Any Taken Seat is set to Available (because the passenger missed the flight)
- The “Wait List” is processed to fill any available Seats. This means:
  - An “available” Seat may receive a “Passenger Onboard” event at which point it changes its state to “Occupied”
- The Boarding process ends when the DoorsAreShut event is received.
  - The State of any Broken or Available Seat is then set to Empty

## Post Boarding

- A Seat at this point is either Empty or Occupied. The plane takes off. The plane lands and taxis to the Gate. The Seat cares about none of this
- The passengers disembark. A “FlightInstanceCompleted” event arrives.
  - An Occupied Seat notifies its Ticket that this has occurred.
- All Seats are then archived as part of the Flight Instance archive

## Homework Assumptions:

- It is assumed that the same Events and States apply to all Seats (whether coach, upgrade or business) and no matter what additional equipment they have.
- The diagram should be similar to the State / Event diagram for a Section that was reviewed in class.
- The focus should be entirely on the SEAT. Not the passenger, not the Plane and not the Flight Instance, unless what happens to them affects the state of a Seat (see above description).

**Additional Requirements:** The state / event diagram should be relatively neat and the required conventions must be followed:

- **Arrow:** Event [Conditional] / Action
- **Rectangle:** Stable State (can only leave via an Arrow that includes an Event)
- **Ovals:** Transient State (can only leave via an Arrow that does **not** include an Event)