Restaurant Simulation - Objects and References

# 1. Restaurant

\*\*Stereotype:\*\* «inherits SimEntity»

\*\*Constraint:\*\* {manages operations}

\*\*Attributes:\*\*

* - name: String
* - tables: List<Table>
* - menu: List<Platter>
* - staff: List<Staff>
* - revenue: double
* - avgWalkTime: double
* - globals: GlobalVariables
* - decisionEngine: GlobalMethods

\*\*Methods:\*\*

* + registerLoggables()
* + triggerLog()
* + simulateDay()
* + decideStaffing()
* + decideTableAssignments()
* + decideInventoryRestock()
* + decideStaffing (uses Probability: + RushHourOverloadChance)
* decideInventoryRestock (uses Probability: IngredientSpoilageRate)
* + getGlobals(): GlobalVariables
* + getDecisionEngine(): GlobalMethods
* + evaluate(): boolean
* + commit(): void
* + getState(): String[][]

# 2. Hostess

\*\*Stereotype:\*\* «inherits SimEntity»

\*\*Constraint:\*\* {assigns tables}

\*\*Attributes:\*\*

* - name: String

\*\*Methods:\*\*

* + registerLoggables()
* + triggerLog()
* + greetCustomer(Customer)
* + seatCustomer(Customer, Table)
* + decideTableAssignment(Customer)
* + releaseTableDecision(Table, Customer)
* + decideSeating()
* + decideQueueOrder()
* decideSeating (uses Probability: OptimalTableSelectionProbability)
* decideQueueOrder (uses Probability: QueueBalkingProbability)
* + evaluate(): boolean
* + commit(): void
* + getState(): String[][]

# 3. CashRegister

\*\*Stereotype:\*\* «inherits SimEntity»

\*\*Constraint:\*\* {tracks revenue}

\*\*Attributes:\*\*

* - totalStoreIncome: double
* - totalTips: double

\*\*Methods:\*\*

* + registerLoggables()
* + triggerLog()
* + processPayment(Server, Order, double tip)
* + recordTip(Server, double tip)
* + decidePaymentHandling()
* + evaluate(): boolean
* + commit(): void
* + getState(): String[][]

# 4. Table

\*\*Stereotype:\*\* «inherits SimEntity»

\*\*Constraint:\*\* {seating location}

\*\*Attributes:\*\*

* - id: int
* - capacity: int
* - location: String
* - occupied: boolean

\*\*Methods:\*\*

* + registerLoggables()
* + triggerLog()
* + assignCustomer(Customer)
* + clearTable()
* + decideClearTable()
* + evaluate(): boolean
* + commit(): void
* + getState(): String[][]

# 5. Platter

\*\*Stereotype:\*\* «inherits SimEntity»

\*\*Constraint:\*\* {cookable item}

\*\*Attributes:\*\*

* - name: String
* - ingredients: List<Ingredient>
* - cookingTime: int
* - price: double

\*\*Methods:\*\*

* + registerLoggables()
* + triggerLog()
* + prepare()
* + evaluate(): boolean
* + commit(): void
* + getState(): String[][]

# 6. Ingredient

\*\*Stereotype:\*\* «inherits SimEntity»

\*\*Constraint:\*\* {perishable goods}

\*\*Attributes:\*\*

* - name: String
* - quantity: double
* - costPerUnit: double
* - expiryDate: Date

\*\*Methods:\*\*

* + registerLoggables()
* + triggerLog()
* + evaluate(): boolean
* + commit(): void
* + getState(): String[][]

# 7. Cook

\*\*Stereotype:\*\* «inherits SimEntity»

\*\*Constraint:\*\* {kitchen staff}

\*\*Attributes:\*\*

* - name: String
* - skillLevel: int

\*\*Methods:\*\*

* + registerLoggables()
* + triggerLog()
* + cook(Platter)
* + prep(Platter)
* + announceOrder(Table)
* + decideNextOrder()
* + decideCookingPriority()
* decideNextOrder (uses Probability: PrepTimeVariance)
* decideCookingPriority (uses Probability: CookingDelayRate)
* + evaluate(): boolean
* + commit(): void
* + getState(): String[][]

# 8. Server

\*\*Stereotype:\*\* «inherits SimEntity»

\*\*Constraint:\*\* {floor staff}

\*\*Attributes:\*\*

* - name: String
* - tablesAssigned: List<Table>

\*\*Methods:\*\*

* + registerLoggables()
* + triggerLog()
* + serve(Table)
* + takeOrder(Customer)
* + deliverCheck(Customer)
* + returnPayment(CashRegister)
* + decideDeliverySequence()
* + decideTipHandling()
* decideDeliverySequence (uses Probability: ServiceDelayVariance)
* decideTipHandling (uses Probability: TipLikelihood)
* + evaluate(): boolean
* + commit(): void
* + getState(): String[][]

# 9. ServerTable

\*\*Stereotype:\*\* «inherits SimEntity»

\*\*Constraint:\*\* {pickup counter}

\*\*Attributes:\*\*

* - bell: boolean
* - orderQueue: Queue<Order>

\*\*Methods:\*\*

* + registerLoggables()
* + triggerLog()
* + announceOrder(Order)
* + pickUpOrder(Server)
* + viewNextOrder()
* + evaluate(): boolean
* + commit(): void
* + getState(): String[][]

# 10. Order

\*\*Stereotype:\*\* «inherits SimEntity»

\*\*Constraint:\*\* {food request}

\*\*Attributes:\*\*

* - platter: Platter
* - table: Table
* - timePlaced: int

\*\*Methods:\*\*

* + registerLoggables()
* + triggerLog()
* + getTable()
* + getPlatter()
* + calculateTip(happiness: double)
* + evaluate(): boolean
* + commit(): void
* + getState(): String[][]

# 11. Customer

\*\*Stereotype:\*\* «inherits SimEntity»

\*\*Constraint:\*\* {dining patron}

\*\*Attributes:\*\*

* - groupSize: int
* - patience: int
* - satisfaction: int
* - tablePreference: String

\*\*Methods:\*\*

* + registerLoggables()
* + triggerLog()
* + requestTable(String)
* + order(Platter)
* + leave()
* + decideExit()
* + decideReorder()
* decideExit (uses Probability: PatienceThreshold)
* decideReorder (uses Probability: ReorderLikelihood)
* + evaluate(): boolean
* + commit(): void
* + getState(): String[][]

# 12. Inventory

\*\*Stereotype:\*\* «inherits SimEntity»

\*\*Constraint:\*\* {stock control}

\*\*Attributes:\*\*

* - ingredients: List<Ingredient>

\*\*Methods:\*\*

* + registerLoggables()
* + triggerLog()
* + restock()
* + checkStock(Platter)
* + decideRestockTiming()
* + evaluate(): boolean
* + commit(): void
* + getState(): String[][]

# 13. Refrigerator

\*\*Stereotype:\*\* «inherits SimEntity»

\*\*Constraint:\*\* {cold storage}

\*\*Attributes:\*\*

* - capacity: double

\*\*Methods:\*\*

* + registerLoggables()
* + triggerLog()
* + store(Ingredient)
* + remove(Ingredient)
* + evaluate(): boolean
* + commit(): void
* + getState(): String[][]

# 14. Stove

\*\*Stereotype:\*\* «inherits SimEntity»

\*\*Constraint:\*\* {hot line}

\*\*Attributes:\*\*

* - slots: int

\*\*Methods:\*\*

* + registerLoggables()
* + triggerLog()
* + startCooking(Platter)
* + finishCooking(Platter)
* + evaluate(): boolean
* + commit(): void
* + getState(): String[][]

# 15. Finance

\*\*Stereotype:\*\* «inherits SimEntity»

\*\*Constraint:\*\* {tracks profit}

\*\*Attributes:\*\*

* - fixedCosts: double
* - laborCosts: double

\*\*Methods:\*\*

* + registerLoggables()
* + triggerLog()
* + calculateNetRevenue()
* + decideExpenseApproval()
* + evaluate(): boolean
* + commit(): void
* + getState(): String[][]

# 16. SimulationClock

\*\*Stereotype:\*\* «Utility»

\*\*Constraint:\*\* {drives simulation}

\*\*Attributes:\*\*

* - currentTime: int
* - tickRate: int

\*\*Methods:\*\*

* + advanceTime()
* + scheduleEvent()
* + getTime()
* + decideNextEventTrigger()
* + evaluate(): boolean
* + commit(): void
* + getState(): String[][]

# 19. SimulationManager

\*\*Stereotype:\*\* «Simulation Kernel with Console & Waveform»

\*\*Constraint:\*\* {drives simulation clk}

\*\*Methods:\*\*

* + registerLoggables(objectName: String, logMap: Map<String, Supplier<Object>>)
* + logObject(objectName: String)
* + triggerLog(objectName: String)
* + loadInitFile(filename: String)
* + resetSimulation()
* + saveState(filename: String)
* + setVCD(filename: String)
* + run(int): void
* + stepOnce(): void
* + getClock(): SimulationClock
* + getProcesses(): List<SimProcess>
* + startConsole(): void
* + listObjects(): void
* + showObject(String): void
* + setValue(String, String, String): void
* + startLogging(String): void
* + stopLogging(): void
* + logTick(int): void
* + displayStates(): void

# Object Connections (References)

* 1. Restaurant ➝ 2. Hostess
* 1. Restaurant ➝ 4. Table
* 1. Restaurant ➝ 7. Cook
* 1. Restaurant ➝ 8. Server
* 1. Restaurant ➝ 12. Inventory
* 1. Restaurant ➝ 15. Finance
* 2. Hostess ➝ 11. Customer
* 2. Hostess ➝ 4. Table
* 2. Hostess ➝ 3. CashRegister
* 4. Table ➝ 11. Customer
* 7. Cook ➝ 5. Platter
* 5. Platter ➝ 6. Ingredient
* 12. Inventory ➝ 6. Ingredient
* 12. Inventory ➝ 13. Refrigerator
* 7. Cook ➝ 14. Stove
* 8. Server ➝ 4. Table
* 7. Cook ➝ 12. Inventory
* 7. Cook ➝ 13. Refrigerator
* 7. Cook ➝ 14. Stove
* 7. Cook ➝ 9. ServerTable
* 9. ServerTable ➝ 10. Order
* 10. Order ➝ 4. Table
* 9. ServerTable ➝ 8. Server
* 8. Server ➝ 10. Order
* 8. Server ➝ 3. CashRegister
* 3. CashRegister ➝ 15. Finance
* 16. SimulationClock ➝ 1. Restaurant
* 16. SimulationClock ➝ 7. Cook
* 16. SimulationClock ➝ 8. Server
* 16. SimulationClock ➝ 11. Customer
* 16. SimulationClock ➝ 2. Hostess
* 19. SimulationManager ➝ 1. Restaurant
* 1. Restaurant ➝ 19. SimulationManager