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TEA-ROOM COVID-19: REQUIREMENT ANALYSIS

1. SETTING

A **teaRoom** rectangular room composed of:

A. **N teaTable**: tables placed inside the tearoom, where the admitted **Client** can consume his tea.

B. **serviceArea**, composed of:

   i. **serviceDesk**: where the entity barman prepares the tea after receiving a request by the waiter;

   ii. **home**: where the waiter can rest if it has no tasks to do.

C. **hall**: where, when he arrives, a **Client** has to wait here before entering the teaRoom (client behaviour explained in point 2). It is equipped with:

   i. **a presenceDetector,** which can detect the presence of a person or other entity;

   ii. **a smartbell,** which measures the temperature of the Client that wants to enter the tearoom and, if the Client's temperature is less than 37.5°, ***sends a request message*** *to the waiter*.

      *1. **clientIdentifier:** value to univocally represent a client's request of entering the tearoom. It is assigned by the smartbell to the client and it is given to the waiter with the aforemetined request.*

   iii. an **entranceDoor**, through which the Client will be admitted inside the tearoom;

   iv. an **exitDoor**, through which the Client can leave the tearoom.

A **tearoom is considered safe** if there are no people inside with a temperature greater or equal than 37.5° and if there are clean tea-tables posed at a proper distance.

2. CLIENT

A. **notifiy interest in entering the tearoom**: once in the **hall**, the Client ***has to send a notification*** to the **smartbell**, whose behavior has been described in point [1.A.iii.2].

B. ***maxWaitTime***: time value that will be given by the **waiter** if there are no free and clean tables available and he's not been sent away because of the temperature, after which either he has entered, or he has to leave.

C. ***maxStayTime***: maximum time that the Client can spend at a teaTable. After it expires, the client has to leave, no matter if he's finished the tea or not.

3. WAITER

The **waiter tasks**, listed in the requirements, are a set of actions the waiter should be able to perform one at the time, *optimizing as much as possible the execution so that the waiting time of the requests coming from each client is minimized*.

A. **Convoy the Client**: once a Client is free to enter the tearoom or ready to leave it, the waiter has to accompany them to and from the table, from and to the entranceDoor and exitDoor, respectively.

B. **Clean the (tea)table**: once the client leaves the table, the waiter has to clean it before another client can occupy it.

4. BARMAN

A. ***receive* order from waiter**: the orders are *transmitted through a WIFI* device by the waiter to the barman.

B. ***notify* waiter of drink ready**: the barman has to send a notification to the waiter once the drink order by a Client is ready. The drink should be prepared in a time that is significantly smaller than the client's maxStayTime.

5. ENTITES AS ACTORS

What we can infer from the requirements is that:

A. we have identified different entities that will come into play in the system (barman, waiter, client, smartbell);

B. all of these entities have a behavior that can be represented as a **Finite State Machine** while also have to keep a **readable state** for the manager;

C. they will need to interact with each other through different kinds of messages.

These three points have highlighted the need for a model representation through the concept of Actor as a Finite State Machine. To do so, we introduce the **QAktor meta-modeling language**, referenced here, so as to close the abstraction gap as much as possible from the beginning and also develop working prototypes fast and easy.

6. DEFINING THE STATES

A. During this first analysis, we have identified the main states the various actors can be in:

   i. **Waiter** can be busy or free;
   ii. **Barman** can be busy or free;
   iii. **Client** can be Outside, waitingInTheHall, seated, finished, payed and left;
   iv. **SmartBell** can be busy or free;

B. even though teaTable is not an actor, we need to keep its state memorized for the system to work properly and for the current state of the teaRoom to be complete. The states the teaTable can be in are:

   i. ***tableClean***: without food residue and sanitized and available;
   ii. ***tableDirty***: not clean but available;
   iii. ***tableBusy***: occupied by a client.

7. TEST PLAN

A. We plan to test various activities:

   i. The **smartBell** must let in the **hall** only **clients** that have a temperature below 37.5° Celsius.
   ii. When a client enters the tearoom, he may only sit at a table that is in the state **tableClean**. If there is no such table available, then the **waiter** must inform the **client** about the **maximum waiting time**.
   iii. The client must leave the **hall** when the **maximum waiting time** is over.
   iv. The client must receive the drink he ordered.
   v. The client must **pay and leave when the maximum stay time** is over.