Facility Management System

System Description and Assumption: This system shall support the management of buildings, their constant use, inspection, and maintenance support when it is needed. The following are the three main functionalities of this system:
1. Facility - this covers the functionalities such as listing all the facilities; adding a new facility; removing a facility; getting and setting detail information such as the name, address, and capacity of facilities; and their current statuses.
2. Facility use - this covers the functionalities such as listing the history of usage; calculating the usage rate of facility; assigning and de-assigning a facility for use.
3. Facility inspect - this covers the functionalities such as inspecting a facility; and listing the inspection history of a facility.
4. Facility maintain - this covers the maintenance of a facility such as making a maintenance request; scheduling a maintenance request; checking maintenance status; listing maintenance requests; calculating down time of a facility.

Public interfaces provided by domain layer:

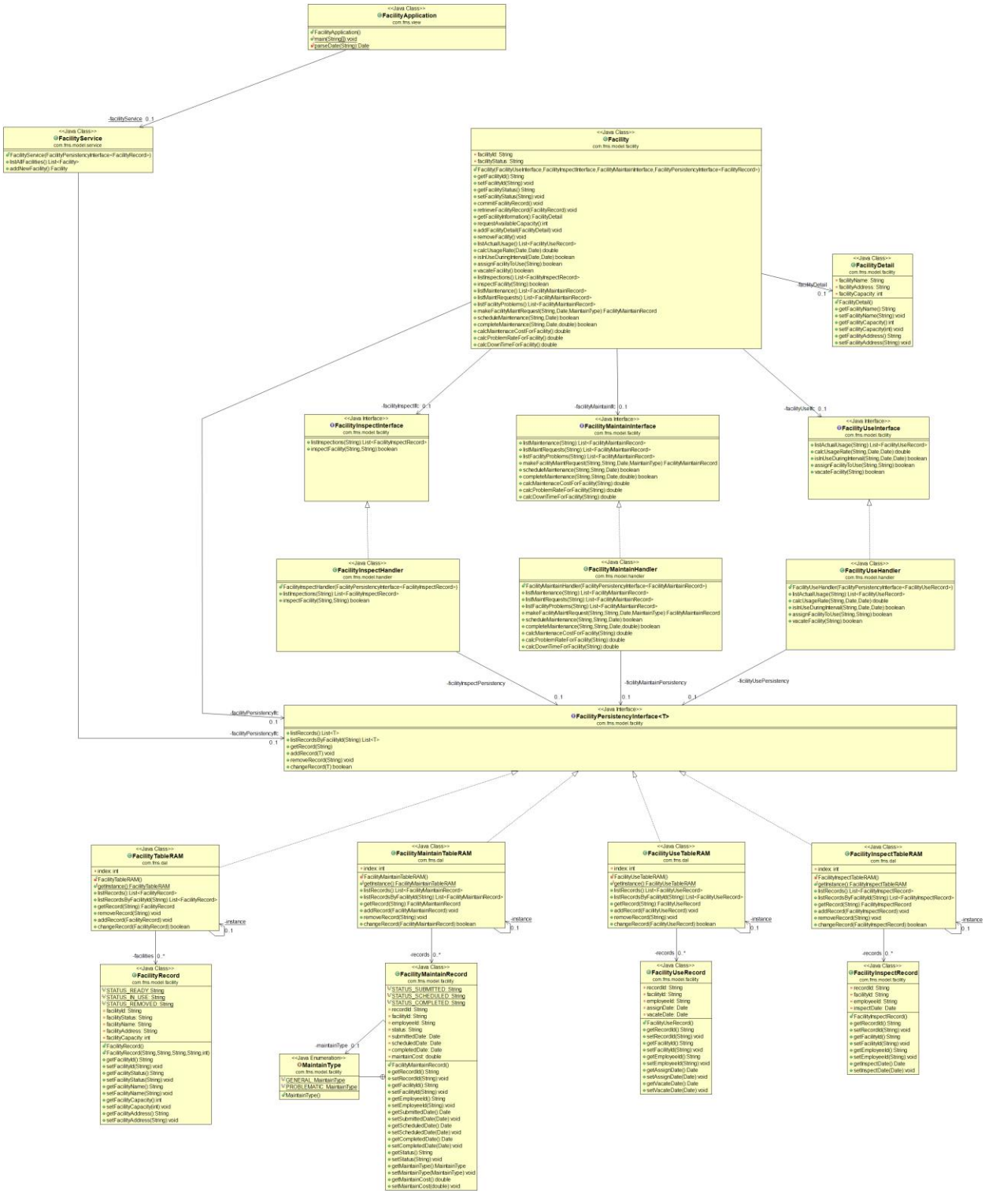
```
class FacilityService
        // List all the facilities
        public List<Facility> listAllFacilities()

        // Add a new facility
        public Facility addNewFacility()

class Facility
        /* Facility public interfaces */
        // Get the detail information of the facility
        public FacilityDetail getFacilityInformation()

        // Request the available capacity of the facility
        public int requestAvailableCapacity()

        // Add or set the detail information of the facility
        public void addFacilityDetail(FacilityDetail facilityDetail)

        // Remove the facility
        public void removeFacility()

        /* Facility use-related public interfaces (call FacilityUseInterface) */
        // List the actual usage of the facility
        public List<FacilityUseRecord> listActualUsage()

        // Calculate the usage rate of the facility
        public double calcUsageRate(Date startDate, Date endDate)

        // Check if the facility is in-use or not from start date to end date
        public boolean isInUseDuringInterval(Date startDate, Date endDate)

        // Assign the facility to use
        public boolean assignFacilityToUse(String employeeId)

        // Vacate the facility
        public boolean vacateFacility()
```

```
/* Facility inspect-related public interfaces (call FacilityInspecInterface) */
// List all the inspection records of the facility
public List<FacilityInspectRecord> listInspections()

// Inspect the facility
public boolean inspectFacility(String employeeId)

/* Facility maintain-related public interfaces (call FacilityMaintainInterface) */
// List all the maintain records of the facility
public List<FacilityMaintainRecord> listMaintenance()

// List the maintain records of the facility with submitted status
public List<FacilityMaintainRecord> listMaintRequests()

// List the maintain records of the facility with problematic type
public List<FacilityMaintainRecord> listFacilityProblems()

// Submit a maintain record for the facility
public FacilityMaintainRecord makeFacilityMaintRequest(String employeeId, Date submittedDate,
FacilityMaintainRecord.MaintainType maintainType)

// Schedule a maintain record for the facility with scheduled date
public boolean scheduleMaintenance(String recordId, Date scheduledDate)

// Complete a maintain record for the facility with completed date and maintain cost
public boolean completeMaintenance(String recordId, Date completedDate, double maintainCost)

// Calculate the total maintain cost for the facility
public double calcMaintenaceCostForFacility()

// Calculate the problem rate for the facility (number of problematic records by number of total records)
public double calcProblemRateForFacility()

// Calculate the down time for the facility (days between submitted date and completed date of the
problematic records)
public double calcDownTimeForFacility()
```

Public interfaces provided by data access layer:

```
interface FacilityPersistencyInterface<T> {
        public List<T> listRecords();                              // List all the records
        public List<T> listRecordsByFacilityId(String facilityId); // List the records with the specific facility ID
        public T getRecord(String recordId);                       // Get a record with the specific record ID
        public void addRecord(T record);                           // Add a record
        public void removeRecord(String recordId);                 // Remove a record with the specific record ID
        public boolean changeRecord(T record);                     // Change a record
}

public class FacilityTableRAM implements FacilityPersistencyInterface<FacilityRecord>

public class FacilityUseTableRAM implements FacilityPersistencyInterface<FacilityUseRecord>

public class FacilityInspectTableRAM implements FacilityPersistencyInterface<FacilityInspectRecord>

public class FacilityMaintainTableRAM  implements FacilityPersistencyInterface<FacilityMaintainRecord>
```

Design: (UML Class Diagram)



Code:

https://github.com/gaobibo/FacilityManagement