Composition Rules

CR_Usability

```xml
<?xml version="1.0"?>
<Composition>
        <Requirement concern="Usability" id="all">
                <Constraint action="affect" operator="during">
                        <Requirement concern="Performance" id="all"/>
                </Constraint>
                <Outcome action="fullfiled"/>
        </Requirement>
        <Requirement concern="Usability" id="all">
                <Constraint action="affect" operator="during">
                        <Requirement concern="Query_Information" id="all"/>
                </Constraint>
                <Outcome action="fullfiled"/>
        </Requirement>
        <Requirement concern="Usability" id="all">
                <Constraint action="affect" operator="during">
                        <Requirement concern="Complaint_Specification" id="all"/>
                </Constraint>
                <Outcome action="fullfiled"/>
        </Requirement>
</Composition>
```

CR_Liability

```xml
<Composition>
        <Requirement concern="Liability" id="all">
                <Constraint action="affect" operator="during">
                        <Requirement concern="Security" id="all"/>
                </Constraint>
                <Outcome action="fullfiled"/>
        </Requirement>
        <Requirement concern="Liability" id="all">
                <Constraint action="affect" operator="during">
                        <Requirement concern="Persistence" id="all"/>
                </Constraint>
                <Outcome action="fullfiled"/>
        </Requirement>
</Composition>
```

CR_Performance

```xml
<?xml version="1.0"?>
<Composition>
        <Requirement concern="Performance" id="all">
```

```xml
            <Constraint action="affect" operator="during">
                    <Requirement concern="Security" id="all"/>
            </Constraint>
            <Outcome action="fullfiled"/>
        </Requirement>
        <Requirement concern="Performance" id="all">
            <Constraint action="affect" operator="during">
                    <Requirement concern="Persistence" id="all"/>
            </Constraint>
            <Outcome action="fullfiled"/>
        </Requirement>
</Composition>
```

CR_Security

```xml
<?xml version="1.0"?>
<Composition>
        <Requirement concern="Security" id="all">
            <Constraint action="affect" operator="during">
                    <Requirement concern="Liability" id="all"/>
            </Constraint>
            <Outcome action="fullfiled"/>
        </Requirement>
        <Requirement concern="Security" id="all">
            <Constraint action="affect" operator="during">
                    <Requirement concern="Performance" id="all"/>
            </Constraint>
            <Outcome action="fullfiled"/>
        </Requirement>
        <Requirement concern="Security" id="all">
            <Constraint action="affect" operator="during">
                    <Requirement concern="Persistence" id="all"/>
            </Constraint>
            <Outcome action="fullfiled"/>
        </Requirement>
</Composition>
```

CR_Persistence

```xml
<?xml version="1.0"?>
<Composition>
        <Requirement concern="Persistence" id="all">
            <Constraint action="affect" operator="during">
```

```xml
                <Requirement concern="Liability" id="all"/>
            </Constraint>
            <Outcome action="fullfiled"/>
        </Requirement>
        <Requirement concern="Persistence" id="all">
            <Constraint action="affect" operator="during">
                <Requirement concern="Performance" id="all"/>
            </Constraint>
            <Outcome action="fullfiled"/>
        </Requirement>
        <Requirement concern="Persistence" id="all">
            <Constraint action="affect" operator="during">
                <Requirement concern="Security" id="all"/>
            </Constraint>
            <Outcome action="fullfiled"/>
        </Requirement>
        <Requirement concern="Persistence" id="all">
            <Constraint action="affect" operator="during">
                <Requirement concern="Query_Information" id="all"/>
            </Constraint>
            <Outcome action="fullfiled"/>
        </Requirement>
        <Requirement concern="Persistence" id="all">
            <Constraint action="affect" operator="during">
                <Requirement concern="Complaint_Specification" id="all"/>
            </Constraint>
            <Outcome action="fullfiled"/>
        </Requirement>
</Composition>
```

CR_Query_Information

```xml
<?xml version="1.0"?>
<Composition>
        <Requirement concern="Query_Information" id="all">
            <Constraint action="is affected" operator="during">
                <Requirement concern="Usability" id="all"/>
            </Constraint>
            <Outcome action="fullfiled"/>
        </Requirement>

        <Requirement concern="Query_Information" id="all">
            <Constraint action="affect" operator="during">
                <Requirement concern="Persistence" id="all"/>
            </Constraint>
            <Outcome action="fullfiled"/>
        </Requirement>
```

```xml
</Composition>
```

CR_ Register_Tables

```xml
<?xml version="1.0"?>
<Composition>
        <Requirement concern="Register_Tables" id="1" children="include">
                <Constraint action="provide" operator="on">
                        <Requirement concern="Persistence" id="1" children="include"/>
                </Constraint>
                <Outcome action="fullfiled"/>
        </Requirement>
        <Requirement concern="Register_Tables" id="1" children="include">
                <Constraint action="provide" operator="on">
                        <Requirement concern="Security" id="2.1"/>
                        <Requirement concern="Security" id="2.2"/>
                </Constraint>
                <Outcome action="fullfiled"/>
        </Requirement>
</Composition>
```

CR_ Update_Complaint

```xml
<?xml version="1.0"?>
<Composition>
        <Requirement concern="Update_Complaint" id="1.1">
                <Constraint action="provide" operator="on">
                        <Requirement concern="Persistence" id="2.1"/>
                        <Requirement concern="Persistence" id="2.2"/>
                </Constraint>
                <Outcome action="fullfiled"/>
        </Requirement>
        <Requirement concern="Update_Complaint" id="1.2">
                <Constraint action="provide" operator="on">
                        <Requirement concern="Persistence" id="2.3"/>
                </Constraint>
                <Outcome action="fullfiled"/>
        </Requirement>
        <Requirement concern="Update_Complaint" id="1" children="include">
                <Constraint action="provide" operator="on">
                        <Requirement concern="Security" id="2.1"/>
                        <Requirement concern="Security" id="2.2"/>
                </Constraint>
                <Outcome action="fullfiled"/>
        </Requirement>
</Composition>
```

CR_ Register_New_Employee

```xml
<?xml version="1.0"?>
<Composition>
        <Requirement concern="Register_New_Employee" id="1" children="include">
            <Constraint action="provide" operator="on">
                    <Requirement concern="Persistence" id="3" children="include"/>
            </Constraint>
            <Outcome action="fullfiled"/>
        </Requirement>
        <Requirement concern="Register_New_Employee" id="1" children="include">
            <Constraint action="provide" operator="on">
                    <Requirement concern="Security" id="2.1"/>
                    <Requirement concern="Security" id="2.2"/>
            </Constraint>
            <Outcome action="fullfiled"/>
        </Requirement>
</Composition>
```
CR_ Update_Employee

```xml
<?xml version="1.0"?>
<Composition>
        <Requirement concern="Update_Employee" id="1" children="include">
            <Constraint action="provide" operator="on">
                    <Requirement concern="Persistence" id="4" children="include"/>
            </Constraint>
            <Outcome action="fullfiled"/>
        </Requirement>
        <Requirement concern="Update_Employee" id="1" children="include">
            <Constraint action="provide" operator="on">
                    <Requirement concern="Security" id="2.1"/>
                    <Requirement concern="Security" id="2.2"/>
            </Constraint>
            <Outcome action="fullfiled"/>
        </Requirement>
</Composition>
```
CR_ Update_Helt_Unit

```xml
<?xml version="1.0"?>
<Composition>
        <Requirement concern="Update_Helt_Unit" id="1.2">
            <Constraint action="provide" operator="on">
                    <Requirement concern="Persistence" id="5.1"/>
            </Constraint>
            <Outcome action="fullfiled"/>
        </Requirement>
        <Requirement concern="Update_Helt_Unit" id="1.3">
            <Constraint action="provide" operator="on">
                    <Requirement concern="Persistence" id="5.2"/>
                    <Requirement concern="Persistence" id="5.3"/>
```

```xml
            </Constraint>
            <Outcome action="fullfiled"/>
        </Requirement>
        <Requirement concern="Update_Helt_Unit" id="1" children="include">
            <Constraint action="provide" operator="on">
                <Requirement concern="Security" id="2.1"/>
                <Requirement concern="Security" id="2.2"/>
            </Constraint>
            <Outcome action="fullfiled"/>
        </Requirement>
</Composition>
```

CR_ Change_Logged_Employee

```xml
<?xml version="1.0"?>
<Composition>
        <Requirement concern="Change_Logged_Employee" id="1" children="include">
            <Constraint action="provide" operator="on">
                <Requirement concern="Persistence" id="6.1"/>
                <Requirement concern="Persistence" id="6.2"/>
                <Constraint action="provide" operator="on">
                    <Requirement concern="Security" id="2.1"/>
                    <Requirement concern="Security" id="2.2"/>
                </Constraint>
            </Constraint>
            <Outcome action="fullfiled"/>
        </Requirement>
</Composition>
```

CR_Complaint_Specification

```xml
<?xml version="1.0"?>
<Composition>
        <Requirement concern="Complaint_Specification" id="all">
            <Constraint action="affect" operator="during">
                <Requirement concern="Usability" id="all"/>
            </Constraint>
            <Outcome action="fullfiled"/>
        </Requirement>
        <Requirement concern="Complaint_Specification" id="all">
            <Constraint action="affect" operator="during">
                <Requirement concern="Persistence" id="all"/>
            </Constraint>
            <Outcome action="fullfiled"/>
        </Requirement>
</Composition>
```

Handle Conflits

Usab = **Usability**
Liab = **Liability**
Perf = **Performance**
Sec = **Security**
Stan = **Standards**
Pers = **Persistence**
Q_Inf = **Query_Information**
C_Spec = **Complaint_Specification**

	Usab	Liab	Perf	Sec	Stan	Pers	Q_Inf	C_Spec
Usab	Usab							
Liab		Liab						
Perf	+		Perf					
Sec		-	-	Sec				
Stan	+				Stan			
Pers						Pers		
Q_Inf							Q_Inf	
C_Spec								C_Spec

	Usab	Liab	Perf	Sec	Stan	Pers	Q_Inf	C_Spec
Usab	Usab							
Liab		Liab						
Perf	+		Perf					
Sec		0,5	1,0	Sec				
Stan	+				Stan			
Pers						Pers		
Q_Inf							Q_Inf	
C_Spec								C_Spec

Identify and Specify Concerns

Usability
<Concern name="Usability">
<Requirement id="1">
The system should have an easy to use GUI, because it might be used by any person who has access to the internet.
<Requirement id="1.1">
The system should have an on-line HELP to be consulted by any person that uses it.
</Requirement>
</Requirement>
</Concern>

Liability
<Concern name="Liability">
<Requirement id="1">
The system should be available 24 hours a day, 7 days a week.
</Requirement>
</Concern>

Performance
<Concern name="Performance">
<Requirement id="1">
The system must be capable to handle 20 simultaneous users.
</Requirement>
<Requirement id="2">
The response time must not exceed 5 seconds.
</Requirement>
</Concern>

Security
<Concern name="Security">
<Requirement id="1">
The system should use a security protocol to send data over the internet.
</Requirement>
<Requirement id="2">
To have access to the complaint registration features, the use must be allowed by the access control sub-system.
<Requirement id="2.1">
The employee provides the login and password.
</Requirement>
<Requirement id="2.2">
The system validates the typed password.
</Requirement>
</Requirement>
</Concern>

Standards

```xml
<?xml version="1.0"?>
<Concern name="Standards">
      <Requirement id="1">
             The system must be developed according to the standards established by X ,
             responsible for the norms and standardization of systems for the City Hall.
      </Requirement>
</Concern>
```

Persistence

```xml
<?xml version="1.0"?>
<Concern name="Persistence">
      <Requirement id="1">
             The employee will be able to register in one of the tables.
             <Requirement id="1.1">
                    The system saves the data.
             </Requirement>
      </Requirement>
      <Requirement id="2">
             The employee will be able to update complaint.
             <Requirement id="2.1">
                    The system requests the complaint number.
             </Requirement>
             <Requirement id="2.2">
                    The system shows the complaint code and its type.
             </Requirement>
             <Requirement id="2.3">
                    The system updates the complaint conclusion and the information
about the employee who gave it
             </Requirement>
      </Requirement>
      <Requirement id="3">
             The employee will be able to register a new employees on the system.
             <Requirement id="3.1">
                    in case some of the data have not been provided, show an error
message.
             </Requirement>
             <Requirement id="3.2">
                    The system saves the new employee's data.
             </Requirement>
      </Requirement>
      <Requirement id="4">
             The employee will be able to update employee's data on the system.
             <Requirement id="4.1">
                    in case the name or the current password is missing, an error message
should be showed.
             </Requirement>
```

```xml
        <Requirement id="4.2">
                The system updates the employee's data.
        </Requirement>
</Requirement>
<Requirement id="5">
        The employee will be able to update health's data on the system.
        <Requirement id="5.1">
                The system shows the health unit's data.
        </Requirement>
        <Requirement id="5.2">
                in case some of the information was not provided, an error message
should be shown.
        </Requirement>
        <Requirement id="5.3">
                The system updates the health unit's data.
        </Requirement>
</Requirement>
<Requirement id="6">
        The employee will be able to change a logged employee on the system.
        <Requirement id="6.1">
                The system shows the login screen.
        </Requirement>
        <Requirement id="6.2">
                in case the password or the employee is not valid, an error message
should be shown.
        </Requirement>
</Requirement>
</Concern>
```

Query_Information

```xml
<?xml version="1.0"?>
<Concern name="Query_Information">
        <Requirement id="1">
                The citizen chooses the type of query.
        </Requirement>
        <Requirement id="2">
                The citizen provides the data for the query.
                <Requirement id="2.1">
                        In the case of a query on specialties grouped by health units, the
citizen selects the unit to be queried.
                </Requirement>
                <Requirement id="2.2">
                        In the case of a query on health units grouped by specialties, the
citizen selects the specialty to be queried.
                </Requirement>
                <Requirement id="2.3">
                        In the case of a query on complaints, the citizen provides the
complaint code.
```

```xml
                </Requirement>
                <Requirement id="2.4">
                        In the case of a query on diseases, the citizen selects the disease to be
queried.
                </Requirement>
        </Requirement>
        <Requirement id="3">
                The system shows the query result.
        </Requirement>
</Concern>
```

Complaint_Specification

```xml
<?xml version="1.0"?>
<Concern name="Complaint_Specification">
        <Requirement id="1">
                The citizen informs the kind of complaint.
        </Requirement>
        <Requirement id="2">
                The system registers the kind, date and time of the attendance.
        </Requirement>
        <Requirement id="3">
                The system shows the specific screen for each type of complaint.
        </Requirement>
        <Requirement id="4">
                The citizen provides the data.
        </Requirement>
        <Requirement id="5">
                he system saves the complaint (with the OPENED state), return the code for
the attendance, so that the citizen can take note and query for the situation of his/her
complaint.
        </Requirement>
</Concern>
```

Register_Tables

```xml
<?xml version="1.0"?>
<Concern name="Register_Tables">
        <Requirement id="1">
                The employee will be able to register in one of the tables.
                <Requirement id="1.1">
                        The employee chooses the option to register (insert/update) in one of
the tables.
                </Requirement>
                <Requirement id="1.2">
                        The employee informs the data.
```

```
                </Requirement>
        </Requirement>
</Concern>
```

Update_Complaint

```
<?xml version="1.0"?>
<Concern name="Update_Complaint">
        <Requirement id="1">
                The employee will be able to update complaint.
                <Requirement id="1.1">
                        The employee activates the options update complaint.
                </Requirement>
                <Requirement id="1.2">
                        The employee types the conclusion.
                </Requirement>
        </Requirement>
</Concern>
```

Register_New_Employee

```
<?xml version="1.0"?>
<Concern name="Register_New_Employee">
        <Requirement id="1">
                The employee will be able to register new employees on the system.
                <Requirement id="1.1">
                        The employee provides the following information about the new
employee: Name, Login Password (with special fied for confirmation).
                </Requirement>
                <Requirement id="1.2">
                        The employee confirms the operation.
                </Requirement>
        </Requirement>
</Concern>
```

Update_Employee

```
<?xml version="1.0"?>
<Concern name="Update_Employee">
        <Requirement id="1">
                The employee will be able to update employee's data on the system.
                <Requirement id="1.1">
                        The employee chooses the option update employee.
                </Requirement>
                <Requirement id="1.2">
                        The employee provides his/her data to be updated: Name, New
pasword (with extra field for confirmation), Current password.
                </Requirement>
```

```
                </Requirement>
        </Concern>
```

Update_Health_Unit

```
<?xml version="1.0"?>
<Concern name="Update_Health_Unit">
<Requirement id="1">
                The employee will be able to update health's data on the system.
                <Requirement id="1.1">
                        The employee chooses the option update health unit.
                </Requirement>
                <Requirement id="1.2">
                        The employee provides the health unit data to be updated.
                </Requirement>
                <Requirement id="1.3">
                        The employee changes the necessary data.
                </Requirement>
        </Requirement>
</Concern>
```

Change_Logged_Employee

```
<?xml version="1.0"?>
<Concern name="Change_Logged_Employee">
        <Requirement id="1">
                The employee will be able to change a logged employee on the system.
                <Requirement id="1.1">
                        The employee chooses the option change logged employee.
                </Requirement>
        </Requirement>
</Concern>
```

Identify Coarse-Grained Concern Realtionships

Concerns	Usab	Liab	Perf	Sec	Stan	Pers	Q_Inf	C_Spec
Usab								
Liab								
Perf	✓	✓						
Sec		✓	✓					
Stan								
Pers	✓	✓	✓	✓				
Q_Inf	✓					✓		
C_Spec	✓					✓		

Usab = **Usability**
Liab = **Liability**
Perf = **Performance**
Sec = **Security**
Stan = **Standards**
Pers = **Persistence**
Q_Inf = **Query_Information**
C_Spec = **Complaint_Specification**

	Usab	Liab	Perf	Sec	Stan	Pers	Q_Inf	C_Spec
Usab	**Usab**							
Liab		**Liab**						
Perf	✓	✓	**Perf**					
Sec		✓	✓	**Sec**				
Stan					**Stan**			
Pers	✓		✓	✓		**Pers**		
Q_Inf	✓			✓		✓	**Q_Inf**	
C_Spec	✓			✓		✓		**C_Spec**

Concerns	Persistence	Security
Register_Tables	✓	✓
Update_Complaint	✓	✓
Register_New_Employee	✓	✓
Update_Employee	✓	✓
Update_Health_Unit	✓	✓
Change_Logged_Employee	✓	✓

Specify Concern Dimension

Concern	Influence	Mapping
Usability	Specification, architecture, design, implementation	Function
Liability	achitecture	Decision
Performance	Specification, architecture, design, evolution	Decision
Security	Specification, architecture, design, implementation	Aspect
Standards	Specification, architecture, design, evolution	Decision
Persistence	Specification, architecture, design, implementation	Aspect
Query_Information	Specification, design, evolution	Fuction
Complaint_Specification	Specification, design, evolution	Function