Modelling Exercise

- For the given requirement statement (in natural language) create three **interrelated** representations to capture:
  - **Data** (or static or conceptual) **model** using UML class diagrams
  - **Behavioural model** using UML state diagrams
  - **Functional model** using UML sequence diagrams

- **Requirement** (natural language):
  - If a glass break detector attached to the entrance door detects that the entrance door has been damaged, the system shall enter the alarm state and inform the security company.
GlassBreakDetector detects ()

EntranceDoor status: DoorStatus

SecurityCompany mode: AlarmMode
putAlarm ()

<<Enumeration>>

DoorStatus
UNBROKEN
DAMAGED

<<Enumeration>>

AlarmMode
OFF
ON_DUTY
ALARM
Behavioural model

<table>
<thead>
<tr>
<th>:System</th>
</tr>
</thead>
<tbody>
<tr>
<td>mode: AlarmMode</td>
</tr>
<tr>
<td>putAlarm()</td>
</tr>
<tr>
<td>switchOn()</td>
</tr>
<tr>
<td>switchOff()</td>
</tr>
</tbody>
</table>

- OFF
  - switchOn()
  - ON_DUTY
    - putAlarm() [GlassBreakDetector.detects()]
    - ALARM
  - switchOff()
Behavioural model

:System
mode: AlarmMode
putAlarm()
switchOn()
switchOff()

:EntranceDoor
status: DoorStatus
break()
fix()

OFF

switchOff()

switchOn()

ON_DUTY

putAlarm() [GlassBreakDetector.detects()]

ALARM

UNBROKEN

fix()

break()

DAMAGED
Updated after **Behavioural** analysis

**GlassBreakDetector**
- detects ()
- changesStatus

**EntranceDoor**
- status: DoorStatus
  - break()
  - fix()

**System**
- mode: AlarmMode
  - putAlarm()
  - switchOn()
  - switchOff()

**SecurityCompany**
Functional model

:GlassBreakDetector

:System

:SecurityCompany

:EntranceDoor

[EntranceDoor.status=DAMAGED]
changesStatus()

[mode=ALARM] informs()

[System.mode=ALARM]
manages()

[EntranceDoor.status=UNBROKEN]
manages()

repairs()
Static model:
Updated after **Functional** analysis

GlassBreakDetector
- detects ()
- changesStatus

EntranceDoor
- status: DoorStatus
- break()
- fix()

System
- mode: AlarmMode
- putAlarm()
- switchOn()
- switchOff()

SecurityCompany
- manages

<<Enumeration>>
- DoorStatus
  - UNBROKEN
  - DAMAGED

<<Enumeration>>
- AlarmMode
  - OFF
  - ON_DUTY
  - ALARM