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| **Student Name** | **Student ID** | **Date** |
| Alexander Craig | 100741774 | February 15th, 2011 |
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| **Use Case Name:** | **Run Self-Test** |
| **Brief Description:** | A periodic timer triggers a complete self-test of the system. The system sends test signals to all connected alarms and sensors, and triggers a break-in alert if any alarm/sensor fails to respond with a heartbeat signal (assumes that the alarm/sensor was sabotaged by an intruder, as a false break-in alert is a better outcome than failing to detect a legitimate break-in). |
| **Precondition** | The system is enabled. |
| **Primary Actor** | Timer |
| **Secondary Actors** | Alarm, Sensor, Display |
| **Dependency** | EXTENDED BY USE CASE Notify Break-In |
| **Generalization** |  |

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| **Basic Flow** | | | |
| **Step #** |  | | |
|  | The timer sends a signal to the system to initiate the self-test procedure. | | |
|  | DO | | |
| **Step #** |  | |
|  | The system sends a self-test signal to a connected sensor. | |
|  | The system signals the timer to start a new timeout of predefined length. | |
|  | The sensor performs a self-test routine. | |
|  | The sensor sends a heartbeat signal to the system to indicate test success. | |
|  | The system VALIDATES THAT a heartbeat signal is received from the sensor before the timeout expires. | |
| UNTIL all connected sensors have been tested. | | |
|  | DO | | |
| **Step #** | |  |
|  | | The system sends a self-test signal to a connected alarm. |
|  | | The system signals the timer to start a new timeout of predefined length. |
|  | | The alarm performs a self-test routine. |
|  | | The alarm sends a heartbeat signal to the system to indicate test success. |
|  | | The system VALIDATES THAT a heartbeat signal is received from the alarm before the timeout expires. |
| UNTIL all connected alarms have been tested. | | |
| **Postcondition**: | A heartbeat signal has been received from all connected alarms and sensors.  All connected alarms and sensors have performed a self-test routine. | | |

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| **Specific Alternative Flows**: | | |
| **Reference Flow Step** | **Branching Action** | |
| RFS Basic Flow 2.5 | **Step #** |  |
|  | The system fails to receive a heartbeat from a connected sensor before the self-test timeout expires. |
|  | The system logs the current time and identifying information of the sensor that failed to self-test. |
|  | IF the system is armed THEN EXTENDED BY USE CASE Notify Break-In ELSE the system sends a signal to the display to output details on the sensor which failed to self-test. |
|  | ABORT |
| **Postcondition**: | At least one sensor is faulty or has lost connection to the system. | | |
| RFS Basic Flow 3.5 | **Step #** |  |
|  | The system fails to receive a heartbeat from a connected alarm before the self-test timeout expires. |
|  | The system logs the current time and identifying information of the alarm that failed to self-test. |
|  | IF the system is armed THEN EXTENDED BY USE CASE Notify Break-In ELSE the system sends a signal to the display to output details on the alarm which failed to self-test. |
|  | ABORT |
| **Postcondition**: | At least one alarm is faulty or has lost connection to the system. | | |