Use cases

1. SafeHome bootup/shutdown service

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| Use case Number |  | Feature Number |  | Frequency of Use | Frequently |
| Created date | 5/4/2015 | Author | Seokju Hong | | |
| Updated date | 5/4/2015 | Updated by | Seokju Hong | Revision # | 0 |
| Priority | High | | | | |
| Primary actor | SafeHome system, User | | | | |
| Title | Bootup | | | | |
| Preconditions | SafeHome system is currently down. | | | | |
| Trigger | The user presses power button of the SafeHome system. | | | | |
| Postconditions | SafeHome system is booted up and perform sensor checking. | | | | |
| Main success scenario | 1. The user presses power button of the SafeHome system. 2. The SafeHome system checks voltage of connected power source. 3. If power source has enough voltage, SafeHome boots up. | | | | |
| Exceptions | 2a. The SafeHome system is not connected to the power source with proper voltage   * 2a1. The SafeHome system aborts to boot up, and shut down. | | | | |

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| Use case Number |  | Feature Number |  | Frequency of Use | Frequently |
| Created date | 5/4/2015 | Author | Seokju Hong | | |
| Updated date | 5/4/2015 | Updated by | Seokju Hong | Revision # | 0 |
| Priority | High | | | | |
| Primary actor | SafeHome system, Sensor, User | | | | |
| Title | Sensor check | | | | |
| Preconditions | SafeHome system is just booted up. | | | | |
| Trigger | Triggered automatically right after booting. | | | | |
| Postconditions | SafeHome system checked all sensors, and perform sensor checking. | | | | |
| Main success scenario | 1. The SafeHome system calls sensor checking method. 2. The SafeHome system sends “MEASURE” message to every sensors. 3. Every sensor sends its current value to the SafeHome system. 4. The SafeHome receives sensors’ message and check every value whether it is in proper range(normal state). | | | | |
| Exceptions | 4a. Sensor value is invalid value or sensor does not send any message to the SafeHome system.(timeout)   * 4a1. The SafeHome system sends “MEASURE” message to the sensor. * 4a2. If checking session fail for 3 times, the SafeHome system makes log about the broken sensor. | | | | |
| Use case Number |  | Feature Number |  | Frequency of Use | Frequently |
| Created date | 5/4/2015 | Author | Seokju Hong | | |
| Updated date | 5/4/2015 | Updated by | Seokju Hong | Revision # | 0 |
| Priority | High | | | | |
| Primary actor | SafeHome system, Camera, User | | | | |
| Title | Camera check | | | | |
| Preconditions | SafeHome system just checked every sensor. | | | | |
| Trigger | Triggered automatically right after sensor checking. | | | | |
| Postconditions | SafeHome system checked all cameras and ready to operate every system. | | | | |
| Main success scenario | 1. The SafeHome system calls camera checking method. 2. The SafeHome system sends “HELLO” message to every cameras. 3. Every camera sends “OK” message to the SafeHome system. 4. The SafeHome receives sensors’ message. | | | | |
| Exceptions | 4a. The SafeHome system did not received OK, or the message from a camera corrupted.   * 4b1. The SafeHome system sends “HELLO” message again to the camera. * 4b2. If it fails for 3 times, the red LED of the port where the camera connected blinks and the SafeHome system sends message to user that the camera is broken | | | | |

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| Use case Number |  | Feature Number |  | Frequency of Use | Normal |
| Created date | 5/4/2015 | Author | Seokju Hong | | |
| Updated date | 5/4/2015 | Updated by | Seokju Hong | Revision # | 0 |
| Priority | High | | | | |
| Primary actor | SafeHome system, Camera, Sensor, User | | | | |
| Title | Shutdown | | | | |
| Preconditions | SafeHome system is operating currently. | | | | |
| Trigger | The user presses power button of the SafeHome system for 3 seconds. | | | | |
| Postconditions | SafeHome system is down. | | | | |
| Main success scenario | 1. The user presses power button of the SafeHome system for 3 seconds 2. The SafeHome system sends “QUIT” message to every sensor and camera. 3. Every sensor and camera sends “OK” message to the SafeHome system and shuts down. 4. If the SafeHome system received “OK” message from every cameras and sensors, the SafeHome system shuts down. | | | | |
| Exceptions | 4a. The SafeHome system did not received OK for 10 seconds.   * 4b1. The SafeHome system forces to shut the sensor or the camera down, and shuts down. | | | | |

1. Security service

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| Use case Number |  | Feature Number |  | Frequency of Use | Frequently |
| Created date | 5/5/2015 | Author | Seokju Hong | | |
| Updated date | 5/5/2015 | Updated by | Seokju Hong | Revision # | 0 |
| Priority | High | | | | |
| Primary actor | SafeHome system, Camera, Sensor, User | | | | |
| Title | Arm-system | | | | |
| Preconditions | User logged into the control panel, or logged into the web control panel. | | | | |
| Trigger | Two possible cases:   1. User presses arm-system button on the control panel 2. User presses arm-system button on the web page of the SafeHome system. | | | | |
| Postconditions | Every sensors, cameras are armed. | | | | |
| Main success scenario | 1. The user presses arm-system button on the control panel, or the user presses arm-system button on the web page of the SafeHome system. 2. The SafeHome system checks every sensors and cameras whether it is armed or not. 3. For every sensor/camera that is not armed, call arm function for those disarmed devices. | | | | |
| Exceptions | 3a. Arming a device failed.   * 3a1. Make a log for failed devices that the devices failed to be armed. | | | | |

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| Use case Number |  | Feature Number |  | Frequency of Use | Frequently |
| Created date | 5/5/2015 | Author | Seokju Hong | | |
| Updated date | 5/5/2015 | Updated by | Seokju Hong | Revision # | 0 |
| Priority | High | | | | |
| Primary actor | SafeHome system, Camera, Sensor, User | | | | |
| Title | Arm-device | | | | |
| Preconditions | User logged into the control panel, or logged into the web control panel. | | | | |
| Trigger | Two possible cases:   1. User presses arm-device button on the control panel 2. User presses arm-device button on the web page of the SafeHome system. | | | | |
| Postconditions | Selected sensor/camera is armed. | | | | |
| Main success scenario | 1. User selects devices that he or she wants to make armed. 2. Call arm function for the selected device (sensor or camera). | | | | |
| Exceptions | 2a. Arming a device failed.   * 2b1. Make a log for failed device that the device failed to be armed. | | | | |

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| Use case Number |  | Feature Number |  | Frequency of Use | Frequently |
| Created date | 5/5/2015 | Author | Seokju Hong | | |
| Updated date | 5/5/2015 | Updated by | Seokju Hong | Revision # | 0 |
| Priority | High | | | | |
| Primary actor | SafeHome system, Camera, Sensor, User | | | | |
| Title | Disarm-system | | | | |
| Preconditions | User logged into the control panel, or logged into the web control panel. | | | | |
| Trigger | Two possible cases:   1. User presses disarm-system button on the control panel 2. User presses disarm-system button on the web page of the SafeHome system. | | | | |
| Postconditions | Every sensor, camera is disarmed. | | | | |
| Main success scenario | 1. The user presses disarm-system button on the control panel, or the user presses disarm-system button on the web page of the SafeHome system. 2. The SafeHome system checks every sensors and cameras whether it is armed or not. 3. For every sensor/camera that is armed, call disarm function for those armed devices. | | | | |
| Exceptions | 3a. Disarming a device failed.   * 3a1. The SafeHome system retries to disarm the device. * 3a2. If it fails 3 times, the SafeHome system forces to disarm the device. | | | | |

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| Use case Number |  | Feature Number |  | Frequency of Use | Frequently |
| Created date | 5/5/2015 | Author | Seokju Hong | | |
| Updated date | 5/5/2015 | Updated by | Seokju Hong | Revision # | 0 |
| Priority | High | | | | |
| Primary actor | SafeHome system, Camera, Sensor, User | | | | |
| Title | Disarm-device | | | | |
| Preconditions | User logged into the control panel, or logged into the web control panel. | | | | |
| Trigger | Two possible cases:   1. User presses disarm-device button on the control panel 2. User presses disarm-device button on the web page of the SafeHome system. | | | | |
| Postconditions | Selected sensor/camera is armed. | | | | |
| Main success scenario | 1. User selects devices that he or she wants to make disarmed. 2. Call disarm function for the selected device (sensor or camera). | | | | |
| Exceptions | 2a. Disarming a device failed.   * 2b1. The SafeHome system retries to disarm the device. * 2a2. If it fails 3 times, the SafeHome system forces to disarm the device. | | | | |

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| Use case Number |  | Feature Number |  | Frequency of Use | Rarely |
| Created date | 5/5/2015 | Author | Seokju Hong | | |
| Updated date | 5/5/2015 | Updated by | Seokju Hong | Revision # | 0 |
| Priority | High | | | | |
| Primary actor | SafeHome system, Sensor, User | | | | |
| Title | Alarm-house | | | | |
| Preconditions | The SafeHome system is currently operating.  There is abnormality with toxic, water level, or fire and corresponding sensor is armed.  Alarming house function is armed. | | | | |
| Trigger | Sensor detects abnormality with its measured value. | | | | |
| Postconditions | Alarm rings over the house. | | | | |
| Main success scenario | 1. The sensor detects abnormalities with fire, toxic, water level, … 2. The sensor calls alarmHouse() function and alarm rings. | | | | |
| Exceptions |  | | | | |

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| Use case Number |  | Feature Number |  | Frequency of Use | Rarely |
| Created date | 5/5/2015 | Author | Seokju Hong | | |
| Updated date | 5/5/2015 | Updated by | Seokju Hong | Revision # | 0 |
| Priority | Normal | | | | |
| Primary actor | SafeHome system, Sensor, User | | | | |
| Title | Alarm-user | | | | |
| Preconditions | The SafeHome system is currently operating.  There is abnormality with toxic, water level, or fire and corresponding sensor is armed.  Alarming user function is armed.  User’s contact information is registered to the SafeHome system. | | | | |
| Trigger | Sensor detects abnormality with fire, toxic, water level, … | | | | |
| Postconditions | The user receives SMS message from the SafeHome system. | | | | |
| Main success scenario | 1. The sensor detects abnormalities with fire, toxic, water level, … 2. The sensor calls alarmUser() function. 3. The SafeHome system sends SMS message to the user that there is a problem in the house. | | | | |
| Exceptions |  | | | | |

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| Use case Number |  | Feature Number |  | Frequency of Use | Rarely |
| Created date | 5/5/2015 | Author | Seokju Hong | | |
| Updated date | 5/5/2015 | Updated by | Seokju Hong | Revision # | 0 |
| Priority | High | | | | |
| Primary actor | SafeHome system, Sensor, User, Emergency agent(119) | | | | |
| Title | Alarm-emergency-agent | | | | |
| Preconditions | The SafeHome system is currently operating.  There is abnormality with toxic, water level, or fire and corresponding sensor is armed.  Alarming emergency agent function is armed.  User’s address information is registered to the SafeHome system. | | | | |
| Trigger | Sensor detects abnormality with its measured value. | | | | |
| Postconditions | Emergency agent receives emergent message from the SafeHome system. | | | | |
| Main success scenario | 1. The sensor detects abnormalities with fire, toxic, water level, … 2. The sensor calls alarmEmergencyAgent() function. 3. The SafeHome system sends message to emergency agents(like 119) that there is a problem in the house. | | | | |
| Exceptions |  | | | | |

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| Use case Number |  | Feature Number |  | Frequency of Use | Frequently |
| Created date | 5/5/2015 | Author | Seokju Hong | | |
| Updated date | 5/5/2015 | Updated by | Seokju Hong | Revision # | 0 |
| Priority | High | | | | |
| Primary actor | SafeHome system, User, Lighting equipment, Heater, Air conditioner | | | | |
| Title | Set travel mode | | | | |
| Preconditions | User logged into the control panel, or logged into the web control panel. | | | | |
| Trigger | 1. User presses travel mode change button on the control panel 2. User presses travel mode change button on the web page of the SafeHome system. | | | | |
| Postconditions | Either normal, away, overnight travel, extended travel mode is set.  The SafeHome system turns light, heater, air conditioner on and off at random interval. | | | | |
| Main success scenario | 1. User selects 1 mode over 4 modes(normal, away, overnight travel, extended travel) 2. The SafeHome system randomly generates time interval and schedule working time of lighting equipment, heater, and air conditioner. | | | | |
| Exceptions |  | | | | |

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| Use case Number |  | Feature Number |  | Frequency of Use | Everyday |
| Created date | 5/5/2015 | Author | Seokju Hong | | |
| Updated date | 5/5/2015 | Updated by | Seokju Hong | Revision # | 0 |
| Priority | Normal | | | | |
| Primary actor | Motion detector, SafeHome system, Strange object | | | | |
| Title | Detect motion | | | | |
| Preconditions | The SafeHome is booted up.  Motion detection feature is armed. | | | | |
| Trigger | Motion is detected by motion detector. | | | | |
| Postconditions | Motion detector calls alarmUser() function. | | | | |
| Main success scenario | 1. Strange object moves around the motion detector. 2. Motion detector detects the object. 3. The motion detector calls alarmUser() function to notify user that there’s something strange moving in the house. | | | | |
| Exceptions | 3a. User alarming feature is not armed.   * Abort alarming user. | | | | |

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| Use case Number |  | Feature Number |  | Frequency of Use | Everyday |
| Created date | 5/5/2015 | Author | Seokju Hong | | |
| Updated date | 5/5/2015 | Updated by | Seokju Hong | Revision # | 0 |
| Priority | Normal | | | | |
| Primary actor | Window sensor, SafeHome system, Strange object | | | | |
| Title | Detect window action | | | | |
| Preconditions | The SafeHome is booted up.  Window action detection feature is armed. | | | | |
| Trigger | Any window is opened. | | | | |
| Postconditions | Motion detector calls alarmUser() function. | | | | |
| Main success scenario | 1. Strange object opens window. 2. Window sensor detects that the window is opened.. 3. The window sensor calls alarmUser() function to notify user that the stranger just opened the window.. | | | | |
| Exceptions | 3a. User alarming feature is not armed.   * Abort alarming user. | | | | |

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| Use case Number |  | Feature Number |  | Frequency of Use | Everyday |
| Created date | 5/5/2015 | Author | Seokju Hong | | |
| Updated date | 5/5/2015 | Updated by | Seokju Hong | Revision # | 0 |
| Priority | Normal | | | | |
| Primary actor | CO2 sensor, SafeHome system | | | | |
| Title | Detect high gas concentration | | | | |
| Preconditions | The SafeHome is booted up.  Sensing gas concentration feature is armed. | | | | |
| Trigger | CO2 concentration is higher than threshold value. | | | | |
| Postconditions | CO2 sensor calls alarmHome(), alarmUser() function. | | | | |
| Main success scenario | 1. CO2 gas level increases. 2. CO2 sensor detects that CO2 level is higher than threshold. 3. The CO2 sensor calls alarmHome(), alarmUser() function to notify user and people in the house that current CO2 level is too high. | | | | |
| Exceptions | 3a. User alarming feature is not armed.   * Abort alarming user.   3b. Home alarming feature is not armed.   * Abort alarming home. | | | | |

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| Use case Number |  | Feature Number |  | Frequency of Use | Everyday |
| Created date | 5/5/2015 | Author | Seokju Hong | | |
| Updated date | 5/5/2015 | Updated by | Seokju Hong | Revision # | 0 |
| Priority | Normal | | | | |
| Primary actor | Fire sensor, SafeHome system, Emergency agent | | | | |
| Title | Detect fire | | | | |
| Preconditions | The SafeHome is booted up.  Sensing fire feature is armed. | | | | |
| Trigger | Fire outbreaks over the house. | | | | |
| Postconditions | Fire sensor calls alarmHome(), alarmUser(), alarmEmergencyAgent() function. | | | | |
| Main success scenario | 1. Fire outbreaks over the house. 2. Fire detected by the fire sensor. 3. The fire sensor calls alarmHome(), alarmUser(), alarmEmergencyAgent() function to notify user and people in the house that house is on fire. 4. Emergency agent receives emergency message from the SafeHome system. 5. Emergency agents come to the house and tries to extinguish. | | | | |
| Exceptions | 3a. User alarming feature is not armed.   * Abort alarming user.   3b. Home alarming feature is not armed.   * Abort alarming home. | | | | |

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| Use case Number |  | Feature Number |  | Frequency of Use | Everyday |
| Created date | 5/5/2015 | Author | Seokju Hong | | |
| Updated date | 5/5/2015 | Updated by | Seokju Hong | Revision # | 0 |
| Priority | Low | | | | |
| Primary actor | Doggy angst sensor, SafeHome system | | | | |
| Title | Detect dog barking | | | | |
| Preconditions | The SafeHome is booted up.  Dog barking detection feature is armed. | | | | |
| Trigger | Dog barks loudly | | | | |
| Postconditions | Doggy angst sensor calls alarmUser() function. | | | | |
| Main success scenario | 1. Dog barks loudly. 2. Doggy angst sensor detects dog barks loudly. 3. Doggy angst sensor calls alarmUser() function, and the user get SMS message from the SafeHome system. | | | | |
| Exceptions | 3a. User alarming feature is not armed.   * Abort alarming user. | | | | |

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| Use case Number |  | Feature Number |  | Frequency of Use | Normal |
| Created date | 5/6/2015 | Author | Seokju Hong | | |
| Updated date | 5/6/2015 | Updated by | Seokju Hong | Revision # | 0 |
| Priority | High | | | | |
| Primary actor | SafeHome system, Camera, User | | | | |
| Title | Camera view | | | | |
| Preconditions | User has logged into the SafeHome control panel. | | | | |
| Trigger | User clicks “View CCTV camera” button on the SafeHome control panel. | | | | |
| Postconditions | User can see what camera captures real-time. | | | | |
| Main success scenario | 1. User clicks “View CCTV camera” button on the SafeHome control panel. 2. User selects available CCTV. 3. User can monitor his/her room with CCTV scenes. | | | | |
| Exceptions |  | | | | |

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| Use case Number |  | Feature Number |  | Frequency of Use | Normal |
| Created date | 5/6/2015 | Author | Seokju Hong | | |
| Updated date | 5/6/2015 | Updated by | Seokju Hong | Revision # | 0 |
| Priority | High | | | | |
| Primary actor | SafeHome system, Camera, User | | | | |
| Title | Camera overview | | | | |
| Preconditions | User has logged into the SafeHome control panel. | | | | |
| Trigger | User clicks “Overview CCTV camera” button on the SafeHome control panel. | | | | |
| Postconditions | User can see what camera captures real-time. | | | | |
| Main success scenario | 1. User clicks “Overview CCTV camera” button on the SafeHome system. 2. User can monitor his/her entire room by watching thumbnail view of every camera. | | | | |
| Exceptions |  | | | | |

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| Use case Number |  | Feature Number |  | Frequency of Use | Normal |
| Created date | 5/6/2015 | Author | Seokju Hong | | |
| Updated date | 5/6/2015 | Updated by | Seokju Hong | Revision # | 0 |
| Priority | High | | | | |
| Primary actor | SafeHome system, Camera | | | | |
| Title | Camera record | | | | |
| Preconditions | User has logged into the SafeHome control panel.  Camera is armed and passed checking session. | | | | |
| Trigger | Invoked automatically as soon as checking session is finished. | | | | |
| Postconditions | The data that camera captures is saved into the HDD of the SafeHome system. | | | | |
| Main success scenario | 1. The SafeHome finishes checking session and for every camera c, call c.record() method. 2. Every camera starts to record. | | | | |
| Exceptions | 2a. HDD space is not enough.   * 2a1. Every camera stops recording. * 2a2. Camera calls alarmUser() to notify that HDD must be swapped. | | | | |

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| Use case Number |  | Feature Number |  | Frequency of Use | Normal |
| Created date | 5/6/2015 | Author | Seokju Hong | | |
| Updated date | 5/6/2015 | Updated by | Seokju Hong | Revision # | 0 |
| Priority | Medium | | | | |
| Primary actor | SafeHome system, User | | | | |
| Title | Retrieve CCTV data | | | | |
| Preconditions | CCTV surveillance system is activated.  User logged into the SafeHome control panel. | | | | |
| Trigger | The user presses “retrieve camera data” button. | | | | |
| Postconditions | The user saves a part of camera data into his/her external memory. | | | | |
| Main success scenario | 1. User pushes “retrieve” button on the SafeHome control panel. 2. User connects USB memory to the SafeHome control panel. 3. The SafeHome asks user what camera data user will retrieve. 4. User inputs camera number and date/time range. 5. The SafeHome box copies CCTV data recorded in the input range. | | | | |
| Exceptions | 5a. Camera ID is not applicable   * 5a1. Print error message “Camera ID is not applicable.” and go back to step 5.   5b. Date/time range is not available   * 5b1. Print error message “Datetime range is not available.” and go back to step 5.   6a. Available space in the USB memory is not enough   * 6a1. Print error message “Not enough spaces in the memory” and go back to step 5. | | | | |